

Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit gives approval for the development/ project listed that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible and must remain posted during entirety of development.

Permit: #21-596

Date Approved: July 5, 2021

Expires: July 5, 2022

Issued to: Sherwood Midstream, LLC

POC: Richard Lowry

Company Address: 320 South View Drive, Suite 200 Bridgeport, WV 26330

Project Address: 253 Armstrong Avenue West Union, WV 26456

Firm: 54017C0140C

Lat/Long: 39.28185833N, -80.72873056W

Purpose of Development: Permit Renewal (#17-485)

Issued by: George C. Eidel, CFM, OEM Director/Doddridge County FPM (or designee)

Date: July 5, 2021

For additional information regarding this permit, please contact
Doddridge County Floodplain Manager at 304.873.2631, or via email at
doddridgecountyfpm@gmail.com
118 East Court Street; West Union, WV 26456

COPY

COPY

COPY

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
333 BALDWIN ROAD
PITTSBURGH, PA 15205
(412) 429-2324

PNC BANK, N.A.
Pittsburgh, PA



8-9/430

CHECK DATE 6/3/2021

COPY

COPY

COPY

PAY Five Hundred Sixty and 00/100 Dollars

AMOUNT 560.00

TO Doddridge County Commission
105 Court Street
Suite #3
West Union, WV 26456


AUTHORIZED SIGNATURE

Security features. Details on back.

⑈ 71717⑈ ⑆043000096⑆ 0002272405⑈

FP# 21-596

COPY

FLOODPLAIN PERMIT #21-596

Smithburg Processing Plant, Sherwood Midstream, 253 Armstrong Ave, 39.28185833, -80.72873056

TASK	COMPLETE (DATE)	NOTES
<i>CHECK RECEIVED</i>	6/7/2021	
<i>US ARMY CORP. ENGINEERS (USACE)</i>		
<i>US FISH & WILDLIFE SERVICES (USFWS)</i>		
<i>WV DEPT. NATURAL RESOURCES (WVDNR)</i>		
<i>WV DEPT. ENVIROMENTAL PROTECTION (WVDEP)</i>		
<i>STATE HISTORIC & PRESERVATION OFFICE (SHPO)</i>		
<i>OFFICE of LAND & STREAM (OLS)</i>		
<i>WVDOH</i>		
<i>Elevation Certificate</i>		
<i>DATE OF COMMISSION READING</i>	6/15/2021	
<i>DATE AVAILABLE TO BE GRANTED</i>	7/5/2021	
<i>PERMIT GRANTED</i>		
<i>COMPLETE</i>		



Doddridge County Floodplain Permits

(Week of June 14, 2021)

Please take notice that on the (7th) of (June), 2021, (Sherwood Midstream LLC) filed an application for a Floodplain Permit (#21-596) to develop land located at or about (253 Armstrong Ave. West Union);
Coordinates: 39.28185833, -80.72873056. The Application is on file with the Floodplain Manager of the County and may be inspected or copied during regular business hours in accordance to WV Code Chapter 29B Freedom of Information, Article 1 Public Records and county policy and procedures. Any interested persons who desire to comment shall present the same in writing by (July 5, 2021) (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Floodplain Manager of the County at 105 Court Street, Suite #3, West Union, WV 26456. This project is for the renewal of permit #20-570 Smithburg Processing Plant

A handwritten signature in black ink, appearing to read "George C. Eidel".

GEORGE C. EIDEL, CFM

Doddridge County Floodplain Manager



Civil & Environmental Consultants, Inc.

333 Baldwin Road
Pittsburgh, PA 15205

Phone: (412) 429-2324 · Toll Free: (800) 365-2324

Fax: (412) 429-2114

Letter of Transmittal

Date: 6/4/2021

Job No.: 130-359

Attention: George Eidel

To:

Doddridge County Commission
105 Court Street, Suite #3
West Union, WV 26456

RE:

Smithburg Natural Gas Processing Facility - Floodplain
Permit Extension

We are sending you attached via *FedEx Standard* the following items:

- Shop drawings
 Prints
 Plans
 Samples
 Specifications
 Copy of letter
 Change order
 Floodplain Permit Extension Package

Copies	Date	No.	Description
2	06/04/2021		"No-Rise" Letter
2	05/11/2020		Current Floodplain Development Permit
2	06/04/2021		Floodplain Development Permit Application
2	07/15/2013		Deed
2	09/08/2017		Tax Parcel Map
2	09/08/2017		Floodplain Site Plan
2	05/01/2020		Hydrologic and Hydraulic Analysis of Middle Island Creek, Meathouse Fork, and Buckeye Creek - Smithburg Natural Gas Processing Facility
2	05/01/2020		Smithburg Natural Gas Processing Facility Water Line and Booster Plans
2	05/01/2020		Water Booster Pump Station Quotation
1	06/03/2021		Application Fee

- For approval
 Approved as submitted
 Resubmit _ copies for approval
 For your use
 Approved as noted
 Submit _ copies for distribution
 As requested
 Returned for corrections
 Return _ prints
 For review and comment
 _
 For bids due
 Prints returned after loan to us

Remarks: Attached is the floodplain permit extension package and application fee for the Smithburg Natural Gas Processing Facility. Feel free to call me at 412-429-2324 if you have any questions.

Thank you,

Copy to: -

Signed:

Brian R. Tomiczek



June 4, 2021

Mr. George Eidel
Doddridge County Floodplain Manager
105 Court Street, Suite 3
West Union, WV 26456

Dear Mr. Eidel:

Subject: Commercial/Industrial Floodplain Development Permit Renewal #20-570
Smithburg Processing Facility, Doddridge County, West Virginia
CEC Project 130-359

On behalf of Sherwood Midstream, LLC (Sherwood), Civil & Environmental Consultants, Inc. (CEC) is submitting this "No-Rise" letter to extend the Commercial/Industrial Floodplain Development Permit (#20-570) for the Smithburg Natural Gas Processing Facility located in Doddridge County, West Virginia. The facility processes natural gas and provides support for the local shale industry. The ongoing development involves the installation of a below grade 4" HDPE waterline and potable water booster pump station with appurtenances. The current permit expired on May 11, 2021. CEC understands that this letter along with the respective Floodplain Permit Application and Application Fee are required in order to extend the permit for one (1) additional year upon approval. On behalf of Sherwood, CEC is submitting the following enclosed additional supporting documents for the Doddridge County Floodplain Development Permit Application:

- Floodplain Development Permit Fee for \$560.00
- Current Floodplain Development Permit
- Floodplain Development Permit Extension Application
- Hydrologic and Hydraulic Analysis of Middle Island Creek, Meathouse Fork, and Buckeye Creek – Smithburg Natural Gas Processing Facility
- Smithburg Natural Gas Processing Facility Water Line and Booster Plans
- Water Booster Pump Station Quotation

The Smithburg Processing Facility project is located within the Middle Ohio North Watershed, a tributary of the Ohio River. The Smithburg Processing Facility and associated access roads will enter and/or cross the following FEMA Special Flood Hazard Areas:

1. Zone AE of Meathouse Fork located on FEMA FIRM panel number 54017C0140C.
2. Zone AE of Buckeye Run located on FEMA FIRM panel number 54017C0140C.

Please note that the staging, laydown, and construction parking pad and access road have already been constructed, in general accordance with the previous floodplain permit. The proposed water booster station is to be located on the previously permitted construction parking pad, between Cross Sections BB and O of the attached Post-Development 100-Year Floodplain Map, SP02. The

Mr. George Eidel
CEC Project Number 130-359
Page 2
June 4, 2021

proposed booster station and below grade water line installation and connections are not anticipated to increase base flood elevations of Meathouse Fork based on the relatively small footprint (49 sq. ft.) of the booster station (See plans). As such, the proposed water booster station and below grade water line will not impact the base flood elevations, regulatory floodway elevations, or regulatory floodway widths of the study area.

Please find the proposed water booster station price quotation attached. This quotation was used to determine the floodplain permit extension fee.

Based upon the attached quotation of \$54,911 and estimated \$25,000 for installation, the work to be conducted (\$79,911.00) within the floodplain was calculated to be less than \$100,000.00. As per the following section of the fee schedule, a \$560.00 fee is being submitted with this application.

Commercial Development

(the total costs of which exceed \$50,000.00 plus \$2.00 per \$1,000.00 to cover costs over \$50,000.00) - **\$500.00**

Please contact us at 412-429-2324 if you have any questions or require any additional information.

Very truly yours,

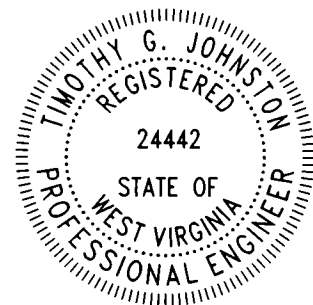
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.



Timothy G. Johnston, P.E.
Project Manager



Richard P. Celender, RLA, C.E.T., CPESC, CPSWQ
Vice President



Enclosures

130-359-NRL Floodplain Permit-6.4.21



Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit gives approval for the development/ project listed that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible and must remain posted during entirety of development.

Permit: #20-570

Date Approved: May 11, 2020 **Expires: May 11, 2021**

Issued to: Sherwood Midstream, LLC **POC: Richard Lowry**

Company Address: 320 South View Drive, Suite 200 Bridgeport, WV 26330

Project Address: 253 Armstrong Avenue West Union, WV 26456

Firm: 54017C0140C **Lat/Long: 39.28185833N, -80.72873056W**

Purpose of Development: Renewal Permit #17-485

Issued by: George C. Eidel, CFM, OEM Director/Doddridge County FPM (or designee)

Date: May 11, 2020

For additional information regarding this permit, please contact
Doddridge County Floodplain Manager at 304.873.2631, or via email at
doddridgecountyfpm@gmail.com
118 East Court Street; West Union, WV 26456



Permit# 21-596

Project Name: Smithburg Processing Facility

Permittees Name: Sherwood Midstream LLC

Doddridge County, WV

Floodplain Development Permit Application

This document is to be used for projects that impact/potentially impact the FEMA—designated floodplain and/or floodway of Doddridge County, WV pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance.

SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

1. No work may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. The permit will expire if no work is commenced within six months of issuance.
5. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
6. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
7. I THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE _____

DATE 6/4/21

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: Sherwood Midstream LLC		
Corporate Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	State: PA	Zip: 15317
Corporate Point of Contact (POC): Richard Lowry		
Corporate POC Title: Adv. HES Professional		
Corporate POC Primary Phone: (724) -416-0520		
Corporate POC Primary Email: RALowry@marathonpetroleum.com		
Corporate FEIN: 30-0528059	Corporate DUNS:	
Corporate Website:		
Local Mailing Address: 320 South View Drive, Suite 200		
City: Bridgeport	State: WV	Zip: 26330
Local Project Manager (PM):		
Local PM Primary Phone:		
Local PM Secondary Phone:		
Local PM Primary Email:		
Person Filing Application: Richard Lowry		
Applicant Title: Adv. HES Professional		
Applicant Primary Phone: (724) -416-0520		
Applicant Secondary Phone: (412) 925-8165		
Applicant Primary Email: RALowry@marathonpetroleum.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

<u>ACTIVITY</u>	<u>STRUCTURAL TYPE</u>
<input type="checkbox"/> New Structure	<input type="checkbox"/> Residential (1 – 4 Family)
<input type="checkbox"/> Addition	<input type="checkbox"/> Residential (more than 4 Family)
<input type="checkbox"/> Alteration	<input type="checkbox"/> Non-residential (floodproofing)
<input type="checkbox"/> Relocation	<input type="checkbox"/> Combined Use (res. & com.)
<input type="checkbox"/> Demolition	<input type="checkbox"/> Replacement
<input type="checkbox"/> Manufactured/Mobil Home	

B. OTHER DEVELOPMENT ACTIVITIES:

- | | | | |
|---|---------------------------------|-----------------------------------|-------------------------------------|
| <input type="checkbox"/> Fill | <input type="checkbox"/> Mining | <input type="checkbox"/> Drilling | <input type="checkbox"/> Pipelining |
| <input type="checkbox"/> Grading | | | |
| <input type="checkbox"/> Excavation (except for STRUCTURAL DEVELOPMENT checked above) | | | |
| <input type="checkbox"/> Watercourse Alteration (including dredging and channel modification) | | | |
| <input type="checkbox"/> Drainage Improvements (including culvert work) | | | |
| <input type="checkbox"/> Road, Street, or Bridge Construction | | | |
| <input type="checkbox"/> Subdivision (including new expansion) | | | |
| <input type="checkbox"/> Individual Water or Sewer System | | | |
| <input checked="" type="checkbox"/> Other (please specify) | | | |

Construction of 4" diameter HDPE water line and potable water booster pump station

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 1 of 2

Site/Property Information:		
Legal Description: See deed dated July 15, 2013.		
Physical Address/911 Address:		
Decimal Latitude/Longitude: N 39.28185833" / E -80.72873056"		
DMS Latitude/Longitude: N 39° 16' 54.69" / E -80° 43' 43.43"		
District: West Union	Map: 16	Parcel: 15
Land Book Description:		
Deed Book Reference: D.B.V. 310, PG. 243		
Tax Map Reference: Tax Map 16		
Existing Buildings/Use of Property: Existing meadow, woodland, streams, and wetlands.		

Floodplain Location Data: (to be completed by Floodplain Manager or designee)			
Community:	Number:	Panel:	Suffix:
Location (Lat/Long):		Approximate Elevation:	
		Estimated BFE:	
Is the development in the floodway? <input type="checkbox"/> Yes <input type="checkbox"/> No		Is the development in the floodplain? <input type="checkbox"/> Yes <input type="checkbox"/> No Zone: _____	
Notes:			

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 2 of 2

Site/Property Information:		
Legal Description: See deed dated July 15, 2013.		
Physical Address/911 Address:		
Decimal Latitude/Longitude: N 39.27828333" / E -80.72640278"		
DMS Latitude/Longitude: N 39° 16' 40.99" / E -80° 43' 35.19"		
District: West Union	Map: 16	Parcel: 15.2
Land Book Description:		
Deed Book Reference: D.B.V. 310, PG. 243		
Tax Map Reference: Tax Map 16		
Existing Buildings/Use of Property: Existing meadow, woodland, streams, and wetlands.		

Floodplain Location Data: (to be completed by Floodplain Manager or designee)			
Community:	Number:	Panel:	Suffix:
Location (Lat/Long):		Approximate Elevation:	
		Estimated BFE:	
Is the development in the floodway?		Is the development in the floodplain?	
<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No Zone: _____	
Notes:			

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

Please provide data on current site/property landowner(s), both surface and mineral rights (as applicable). Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 1 of 2

Property Owner Data:		
Name of Primary Owner (PO): MarkWest Liberty Midstream & Resources, LLC		
PO Address: 1515 Arapahoe St. Tower 1 Ste.		
City: Denver	State: CO	Zip: 80202
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO): MarkWest Liberty Midstream & Resources, LLC		
PO Address: 1515 Arapahoe St. Tower 1 Ste.		
City: Denver	State: CO	Zip: 80202
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Mineral Rights Owner Data: (As Applicable)		
Name of Primary Owner (PO): N/A		
PO Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

Please provide data on current site/property landowner(s), both surface and mineral rights (as applicable). Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 2 of 2

Property Owner Data:		
Name of Primary Owner (PO): MarkWest Liberty Midstream & Resources, LLC		
PO Address: 1515 Arapahoe St. Tower 1 Ste.		
City: Denver	State: CO	Zip: 80202
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO): MarkWest Liberty Midstream & Resources, LLC		
PO Address: 1515 Arapahoe St. Tower 1 Ste.		
City: Denver	State: CO	Zip: 80202
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Mineral Rights Owner Data: (As Applicable)		
Name of Primary Owner (PO): N/A		
PO Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

Please provide all pertinent data for contractors and sub---contractors that may be participating in this project. Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 1 of 1

Contractor/Sub-Contractor (C/SC) Information:		
C/SC Company Name: TBD		
C/SC WV License Number:		
C/SC FEIN:	C/SC DUNS:	
Local C/SC Point of Contact (POC):		
Local C/SC POC Title:		
C/SC Mailing Address:		
City:	State:	Zip-Code:
Local C/SC Office Phone:		
Local C/SC POC Phone:		
Local C/SC POC E-Mail:		

Engineer Firm Information:		
Engineer Firm Name: Civil & Environmental Consultants, Inc.		
Engineer WV License Number: 22978		
Engineer Firm FEIN: 25-1599565	Engineer Firm DUNS: 36-160-9878	
Engineer Firm Primary Point of Contact (POC): Timothy G. Johnston		
Engineer Firm Primary POC Title: Project Manager		
Engineer Firm Mailing Address: 333 Baldwin Road		
City: Pittsburgh	State: PA	Zip-Code: 15205
Engineer Firm Office Phone: (412) 429-2324		
Engineer Firm Primary POC Phone: (724) 875-6718		
Engineer Firm Primary POC E-Mail: tjohnston@ceecine.com		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Elwood P. and Elizabeth Rill		
Physical Address: 4619 Glenville Road		
City: Glen Rock	State: PA	Zip: 17327
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Frederick Gregory, Charles A. and Michelle E. Dotson		
Physical Address: 5814 Church Drive		
City: Charleston	State: WV	Zip: 25306
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Thomas E. and Anna S. Doak		
Physical Address: 213 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): James Matthew & Barbara McKinney		
Physical Address: 155 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Clinton and Nancy J. Means		
Physical Address: 143 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Darlene K. McKinney		
Physical Address: 140 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Doddridge County COOP Marketing C/O James Foster		
Physical Address: RT 1 Box 105		
City: New Milton	State: WV	Zip: 26411
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Marie E. Gassaway		
Physical Address: 618 Fairview Avenue		
City: Lebanon	State: TN	Zip: 37087
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Warren E. and Judy E. Bee		
Physical Address: 3076 Big Isaac Road		
City: Salem	State: WV	Zip: 26426
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Frederick Gregory, Charles A. and Michelle E. Dotson		
Physical Address: 5814 Church Drive		
City: Charleston	State: WV	Zip: 25306
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Thomas E. and Anna S. Doak		
Physical Address: 213 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): James Matthew & Barbara McKinney		
Physical Address: 155 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Doddridge County Senior Citizens Inc.		
Physical Address: PO Box 432		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): DSCS Company LLC		
Physical Address: PO Box 432		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Doddridge County Senior Citizens Inc.		
Physical Address: 118 E Court St.		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Edith Ann Bibbs Richards		
Physical Address: 5800 Laurent Dr. Apt. 524		
City: Parma	State: OH	Zip: 44129
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Craig D. and Cassandra D. Ewing C/O Sandy Ewing		
Physical Address: 45 Holly Street		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Virginia L. Nicholson		
Physical Address: 155 Armstrong Avenue		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): Lawrence Gaskins		
Physical Address: 3582 Smithton Road		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): Town of West Union		
Physical Address:		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): WV Railroad Maintenance		
Physical Address:		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): Spencer Enterprises, LLC		
Physical Address: PO Box 143		
City: Smithburg	State: WV	Zip: 23436
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO):		
Physical Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO):		
Physical Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

A Site Plan is an accurate and detailed map of the proposed development for this project. It shows the size, shape, location and special features of the project property, and the size and location of any development planned to the property, especially as that development will impact the floodplain and/or floodway. Site plans show what currently exists on the project property, and any changes or improvements you are proposing to make. **A certified and licensed engineering firm should complete site plans.**

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

1. Legal description of the parcel, north arrow and scale
2. All property lines and their dimensions
3. Names of adjacent roads, location of driveways
4. Location of sloughs, tributaries, streams, rivers, wetlands, ponds, and lakes, with setbacks indicated, and including FEMA floodplain data based on most updated FIRM.
5. Location, size, shape of all buildings, existing and proposed, with elevation of lowest floor indicated.
6. Location and dimensions of existing or proposed on-site sewage systems.
7. Location of all propane tanks, fuel tanks or other liquid storage tanks whether above ground or below ground level.
8. Location and dimensions of any proposed pipeline placement(s) into floodplain/floodway.
9. Location and dimensions of any roadway development into floodplain/floodway. *(Includes initial development access roads)*
10. Location and dimensions of any bridge and/or culvert development into floodplain/floodway.
11. Location and dimensions of any storage yard or facility into the floodplain/floodway.
12. Location of any existing utilities and/or proposed utility placement and/or displacement.
13. Location, dimensions and depth of any existing or proposed fill on site.
14. A survey showing the **existing ground elevations** of at least location on the building site. **ELEVATION NOTE:** All vertical datum will reference either NGVD 29 or NAVD 88. Assumed datum will not be acceptable unless the property is located in an area where vertical datum has not been published. For those areas where vertical datum has not been established, a site plan with contours, elevations using assumed datum, high water marks and existing water levels of sloughs, rivers, lakes or streams and proposed lowest floor elevation.

Applicant

Please read print name, sign and date below:

- I certify that I am authorized to submit this application for the primary project developer.
- I certify that the information included in this application is to the best of my knowledge true and complete.
- I certify that all required Federal, State, and local permits required by law and/or ordinance for the above described development of this project have will be properly attained, are current and valid, and must be presented prior to a Doddridge County Floodplain Permit being issued.
- I understand that if in the course of the development project additional permits become required that were not needed during the initial proposal, the primary developer must notify the Doddridge County Floodplain Manager within 48 hours of such need, and that a "Stop Work" order may be issued for all project work directly impacting the floodplain or floodway, until such time the required additional permits are acquired.
- I understand that once the floodplain permit is submitted, the application will be entered into official public record at the next regularly scheduled Doddridge County Commission meeting after the date of submittal.
- I understand that from the date of submittal of the fully completed permit application, the Doddridge County Floodplain Manager has ninety (90) days to make a determination to either grant or deny said permit application. During this approval period, the Doddridge County Floodplain Manager may, at his or her discretion, conduct a review and/or additional study of provided documentation by means of an independent engineering firm. All costs associated with said review and/or study must be reimbursed to the County before issuance of approved permit.
- I understand that during the approval period, the Doddridge County Floodplain Manager of designee may at his or her discretion conduct site visits and document conditions of proposed development pursuant to the permit application.
- I understand that once the Floodplain Permit is granted, the permit will be entered into official public record. Appeals to the permit may be made no later than twenty (20) days after said issuance. If a valid appeal is submitted, as determined by the Doddridge County Floodplain Manager, a "Stop Work" order will be issued for all project development directly involving the floodplain or floodway. A public hearing by the Doddridge County Appeals Board will be scheduled no less than ten (10) days after the next regularly scheduled Doddridge County Commission meeting.
- I understand that all decisions of the Doddridge County Appeals Board shall be final.
- I understand issuance of a Floodplain Permit authorizes me to proceed with construction as proposed.
- In signing this application, the primary developer hereby grants the Doddridge County Floodplain Manager or designee the right to enter onto the above—described location to inspect the development work proposed, in progress, and/or completed.
- I understand that if I do not follow exactly the site—plan submitted and approved by this permit that a "Stop Work" order may be issued by the Doddridge County Floodplain Manager and that I must stop all construction immediately until discrepancies of actual work vs. proposed work is resolved.

Applicant Signature: _____

Date: 6/4/21

Applicant Printed Name: _____

Rick Lowry

This Indenture, made the 15th day of July, 2013,

BETWEEN GENE P. MOOSE and LINDA G. MOOSE, husband and wife, of 680 Barlow-Greenmount Road, Gettysburg, Pa. 17325 parties of the first part, GRANTORS,

- A N D -

MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C., a Delaware limited liability company, of 1515 Arapahoe Street, Tower 1, Suite 600, Denver, Colorado, 80202, party of the second part, GRANTEE.

WITNESSETH, that in consideration of One Million Seven Hundred Thousand and no/100 Dollars (\$1,700,000.00) in hand paid, the receipt whereof is hereby acknowledged, the said grantors do hereby grant and convey to the said grantee,

ALL THE THREE (3) TRACTS OF LAND SITUATE ON THE WATERS OF BUCKEYE FORK AND MEATHOUSE FORK, NEAR THE JUNCTION OF THE HEADWATERS OF MIDDLE ISLAND CREEK, WEST UNION MAGISTERIAL DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA, AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

TRACT NO. 1:

BEGINNING at a maple stump on the bank of said Buckeye fork at the mouth of Coon Run, and running thence with eleven lines of the Susan H. Jones portion of the Thomas A. Jones lands, as conveyed to her in the year 1894, South 87 degrees East, 25 poles to a red oak; North 71 degrees East (erroneously referred to as 712 degrees East in prior deed) 11 poles to a red oak; North 47 ½ degrees East, 18 poles to a beech; North 31 degrees East, 8 poles to a stake; North 3 degrees West, 9 poles to a willow of the Baltimore and Ohio Railroad Company's right of way; thence with a line thereof North 81 degrees East, 15 poles to a stake; South 14 degrees East, 3 ¾ poles to a stone; South 2 ½ degrees East, 24.5 poles to a chestnut; South 26 degrees West, 8 poles to a stone; south 2 degrees West, 20.9 poles to a beech; South 5 ¾ degrees East, 29 ¾ poles to a stone in place of a white oak, corner to an original survey; thence with lines of land conveyed to W. e. Jones by Norma McGowman and husband in the year 1912, South 5 degrees East, 3 ½ poles to a maple; South 79 7/8 degrees East, 24 ½ poles to a stone; North 62 degrees East, 9 ¾ poles to a white oak; South 66 ¼ degrees East, 35.5 poles to a locust, South 70 ½ degrees East, 11.5 poles to a sugar; South 81 ½ degrees East, 16.1 poles to a locust; South 88 ¾ degrees East, 17.4 poles to a chestnut oak; North 69 ½ degrees East, 7.4 poles to a white oak; South 32 degrees East, 45 ¼ poles to a stone; south 84 ½ degrees West, 140 poles to a stone and locust; thence with five lines of the Belle Holt portion of the said Thomas A. Jones lands; South 28 degrees East, 26 ¼ poles to a stone; South 60 degrees West, 37 poles to a stone; south 88 ¼

degrees West, 25 poles to a stone; south 60 degrees West, 15 poles to a stone; south 77 ½ degrees West, 10 ¾ poles to a double chestnut oak; South 85 degrees West, 2 ¼ poles to a stake; thence with lines as surveyed in July, 1947, (in reverse) North 23 ½ degrees West, 35 poles to a leaning locust; North 20 ½ degrees West, 15.5 poles to a locust (dead); North 9 ½ degrees West, 19.6 poles to a stake; North 44 ½ degrees East, 12.36 poles to a stake; North 39 ½ degrees East, 12.2 poles to a stake; North 15 degrees West, 10.6 poles to a wild cherry; North 10 degrees East, 81 poles to an elm; North 34 degrees West, 2.8 poles to the place of BEGINNING. CONTAINING 124.4 Acres, more or less.

TRACT NO. 2:

BEGINNING at a stone corner to land of William Trainer and with three of his lines South 27 degrees West, 53 poles to a stone at place of 24 hickories; South 85 degrees West, 12 ¼ poles to a stone; North 83 degrees West, 11 ¼ poles to a stone, corner to land of John L. Davisson, and with three lines of same, North 82 ¼ degrees West, 29 poles to a stone in low gap; North 76 ¾ degrees West, 35 ¾ poles to a hickory stump; South 60 degrees West, 4 ½ poles to a stone corner to Lot No. 2 of the partition of the Jones Farm and with a line of said Lot No. 2, North 28 degrees West, 26 ½ poles to a stone and locust bush in line of land of John Fitzwilliams and with same North 83 ½ degrees East, 128 poles to the BEGINNING. CONTAINING 24 ½ Acres, more or less.

TRACT NO. 3:

BEGINNING at a maple stump; thence South 34 degrees East, 2.8 poles to an elm; thence south 10 degrees West, 81 poles to a wild cherry; thence south 15 degrees East, 10.6 poles to a stake; thence south 39 ½ degrees West, 12.2 poles to a stake; thence South 44 ½ degrees West, 12.36 poles to a stake; thence South 9 ½ degrees East, 19.6 poles to a dead locust; thence south 20 ½ degrees East, 15.5 poles to a leaning locust; thence South 23 ½ degrees East, 35 poles to a stake; thence south 85 degrees West, 48 ¼ poles to a stone in road; thence North 10 degrees West, 9 poles to a point in said road; thence North 10 degrees West, 5 poles to a point in road; thence North 10 degrees West, 5 poles to a point in road; thence North 30 degrees West, 12 poles to a point in road; thence North 41 degrees West, 16 ¼ poles to a point in road; thence North 51 degrees West, 16.5 poles to a point in road; thence leaving the road, North 43 degrees East, 33 poles to a stone; thence North 42 ½ degrees West, 14 poles to a locust; thence North 18 degrees West, 23 poles to a stone; thence North 51 ½ degrees West, 105 poles to a stone; thence North 17 ½ degrees East, 11.5 poles to a stone; thence North 56 degrees East, 3 poles to a point at Meathouse Fork; thence with the meanders of said Meathouse Fork, in an easterly direction 97.5 poles to a stone; thence North 75 degrees East, 10 poles to a stone; thence North 50 degrees East, 6 poles to a stone; thence North 73 degrees East, 8.5 poles to a stone; thence south 59 degrees East, 20 poles; thence south 47 degrees East, 26 ¼ poles to the place of BEGINNING. CONTAINING 99.6 Acres, more or less.

THERE IS EXCEPTED AND RESERVED FROM THE LAST ABOVE DESCRIBED PARCEL OF LAND A TRACT OF LAND CONTAINING 8 ACRES AND DESCRIBED AS FOLLOWS:

BEGINNING in an outside line of the M. M. Jones dower tract at a stone and running thence North 51 ½ degrees West, 102.5 poles to the center of the creek; thence North 18 ½

degrees East, 11 ½ poles to a stake; thence North 56 degrees East, 3 poles to a stone; thence South 50 ½ degrees East, 91 poles to a stone; thence South 9 ½ degrees East, 19.32 poles to the place of BEGINNING and being the same tract of land conveyed to J. r. Jones by w. E. Jones, et al by deed bearing date the 28th day of December, 1912, and of record in the aforesaid Clerk's Office in Deed Book 61 at page 401.

Being the same three (3) tracts which Dwight E. Moore and Tina M. Moore, husband and wife, by deed dated September 18, 2003 and recorded in the office of the Clerk of Courts of Doddridge County, West Virginia in Deed Book 257 at page 66, conveyed unto Gene P. Moose and Linda G, Moose, husband and wife, the grantors herein.

This conveyance is made subject to all exceptions, reservations, restrictions, conditions, covenants, outconveyances, easements, right of way or other servitudes, if any, made, retained or created in prior instruments of record in the chain of title to the real estate herein conveyed, insofar as the same are valid and in effect.

RESERVING, HOWEVER, unto the Grantors herein, any minerals, natural gas, oil or associated substances owned by Seller. Said substances shall **NOT** convey unto Purchaser

The subject real estate is assessed upon the Land Books of Doddridge County, West Virginia, for the year 2013 in West Union District, as follows:

First Tract & Second Tract:

MOOSE GENE P & LINDA G (SURV)
M I CREEK 148 AC
Tax Map 16, Parcel 15.2
Tax Ticket Number: 27558

Third Tract:

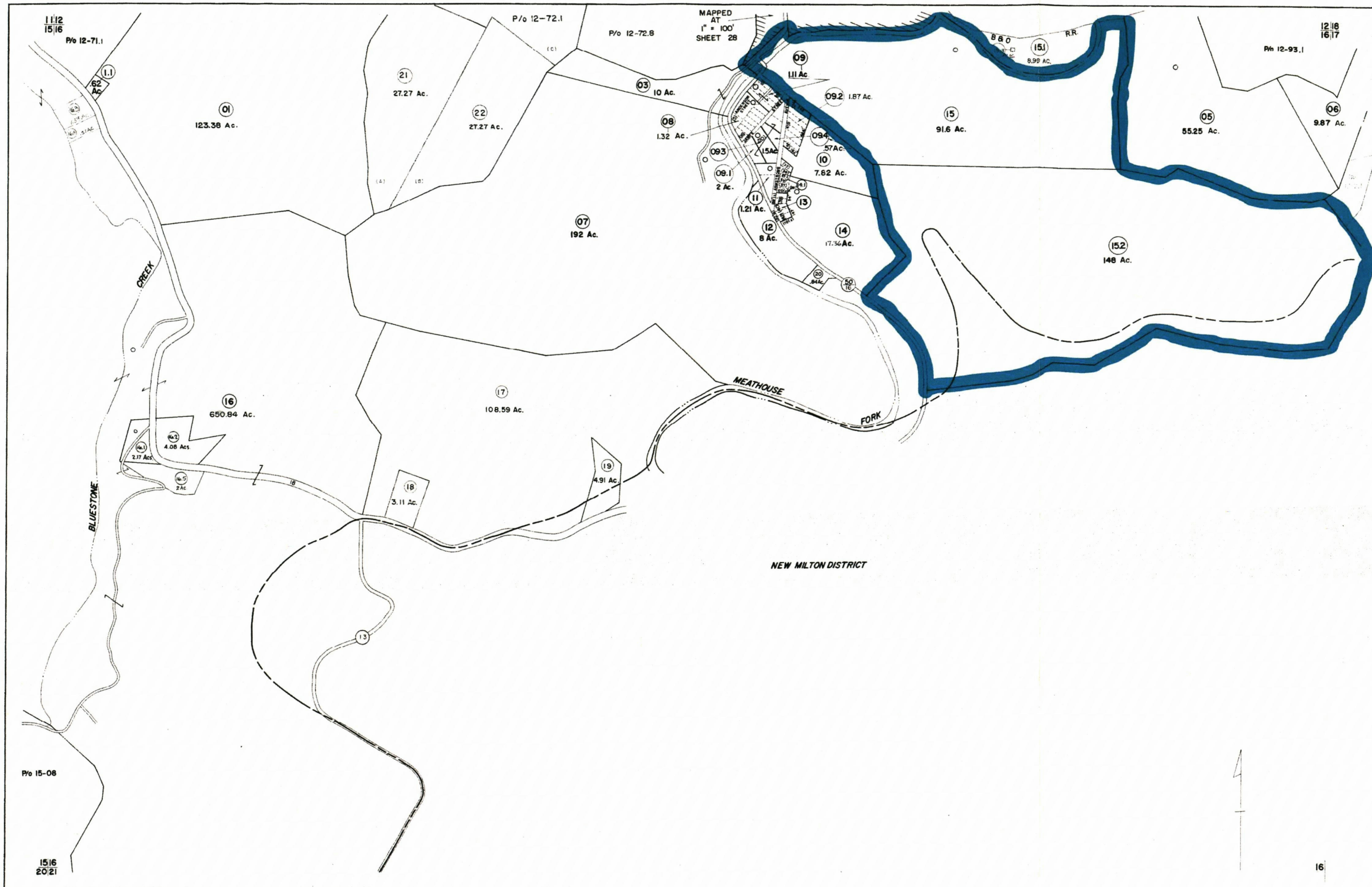
MOOSE GENE P & LINDA G (SURV)
SMITHBURG 91.6 AC
Tax Map 16, Parcel 15
Tax Ticket Number: 27559

DECLARATION OF RESIDENT STATUS

The undersigned Grantors hereby certify, under penalty of perjury, that they are not residents of the State of West Virginia, and have complied with the state income tax withholding requirements imposed by West Virginia Code Chapter 11, Article 21, Section 71b.

DECLARATION OF CONSIDERATION OR VALUE

The undersigned do hereby declare, under penalty of fine and imprisonment, that the total consideration paid for the real estate conveyed by the document to which this declaration is appended is \$1,700,000.00.



FOR TAX PURPOSES ONLY

Prepared by
L. ROBERT KIMBALL
 Consulting Engineer
 Ebensburg, Pennsylvania

Legend	
Property line	Original lot line
Edge of pavement or roadbed	Dead lot number
Corporation line	Parcel or index number
District line	Improvement
County line	Railroad

Revisions	
1 REVISOR 3/1/84	Revised to 7-1-88
2 1-28-78	OGIS 1-18-91 JBR
3 8-30-76	OGIS 11-93 RD
4 12-1-77	SLS INC. 3/13/00 JAW
5 4-1-80	ESI 3/29/01 REK
6 REVISOR 7-81 T. Groves	2/27/04 SBI
7 2-2-84	

STATE OF WEST VIRGINIA
 DODDRIDGE COUNTY
 Office of Assessor

WEST UNION DISTRICT
 SHEET 16

Date, Aerial Photography: APRIL, 1962 Date, Map: DEC, 1963

**HYDROLOGIC AND HYDRAULIC ANALYSIS OF MIDDLE ISLAND
CREEK, MEATHOUSE FORK, AND BUCKEYE CREEK**

**SMITHBURG NATURAL GAS PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA**

Prepared for:

SHERWOOD MIDSTREAM LLC

Prepared by:

**CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PITTSBURGH, PENNSYLVANIA**

CEC Project 130-359.0209

September 2017

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APPENDICES

Appendix A – Site Location, and WV Flood Maps

Appendix B – FEMA Flood Insurance Study and FIRM

Appendix C – Existing Conditions Hydraulic Calculations, Cross Sections, and Floodplain Maps

Appendix D – Proposed Conditions Hydraulic Calculations, Cross Sections, and Floodplain
Maps

Appendix E – HEC-RAS Summary of Existing and Proposed Hydraulic Calculations

1.0 INTRODUCTION

1.1 BACKGROUND

On behalf of Sherwood Midstream LLC (Sherwood), Civil & Environmental Consultants, Inc. (CEC) presents this Hydrologic and Hydraulic (H&H) Analysis Report for the proposed Smithburg Natural Gas Processing Facility. The proposed project is located off Snowbird Road (CO RT 50/16) in Doddridge County, West Virginia. Buckeye Creek is located along the northeast property line and Meathouse Fork is located along the northwest property line. The two streams converge to form Middle Island Creek in the northern portion of the property. A site location map is included in Appendix A.

The Federal Emergency Management Agency (FEMA) completed a detailed study of Middle Island Creek, Meathouse Fork, and Buckeye Creek, which is included in Flood Insurance Study (FIS) 54017CV000A, dated October 4, 2011. The detailed study determined a Special Flood Hazard Area designation of Zone AE for these streams. A copy of the FIS and Flood Insurance Rate Map (FIRM) 54017C0140C dated October 4, 2011 are included in Appendix B.

Plans for the Smithburg Natural Gas Processing Facility include the construction of six cryogenic plants, two de-ethanizer plants, and auxiliary equipment. Grading activities will include the construction of an access road, a gravel parking lot, an approximate 40-acre pad and a stockpile. The gravel parking lot and stockpile will include the placement of excess material and associated earthwork within the FEMA Zone AE floodplain of Meathouse Fork.

1.2 PURPOSE

The purpose of this H&H Analysis is to calculate the existing and proposed 100-year water surface elevations (WSELs) Meathouse Fork, Buckeye Creek, and Middle Island Creek within the project area. The H&H Analysis will compare the existing 100-year WSELs to the proposed 100-year WSELs in order to determine if the gravel parking lot and stockpile has a theoretical effect to the FEMA Zone AE floodplain.

2.0 HYDROLOGIC ANALYSIS

2.1 METHODOLOGY

The FEMA FIS 54017CV000A, dated October 4, 2011 determined the Meathouse Fork 100-year, 24-hour storm peak discharge to be 9,600 cubic feet per second (cfs) at its confluence with Middle Island Creek. The FIS also determined the Buckeye Creek 100-year, 24-hour storm peak discharge to be 7,350 cfs at its confluence with Middle Island Creek. However, the FIS did not determine a 100-year, 24-hour storm peak discharge for Middle Island Creek at the confluence of Meathouse Fork and Buckeye Creek. The nearest peak discharge calculated for Middle Island Creek is approximately five and a half miles downstream at the confluence of Piggan Run, which is 13,080 cfs. However, because this flow was determined five and a half miles downstream of the Buckeye Creek and Meathouse Fork confluence, CEC used the sum of peak discharges of Meathouse Fork and Buckeye Creek as the Middle Island Creek peak discharge. Therefore, the Middle Island Creek 100-year, 24-hour storm peak discharge was estimated to be 16,950 cfs.

3.0 HYDRAULIC ANALYSIS

3.1 METHODOLOGY

The U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS) computer software was utilized to analyze the hydraulic capacity and calculate the existing and proposed 100-year WSELs along Middle Island Creek, Meathouse Fork, and Buckeye Creek. The Meathouse Fork study area began at Middle Island Creek and ended approximately 1,930 feet upstream of the stream confluence. The Buckeye Creek study area began at Middle Island Creek and ended approximately 1,270 feet upstream of the stream confluence.

3.2 EXISTING CONDITIONS

The existing condition HEC-RAS model utilized the aerial survey information provided by Nor East Mapping, Inc. to create the cross sections. The FEMA FIS determined a range for the Manning's roughness coefficient values for the channel and overbank areas. For Middle Island Creek, channel "n" values range from 0.040 to 0.045 and overbank "n" values range from 0.050 to 0.070. CEC used a channel "n" value of 0.040 and an overbank "n" value of 0.060. For Buckeye Creek and Meathouse Fork, channel "n" values range from 0.055 to 0.080 and CEC used 0.055. The FIS did not provide overbank values for Buckeye Creek and Meathouse Fork. Therefore, CEC used 0.060, which is consistent with the Middle Island Creek "n" value. CEC used the expansion and contraction coefficients of 0.3 and 0.1, respectively, in order to hydraulically model flow from cross section to cross section. CEC approximated the Middle Island Creek known water surface elevation of 792.70 using the flood profiles provided in the FIS, which was used as the boundary reach condition. The HEC-RAS model used a junction as the Buckeye Creek and Meathouse Fork boundary reach conditions. Appendix C includes the HEC-RAS input and output data and the cross sections for the existing conditions model.

3.3 PROPOSED CONDITIONS

The proposed condition HEC-RAS model utilized the existing conditions as a base. CEC revised the Meathouse Fork cross-sections 10+53 (J) to 18+10 (CC) to include the proposed gravel parking lot and stockpile. CEC did not revise the remaining existing conditions HEC-RAS input data.

Appendix D includes the HEC-RAS input and output data and the cross sections for the proposed conditions model. Appendix D also includes SP02, which shows the estimated lateral extent of the proposed conditions floodplain resulting from the 100-year, 24-hour design storm event.

4.0 CONCLUSIONS

4.1 EXISTING CONDITIONS

The existing conditions HEC-RAS model estimated the WSELs along the studied lengths of Middle Island Creek, Meathouse Fork, and Buckeye Creek. Appendix E contains summary tables of the existing WSELs. Appendix C includes SP01, which shows the estimated lateral extent of the existing conditions WSELs plotted along the existing contours.

4.2 PROPOSED CONDITIONS

The proposed conditions HEC-RAS model estimated the WSELs along the same studied lengths of Middle Island Creek, Meathouse Fork, and Buckeye Creek as the existing conditions HEC-RAS model. The proposed conditions HEC-RAS model included the proposed gravel parking lot and stockpile. Appendix E contains summary tables of the proposed WSELs. Appendix D includes SP02, which shows the estimated lateral extent of the proposed conditions WSELs plotted along the existing and proposed contours.

Appendix E contains a summary table comparing the existing WSELs to the proposed WSELs and summarizes the theoretical impacts the proposed gravel parking lot and stockpile have on the existing conditions.

4.3 SUMMARY

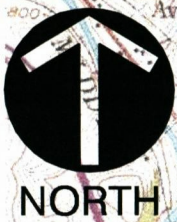
CEC developed the following conclusions based on the H&H analysis results:

- The WSEL will increase in the proposed conditions from section 14+49 (M) to 18+60 (DD) along Meathouse Fork by a maximum of 0.09' during the 100-year, 24-hour storm event. The 0.09' increase is within the FEMA and Doddridge County allowable limit increase of one foot.
- The WSEL will not increase upstream of the subject property at section 19+33 (EE) along Meathouse Fork during the 100-year, 24-hour storm event.
- The WSEL will not increase in the proposed conditions along Buckeye Creek during 100-year, 24-hour storm event.
- The proposed WSEL will not increase along Middle Island Creek during 100-year, 24-hour storm event.

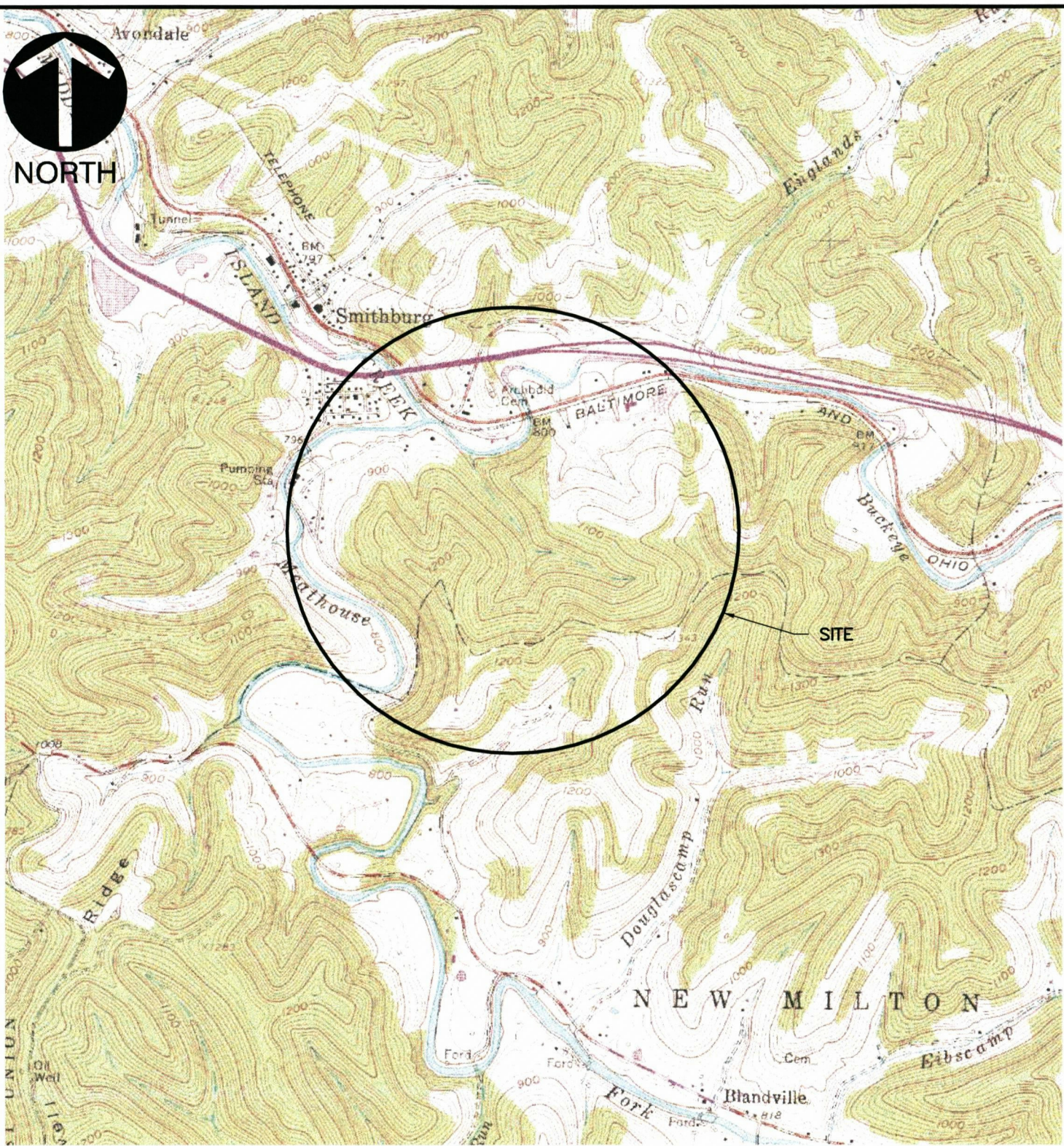
Based on these results, CEC concludes the proposed Smithburg Natural Gas Processing Plant meets the FEMA and Doddridge County requirements for proposed development within a FEMA designated Zone AE floodplain.

APPENDIX A

SITE LOCATION AND WV FLOOD MAPS



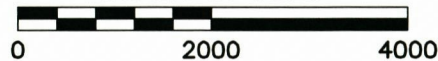
NORTH



REFERENCE

1. USGS 7.5 MIN. TOPOGRAPHIC QUADRANGLE SMITHBURG, WV, DATED 1961. PHOTOREVISED 1976.

SCALE IN FEET



Civil & Environmental Consultants, Inc.

333 Baldwin Road - Pittsburgh, PA 15205
412-429-2324 · 800-365-2324
www.cecinc.com

SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS
PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA

SITE LOCATION MAP

DRAWN BY:	JAS	CHECKED BY:	JFB	APPROVED BY:	FIGURE NO.:
DATE:	7/14/2017	DWG SCALE:	1"=2,000'	PROJECT NO:	130-359.0209

P:\2013\130-359\CADD\DWG\TASK 0209\130359.0209-CIV01-FG 1.dwg[LAYOUT] LS:(01/09/2017 - btomiczek) - LP: 9/1/2017 4:35 PM

WV Flood Map



— Cross Section (XS) Lines
 Base Flood Elevation (BFE) Lines

- ~ Rule_1
- Floodway
- Flood Hazard Zone**
- Approximate Study (Zone A)
- Detailed Study (AE, AH, AO)
- High : 134.442
- Low : -7.71759

DFIRM or DFIRM. Its purpose is to assist with determining potential flood risk for the selected location.

Location of flood information
User Notes:
 Smithburg Natural Gas Processing Plant Fill Area

Map created on August 17, 2017

Flood Hazard Area:	
Flood Hazard Area: Location is NOT WITHIN identified flood hazard area, but within 75 feet of an identified	
Flood Hazard Zone:	N/A
Stream:	N/A
FEMA Issued Flood Map:	54017C0140C
Watershed (HUC8):	Little Musringum-Middle Island (5030)
Advisory Flood Height:	N/A
Water Depth:	N/A
Elevation:	About 793 ft
Location (long, lat):	(80.733386 W,39.283073 N)
Location (UTM 17N):	(522995, 4348223)
Contacts:	Doddridge
CRS Information:	N/A
Flood Profile:	N/A
HEC-RAS Model:	N/A
Parcel Number:	

Disclaimer:

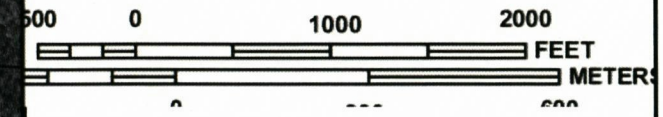
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov.
 WV Flood Tool (<http://www.MapWV.gov/flood>) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.



**DODDRIDGE COUNTY
UNINCORPORATED AREAS
540024**



MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

FIRM
FLOOD INSURANCE RATE MAP
DODDRIDGE COUNTY,
WEST VIRGINIA
AND INCORPORATED AREAS

PANEL 140 OF 325
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

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



**MAP NUMBER
54017C0140C
MAP REVISED
OCTOBER 4, 2011**

Federal Emergency Management Agency

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

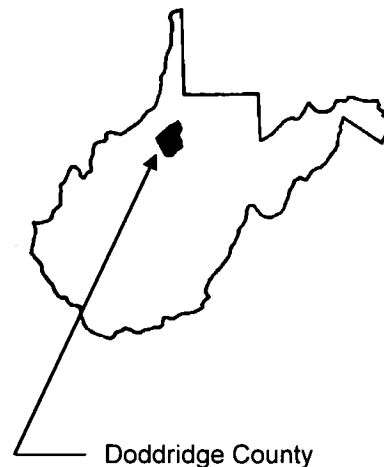
APPENDIX B

FEMA FLOOD INSURANCE STUDY AND FIRM

FLOOD INSURANCE STUDY



DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS



COMMUNITY NAME

WEST UNION, TOWN OF
DODDRIDGE COUNTY (UNINCORPORATED
AREAS)

COMMUNITY NUMBER

540025
540024



Effective: October 4, 2011

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
54017CV000A

**NOTICE TO
FLOOD INSURANCE STUDY USERS**

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Initial Countywide FIS Effective Date: March 18, 1991

Flood Insurance Study Revised: October 4, 2011

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**FLOOD INSURANCE STUDY
DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS**

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide format Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of Doddridge County, West Virginia, including the Town of West Union and the unincorporated areas of the county (hereinafter referred to collectively as Doddridge County); and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State or other jurisdictional agency will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study were prepared by the U.S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA) under Inter-Agency Agreement No. EMW-87-E- 2512. Within the Town of West Union, the work for this study was completed in May 1988; within the unincorporated areas of the county, the work for this study was completed in June 1988.

This digital conversion was prepared by the USACE, Huntington District, for FEMA, under Inter-Agency Agreement No. HSFE03-06-X-0023.

Base map information shown on the FIRM was provided by West Virginia Statewide Addressing and Mapping Board (SAMB). Imagery was captured at a scale of 1:24,000 in the Spring of 2003 for the purpose of producing natural color digital orthophotos at a two-foot pixel resolution.

The projection used in the preparation of this map is Universal Transverse Mercator (UTM) Zone 17, and the horizontal datum used is North American Datum of 1983 (NAD 83), GRS1980 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to UTM, NAD 1983. Differences in the datum, spheroid, projection, or UTM zones used in the production of FIRMs for adjacent counties may

result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

1.3 Coordination

On January 17, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the county, and the USGS (the study contractor) to determine the streams to be studied by detailed methods. The Huntington District of the U. S. Army Corps of Engineers (USACE) and the Soil Conservation Service (SCS) were contacted for information pertinent to this study.

On April 18, 1990, a final CCO meeting was held with representatives of FEMA, the county, and the study contractor to review the results of the study. The final CCO meeting for the unincorporated areas of Doddridge County also served as the final CCO meeting for this countywide study, and was open to representatives from all communities within the county that were covered by this countywide study.

For this countywide FIS, the final CCO meeting was held on April 29, 2010, and attended by representatives of the Town of West Union and Doddridge County, West Virginia. All problems raised at that meeting have been addressed.

2.0 **AREA STUDIED**

2.1 Scope of Study

This FIS covers the geographic area of Doddridge County, West Virginia, including communities listed in Section 1.1.

Table 1, "Areas Studied by Detailed Methods" lists the streams studied by detailed methods.

Table 1 – Areas Studied by Detailed Methods

<u>Stream</u>	<u>Limits of Detailed Study</u>
Middle Island Creek	From the downstream county boundary to the confluence of Meathouse Fork and Buckeye Creek
Buckeye Creek	From the confluence with Middle Island Creek to a point approximately 240 feet upstream of the confluence of Long Run, and from the confluence of Greenbrier Creek to the confluence of Traugh Fork
Meathouse Fork	From the confluence with Middle Island Creek to County Highway 56, and from a point approximately 1,600 feet downstream of County Highway 25-13 to the confluence of Laurel Run and Big Isaac Creek
McElroy Creek	From the confluence of Flint Run to the confluence of Big Battle Run

Table 1 – Areas Studied by Detailed Methods - continued

<u>Stream</u>	<u>Limits of Detailed Study</u>
Wilhelm Run	From the confluence with Arnold Creek to a point approximately 1.2 miles upstream
Long Run	From the confluence with Buckeye Creek to a point approximately 2.4 miles upstream
Toms Fork	From the confluence with Meathouse Fork to the confluence of Little Toms Fork
Greenbrier Creek	From the confluence with Buckeye Creek to a point approximately 1.9 miles upstream
Big Isaac Creek	From the confluence with Meathouse Fork to the confluence of Little Isaac Creek
Laurel Run	From the confluence with Meathouse Fork to a point approximately 0.9 mile upstream of the confluence with Meathouse Fork

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through January 1990.

All or portions of the following streams were studied by approximate methods: Broad Run, Arnold Creek, Slaughter Run, Flint Run, Riggins Run, Robinson Fork, Big Battle Run, Skelton Run, Talkington Fork, Long Run, Bluestone Creek, Cove Creek, Indian Fork, Nutter Fork, Jockey Camp Run, Morgans Run, Buckeye Creek, Buffalo Calf Creek, Meathouse Fork, Little Toms Fork, Lick Run, Big Isaac Creek, Middle Fork, Dotson Run, Cabin Run, Leason Creek, Right Fork, Left Fork, Elk Lick Run, Pike Fork, Little Battle Run, Piggin Run, Brushy Fork, Rock Run, Wolfpen Run, Englands Run, Jockeycamp Run, Douglascamp Run, Traugh Fork, Bonnet Fork, the South Fork Hughes River, and Sycamore Fork. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Doddridge County.

No Letters of Map Revision (LOMRs) were incorporated for the October 4, 2011, revision.

2.2 Community Description

Doddridge County is located in northern West Virginia. It is bordered by the unincorporated areas of Wetzel and Tyler Counties to the north; the unincorporated areas of Ritchie County to the west; the unincorporated areas of Harrison County to the east; and the unincorporated areas of Gilmer and Lewis Counties to the south. The total land

area contained within the county is approximately 321.6 square miles. In 2000, the population of the county was 7,491 (Reference 1).

The county seat is located in the Town of West Union. The total land area of the town is approximately 0.32 square miles, and the population was 806 in 2000 (Reference 1).

The climate of Doddridge County is temperate with a seasonal variation in temperature. The county is located in a region termed humid continental: humid because of the evenly spaced precipitation, and continental because of the yearly range in temperature. Mean annual precipitation of the county is approximately 45 inches. The average monthly temperatures in degrees Fahrenheit range from the mid-30's in winter to the low 70's in summer (Reference 2).

2.3 Principal Flood Problems

The principal flood problems of Doddridge County are the overflows of Middle Island Creek, Buckeye Creek, and Meathouse Fork. The history of flooding in the county indicates that flooding can occur at any time of the year. Large frontal storms or decaying tropical storms produce the worst flooding on the larger streams, while high intensity thunderstorms produce severe flooding on smaller drainage areas. Major floods have occurred in the county in 1875, 1950, 1963, and 1985.

The mountainous topography of the county is conducive to rapid rises on streams and also to fast runoff best described as flash flooding. This condition has been aggravated by human activities such as timbering in the county.

2.4 Flood Protection Measures

No major structural flood protection measures exist or are planned for the county.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 2-, 1-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 2-, 1-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

Discharge-frequency curves were developed on a regional basis that applies to West Virginia (References 3 and 4). For the streams studied by detailed methods, 1-percent-annual-chance flood elevations were determined through discharge-frequency relations and the Manning equation. Within the Town of West Union, flood elevations were determined through streamflow-station data relationships and the Manning's equation.

Peak discharge-drainage area relationships for each stream studied by detailed methods are presented in Table 2, "Summary of Discharges".

Table 2 – Summary of Discharges

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA (SQ. MILES)</u>	<u>PEAK DISCHARGE (CFS) 1-PERCENT-ANNUAL-CHANCE</u>
MIDDLE ISLAND CREEK		
Upstream of Doddridge-Tyler County boundary	134.78	15,200
Approximately 0.1 mile downstream of confluence of Piggan Run	120.06	13,080
BUCKEYE CREEK		
At confluence with Middle Island Creek	38.62	7,350
Downstream of confluence of Long Run	22.62	5,150
Upstream of confluence of Greenbrier Creek	9.41	3,050
Downstream of confluence of Traugh Fork	1.52	1,310
MEATHOUSE FORK		
At confluence with Middle Island Creek	66.84	9,600
Downstream of confluence of Toms Fork	50.47	8,200
Downstream of confluence of Brushy Fork	29.87	6,050
Downstream of confluence of Laurel Run and Big Isaac Creek	3.76	2,230
MCELROY CREEK		
Upstream of confluence of Flint Run	61.95	9,250
Upstream of confluence of Rigging Run	51.23	8,300
Downstream of confluence of Talkington Fork	39.18	7,100
Downstream of confluence of Robinson Fork and Big Battle Run	20.75	4,900

Table 2 – Summary of Discharges

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA (SQ. MILES)</u>	<u>PEAK DISCHARGE (CFS) 1-PERCENT-ANNUAL- CHANCE</u>
WILHELM RUN		
At confluence with Arnold Creek	3.29	2,070
Approximately 1.2 miles upstream of confluence with Arnold Creek	2.07	1,570
LONG RUN		
At confluence with Buckeye Creek	4.44	2,460
Approximately 2.4 miles upstream of confluence with Buckeye Creek	1.85	1,470
TOMS FORK		
At confluence with Meathouse Fork	15.27	4,100
Downstream of confluence of Little Toms Fork	12.58	3,650
GREENBRIER CREEK		
At confluence with Buckeye Creek	2.80	1,880
Approximately 1.9 miles upstream of confluence with Buckeye Creek	1.09	1,080
BIG ISAAC CREEK		
At confluence with Meathouse Fork	1.79	1,450
LAUREL RUN		
At confluence with Meathouse Fork	1.97	1,530
Upstream of confluence of Big Isaac Creek	1.57	1,340

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the FIRM (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals were computed

using the USACE HEC-2 step-backwater computer program, and the results were published in a special flood hazard information report (References 5 and 6). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field surveys of the stream and floodplain areas. For Middle Island Creek, channel "n" values range from 0.040 to 0.045 and overbank "n" values range from 0.050 to 0.070. For Buckeye Creek and Meathouse Fork, channel "n" values range from 0.055 to 0.080.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Qualifying benchmarks within a given jurisdiction that are catalogued by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Benchmarks catalogued by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation (e.g. mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation (e.g. concrete bridge abutment)
- Stability C: Monuments which may be affected by surface ground movements (e.g. concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g. concrete monument above frost line, or steel witness post)

In addition to NSRS benchmarks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for benchmarks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at www.ngs.noaa.gov.

It is important to note that temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

3.3 Vertical Datum

All elevations used in the original Doddridge county FIS reports were referenced to the National Geodetic Vertical Datum of 1929 (NGVD29), formerly referred to as Sea Level Datum of 1929. All flood elevations shown in this FIS report and on the FIRM are referenced to North American Vertical Datum of 1988 (NAVD88). Structure and ground elevations in the community must, therefore, be referenced to NAVD88. Elevation factors used to convert the NGVD29 elevation data of the previous Braxton county FIS reports to NAVD88 are summarized below. Elevation reference marks used in this study are shown on the maps.

The data points used to determine the conversion are listed in Table 3, "Vertical Datum Conversion Values".

Table 3 – Vertical Datum Conversion Values

<u>USGS 7.5-Minute Quadrangle Name</u>	<u>Corner</u>	<u>Latitude (Decimal Degrees)</u>	<u>Longitude (Decimal Degrees)</u>	<u>Conversion from NGVD29 to NAVD88 (foot)</u>
Shirley	SE	39.375	80.750	-0.522
Center Point	SE	39.375	80.625	-0.515
Folsom	SE	39.375	80.500	-0.525
Pennsboro	SE	39.250	80.875	-0.554
West Union	SE	39.250	80.750	-0.515
Smithburg	SE	39.250	80.625	-0.502
Oxford	SE	39.125	80.750	-0.531
New Milton	SE	39.125	80.625	-0.522
AVERAGE				-0.500 foot

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. A conversion factor of -.500 feet was applied to the NGVD29 elevations in Doddridge County to convert to NAVD88. Structure and ground elevations in the county must, therefore, be referenced to NAVD88. It is important to note that adjacent communities and counties may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the community and county boundaries.

For more information on NAVD88, see the FEMA publication entitled "Converting the National Flood Insurance Program to the North American Vertical Datum of 1988" (FEMA, June 1992), or contact the National Geodetic Survey Information Services, NOAA, N/NGS12, National Geodetic Survey, SSMC-3, #9202, 1315 East-West Highway, Silver Spring, MD 20910-3282 (Internet address <http://www.ngs.noaa.gov>).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance (100-year) flood elevations and

delineations of the 1- and 0.2-percent-annual-chance (500-year) floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 1-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 7).

For the streams studied by approximate methods, the boundaries of the 1-percent-annual-chance floodplain were delineated using the Flood Hazard Boundary Map (FHBM) for the Town of West Union and the FIS for the Unincorporated Areas of Doddridge County (References 8 and 9).

The 1-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic".

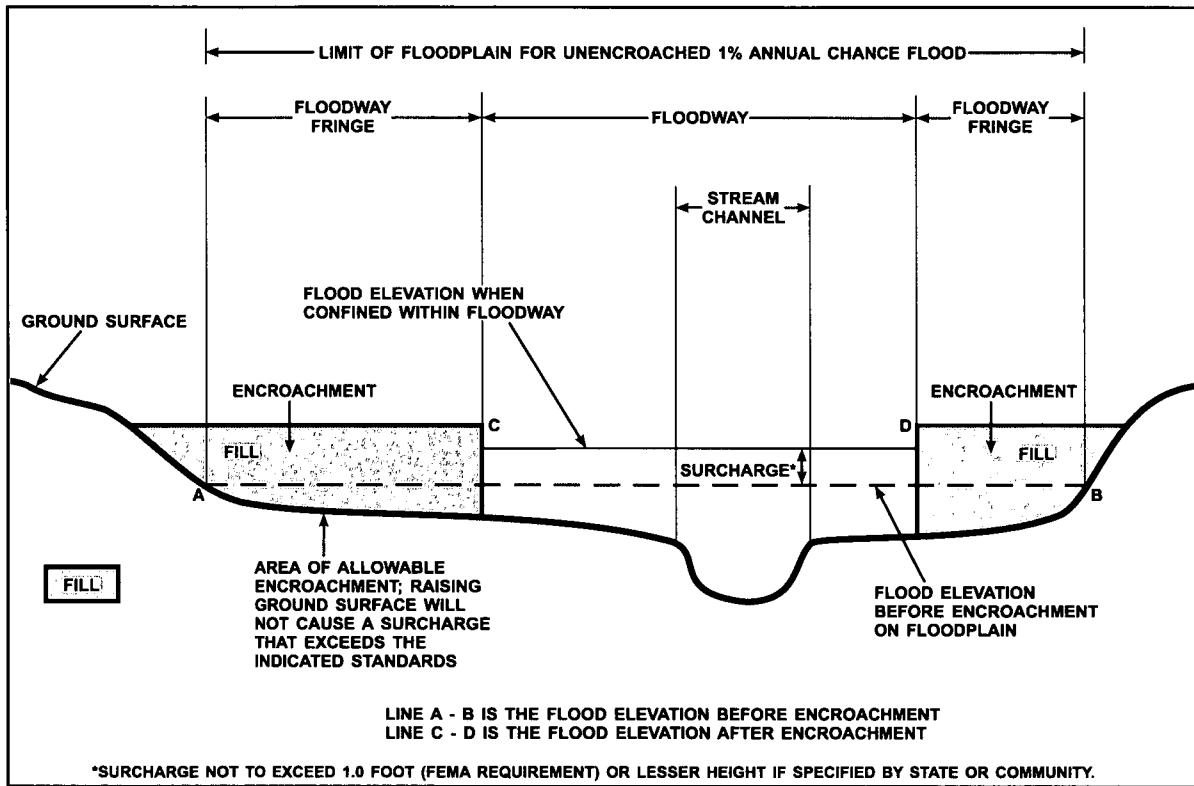


Figure 1 - Floodway Schematic

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no (1-percent-annual-chance) BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance 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 risk zone that corresponds to the areas of 1-percent-annual-chance 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 at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot base flood depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the 1-percent-annual-chance flood event by a flood-control system that was subsequently decertified. Zone AR indicates that the former flood-control system is being restored to provide protection from the 1-percent-annual-chance or greater flood event.

Zone A99

Zone A99 is the flood insurance risk zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

Zone V is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.

Zone VE

Zone VE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1-foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

Zone D is the flood insurance risk zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Doddridge County. Previously, separate FHBMs and/or FIRMs were prepared for each incorporated community with identified flood hazard areas and the unincorporated areas of the County. Historical map dates relating to pre-countywide maps prepared for each community are presented in Table 4, "Community Map History".

COMMUNITY NAME	INITIAL NFIP MAP DATE	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	INITIAL FIRM DATE	FIRM REVISIONS DATE
West Union, Town of	March 29, 1974	NONE	March 18, 1991	
Doddridge County (Unincorporated Areas)	November 8, 1974	June 3, 1977	March 18, 1991	

TABLE 4	<p>FEDERAL EMERGENCY MANAGEMENT AGENCY</p> <p>DODDRIDGE COUNTY, WV AND INCORPORATED AREAS</p>	<p>COMMUNITY MAP HISTORY</p>
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7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the unincorporated areas of Tyler, Ritchie and Harrison Counties, and for Lewis County and Incorporated Areas (References 10, 11, 12 and 13). The results of this study are in exact agreement with the results of those studies.

A FIS is currently being prepared for Gilmer County and Incorporated Areas (Reference 14). The results of that study will be in exact agreement with the results of this study.

Because it is based on more up-to-date analyses, this study supersedes the Flood Hazard Boundary Map for the Town of West Union and the FIS for the Unincorporated Areas of Doddridge County (References 8 and 9).

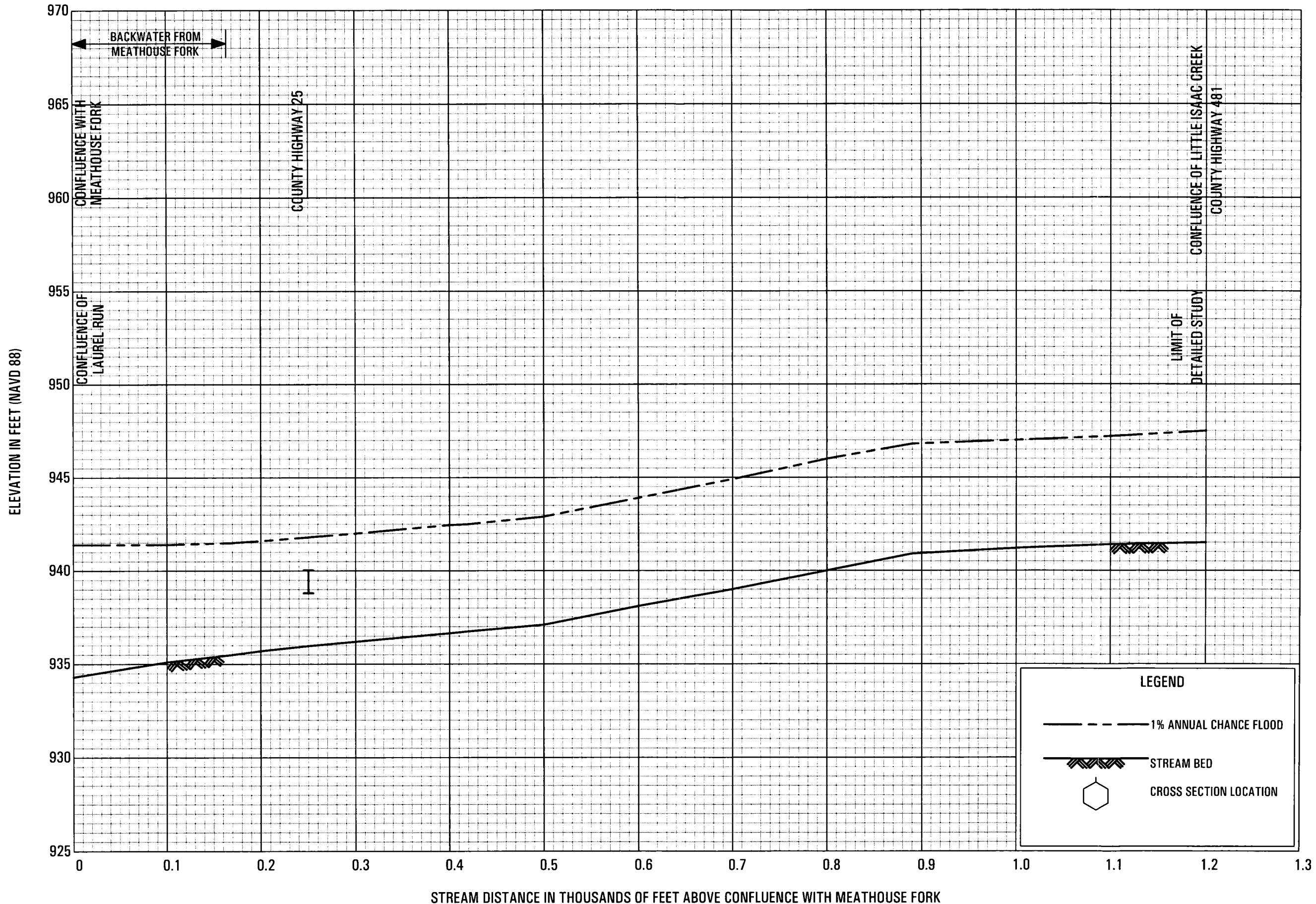
8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region III, One Independence Mall, Sixth Floor, 615 Chestnut Street, Philadelphia, PA 19106-4404.

9.0 BIBLIOGRAPHY AND REFERENCES

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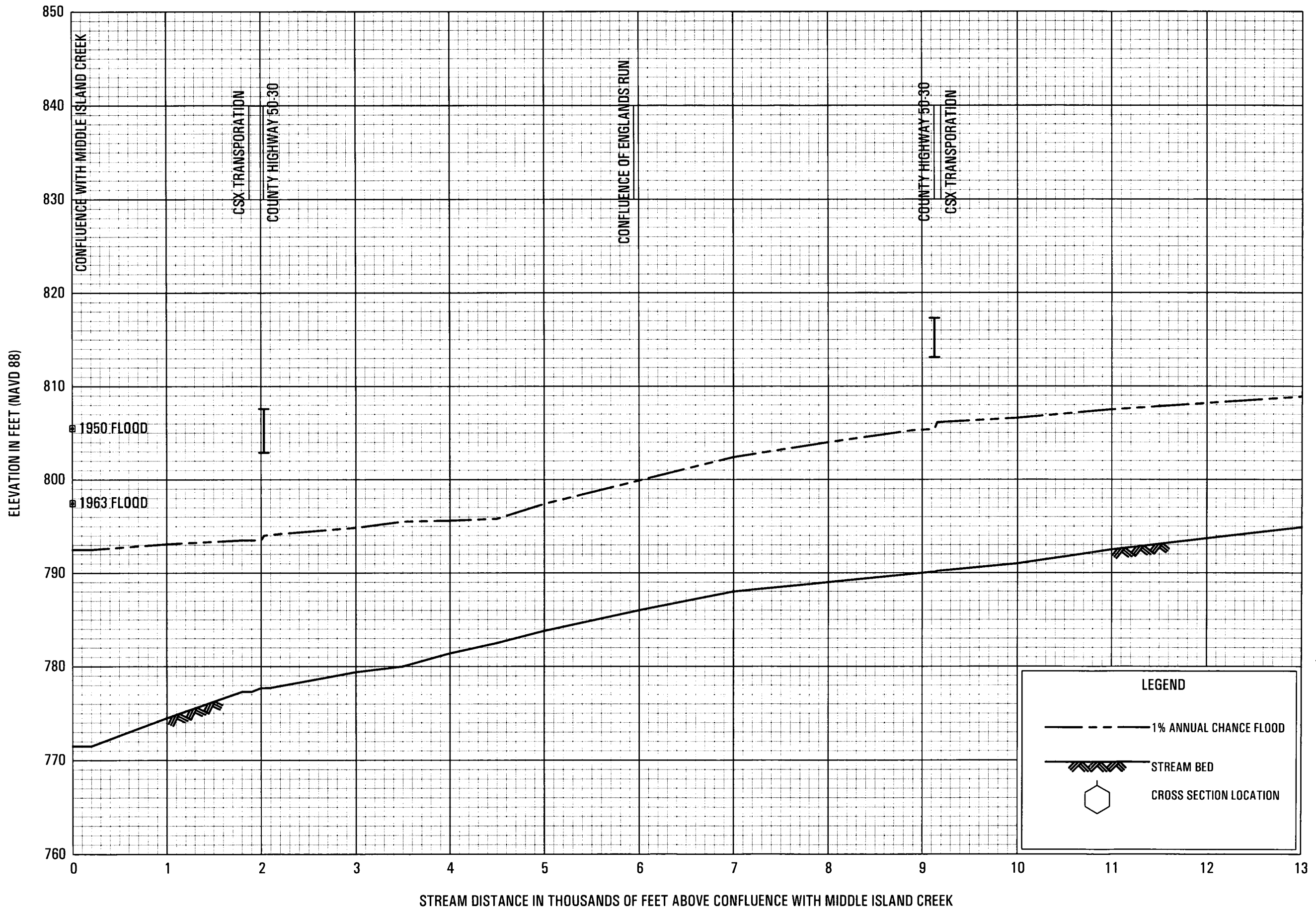
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FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

FLOOD PROFILES
 BIG ISAAC CREEK

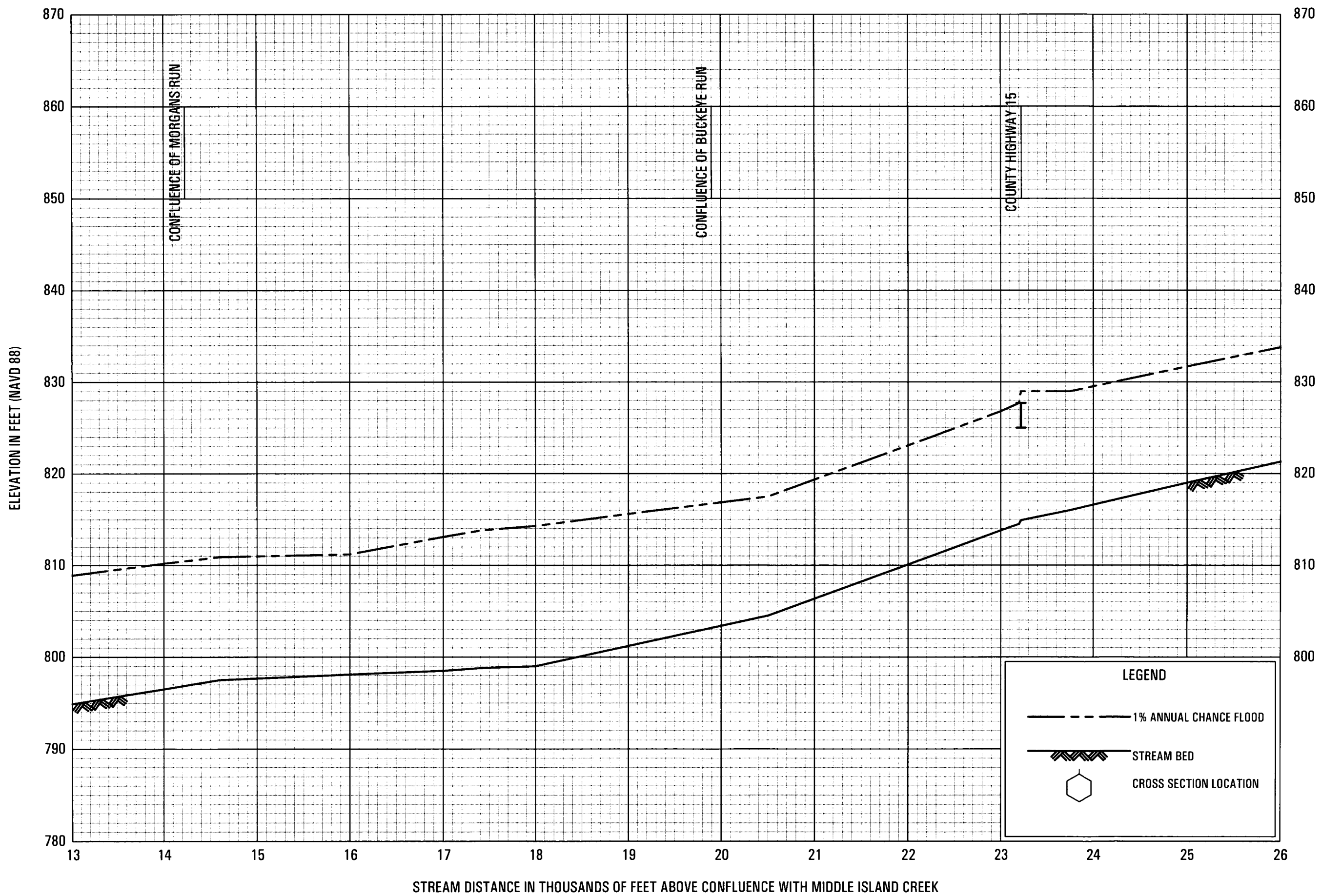
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FLOOD PROFILES

BUCKEYE CREEK

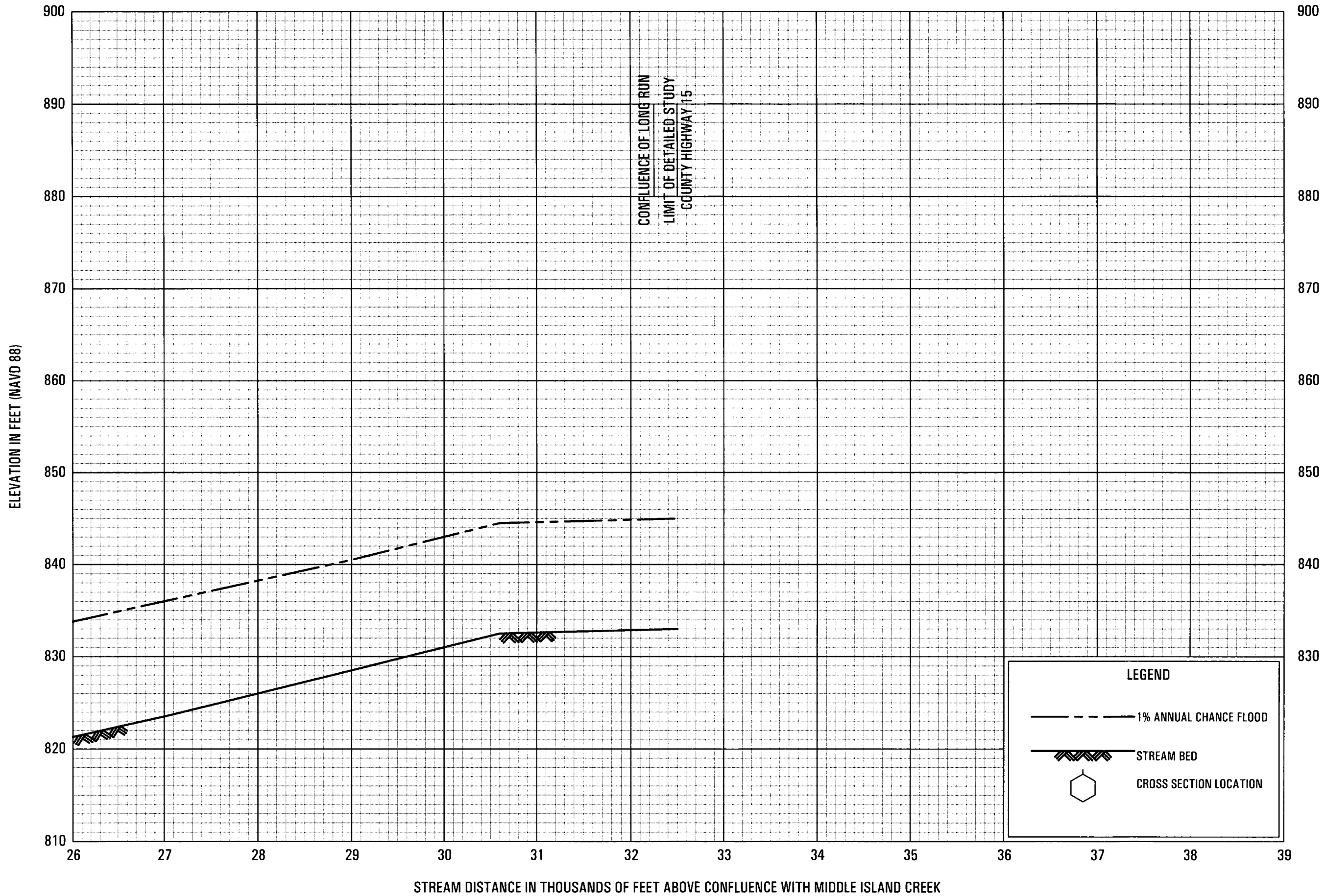
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

BUCKEYE CREEK

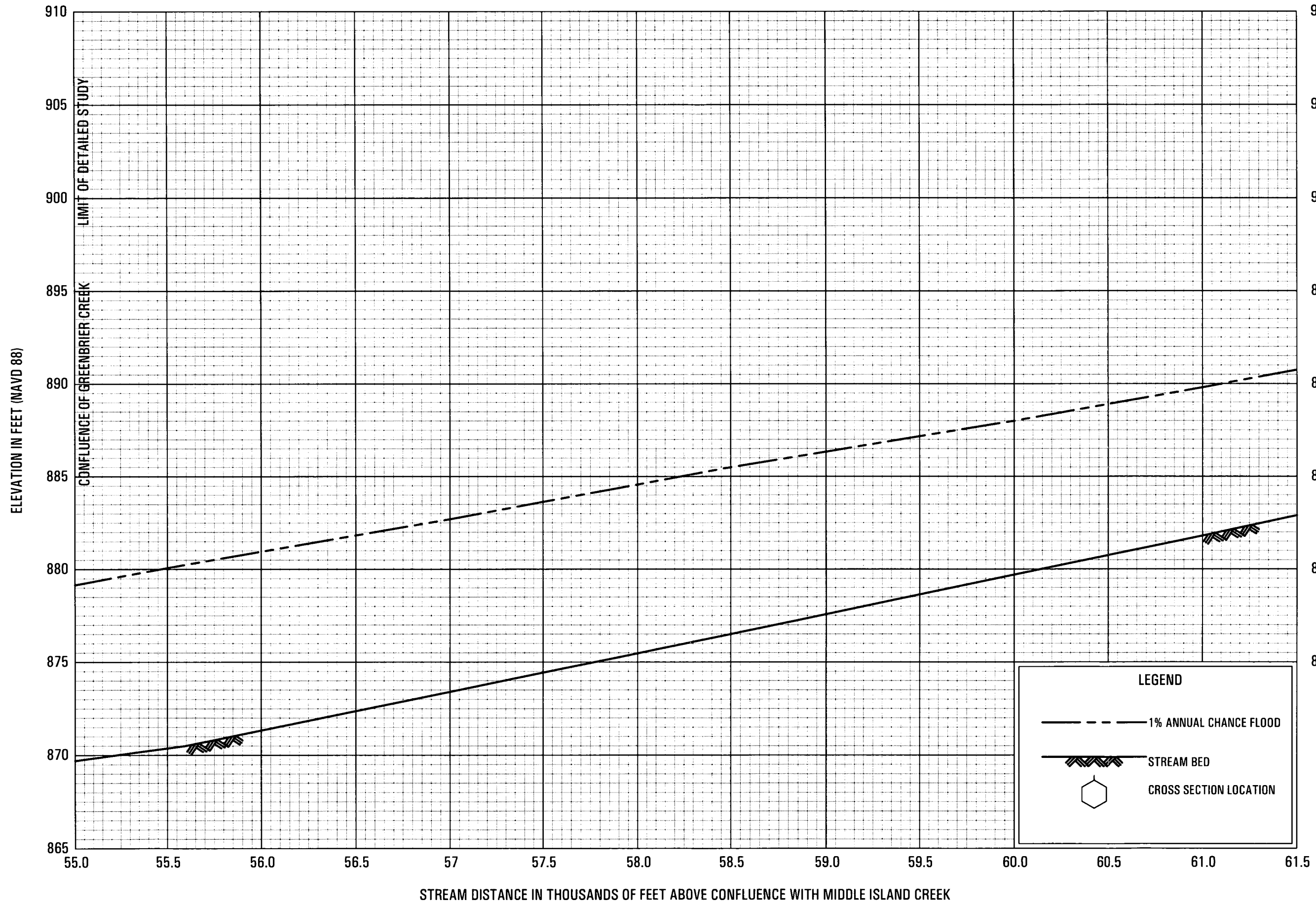
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

BUCKEYE CREEK

**FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS**



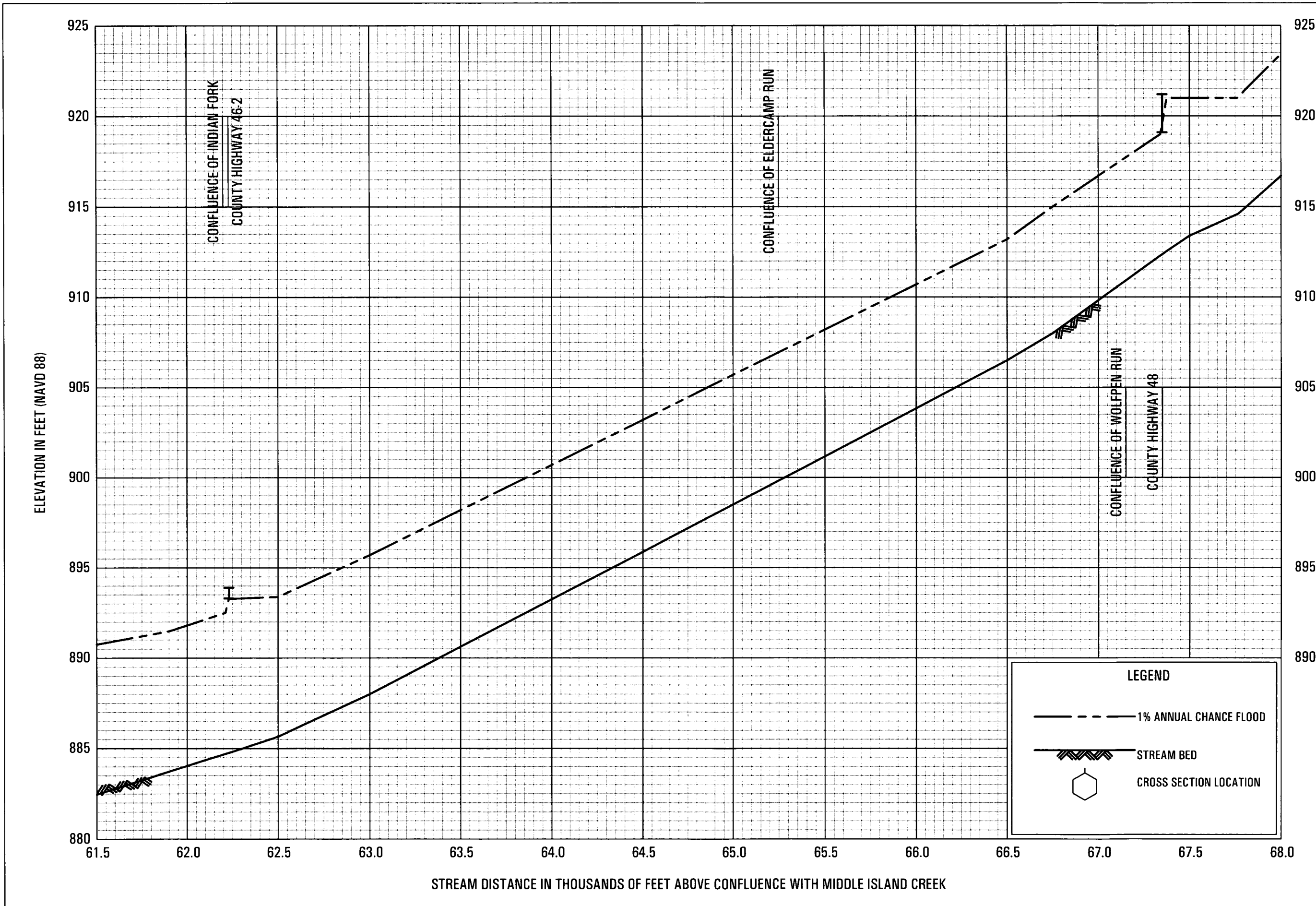
FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

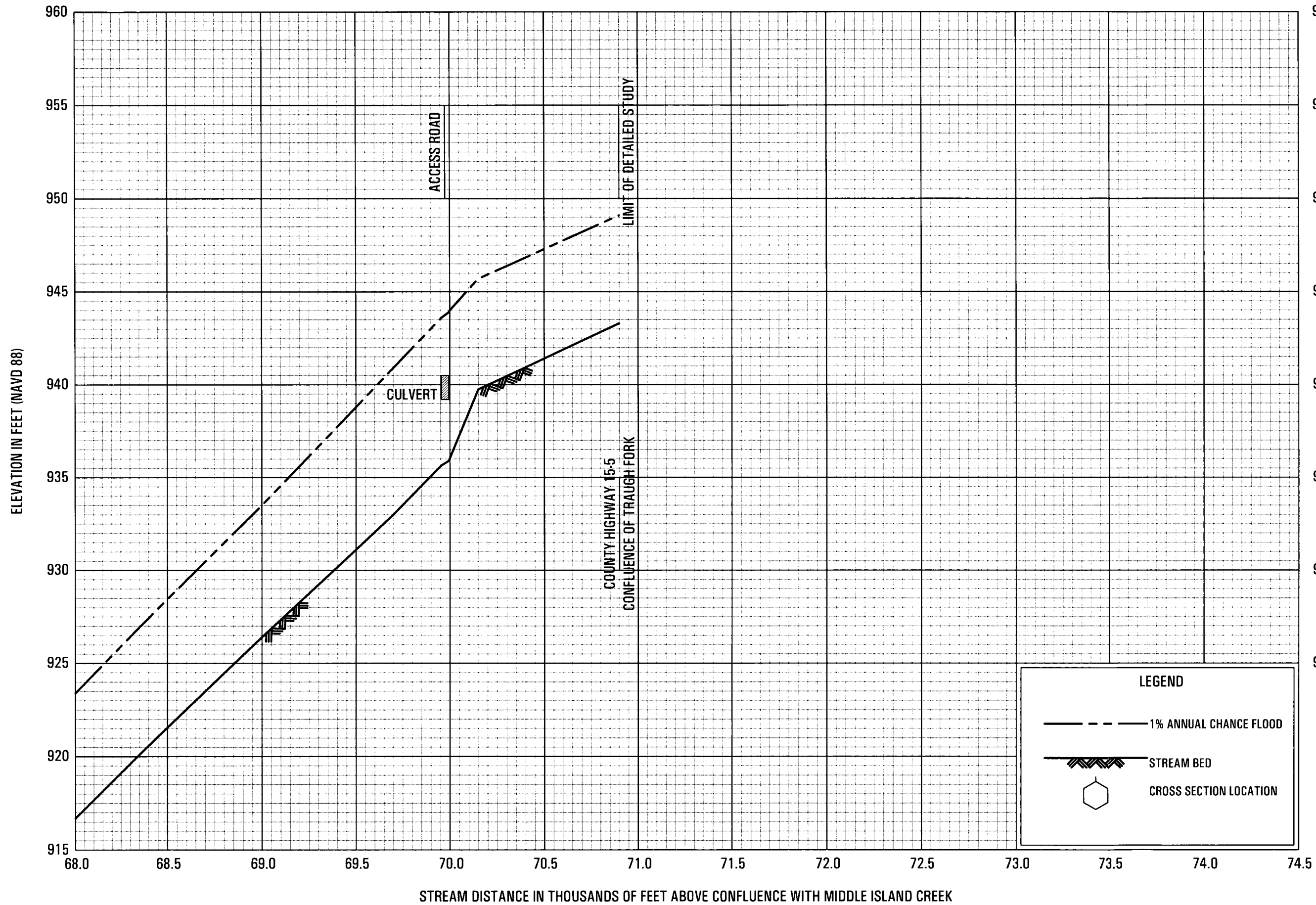
DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



FLOOD PROFILES
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS



FLOOD PROFILES

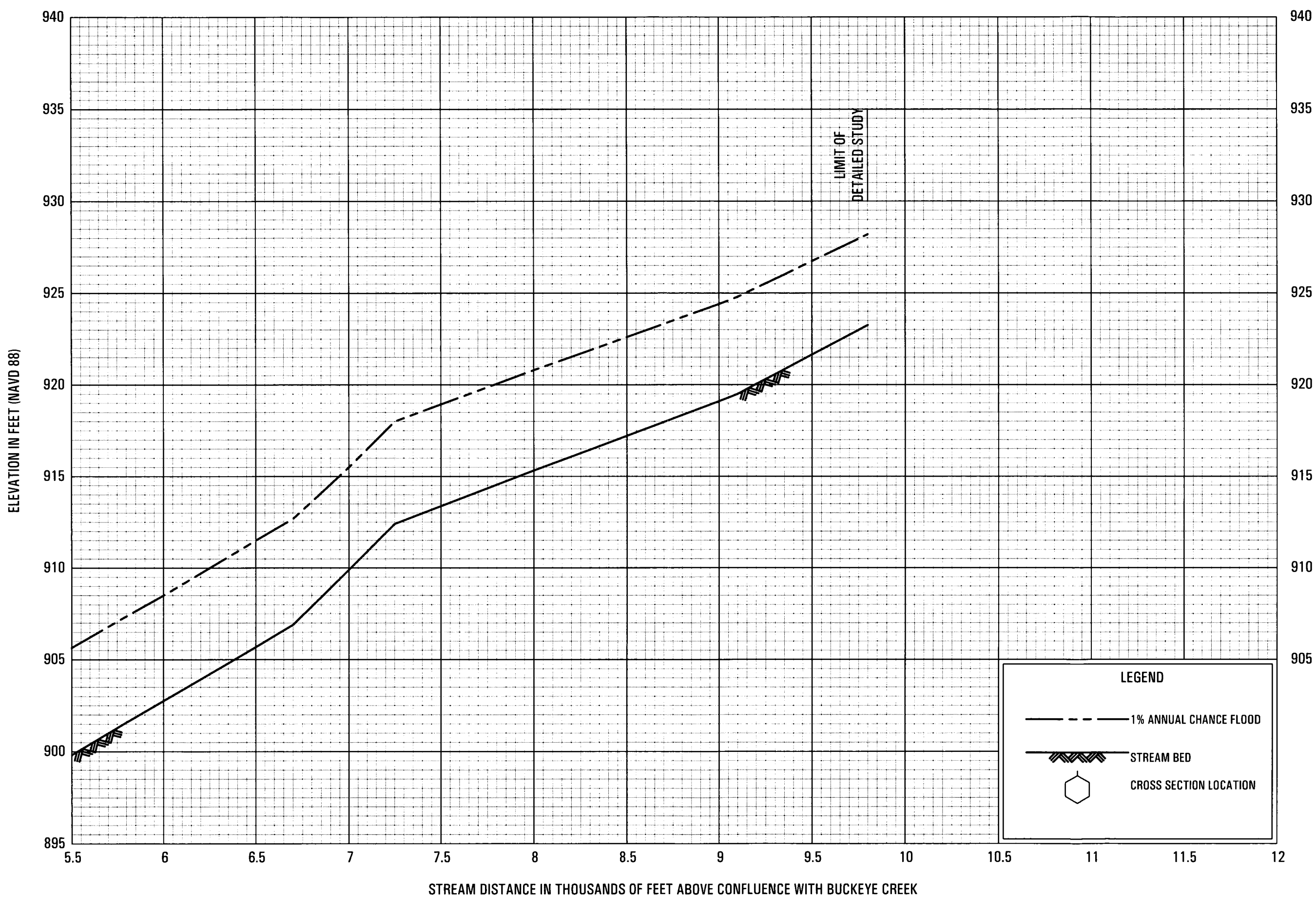
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

07P

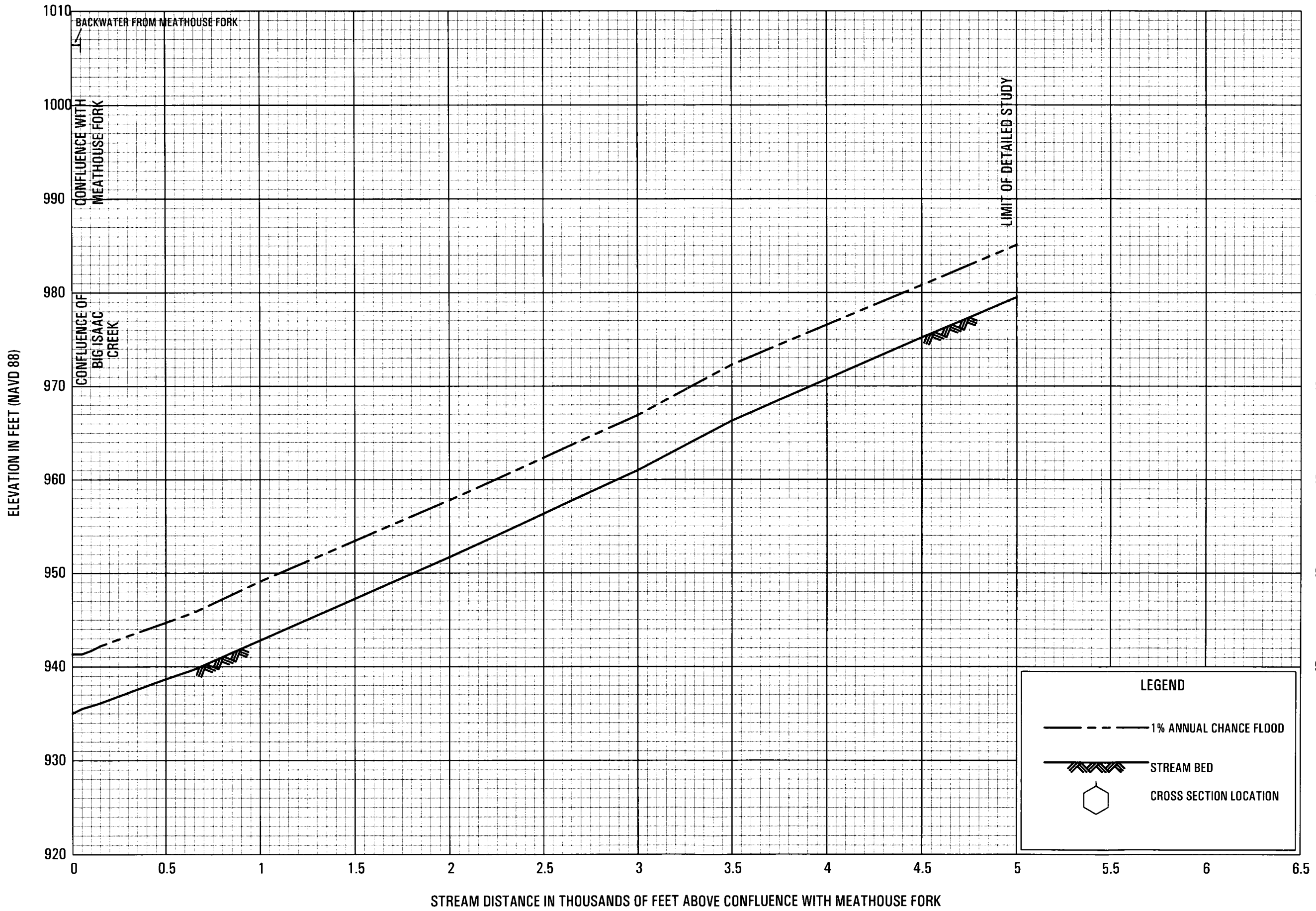


LEGEND

- 1% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

**FLOOD PROFILES
GREENBRIER CREEK**

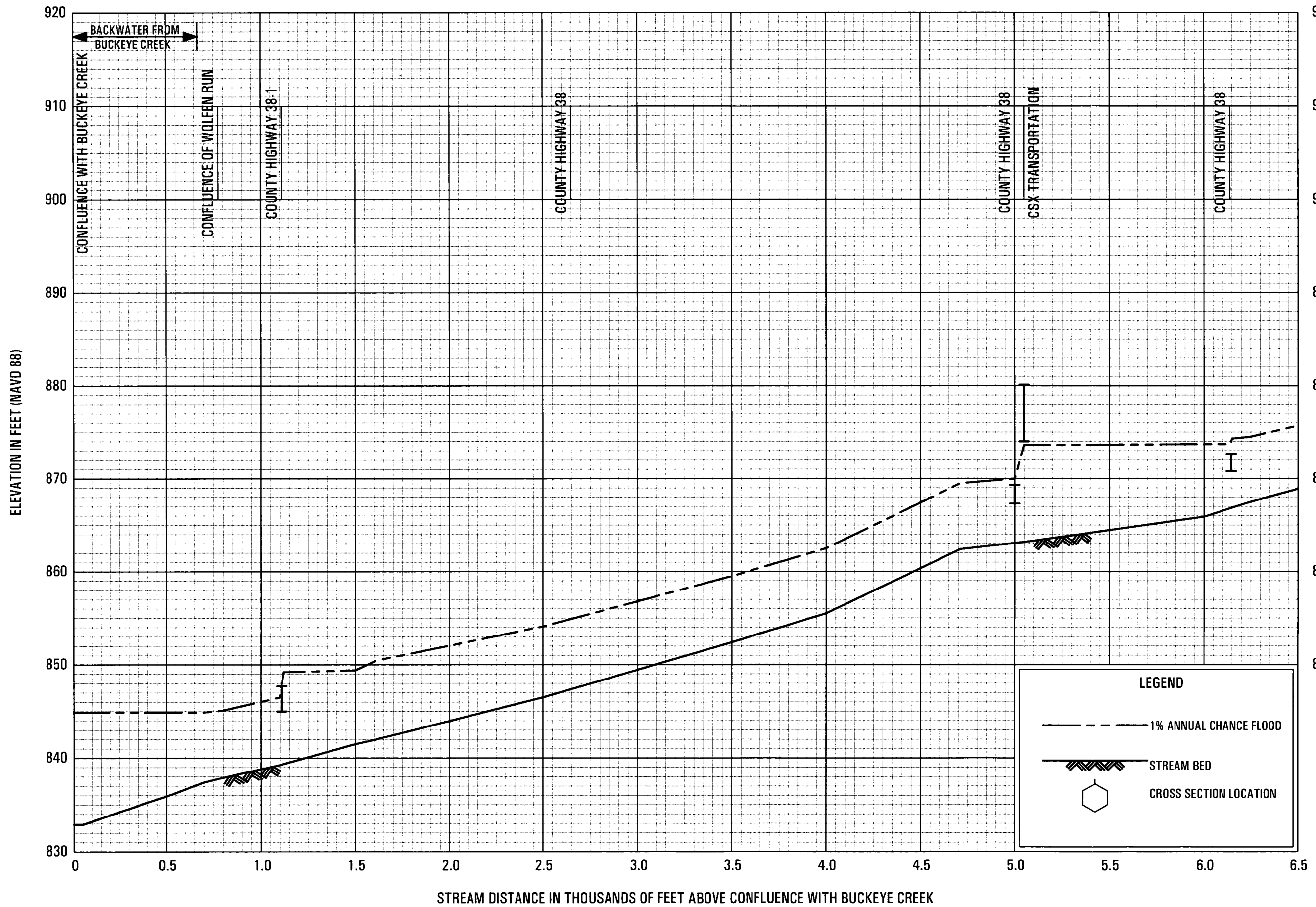
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DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS



FLOOD PROFILES

LAUREL RUN

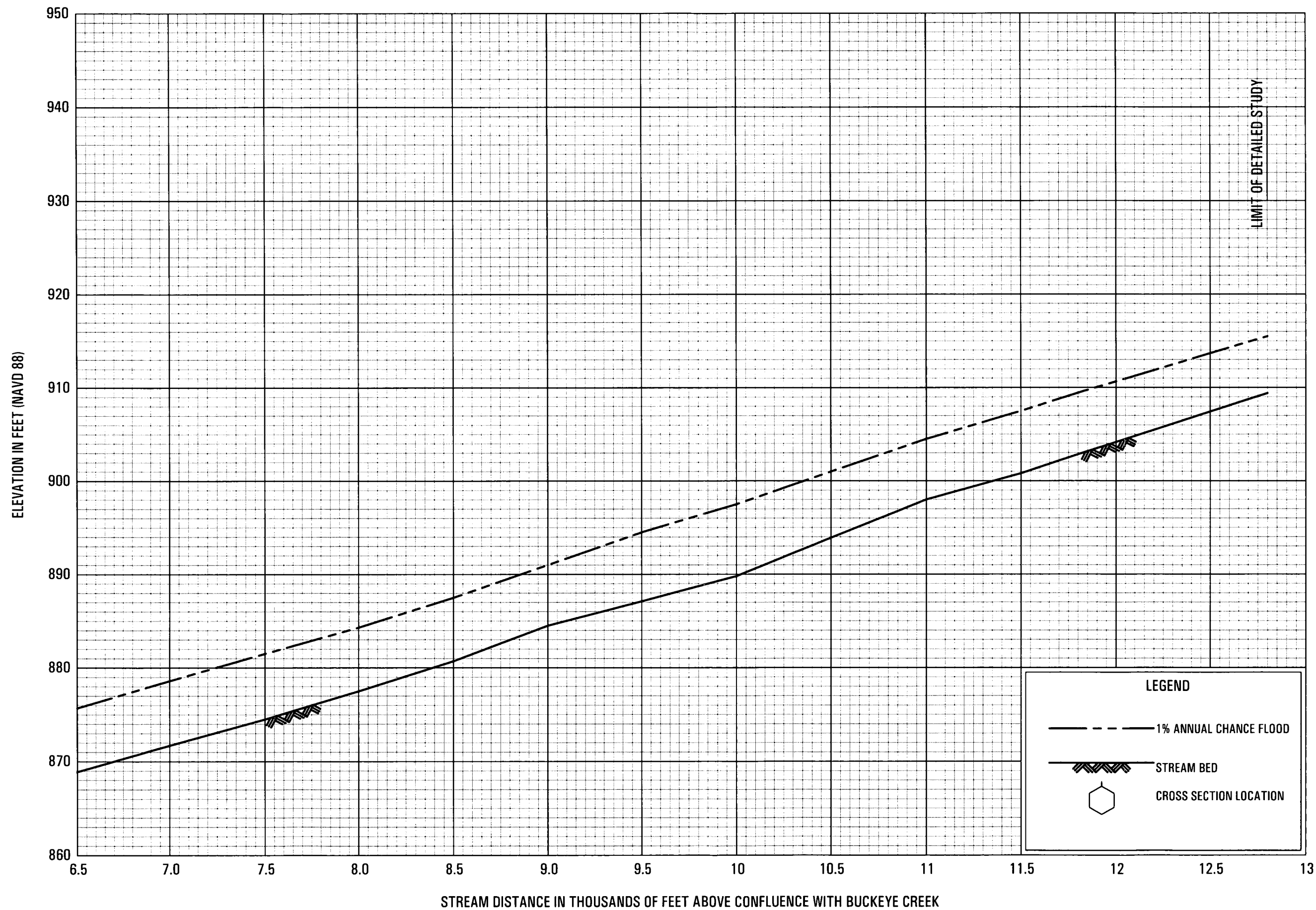
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FLOOD PROFILES

LONG RUN

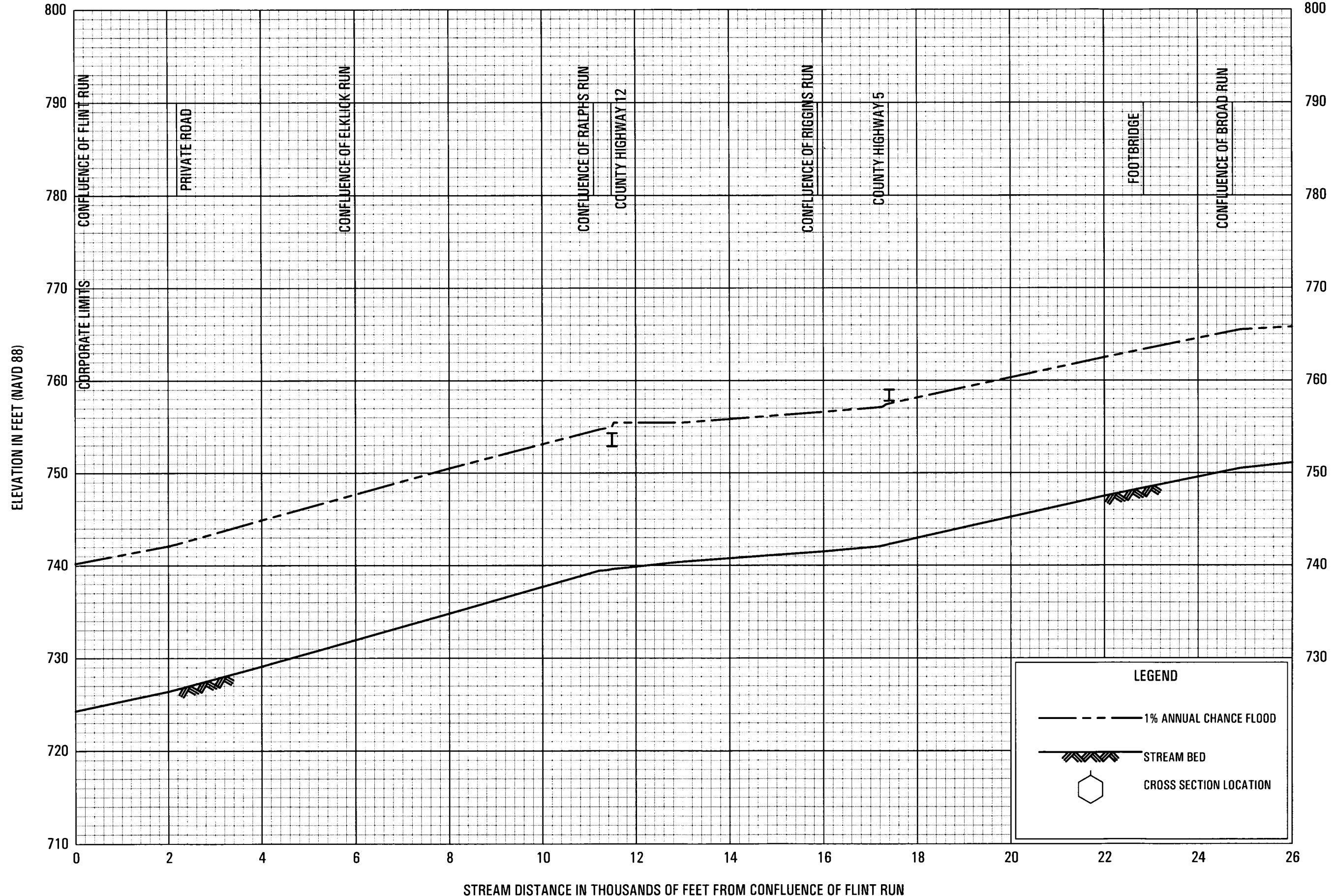
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FLOOD PROFILES

LONG RUN

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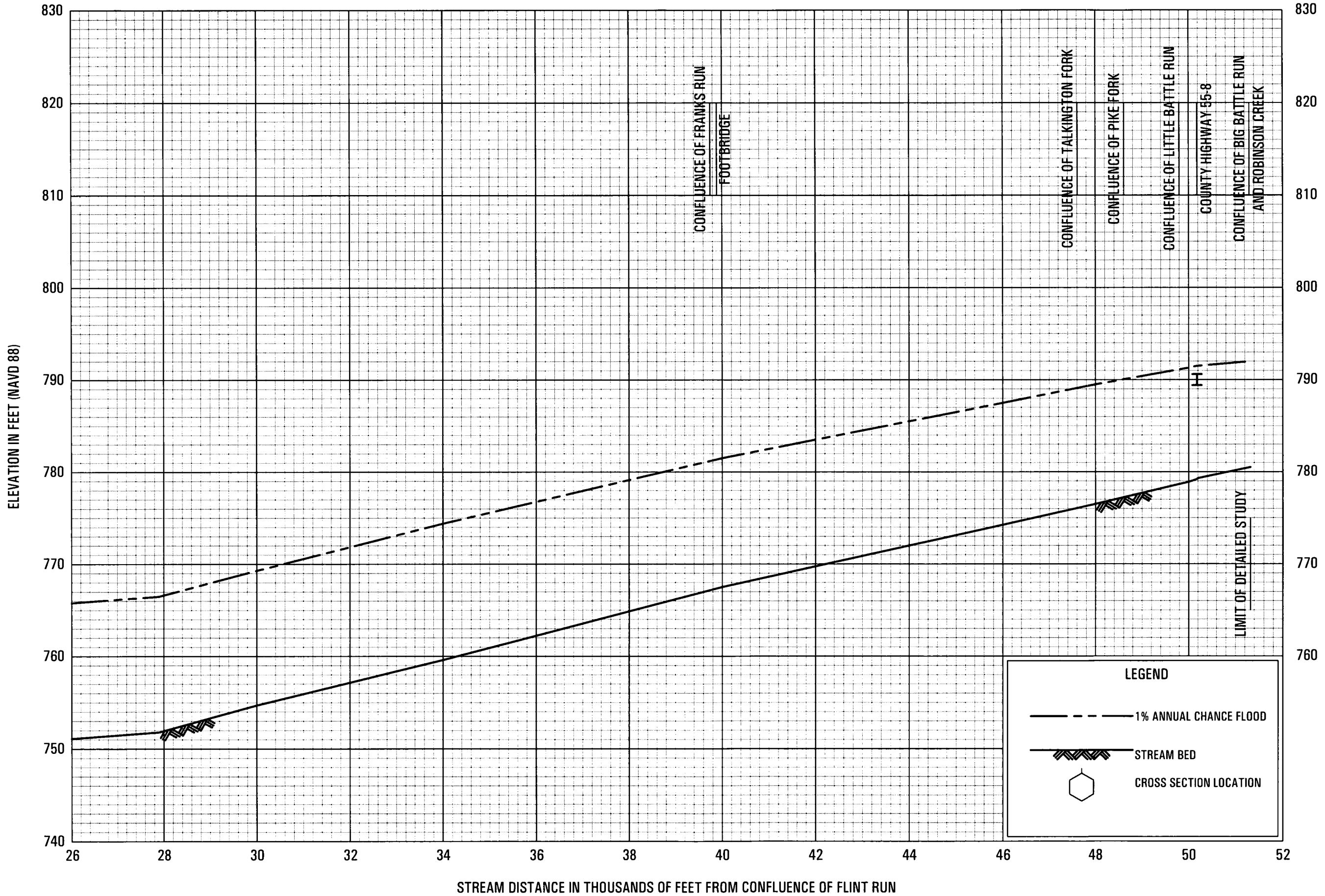
FLOOD PROFILES

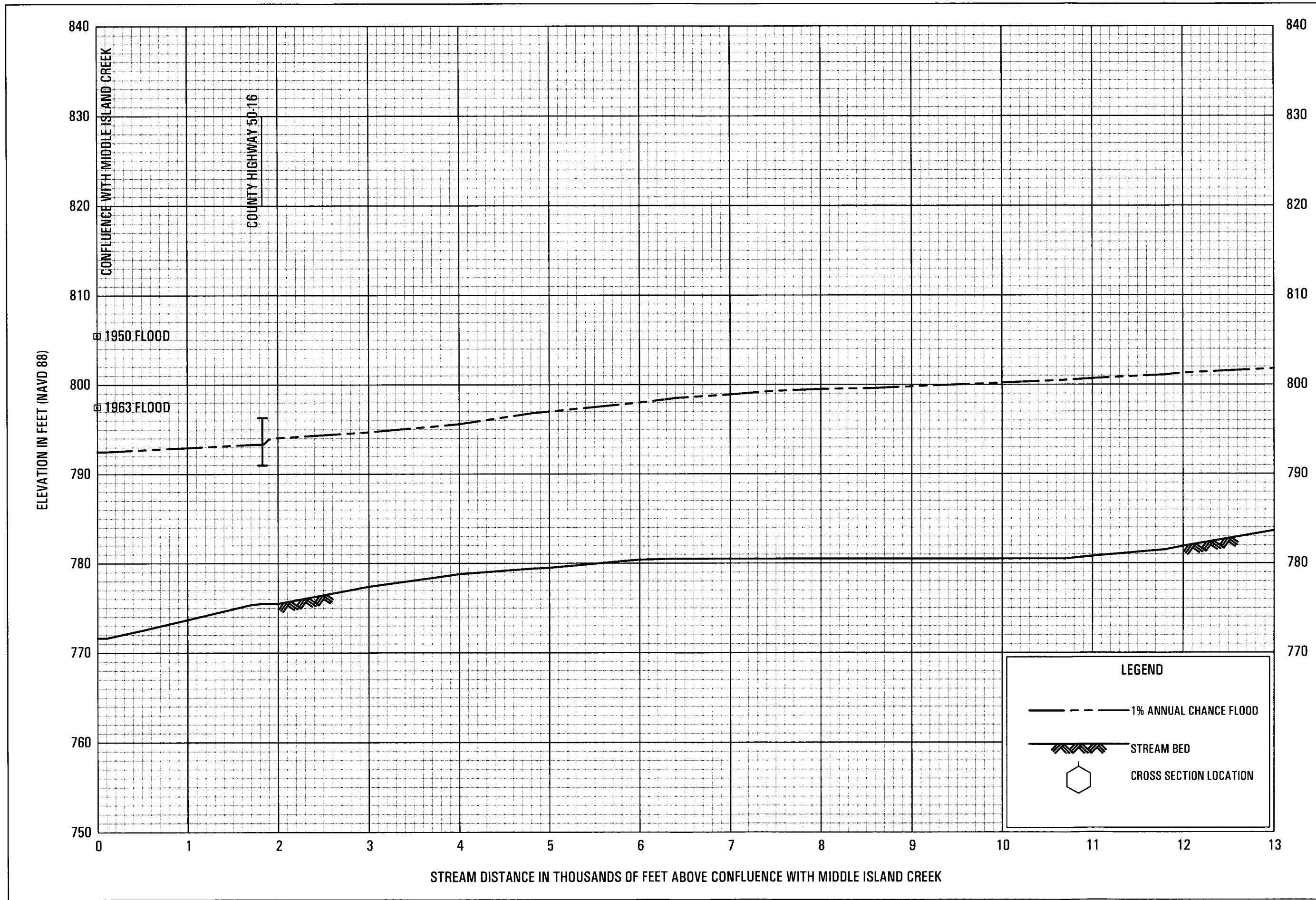
MCELROY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

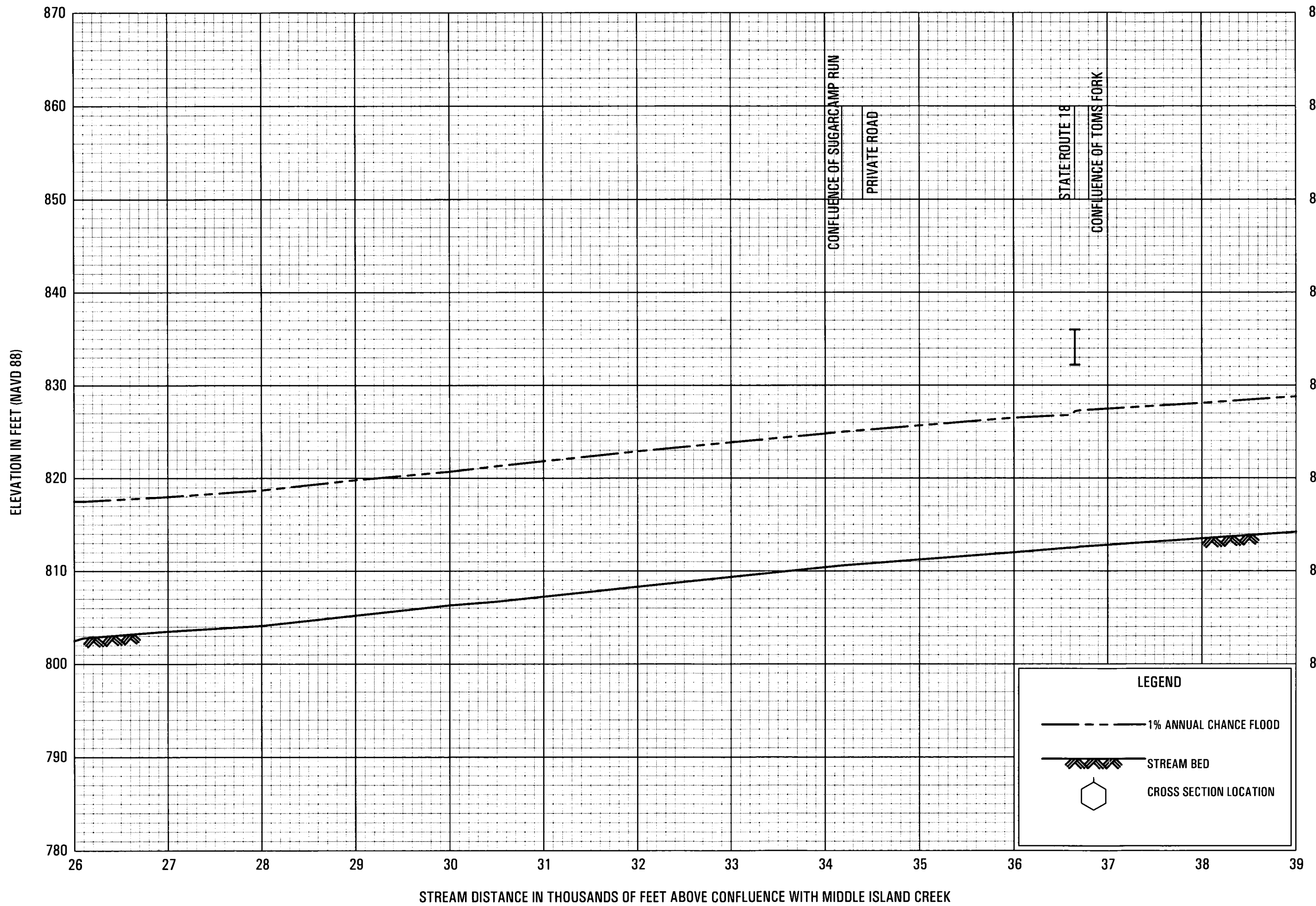




FLOOD PROFILES

MEATHOUSE FORK

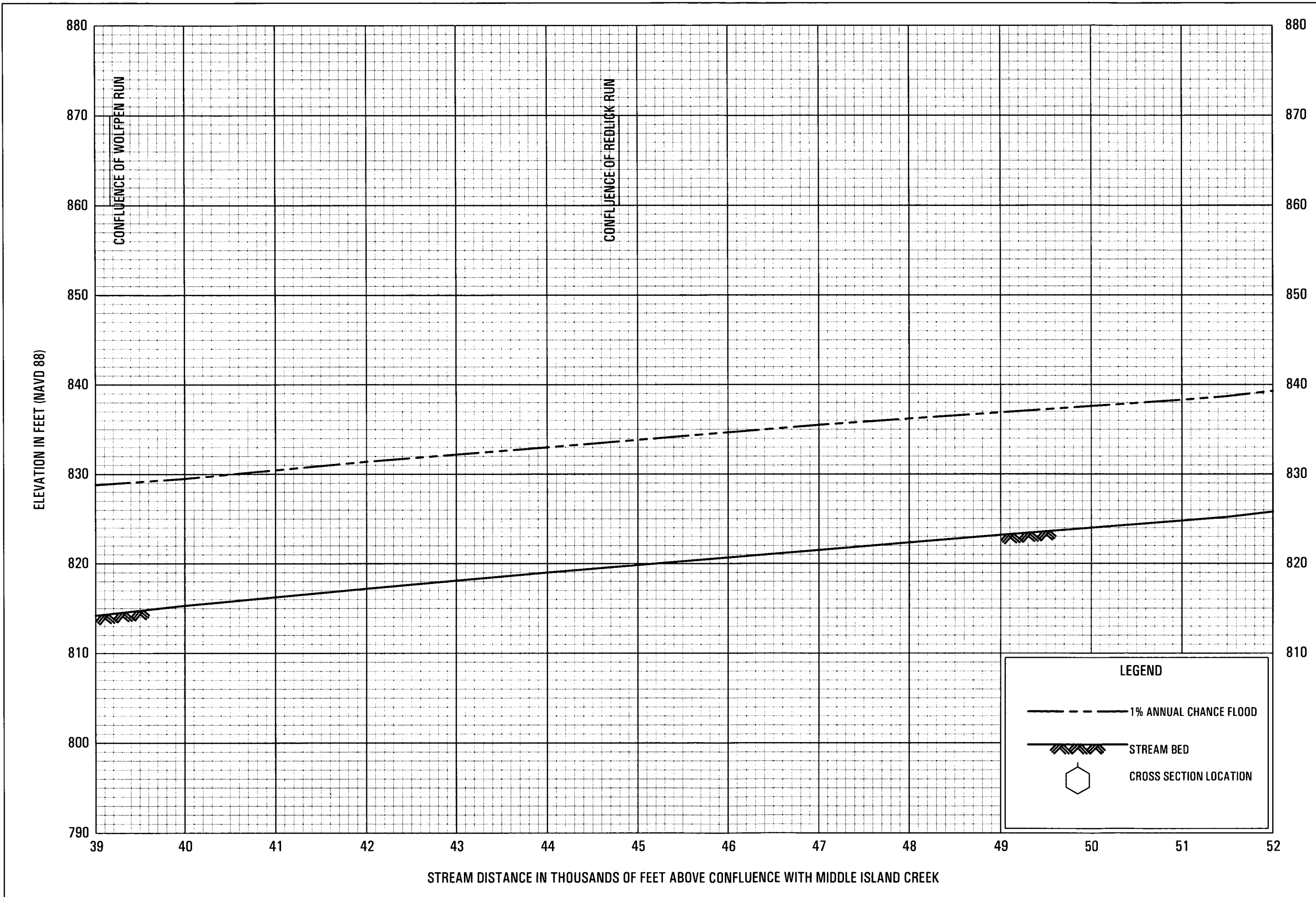
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 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

MEATHOUSE FORK

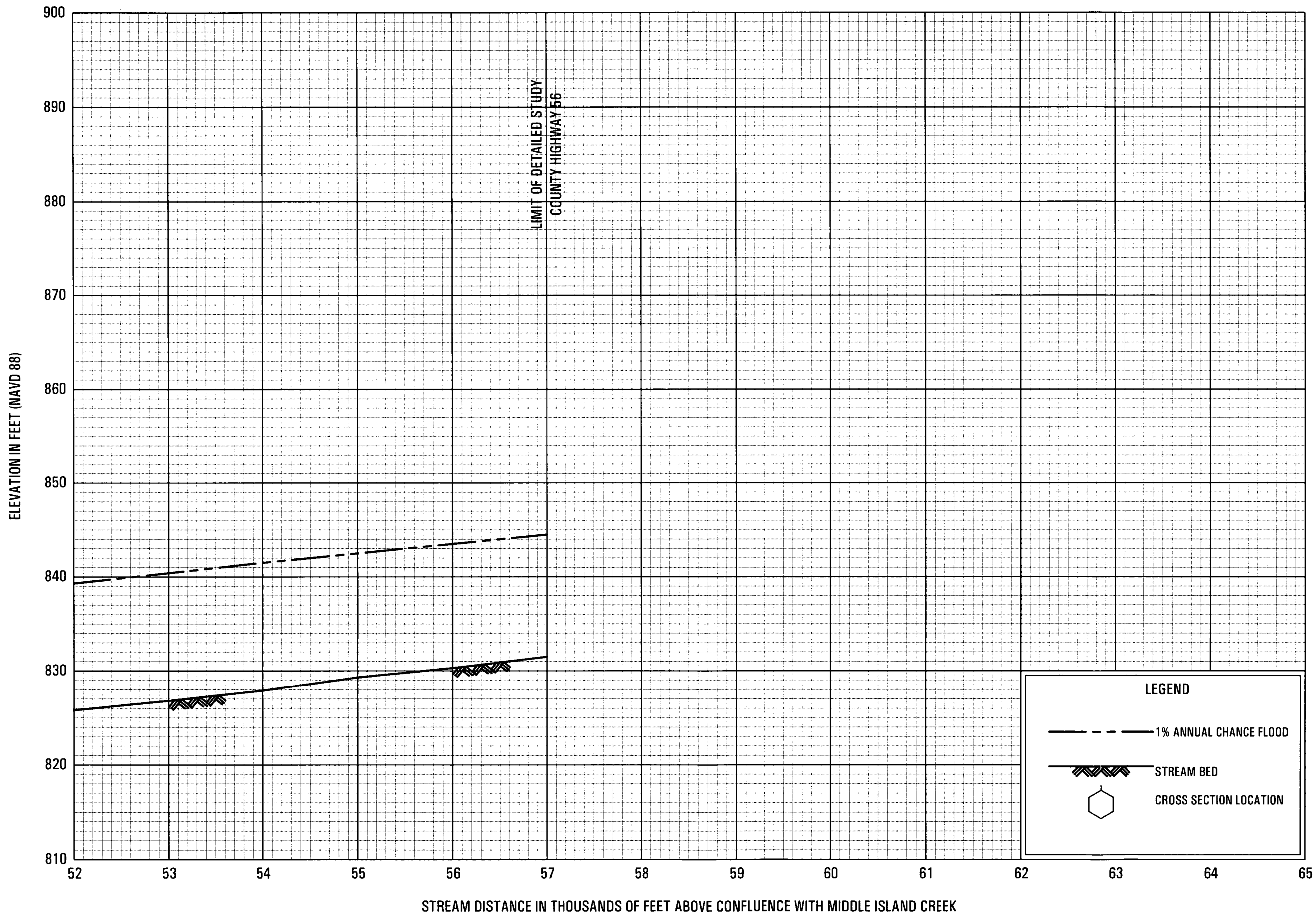
**FEDERAL EMERGENCY MANAGEMENT AGENCY
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AND INCORPORATED AREAS**



FLOOD PROFILES

MEATHOUSE FORK

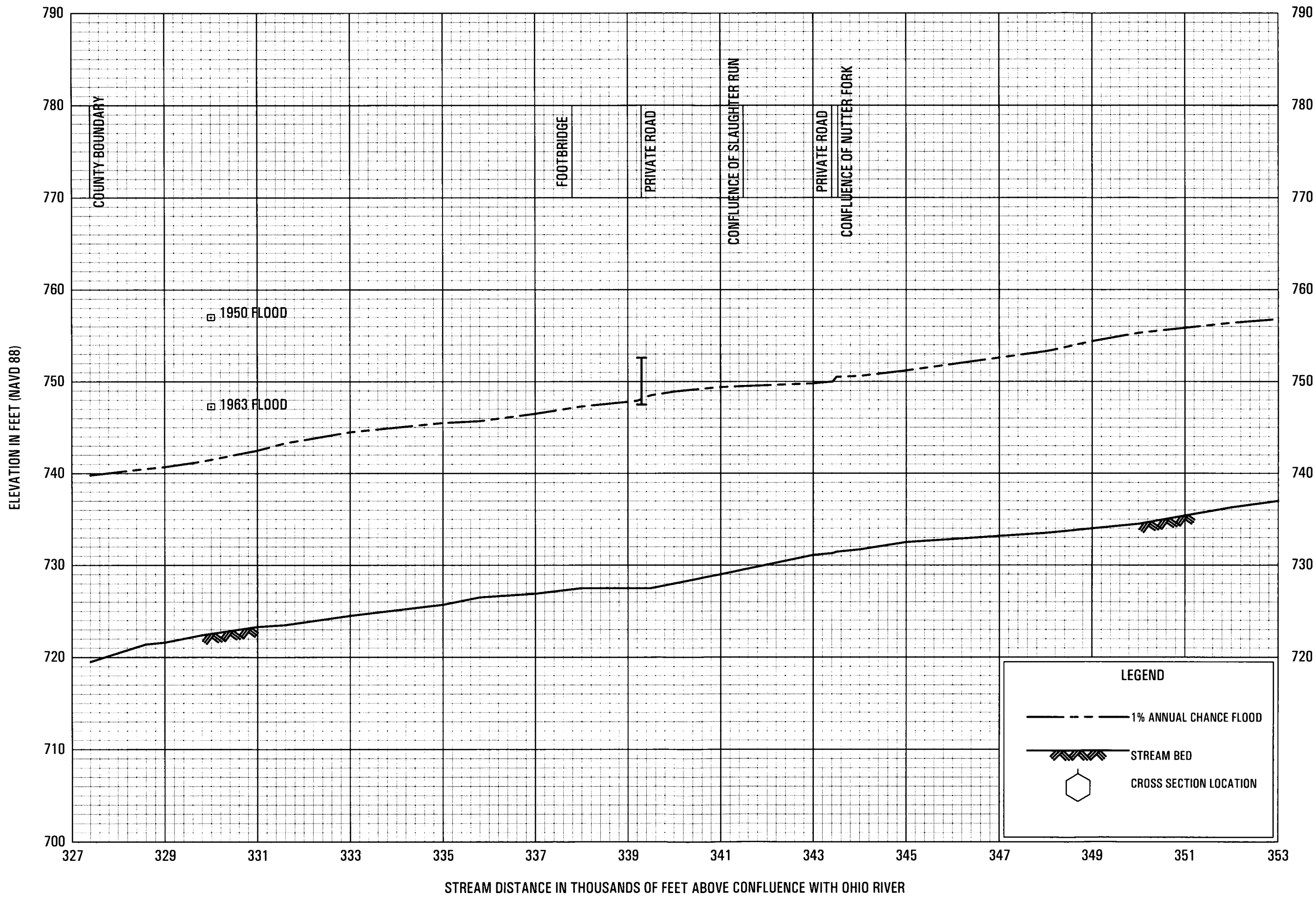
**FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS**



FLOOD PROFILES

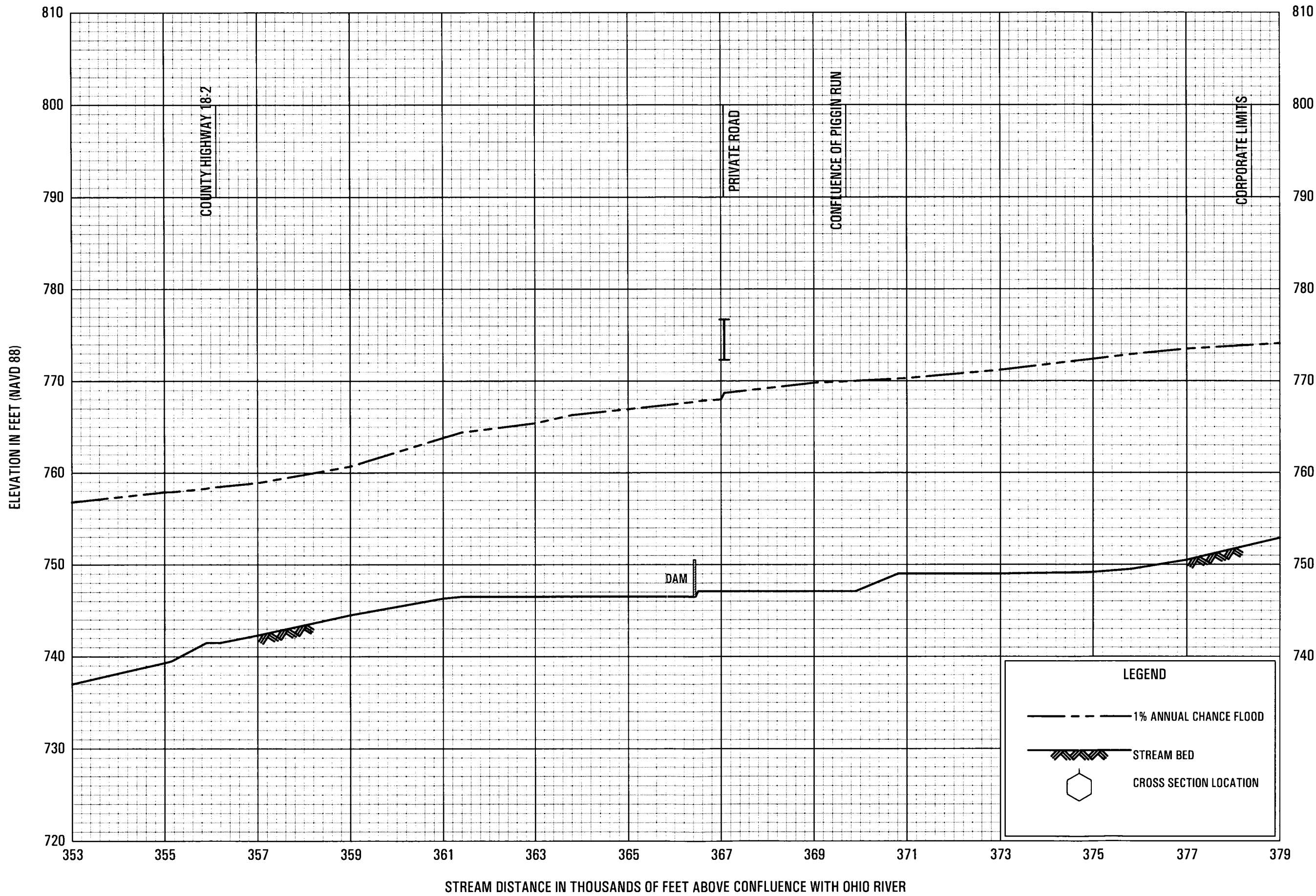
MEATHOUSE FORK

**FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS**



FLOOD PROFILES
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS



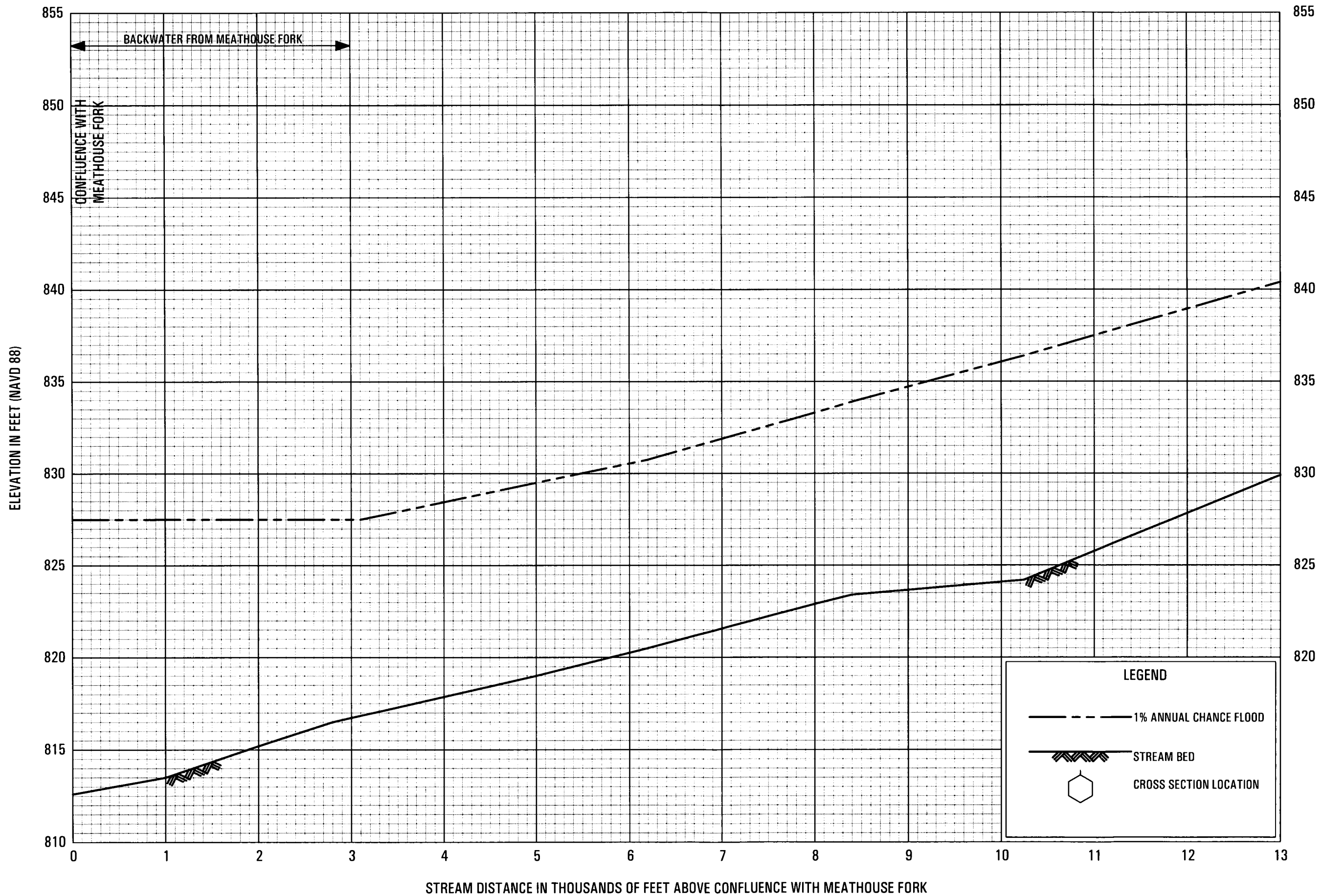
FLOOD PROFILES

MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

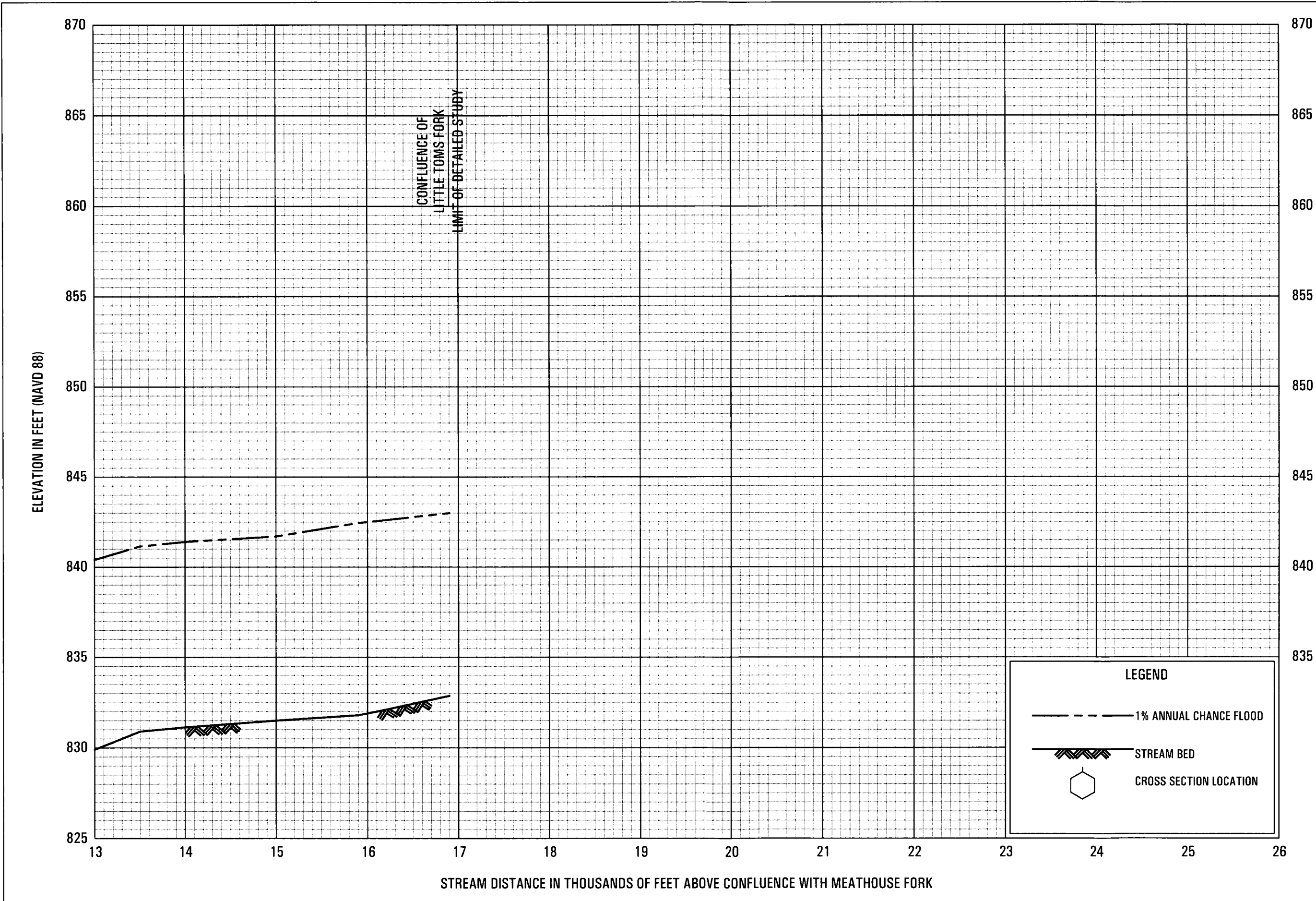
AND INCORPORATED AREAS



FLOOD PROFILES

TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



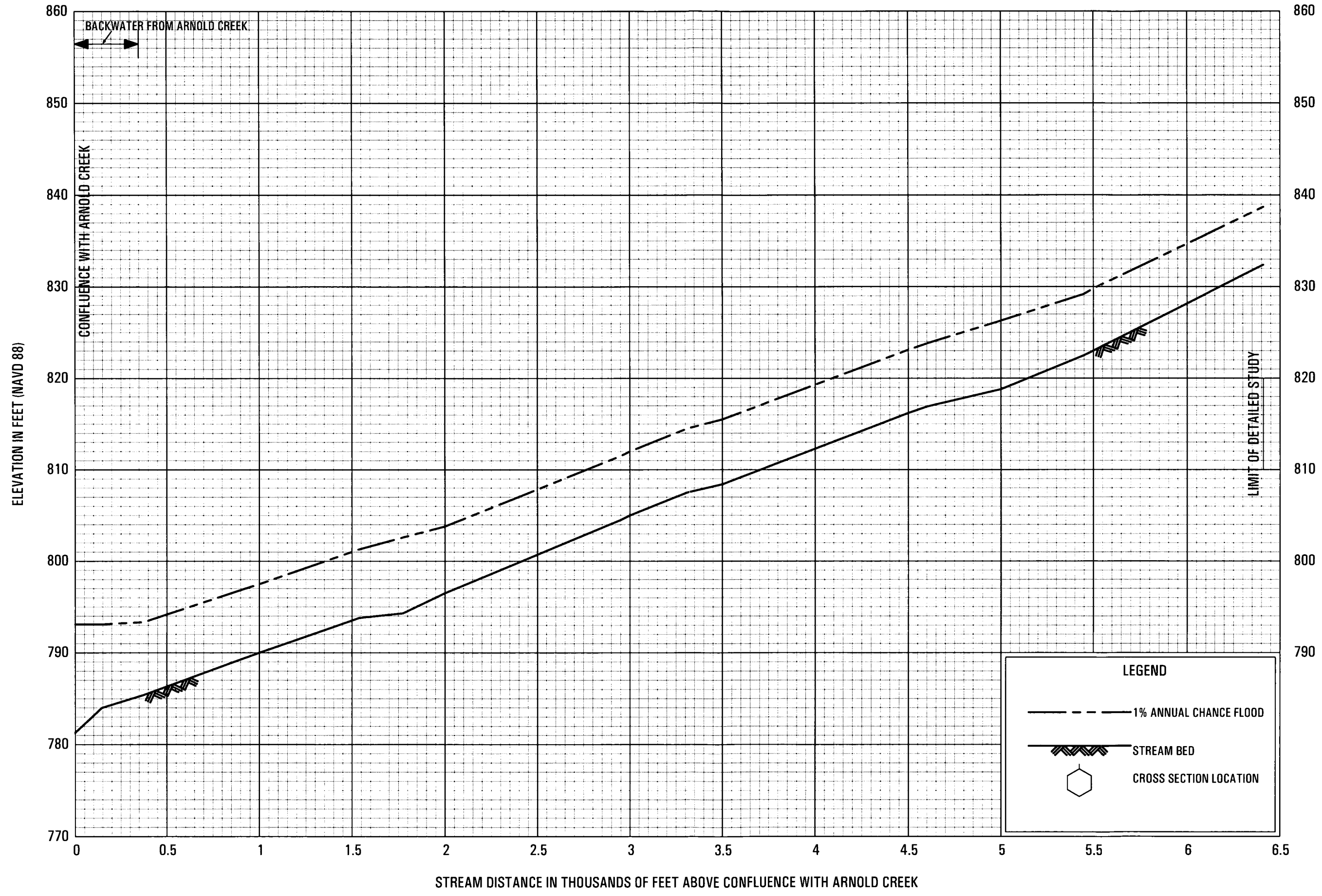
FLOOD PROFILES

TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



FLOOD PROFILES

WILHELM RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

APPENDIX C

**EXISTING CONDITIONS HYDRAULIC CALCULATIONS, CROSS
SECTIONS, AND FLOODPLAIN MAPS**

130359_SMITH_HECRAS.rep

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X      X  XXXXXX   XXXX      XXXX      XX      XXXX
X      X  X       X  X      X  X      X  X      X
X      X  X       X          X  X      X  X      X
XXXXXXXX XXXX     X          XXX XXXX   XXXXXX   XXXX
X      X  X       X          X  X      X  X          X
X      X  X       X  X      X  X      X  X          X
X      X  XXXXXX   XXXX      X  X      X  X      XXXXX
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PROJECT DATA

Project Title: 130-359-SMITHBURG-HEC-RAS
Project File : 130359_SMITH_HECRAS.prj
Run Date and Time: 9/1/2017 3:19:41 PM

Project in English units

Project Description:

Sherwood Holdings, LLC
CEC #130-359
4600 J. Barry Ct., Suite 500
Canonsburg, PA 15317

September 2017

Smithburg Natural Gas Processing Plant

FEMA Zone AE from the Doddridge County FIS shown on FEMA FIRM Panel
#54017C0140C, effective October 4, 2011.

CEC Engineering Team:

Principal: Rick Celender, C.E.T., CPESC, CPSWQ
Project Manager: Andy Gullone, P.E., CPESC, CFM
Hydraulic Modeler: Andy Celender
Reviewers: Andy Gullone, Dustin Kuhlman

Model Creation:

Existing (Pre-project): CEC Created Model File, "130-359-Existing," Plan File,

130359_SMITH_HECRAS.rep

"Existing."

Proposed (Post-project): CEC

Created Model File, "130-359-Proposed" Plan File, "Proposed."Geometry file created in Civil 3D and imported/modified in HEC-RAS.

Steady flow file based on data from FEMA FIS effective July 17, 1989.

Data Sources:

Geometry - Existing surface created from Noreast Aerial.

Flow - Total Meathouse Fork 100-year flow = 9,600 CFS.

Downstream Boundary - Junction. Approximate stream distance of 1,933 feet.

Flow - Total Buckeye Creek 100-year flow = 7,350 CFS.

Downstream Boundary - Junction. Approximate stream distance of 1,267 feet.

Flow - Total Middle Island Creek 100-year flow = 16,950 CFS.

Downstream Boundary - Known WSEL = 792.70. Approximate stream distance of 190 feet.

PLAN DATA

Plan Title: Existing

Plan File : p:\2013\130-359\Calculations\Phase
2\20170821_H&H\130359_SMITH_HECRAS.p05

Geometry Title: 130-359-Existing

Geometry File : p:\2013\130-359\Calculations\Phase
2\20170821_H&H\130359_SMITH_HECRAS.g02

Flow Title : Existing Flow

Flow File : p:\2013\130-359\Calculations\Phase
2\20170821_H&H\130359_SMITH_HECRAS.f01

Plan Summary Information:

Number of:	Cross Sections =	31	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	1	Lateral Structures =	0

Computational Information

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

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only

130359_SMITH_HECRAS.rep

Friction Slope Method: Average Conveyance
 Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing Flow
 Flow File : p:\2013\130-359\Calculations\Phase
 2\20170821_H&H\130359_SMITH_HECRAS.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Buckeye Creek	BUCKEYE CREEK	1266.73	7350
Meathouse Fork	MEATHOUSE FORK	1933.09	9600
Middle Island Cr	MIDDLE ISLAND CR	50	16950

Boundary Conditions

River	Reach	Profile	Upstream
	Downstream		

Middle Island Cr MIDDLE ISLAND CR PF 1
 Known WS = 792.7

GEOMETRY DATA

Geometry Title: 130-359-Existing
 Geometry File : p:\2013\130-359\Calculations\Phase
 2\20170821_H&H\130359_SMITH_HECRAS.g02

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Buckeye Creek	BUCKEYE CREEK		junction
Meathouse Fork	MEATHOUSE FORK		junction
Middle Island Cr	MIDDLE ISLAND CR	junction	

JUNCTION INFORMATION

Name: junction
 Description:
 Momentum computation Method
 Add Friction
 Do Not Add Weight

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
Meathouse Fork	MEATHOUSE FORK	to Middle Island Cr	MIDDLE ISLAND CR	258.95	0
Buckeye Creek	BUCKEYE CREEK	to Middle Island Cr	MIDDLE ISLAND CR	136.73	50

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1266.73

INPUT

Description:

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	5.76001	846.8715	15.06003	840	26.38	831.6429	29.82001	829.18
36.76001	824.6258	25.93002	81060.84003	808.7470	30.34003	798.9872	40.48001	796.79	
83.61002	785.4387	37.56003	78498.61002	78099.06003	779.84	103.96	778.22		
125.84	776.03	145.27	778.26	148.42	780	155.58	784	157.02	784.71
158.99	785.78	164.78	786	169.56	786.17	170.54	786.19	172.15	786.59
177.97	788	182.93	789.21	188.95	790.48	196.42	792	197.98	792.31
209.04	792.73	209.75	792.76	210.55	792.78	223.59	793.21	225.76	793.27
228.03	793.38	232.48	793.76	233.81	793.85	234.09	793.87	236.22	794
242.41	794.29	245.83	794.52	257.47	794.73	261.16	794.82	264.72	794.88
273.9	795	278.43	795.24	281.63	795.31	287.94	796	288.98	796.11
289.82	796.16	293.88	796.43	297.36	796.54	305.43	797.03	309.85	797.28
319.57	797.75	321.43	797.83	323.23	797.89	328.17	798	332.92	798.11
349.84	798.32	354.92	798.4	359.62	798.49	359.86	798.5	372.81	798.82
376.88	798.79	378.66	798.77	402.67	800				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0683	61002	.055	158.99	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	83.61002	158.99		102.48	100	91.88	.1	.3

CROSS SECTION

130359_SMITH_HECRAS.rep

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1166.73

INPUT

Description:

Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8508.649994	845.0327	57001	831.8630	35001	83034.45999	827.26		
39.48999	824.3362	85001	810.05	75.06	796.95	76.72	795.17	81.28	790
84.84	785.97	102.57	780.44	103.96	780	109.69	778.2	131.77	776
150.91	778.2	153.39	779.64	153.98	780	162.39	785.11	167.69	785.51
168.07	785.55	168.94	785.92	176.61	789.23	184.89	792	186.42	792.51
187.44	792.81	190.97	792.87	192.67	792.88	198.65	792.94	200.56	792.93
209.55	792.81	212.6	793.05	217.66	793.34	220.59	793.51	224.29	793.75
231.41	794	236.61	794.15	242.27	794.42	250.59	794.74	257.69	795.02
265.28	795.23	277.29	795.68	278.09	795.71	278.99	795.77	283.03	796
290.63	796.39	296.65	796.74	300.34	796.91	301.32	797.03	307.61	797.61
307.67	797.62	318.05	798	318.47	798.02	318.57	798.02	318.71	798.02
330.17	798.22	347.52	798.29	348.8	798.29	351.81	798.31	357.02	798.43
374.1	798.75	378.76	798.94	388.52	799.45	401.4	800		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.84	.055	162.39	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	84.84	162.39		97.82	100	98.73	.1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1066.73

INPUT

Description:

Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	10.97	843.67	13.72	841.76	30.06	830	35.72	825.93
49.39999	817.95	62.84	810.6663	41998	81076.66998	794.7477	29999	794.02	
84.62	786.8392	10999	784	97.5	781.97	111.36	778.2	133.95	775.97
153.11	778.2	155.41	780	162.96	786	163.71	786.59	165.16	786.85
167.46	787.06	171.55	788.53	173.51	789.01	175.9	789.52	178.04	789.9
179.44	790	182.71	790.23	189.25	790.58	199.84	791.11	201.06	791.16
201.42	791.18	205.98	792	206.85	792.16	207.16	792.17	213.6	792.42
217.28	792.43	225.36	792.54	234.12	792.65	239.08	792.71	244.33	792.76
253.6	792.84	264.83	793.23	267.9	793.33	269.79	793.37	275.53	793.55

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283.3	793.76	287.71	793.84	296.1	794	298.67	794.05	305.21	794.28
306.84	794.33	307.53	794.52	311.65	795.55	312.53	795.61	313.73	795.7
319.71	795.69	320.84	795.69	329.64	795.82	331.68	795.85	340.99	795.82
344.36	795.81	344.74	795.82	349.66	796	354.36	796.17	354.51	796.18
357.87	796.52	359.57	797.23	361.81	797.79	363.28	797.91	363.3	797.91
368.53	797.99	368.75	798	371.4	798.23	381.77	799.22	382.75	799.25
383	799.25	384.8	799.2	388.41	799.13	389.08	798.94	390.84	798.52
392.67	798.53	396.38	798.61	397.38	798.82	399.6	799.33	401.72	799.6
402.41	799.63	402.9	799.7	407.83	800				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.62	.055	163.71	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	84.62	163.71		100.89	100		.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 966.73

INPUT

Description:

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	826	2.25	824.774	490021	824.1112	17999	82019	98001	815.81
28.42001	811.4539	99002	80041	89999	798.11	45	795.11	51.72	788.61
63.06	78065	27002	778.22	100.02	775.94	125.62	778.24	126.19	778.58
128.55	780	131.86	782	134.32	783.46	135.4	783.64	139.39	785.66
141.27	786.66	141.47	786.8	143.64	788	146.69	789.28	147.12	789.31
148.52	789.41	154.03	789.81	155.01	789.88	156.08	790	163.3	790.79
163.98	790.86	164.19	790.87	164.41	790.89	170.42	791.24	176.28	791.37
177.34	791.42	178.26	791.41	178.93	791.41	185.11	791.62	188.21	791.65
192.65	791.74	193.74	791.77	195.26	791.79	198.68	791.87	200.67	791.95
200.77	791.95	201	792	204.28	792.77	206.2	792.82	209.19	792.79
214.72	792.91	221.04	793.03	223.32	793.1	230.44	793.33	233.77	793.41
234.37	793.44	238.44	793.59	246.96	793.79	249.56	793.83	251.56	793.86
256.59	793.9	257.15	794	260.43	794.55	262.17	794.85	264.74	794.91
267.93	794.98	273.86	794.78	278.45	794.64	279.05	794.53	279.08	794.53
279.1	794.53	279.13	794.53	279.33	794.53	290.18	794.74	299.26	794.91
300.98	794.93	301.8	794.95	302.46	794.97	305.32	795.43	307.47	795.79
308.34	795.8	310.93	795.82	315.75	796	318.22	796.1	320.05	796.15
322.18	796.23	324.02	796.27	326.23	796.2	330.34	796.24	331.3	796.25
331.56	796.25	334.15	796.42	335.32	796.49	335.66	796.5	341.42	796.69
341.82	796.66	351.6	800						

130359_SMITH_HECRAS.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 51.72 .055 146.69 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 51.72 146.69 118.09 100.38 66.66 .1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 866.35

INPUT

Description:

Station Elevation Data num= 110
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 8003.660004 796.964.709991 796.8211.66998 79616.73999 795.35
 17.16 795.1918.51999 79418.85999 793.64 19.69 793.2323.63998 791.24
 25.47998 790 27.78 788.44 29 787.53 33.13 786.9435.07999 786.65
 35.82999 786.37 36.72 78640.89999 784.343.51999 784 45.31 783.79
 45.88 783.7246.95999 783.4748.44998 783.07 49.31 783.6553.35001 786
 55.60999 787.2864.60999 788.4568.51999 789.09 72.25 78973.57999 788.96
 83.10999 788.94 88.16 785.395.28998 78097.95999 778.01 121.7 775.97
 146.46 778.02 148.02 780 148.9 781.11 150.26 782.29 156.29 785.69
 156.89 785.99 157.95 786.05 164.61 786.43 165.21 786.45 165.93 786.47
 173.98 787.05 176 787.19 176.43 787.21 181.29 788 183.28 788.32
 183.39 788.33 186.23 788.43 189.69 788.68 195.95 789.11 201.11 789.76
 202.9 789.96 205.05 789.95 207.58 789.91 210.46 789.87 211.32 790
 214.37 790.42 217.24 790.23 218.89 790.12 220.68 790.18 223.56 790.28
 227.23 790.36 232.83 790.47 237.6 790.51 239.64 790.63 242.61 790.76
 253.5 791.28 258.52 791.63 263.71 791.87 265.76 792 272.02 792.74
 275.91 793.27 279.03 793.51 284.41 794 288.68 794.39 291.98 794.57
 296.08 794.72 302.88 794.97 315.81 795.11 316.92 795.11 317.68 795.11
 317.94 795.12 326.11 795.26 331.62 795.26 332.32 795.26 337.77 795.43
 339.91 795.48 340.04 795.49 340.2 795.47 343.79 795.09 344.74 795.13
 349.3 795.29 350.87 795.56 352.71 795.69 355.57 795.81 358.16 796
 360.45 796.17 364.7 796.37 370.08 796.69 374.56 797.82 378.07 798.72
 386.43 799.68 386.65 799.7 388 799.97 388.1 799.98 388.43 800

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0683.10999 .055 156.89 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 83.10999 156.89 146.5 139.62 119.7 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent

0 68.52 795

CROSS SECTION

RIVER: Buckeye Creek
REACH: BUCKEYE CREEK RS: 726.73

INPUT

Description:

Station Elevation Data			num= 88							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	8241.399994	823.543	359985	822.816	720001	821.3814	41998	818.89		
15.64999	818.41	19.88	816.5824	35999	814.6829	67999	811.0130	65999	810.36	
32.07999	809.6232	50999	809.437	40999	806.8139	43999	806	39.7	805.9	
40.51999	805.7641	39999	804.5243	53999	801.3	45.87	797.79	47.56	794.49	
49.50999	792.4551	25999	79051	32999	789.9154	87999	786.8856	40999	785.74	
57.81999	784.4360	65999	782.04	64.56	780.8468	14999	780	68.5	779.92	
75.73999	778.8976	68999	778.74	78.75	778.61	81.95	778.0982	42999	778	
84.03	777.68	108.4	776.03	128.22	777.62	128.72	778	130.86	779.65	
132.46	781.12	133.34	782.17	136.18	786	136.3	786.17	138.53	786.39	
141.38	787.3	141.47	787.33	141.58	787.31	141.74	787.33	152.9	787.8	
155.64	787.92	156.31	787.94	157.26	788	168.77	788.66	173.38	788.82	
176	789	180.44	790	181.71	790.29	183.06	790.6	184.43	790.73	
186.14	790.96	186.33	790.99	192.41	792	193.97	792.26	198.55	792.68	
207.27	793.29	210.44	793.54	212.34	793.6	222.61	794	224.45	794.07	
228.94	794.24	230.76	794.46	231.93	794.51	233.64	794.76	237.86	795.32	
240.17	795.4	245.8	795.69	249.33	795.92	250.48	796	257.43	796.51	
259.19	796.61	260.1	796.68	260.79	796.79	268.59	797.47	271.5	797.66	
272.68	797.72	277.19	797.96	278.93	798					

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.0654	87999	.055	136.3	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.87999	136.3		98.8	100	91.86	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: BUCKEYE CREEK RS: 626.73

INPUT

Description:

Station Elevation Data			num= 69							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	

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0	814	.75	813.883	369995	813.27	10.8	811.97	11.77	811.83
20.69	810.23	21.19	81021.46001	809.87	25.63	807.6525	84001	807.53	
27.89	806.3933	.73001	803.4935	.93001	800	38.39	793.64	40.75	789.42
42.39	787.847	.34001	784.2348	.59001	783.1450	.79001	781.6652	.59001	780
53.39	779.2559	.23001	778	60.77	777.5762	.84001	777.0781	.01001	775.78
107.9	778	113.99	780.82	117.8	784.31	119.49	786	120.66	787.16
127.74	787.03	131.32	786.97	133.25	786.86	137.61	786.41	144.48	786.55
149.83	786.65	163.39	786.77	163.6	786.78	163.82	786.78	179.84	787.35
189.13	787.94	190	788	192.32	788.14	193.24	788.2	193.68	788.29
195	788.49	200.12	789.3	204.37	790.8	204.72	790.98	205.2	791.22
210.8	794	212.03	794.61	217.01	795.45	221.41	796	227.73	796.31
231.28	796.62	246.6	797.34	250.32	797.54	250.74	797.55	252.03	797.58
253.03	797.61	253.6	797.63	255.15	797.61	256.86	797.64	260.32	797.77
262.84	797.84	263.86	797.86	265.57	797.95	266.38	798		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0647	.34001	.055	120.66	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.34001	120.66		105.28	100		.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 526.73

INPUT

Description:

Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.3099976	803.943	830002	803.310	32001	802	15.84	800.96	
22.32001	798.822	.57001	798.7224	.46001	798.17	24.86	798	26.23	797.37
31.89999	794	32.08	793.89	36.09	790.35	36.31	79037	.82001	787.6
40.53999	786	42.38	784.94	44.13	783.68	44.95	782.86	48.39	779.96
50.00999	778.851	.42999	77853	.03999	776.94	73.34	775.52	98.18	776.99
102.8	781.08	108.95	783.93	109.02	783.96	109.17	784	111.04	784.36
113.42	785.02	115.56	785.15	123.87	785.75	132.3	785.86	133.07	785.87
135.34	785.7	142.1	785.17	143.83	785.29	153.21	785.74	156.5	786
161.01	786.33	164.19	786.59	167.51	787.09	169.29	787.32	169.85	787.4
170.85	788	173.04	789.31	176.92	791.39	178.22	792.03	182.75	794
184.03	794.55	187.24	795.09	193.84	796	201.62	796.68	205.84	797.06
207.07	797.14	212.9	797.3	221	798				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	44.95	.055	109.17	.06

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 44.95 109.17 101.52 100 54.01 .1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 426.73

INPUT

Description:

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.029999	803.588	549988	802.4	16.78	800.9121	32999	800	
24.34	799.4	31.22	798.1846	17999	796.1347	02998	796	47.37	795.95
50.17999	795.5661	16998	794.0561	21999	794.0461	72998	794	69.60	793.35
70.10999	793.1772	44998	79273.24998		791.5978	07999	790.2380	75999	789.54
84.39999	788.4585	84999	78888.15999		787.2993	53999	786.98	93.87	786.95
94.63998	786.91	103.01	786.62	106.18	786.24	108.97	786	111.27	785.79
116.76	779.71	117.36	779.27	118.03	778.54	119.02	778	119.8	777.57
122.04	776.43	147.26	775.23	171.15	776.43	173.1	778	176.02	780.72
178.28	782.51	180.15	784	181.15	784.76	182.49	784.98	183.23	785.03
184.5	785.06	189.8	785.25	190.93	785.28	199.11	785.45	201.92	785.51
202.24	785.5	202.44	785.5	203.02	785.51	203.47	785.52	212.86	785.55
217.48	785.56	220.87	785.64	222.61	785.59	224.17	785.64	227.37	785.78
231.46	785.98	231.94	785.99	232.12	786	239.96	786.32	243.95	786.6
246.04	786.78	246.68	786.8	250.06	786.92	254.88	787.51	255.97	787.65
256.42	787.79	260.37	788.52	262.74	789.5	266.72	791.25	266.96	791.35
272.89	793.86	274.55	794.56	279.34	795.44	281.61	796	282.11	796.11
288.04	796.72	302.3	798						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	111.27	.055	181.15	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 111.27 181.15 90.53 100 148.77 .1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 326.73

INPUT

Description:

Station Elevation Data num= 92

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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.26	006	803.79	820007	803.3	10.94	803.21	11.88	803.13
22.64999	802.14	24.94	80227.95	001	801.77	36.31	801.1	38.19	800.94
49.14001	800.07	49.82	001	800	52.13	799.78	66.17	001	798.71
83.5	797.21	89.34	796.64	94.14	999	100.83	795.1	106.15	794.27
108.14	794.02	108.3	794	119.51	792.2	122.34	792	123.74	791.9
126.77	791.53	127.36	791.4	128.81	791.02	132.87	789.92	133.63	789.84
134.47	789.76	138.94	788.58	140.94	788	141.14	787.94	145.91	786.86
148.45	786.23	151.27	786.22	155.27	786.25	159.78	786.37	167.07	786.58
173.49	786.19	176.88	786.08	176.91	786	179.35	780.52	180.33	778.45
181.6	778	185.83	776.43	208.91	774.81	233.34	776.43	234.91	778
236.56	779.59	239.89	784	240.38	784.64	242.82	784.72	243.93	784.76
252.85	785.02	261.3	784.89	263.52	785	265.61	786	268.2	787.24
268.81	787.45	269.69	787.76	272.39	789.69	276.57	793.12	280.07	795.11
284.34	798	285.27	798.63	287.21	798.71	291.85	798.81	297.66	798.94
302.01	799.11	304.31	799.13	312.74	799.18	320.15	799.24	322.3	799.28
327.35	799.19	333.97	799.08	338.49	798.32	339.5	798.25	342.12	797.87
344.03	798.19	345.11	798.28	350.17	800	350.89	800.29	351.64	800.66
359.09	803.66	363.36	806.01	368.61	808.7	379.99	816.12	381.81	817.34
382.55	817.77	386.22	820						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	176.91	.055	240.38	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	176.91	240.38		110.54	100	104.62	.1
							.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 226.73

INPUT

Description:

Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.46	006	803.46	4.88	005	803.43	5.29	009	803.41
19.98	001	802.31	20.34	802.29	21.89	999	802.18	31.45	001
34.60	001	801.25	42.38	800.63	49.97	800.38	51.48	999	800.28
63.91	799.37	0.41	998	798.84	82.31	798.84	1.10	001	797.87
101.07	796	101.54	795.94	104.78	795.57	117.54	794.27	117.55	794.27
119.97	794	128.06	793.1	128.3	793.06	128.41	793.05	129.71	793
140.28	792.47	149.3	792.12	156.05	792	162.77	791.88	171.54	791.44
176.37	791.18	179.6	790.99	191.02	790.32	195.46	790.08	196.85	790
200.2	789.74	200.38	789.73	200.82	789.65	210.68	788.11	216.58	787.67
220.71	787.44	227.8	787.25	231.46	787.12	236.05	787.07	237.36	787.06

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238.81	786.92	242.25	786.53	243.02	786.53	246.09	786.39	253.64	786.53
255.35	786.58	255.67	786	259.33	779.34	259.94	778.42	260.89	778
265.29	776.43	281.02	774.36	311.42	776.43	311.61	776.61	313.28	778.18
316.97	781.67	319.98	784.52	320.84	784.67	321.76	784.89	325.67	787.01
327.67	788.03	332.49	791.69	333.11	792.19	334.79	793.43	341.49	798
341.62	798.09	346.62	798.34	350.5	798.52	357.55	798.91	358.5	798.97
358.93	798.98	361.24	799.05	361.43	799.05	369.37	799.29	370.34	799.28
380.26	799.36	385.82	799.31	391.42	799.2	395.75	798.68	397.2	798.51
399.7	798.64	402.34	798.85	403.34	799.08	405.06	799.69	407.4	799.69
408.22	800	410.08	800.7	415.15	802.91	420.94	806.42	425.09	808.89
435.12	815.87	437.37	817.34	444.56	822				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	255.35	.055	319.98	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	255.35	319.98		56.16	90	93.21	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 136.73

INPUT

Description:

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8041.439972	803.592.289978	803.28	7.98999	803.378.609985	803.4			
9.419983	803.3713.53998	803.1118.07999	802.8618.54999	802.7420.62997	802.46				
22.93997	801.72	26.09	801.0230.48999	800.7736.67999	800.3641.21997	800			
43.04999	799.8548.95999	799.3352.93997	798.9360.09998	798.2165.00998	797.71				
65.14999	797.6967.14999	797.3876.41998	79677.62997	795.82	79.25	795.74			
79.34998	795.7379.85999	795.7187.95999	795.2996.07999	794.74	101.87	794.34			
108.25	793.94	123.17	793.17	127.67	792.92	130.8	792.82	147.05	792.32
161.73	792	164.94	791.91	165.05	791.91	195.21	791.61	195.68	791.61
196.4	791.59	224.69	790.84	224.85	790.83	233.21	790.16	235.15	790
242.12	789.41	242.96	789.33	245.39	789.01	249.05	788	253.68	786.69
255.63	786.08	256.53	786.07	262.57	786.1	265.89	785.99	268.72	785.9
273.85	785.68	288.14	785.39	288.54	785.36	290.58	783.94	296.91	779.43
300.48	777.5	302.42	776.43	322.59	773.97	344.41	776.43	344.49	776.53
345.74	778.02	347.84	780.78	349.83	782.64	353.12	785.8	358.14	786.29
358.74	786.35	358.92	786.42	363.9	788.56	366.19	790.06	368.38	791.5
369.34	792.13	369.7	792.38	370.27	792.77	377.69	798.06	377.9	798.21
383.55	798.76	384.69	798.87	388.04	799.1	395.03	799.61	404.67	799.65
406.83	799.64	408.46	799.58	411.83	799.53	413.5	799.3	417.17	798.92
420.39	799.14	422.73	799.18	424.54	800.12	427.59	801.69	429.75	802.88

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432.35 805.7 436.85 809.57 446.05 815.28 447.61 816.26

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 288.54 .055 353.12 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 288.54 353.12 0 0 0 .1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1933.09

INPUT

Description:

Station Elevation Data num= 86
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 795.723.369995 795.376.710022 795.0214.92001 794.2722.80002 793.38
 25.94 793.0327.70001 792.83 34.94 792.2138.68002 791.9945.42001 791.54
 48.44 791.3449.05002 791.350.65002 791.19 51.5 791.14 53.47 791.07
 59.62 790.8363.99002 790.62 64.41 790.5766.70001 789.4969.29001 787.65
 71.22 786.5172.01001 786.01 77.38 784.0578.74002 783.55 84.25 782.28
 92.69 779.9893.08002 779.88 100.63 777.48 102.24 776.95 111.23 775.95
 123.23 775.34 135.23 776.03 142.58 776.95 142.91 777.16 144.29 778.04
 148.13 780.48 158.85 785.95 160.02 786.52 161.63 787.3 163.13 787.76
 163.37 787.83 164.31 788.06 172.54 790.07 172.97 790.17 175.83 790.32
 179.83 790.5 189.07 790.8 193.42 790.95 199.57 791.2 217.65 791.82
 218.37 791.84 218.83 791.84 234.97 791.93 234.98 791.94 235.65 791.9
 236.76 791.89 238.63 791.95 239.25 791.91 241.05 791.93 249.28 791.9
 249.69 791.9 252.31 791.88 253.41 791.93 254.74 791.93 260.01 792.01
 267.75 792.14 270.64 792.16 284.19 792.36 291.93 792.49 298.84 792.54
 306.32 792.72 320.76 793.12 328 793.24 343.34 793.57 354.56 794.06
 364.86 794.62 376.44 795.03 388.06 795.3 395.49 795.46 420.15 796.29
 427.64 796.57 430.23 796.66 431.41 796.7 442.09 797.07 455.53 797.69
 463.26 798.01

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0672.01001 .055 158.85 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 72.01001 158.85 76.85 73.09 73.93 .1 .3

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1860

INPUT

Description:

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	796.81	640015	796.585	559998	794.651	2.73999	790.51	23.31	786.06
24.66	785.49	26.78	784.544	1.26001	780.36	42	780.224	4.48001	778.93
49.19	776.44	56.5	775.66	70	774.64	83.5	775.798	4.52002	776.5
85.54001	777.08	85.56	777.09	87.38	777.591	1.73999	779.919	4.45999	781.34
95.11002	781.75	100.78	785.41	108.15	790.32	109.14	790.84	117.76	791.78
119.84	792.04	120.1	792.07	123.24	792.3	125.48	792.34	138.85	792.46
147.12	793	151.05	793.11	163.35	793.26	164.95	793.28	165.64	793.27
165.7	793.27	166.15	793.26	169.1	793.24	175.28	793.21	179.3	793.19
179.84	793.19	180.09	793.19	185.35	792.87	187.8	792.61	189.1	792.42
191.11	792.38	191.82	792.38	196.39	792.43	198.13	792.47	203.09	792.49
210.86	792.43	219.06	792.65	221.2	792.71	221.66	792.72	224.25	792.86
231.38	793.25	234.12	793.31	257.86	793.89	273.33	793.91	278.74	793.87
283.37	793.92	284.93	793.94	287.47	794.01	309.93	794.57	320.37	794.8
344.22	795.43	352.46	795.73	356.6	795.98	367.69	796.64	375.62	796.77
377.6	796.92	381.63	797.04	383.13	797.14	383.79	797.1	393.67	797.36
396.91	797.68	401.6	797.61	407.77	797.87	408.88	797.96		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	26.78	.055	100.78	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	26.78	100.78		57.5	50	36.5	.3
							.5

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1810

INPUT

Description:

Station Elevation Data num= 234

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.890015	803.862	970001	803.863	470001	803.782	20.45999	802.63	
24.59	802.352	7.85001	802.07	29.41	801.984	0.73001	801.17	43.97	800.85
45.42001	799.915	0.54999	796.695	2.26001	796.135	3.10001	795.845	3.79999	795.6
54.01001	795.535	5.17999	794.58	55.44	792.475	5.67001	792.495	5.67999	791.97
56.26001	791.81	63.87	789.673	0.04001	786.487	6.23999	784.047	6.32001	783.99
76.45001	783.976	5.8002	783.827	6.64001	783.788	4.86002	779.01	88.81	776.73
88.94	776.648	9.08002	776.558	9.11002	776.538	9.35001	776.38	89.37	776.36

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89.48999	776.28	89.62	776.289.85001	776.1990.08002	776.19	90.31	776.18		
90.54999	776.1890.79001		776.1791.04001	776.1791.29001	776.1691.51001		776.16		
91.73001	776.1591.95001		776.1592.17001	776.1492.35001	776.14	92.53	776.13		
92.81	776.13	93.09	776.12	93.34	776.12	93.59	776.1193.82001	776.11	
94.04999	776.1	94.37	776.0994.70001	776.0995.04999	776.0895.32001		776.08		
95.59	776.07	95.87	776.06	96.09	776.06	109.01	775.91	109.64	775.89
110.27	775.88	110.46	775.88	110.92	775.87	111.84	775.85	112.39	775.88
112.92	775.9	112.94	775.9	113.49	775.93	114.05	775.96	114.45	775.97
115.69	776.03	116.32	776.06	116.74	776.07	117.15	776.09	117.65	776.11
118.16	776.14	118.66	776.16	119.31	776.18	125.94	776.35	126.37	776.37
126.75	776.38	127.13	776.4	127.53	776.42	127.94	776.43	128.36	776.45
128.85	776.47	129.25	776.48	129.65	776.5	130.07	776.51	130.31	776.52
130.78	776.54	131.25	776.56	131.74	776.58	132.49	776.56	132.95	776.77
133.41	776.98	133.88	777.19	134.36	777.41	134.78	777.6	135.2	777.79
135.63	777.98	136.04	778.16	136.46	778.35	137.08	778.62	137.5	778.81
137.93	779.01	138.36	779.2	138.81	779.4	139.25	779.6	139.71	779.81
140.13	780	140.56	780.19	140.6	780.21	141.1	780.42	141.62	780.65
142.14	780.87	152.62	786.98	152.64	786.99	152.67	787	152.7	787.02
152.72	787.03	152.75	787.04	152.76	787.05	152.77	787.05	155.05	788
155.84	788.18	156.45	788.32	157.61	795.62	158.1	795.98	158.3	795.99
163.19	795.31	168.48	795.03	169.74	794.71	171.64	795.06	175.19	795.23
179.59	795.63	179.79	795.65	181.04	795.61	196.26	795	196.62	794.99
197	794.98	197.4	794.97	197.83	794.96	198.28	794.95	198.76	794.94
199.28	794.92	199.8	794.91	200.36	794.9	200.98	794.89	201.65	794.88
202.39	794.86	203.2	794.84	204.1	794.82	205.1	794.8	205.98	794.79
206.19	794.78	207.38	794.75	208.4	794.72	209.27	794.69	210.03	794.67
210.7	794.65	211.3	794.63	211.51	794.63	211.8	794.62	212.26	794.61
212.66	794.59	213.02	794.58	218.06	794.37	218.61	794.35	219.1	794.34
219.55	794.32	219.92	794.31	219.95	794.31	220.35	794.29	220.71	794.28
221.04	794.27	221.34	794.26	221.6	794.26	221.85	794.25	222.06	794.24
225.51	794.16	227.03	794.1	228.68	793.62	229.14	793.41	229.6	793.26
232.5	792.2	240.27	791.82	246.62	790.96	250.86	790.89	254.63	791.02
259.67	791.5	265.4	792.01	274.55	792.8	278.3	793.18	278.98	793.25
279.87	793.27	287.23	793.56	293.04	793.69	294.82	793.72	296.37	793.74
305.77	793.81	310.93	793.88	315.68	793.85	323.42	793.93	325.7	793.98
329.03	793.98	333.86	793.97	335.08	794.01	336.17	794.04	342.6	794.2
345.37	794.25	352.08	794.33	353.15	794.36	361.8	794.52	365.44	794.56
370.4	794.65	373.67	794.75	379.56	794.9	383.16	795.04	388.21	795.14
393.21	795.33	397.72	795.54	402.69	795.73	408.12	795.91	409.88	796.02
416.55	796.37	420.84	796.53	430.41	796.81	431.69	796.88		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0673.04001 .055 152.62 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 73.04001 152.62 53.2 50 39.49 .3 .5
 Ineffective Flow num= 2

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Sta L	Sta R	Elev	Permanent
0	45.42	804	T
156.98	179.59	799.3	T

BRIDGE

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1785

INPUT

Description:

Distance from Upstream XS = 9
 Deck/Roadway Width = 32
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
40.91		805		798.5	62.22		804.11		797.61	92.44		802.77		796.27
99.16		802.27		795.77	141.49		800.38		793.88	158.3		799.34		792.84

Upstream Bridge Cross Section Data

Station Elevation Data

num= 234

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.2890015	803.862.970001	803.863.470001	803.7820.45999	802.63				
24.59	802.3527.85001	802.07	29.41	801.9840.73001	801.17	43.97	800.85		
45.42001	799.9150.54999	796.6952.26001	796.1353.10001	795.8453.79999	795.6				
54.01001	795.5355.17999	794.58	55.44	792.4755.67001	792.4955.67999	791.97			
56.26001	791.81	63.87	789.673.04001	786.4876.23999	784.0476.32001	783.99			
76.45001	783.976.58002	783.8276.64001	783.7884.86002	779.01	88.81	776.73			
88.94	776.6489.08002	776.5589.11002	776.5389.35001	776.38	89.37	776.36			
89.48999	776.28	89.62	776.289.85001	776.1990.08002	776.19	90.31	776.18		
90.54999	776.1890.79001	776.1791.04001	776.1791.29001	776.1691.51001	776.16				
91.73001	776.1591.95001	776.1592.17001	776.1492.35001	776.14	92.53	776.13			
92.81	776.13	93.09	776.12	93.34	776.12	93.59	776.1193.82001	776.11	
94.04999	776.1	94.37	776.0994.70001	776.0995.04999	776.0895.32001	776.08			
95.59	776.07	95.87	776.06	96.09	776.06	109.01	775.91	109.64	775.89
110.27	775.88	110.46	775.88	110.92	775.87	111.84	775.85	112.39	775.88
112.92	775.9	112.94	775.9	113.49	775.93	114.05	775.96	114.45	775.97
115.69	776.03	116.32	776.06	116.74	776.07	117.15	776.09	117.65	776.11
118.16	776.14	118.66	776.16	119.31	776.18	125.94	776.35	126.37	776.37
126.75	776.38	127.13	776.4	127.53	776.42	127.94	776.43	128.36	776.45
128.85	776.47	129.25	776.48	129.65	776.5	130.07	776.51	130.31	776.52
130.78	776.54	131.25	776.56	131.74	776.58	132.49	776.56	132.95	776.77
133.41	776.98	133.88	777.19	134.36	777.41	134.78	777.6	135.2	777.79
135.63	777.98	136.04	778.16	136.46	778.35	137.08	778.62	137.5	778.81
137.93	779.01	138.36	779.2	138.81	779.4	139.25	779.6	139.71	779.81
140.13	780	140.56	780.19	140.6	780.21	141.1	780.42	141.62	780.65

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142.14	780.87	152.62	786.98	152.64	786.99	152.67	787	152.7	787.02
152.72	787.03	152.75	787.04	152.76	787.05	152.77	787.05	155.05	788
155.84	788.18	156.45	788.32	157.61	795.62	158.1	795.98	158.3	795.99
163.19	795.31	168.48	795.03	169.74	794.71	171.64	795.06	175.19	795.23
179.59	795.63	179.79	795.65	181.04	795.61	196.26	795	196.62	794.99
197	794.98	197.4	794.97	197.83	794.96	198.28	794.95	198.76	794.94
199.28	794.92	199.8	794.91	200.36	794.9	200.98	794.89	201.65	794.88
202.39	794.86	203.2	794.84	204.1	794.82	205.1	794.8	205.98	794.79
206.19	794.78	207.38	794.75	208.4	794.72	209.27	794.69	210.03	794.67
210.7	794.65	211.3	794.63	211.51	794.63	211.8	794.62	212.26	794.61
212.66	794.59	213.02	794.58	218.06	794.37	218.61	794.35	219.1	794.34
219.55	794.32	219.92	794.31	219.95	794.31	220.35	794.29	220.71	794.28
221.04	794.27	221.34	794.26	221.6	794.26	221.85	794.25	222.06	794.24
225.51	794.16	227.03	794.1	228.68	793.62	229.14	793.41	229.6	793.26
232.5	792.2	240.27	791.82	246.62	790.96	250.86	790.89	254.63	791.02
259.67	791.5	265.4	792.01	274.55	792.8	278.3	793.18	278.98	793.25
279.87	793.27	287.23	793.56	293.04	793.69	294.82	793.72	296.37	793.74
305.77	793.81	310.93	793.88	315.68	793.85	323.42	793.93	325.7	793.98
329.03	793.98	333.86	793.97	335.08	794.01	336.17	794.04	342.6	794.2
345.37	794.25	352.08	794.33	353.15	794.36	361.8	794.52	365.44	794.56
370.4	794.65	373.67	794.75	379.56	794.9	383.16	795.04	388.21	795.14
393.21	795.33	397.72	795.54	402.69	795.73	408.12	795.91	409.88	796.02
416.55	796.37	420.84	796.53	430.41	796.81	431.69	796.88		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0673.04001 .055 152.62 .06

Bank Sta: Left Right Coeff Contr. Expan.
 73.04001 152.62 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 45.42 804 T
 156.98 179.59 799.3 T

Downstream Deck/Roadway Coordinates num= 5
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 28.24 805.32 798.82 72.64 803.44 796.94 107.92 801.87 795.37
 136.45 801 794.5 150.04 799.93 793.43

Downstream Bridge Cross Section Data
 Station Elevation Data num= 227
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 804 .480011 803.971.600006 803.912.799988 803.854.100006 803.78
 4.730011 803.74 5.23999 803.716.230011 803.657.200012 803.68.140015 803.54
 8.829987 803.519.899994 803.4510.92001 803.3911.89999 803.33 12.84 803.28
 13.75 803.2214.60999 803.18 15.44 803.1316.26001 803.0816.98001 803.04

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17.39999	803.0320.42001	802.9222.04999	802.8623.07001	802.8223.76001	802.8
24.26999	802.78 24.66	802.77 24.97	802.76 25.22	802.75 27.5	802.66
30.03	802.56 30.34	802.5530.35001	802.5531.29999	802.4831.95001	802.4
32.51001	802.3732.57001	802.3733.79999	802.2234.89999	802.09 35.63	802.01
38.48999	801.2238.60999	801.14 38.69	801.11 38.72	801.1 40.22	789.71
42.13	789.7542.17001	789.7542.67999	789.7143.17001	789.6744.14999	789.59
46.5	789.348.20001	788.55 48.59	789.2 48.62	789.18 48.63	789.18
48.63	789.1748.64001	789.1748.64999	789.16 48.66	789.16 48.66	789.15
48.67001	789.1548.67001	789.1448.67999	789.14 48.69	789.13 49.13	788.8
62.85001	778.06 63.09	777.8865.32999	776.2265.35001	776.22 67.12	776.21
78.07999	775.8778.79001	775.8479.48999	775.82 80.19	775.7980.89001	775.77
81.59	775.7491.54001	775.31 94.44	775.1898.98001	775.57 109.75	776.56
110.12	776.59 110.47	776.62 110.83	776.65 111.18	776.67 111.54	776.7
111.88	776.73 112.23	776.76 112.58	776.78 112.92	776.81 113.26	776.84
113.46	776.86 113.73	776.88 114.34	776.93 114.63	776.95 114.9	776.97
115.18	776.99 115.68	777.35 115.92	777.52 116.06	777.62 116.23	777.74
116.41	777.87 116.61	778.01 116.89	778.21 117.14	778.39 117.35	778.54
117.5	778.65 117.65	778.76 117.7	778.79 119.85	780.29 130.16	786.3
132.95	786.11 133.61	786.13 134.26	786.15 138.81	787.7 138.93	788.36
140.17	795.23 140.43	794.83 140.47	794.76 141.02	795.13 141.06	795.16
142.07	795.46 142.47	795.52 146.01	796.92 148.2	797.07 148.41	797.1
148.96	797.17 149.4	797.24 150.29	797.3 150.68	797.34 151.07	797.28
151.29	797.28 155.33	797.18 156.84	797.15 165.03	796.87 167.55	796.78
167.69	796.78 167.72	796.77 167.89	796.77 167.92	796.76 168.09	796.76
175.39	796.04 175.75	796.02 176.12	796 176.48	795.98 176.84	795.96
177.2	795.95 177.56	795.93 177.91	795.91 178.25	795.89 179.28	795.88
193.69	795.81 193.79	795.8 193.89	795.8 193.99	795.79 194.1	795.79
194.2	795.78 194.3	795.78 194.4	795.77 194.5	795.77 194.61	795.76
194.71	795.76 194.81	795.75 194.91	795.75 195	795.74 195.2	795.74
195.3	795.73 195.39	795.73 195.48	795.72 195.65	795.72 195.73	795.71
195.89	795.71 200.26	795.43 210.95	795.06 211.06	795.06 219.67	794.69
219.98	794.66 221.18	794.31 224.9	793.22 225.86	793.07 226.94	792.96
227.64	792.77 236.42	789.56 239.44	789.41 248.01	789.94 253.1	790.42
262.22	791.2 267.23	791.76 273.27	792.78 273.94	792.96 274.92	793.03
276.23	793.17 278.87	793.29 285.37	793.57 289.07	793.64 290.11	793.66
293.22	793.71 301.25	793.79 304.6	793.81 312.03	793.76 315.19	793.78
324.99	793.98 325.21	793.98 332.96	793.96 336.36	794.05 340.83	794.12
341.46	794.13 347.81	794.29 351.08	794.33 353.69	794.38 360.18	794.56
361.59	794.58 363.02	794.6 367.9	794.65 369.72	794.67 372.73	794.77
376.35	794.87 378.78	794.93 381.79	794.98 389.48	795.12 390.45	795.16
398.54	795.5 399.92	795.56 400.18	795.57 407.73	795.79 411.95	795.92
412.07	795.92 412.25	795.93			

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 49.13 .055 130.16 .06

Bank Sta: Left Right Coeff Contr. Expan.

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49.13 130.16 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 38.09 804.8 T
 143 193.7 799.9 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Meathouse Fork

REACH: MEATHOUSE FORK RS: 1760

INPUT

Description:

Station Elevation Data num= 227
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 804.480011 803.971.600006 803.912.799988 803.854.100006 803.78
 4.730011 803.74 5.23999 803.716.230011 803.657.200012 803.68.140015 803.54
 8.829987 803.519.899994 803.4510.92001 803.3911.89999 803.33 12.84 803.28
 13.75 803.2214.60999 803.18 15.44 803.1316.26001 803.0816.98001 803.04
 17.39999 803.0320.42001 802.9222.04999 802.8623.07001 802.8223.76001 802.8
 24.26999 802.78 24.66 802.77 24.97 802.76 25.22 802.75 27.5 802.66
 30.03 802.56 30.34 802.5530.35001 802.5531.29999 802.4831.95001 802.4
 32.51001 802.3732.57001 802.3733.79999 802.2234.89999 802.09 35.63 802.01

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38.48999	801.2238.60999	801.14	38.69	801.11	38.72	801.1	40.22	789.71
42.13	789.7542.17001	789.7542.67999		789.7143.17001		789.6744.14999		789.59
46.5	789.348.20001	788.55	48.59	789.2	48.62	789.18	48.63	789.18
48.63	789.1748.64001	789.1748.64999		789.16	48.66	789.16	48.66	789.15
48.67001	789.1548.67001	789.1448.67999		789.14	48.69	789.13	49.13	788.8
62.85001	778.06 63.09	777.8865.32999		776.2265.35001		776.22	67.12	776.21
78.07999	775.8778.79001	775.8479.48999		775.82 80.19		775.7980.89001		775.77
81.59	775.7491.54001	775.31 94.44		775.1898.98001		775.57 109.75		776.56
110.12	776.59 110.47	776.62 110.83		776.65 111.18		776.67 111.54		776.7
111.88	776.73 112.23	776.76 112.58		776.78 112.92		776.81 113.26		776.84
113.46	776.86 113.73	776.88 114.34		776.93 114.63		776.95 114.9		776.97
115.18	776.99 115.68	777.35 115.92		777.52 116.06		777.62 116.23		777.74
116.41	777.87 116.61	778.01 116.89		778.21 117.14		778.39 117.35		778.54
117.5	778.65 117.65	778.76 117.7		778.79 119.85		780.29 130.16		786.3
132.95	786.11 133.61	786.13 134.26		786.15 138.81		787.7 138.93		788.36
140.17	795.23 140.43	794.83 140.47		794.76 141.02		795.13 141.06		795.16
142.07	795.46 142.47	795.52 146.01		796.92 148.2		797.07 148.41		797.1
148.96	797.17 149.4	797.24 150.29		797.3 150.68		797.34 151.07		797.28
151.29	797.28 155.33	797.18 156.84		797.15 165.03		796.87 167.55		796.78
167.69	796.78 167.72	796.77 167.89		796.77 167.92		796.76 168.09		796.76
175.39	796.04 175.75	796.02 176.12		796 176.48		795.98 176.84		795.96
177.2	795.95 177.56	795.93 177.91		795.91 178.25		795.89 179.28		795.88
193.69	795.81 193.79	795.8 193.89		795.8 193.99		795.79 194.1		795.79
194.2	795.78 194.3	795.78 194.4		795.77 194.5		795.77 194.61		795.76
194.71	795.76 194.81	795.75 194.91		795.75 195		795.74 195.2		795.74
195.3	795.73 195.39	795.73 195.48		795.72 195.65		795.72 195.73		795.71
195.89	795.71 200.26	795.43 210.95		795.06 211.06		795.06 219.67		794.69
219.98	794.66 221.18	794.31 224.9		793.22 225.86		793.07 226.94		792.96
227.64	792.77 236.42	789.56 239.44		789.41 248.01		789.94 253.1		790.42
262.22	791.2 267.23	791.76 273.27		792.78 273.94		792.96 274.92		793.03
276.23	793.17 278.87	793.29 285.37		793.57 289.07		793.64 290.11		793.66
293.22	793.71 301.25	793.79 304.6		793.81 312.03		793.76 315.19		793.78
324.99	793.98 325.21	793.98 332.96		793.96 336.36		794.05 340.83		794.12
341.46	794.13 347.81	794.29 351.08		794.33 353.69		794.38 360.18		794.56
361.59	794.58 363.02	794.6 367.9		794.65 369.72		794.67 372.73		794.77
376.35	794.87 378.78	794.93 381.79		794.98 389.48		795.12 390.45		795.16
398.54	795.5 399.92	795.56 400.18		795.57 407.73		795.79 411.95		795.92
412.07	795.92 412.25	795.93						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 49.13 .055 130.16 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 49.13 130.16 11.7 26.8 43.8 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 38.09 804.8 T

143 193.7 799.9

T

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1733.17

INPUT

Description:

Station Elevation Data num= 75									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	803.164	140015	802.158	550018	800.313	08002	798.621	7.98001	797.14
19.21002	796.641	19.36002	796.49	19.5	796	20.69	791.623	19.90002	790
37.05002	783.41	39.06	782.453	39.001	782.274	2.10001	780.46	37.003	776.57
51	776.01	76	775	101.61	776.13	102.77	776.94	110.15	782.11
119.67	788	120.03	788.22	121.26	788.26	130.47	788.56	132.84	788.59
145.81	788.88	147.96	788.92	151.84	788.95	163.13	788.83	172.07	788.76
178.88	788.73	186.32	788.77	190.9	788.75	192.43	788.82	203.45	789.18
205.57	789.32	211.06	790	213.25	790.23	213.93	790.36	222.6	791.77
224.97	792	228.23	792.32	229.94	792.51	233.74	792.69	238.93	793.01
244.83	793.05	248.72	793.13	256.33	793	256.66	792.99	256.97	792.98
257.46	792.99	257.92	793.01	262.55	793.18	263.26	793.2	267.93	793.26
270.96	793.32	277.36	793.5	283	793.62	283.85	793.64	286.19	793.71
290.96	793.88	293.54	794	294.38	794.04	298.47	794.04	303.43	794.16
310.92	794.36	313.28	794.42	315.9	794.49	321.87	794.67	326.19	794.85
331.63	795.04	335.59	795.21	341.61	795.54	344.38	795.65	351.48	796

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.0623	120.03	.055	120.03	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	23.90002	120.03		128.75	137.97	138.79	.1	.5

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1595.2

INPUT

Description:

Station Elevation Data num= 71									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8085.07	99987	804.647	209991	803.11	14.16	798.192	20.94998	793.56
25.60999	791.58	34.97	787.9	38.03	786.694	4.60999	785.52	50.72	783.77
60.81998	778	63.35999	776.43	79	776	101.5	774.74	123	776

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141.3	776.43	143.57	780	144.95	782.41	145.13	782.72	146.22	783.3
155.1	787.98	155.24	788	157.94	788.39	159.22	788.45	164.17	788.21
169.21	788.39	172.94	788.34	178.95	788.26	185.29	788.36	196.46	788.57
211.59	788.38	212.46	788.38	212.8	788.37	222.38	788.27	225.61	788.24
235.07	788.3	238.87	788.48	241.39	788.58	246.25	789.3	251.08	789.98
251.16	790	255.08	790.76	261.19	791.66	262.16	792	263.68	792.43
270.39	792.7	273.58	793.2	285.57	794	287.51	794.09	291	794.07
297.37	794.13	311.05	794.14	319.39	794.16	325.8	794.14	339.04	794.24
342.63	794.26	349.88	794.52	362.95	794.96	383.4	796	383.58	796.01
383.66	796.01	401.57	797.09	404.38	797.25	421.64	797.93	422.9	798
426.25	798.18	447.05	798.91	449.82	798.97	471.47	800	471.63	800.01
472.52	800.03								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	38.03	.055	155.1	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	38.03	155.1		148.13	145.81	146.27	.3	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1449.39

INPUT

Description:

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8262.569946	825.517.199951	824.989.059998	824.7510.07996	824				
13.31	821.5816.53998	819.7521.38998	815.2621.78998	814.9223.72998	814.21				
28.53998	81040.23999	799.8542.31998	798.2250.05997	79052.53998	788.19				
54.53998	787.3355.08997	787.0965.16998	784.0280.46997	778.8581.86996	778.31				
82.52997	77885.08997	776.43 105.3	774.51 130.62	776.43 131.11	776.76				
132.98	778 141.97	784 144.33	785.41 159.35	785.91 159.83	785.91				
160.25	785.9 170.62	785.19 171.4	785.33 175.59	786 179.55	786.63				
192.96	786.9 195.85	786.93 197.2	787.06 206.01	787.86 207.64	788.01				
207.72	788.02 212.11	788.17 219.75	788.3 229.42	787.92 234.21	787.71				
241	787.75 248.62	787.74 255.26	787.88 262.32	787.97 270.31	788.87				
277.84	789.76 280.08	790.21 288.29	792 288.33	792.01 292.73	792.34				
303.31	793.03 303.77	793.03 322.29	793.29 324.59	793.23 337.69	792.96				
337.88	792.96 338.35	792.97 350.1	793.06 352.3	793.09 363.42	793.53				
363.52	793.53 363.57	793.53 363.62	793.54 374.7	793.66 378.59	793.66				
380.83	793.68 387.31	793.67 389.04	793.68 390.97	793.73 399.93	793.88				
405.71	793.98 406.93	794 413.66	794.11 421.32	794.27 429.5	794.53				
434.49	794.6 437.38	794.57 444.43	794.63 445.3	794.68 446.88	794.83				
448.99	795.08 451.45	795.14 457.41	795.25 464.78	795.58 466.01	795.63				

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466.23 795.63 471.29 795.59 472.07 795.66 479.59 796 494.57 796.67
 498.5 796.87 514.48 797.85 526.62 798.77 529.6 798.97

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0655.08997 .055 144.33 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 55.08997 144.33 200.19 170.15 123.67 .1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1279.24

INPUT

Description:

Station Elevation Data num= 97
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 832.093.289978 830.957.090027 829.87 7.76001 829.658.140015 829.49
 23.52002 823.828.32001 821.6831.98999 820.2732.21002 820.55.23001 792.59
 57.41 790 58.97 788.1462.32001 784.1664.01001 783.42 68.16 781.41
 72.64999 779.3673.48999 778.8878.14001 776.43 104.77 774.29 127.86 776.43
 128.51 776.97 129.77 778 133.99 781.49 139.51 784 141.87 785.07
 142.67 785.43 142.98 785.46 147.26 785.64 151.38 785.19 153.2 785.04
 157.35 785.17 169.52 785.75 178.81 785.84 191.12 785.74 193.78 786.2
 194.7 786.36 200.61 787.09 201.12 787.15 208.66 787.64 212.14 787.8
 221.61 787.61 223.9 787.56 234.58 787.3 234.63 787.3 234.93 787.31
 243.77 787.8 245.37 787.9 246.02 788 252.12 788.99 259.74 790.21
 264.9 791.35 267.9 792 269.72 792.38 283.01 793.11 286.23 793.32
 291.87 793.35 301.25 793.39 310.27 793.23 316.32 793.1 327.99 792.97
 329.64 792.95 332.74 792.9 340.58 792.61 348.33 792.6 354.91 792.62
 357.16 792.56 365.64 792.29 374.02 792.43 381.88 792.59 396.03 792.88
 401.01 792.97 410.87 793.19 417.2 793.32 418.26 793.34 424.5 793.38
 435 793.8 437.43 793.92 438.22 794 438.91 794.07 439.96 794.1
 446.97 794.32 449.86 794.44 470.14 794.81 473.41 794.92 491.12 796
 493.73 796.15 497.31 796.32 509.94 797.05 520.46 797.64 522.52 797.77
 523.55 797.79 527.82 798.03 537.97 798.51 538.42 798.58 539.05 798.66
 546.31 799.39 551.13 799.96

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0662.32001 .055 142.98 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 62.32001 142.98 130.76 126.25 120.77 .1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1152.99

INPUT

Description:

Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	828.921	419983	828.775	630005	828.44	14.56	825.791	607999	825.39
18.41	825.07	24	824.39	24.69	824.26	03998	823.23	33.13	819.31
45.31998	797.874	919998	790.014	957999	789.255	051999	788.525	270999	786.84
60.04999	781.066	631998	777.568	631998	776.426	832999	776.419	538998	774.1
125.12	776.43	127.84	778.81	130.75	782.08	133.09	783.97	134.92	785.45
140.41	784.88	144.91	784.29	155.54	784.8	158.12	784.81	172.86	785.01
173.16	785.02	174.06	785.29	176.3	785.96	176.44	786	180.55	787.22
182.7	787.86	184.33	787.8	186.28	787.74	193.66	787.51	199.47	787.2
205.23	786.93	209.15	786.92	216.66	786.89	221.57	787.11	223.77	787.14
229.75	787.25	230.27	787.29	240.93	787.68	246.1	787.99	246.37	788.02
252.85	788.61	253.92	788.69	259.12	788.92	265.55	789.28	265.67	789.28
266.18	789.3	270.53	789.34	277.67	789.59	279.5	789.64	280.02	789.65
290.21	789.52	291.47	789.54	306.74	789.73	310.07	789.72	321.46	789.92
322.05	789.93	327.75	790	333.29	790.13	333.7	790.13	345.45	790.43
349.46	790.55	359.39	790.97	360.53	791.05	368.47	791.56	376.8	792
382.97	792.29	399.31	793.02	402.21	793.15	404.43	793.28	413.95	794
416.3	794.17	422.4	794.73	436.45	794.94	438.82	794.94	439.72	794.97
451.41	795.33	453.21	795.4	467.74	796				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0652	70999	.055	134.92	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	52.70999	134.92		99.55	100	94.11	.1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1052.99

INPUT

Description:

Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	824	11.88	822.591	526999	822.18	17001	821.43	2358002	820.13
27.11002	819.25	28.92999	818	37.97	811.45	44.09	808	49.60001	800.33

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57.31	791.6458	61002	790.1759	82001	789.2171	61002	780.3676	6.23999	778
77.60001	777.31	78.66	776.43	103.55	773.91	127.55	776.43	129.34	777.33
130.72	777.98	130.75	778	134.52	781.24	135.01	782	135.44	782.67
142.14	782.8	146.96	783.07	151.63	783.78	160.96	784.9	165.15	784.55
175.65	784.07	181.07	784.06	182.78	784.37	183.2	784.45	190.35	786
190.65	786.06	191.72	786.11	199.51	787.12	201.85	787.29	208.02	787.61
214.39	787.94	218.34	788.14	224.65	788.53	234.84	789.13	248.44	789.9
252.69	790	271.67	790.33	279.19	790.41	283.35	790.66	287.64	790.92
291.17	791.17	292.77	791.29	295.79	791.56	296.4	791.6	299.58	791.62
305.55	791.67	308.59	791.63	318.18	790.78	323.78	790.34	334.01	790.49
342.46	790.46	346.49	790.99	350.74	791.42	356.7	792.07	356.9	792.09
364.5	792.8	372.56	793.6	375.74	794	378.67	794.37	381.83	794.6
390.88	795.25	394.88	795.45	402.38	795.8	407.4	796	408.71	796.05
412.73	796.31	419.23	797	421.51	797.22	421.9	797.27	422.96	797.48
428.09	798.35	431.77	799.31	434.16	800				

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val
0	.06	71.61002	.055	135.44	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	71.61002	135.44		96.56	100	110.74	.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 952.99

INPUT

Description:

Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	818	.710022	817.81	610016	817.559	650024	812.3723	37003	803.59
29.31003	800	37.20001	795.3343	26001	791.9847	15002	790	47.19	789.98
58.22	783.56	60.72	781.8664	96002	778	66.69	776.4390	71002	773.66
116.66	776.43	120.47	778.57	120.57	778.61	125.02	782	125.93	782.68
127.02	783.7	128.68	783.7	139.29	784.22	142.31	784.58	151.09	784.31
157.71	784.12	161.97	784.12	163.32	784.12	175.92	784.12	181	784.12
184.14	784.14	187.61	784.53	192.54	786	193.74	786.34	197.66	788.62
200.41	790	200.68	790.13	204.85	790.78	207.76	791.22	209.63	791.44
211.21	791.48	214.66	791.52	225.96	791.61	235.93	791.84	240.13	791.86
244.77	791.88	255.33	791.72	265.58	791.54	272.12	791.32	275.01	791.25
288.54	791.06	299.92	791.57	301.63	791.63	302.81	791.66	305.58	791.68
314.1	791.82	316.91	792	322.51	792.35	326.81	792.57	336.29	794
336.73	794.07	337.06	794.1	340.21	794.42	349.29	795.28	350.88	795.34
361.24	795.75	367.14	795.84	370.4	795.94	371.13	796	371.3	796.01
377.04	796.41	379.58	797.09	381.43	797.6	382.08	797.7	385.58	798.11

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392.57	797.98	394.3	797.93	395.19	798.23	398.65	799.03	400.86	798.58
403.54	797.92	405.69	798.88	406.06	799.01	413.92	800		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	58.22	.055	127.02	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	58.22	127.02		98.39	100	97.56	.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 852.99

INPUT

Description:

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8084.070007	805.25	14.06	798.6918.20001	796.16	29.19	791.2		
29.23999	791.1832.45999	79041.45999	786.6845.07999	785.42	53.44	780.71			
57.29001	778.5758.42001	778.2159.14999	77864.70999	776.43	88.59	773.4			
114.39	776.43	116.48	778	117.28	778.61	117.44	778.75	117.87	779.08
124.4	783	129.99	783.34	132.94	783.49	139.02	784	143.49	784.37
145.17	784.54	145.57	784.56	146.9	784.48	159.15	783.66	170.2	783.22
172.42	783.18	176.45	783.11	178.47	784.1	181.79	786.62	187.06	790
187.82	790.48	189.89	791.64	195.28	791.95	196.23	792	201.8	792.31
206.57	792.33	214.64	792.35	218.58	792.41	227.42	792.45	236.77	792.28
243.48	792.21	248.26	792.32	251.27	792.38	262.18	792.49	271.57	792.47
274.71	792.47	279.93	792.51	286.65	792.49	289.48	792.48	295.62	792.39
301.14	792.36	310.73	792.57	311.48	792.59	312.37	792.63	319.4	793.03
322.86	793.33	326.2	793.63	328.51	793.75	332.49	794	333.64	794.07
335.84	794.34	337.64	794.53	341.15	795.48	343.08	795.82	346.23	795.84
354	795.76	360.21	795.63	363.57	795.56	364.81	796	365.01	796.07
365.17	796.12	365.28	796.11	368.14	795.91	368.29	796.28	369.44	797.46
378.93	800	381.97	800.81	382.52	801.04	382.71	801.09	384.13	801.73
389.22	804								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0645.07999	.055	124.4	.06	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45.07999	124.4		101.32	100	101.18	.1	.3

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 752.99

INPUT

Description:

Station Elevation Data num= 75									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8043.440002	803.3810.92001	801.0813.01999	800.514.70999	800				
19.72	798.4731.20001	796.6734.29999	796.17 43.22	794.9244.98001	794.65				
46.51001	794.49 50.06	79454.45001	793.3967.51001	791.9171.29001	791.52				
74.11002	791.26 86.59	790.1 86.78	790.08 87.06	790 105.04	784.58				
111.78	778.98 113.05	778 115.06	776.43 140.26	773.16 169.58	776.43				
172.23	778 172.8	778.4 177.82	781.88 180.97	784 181.41	784.29				
188.66	784.4 190.6	784.52 193.9	784.54 201.52	784.41 204.21	784.5				
207.96	784.36 217.62	784.25 232.65	784.31 234.2	784.32 240.15	784.35				
244.28	786 249.97	788.04 255.64	789.6 257.11	790.03 257.32	790.05				
258.82	790.19 271.71	790.97 286.22	791.28 290.14	791.25 303.74	791.2				
307.75	791.27 311.87	791.21 326.27	791.16 333.89	791.65 335.95	791.75				
336.59	791.85 337.72	792 350.06	793.63 356.3	794.29 359.74	794.61				
364.54	794.43 371.68	794.22 372.03	794.26 375.09	794.55 376.37	795.41				
377.08	795.59 378.96	796 382.02	796.67 382.15	796.7 382.29	796.73				
391.98	799.12 396.43	800.32 403.73	802.24 405.31	802.75 409.44	804				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.06	105.04	.055	181.41	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	105.04	181.41		138.39	140 137.57	.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 612.99

INPUT

Description:

Station Elevation Data num= 102									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8022.019989	801.64	4.5	800.68	6.47998	80010.04001	798.71		
12.51999	798.1 13.28	798 14.19	797.8722.69998	796.8330.51999	796.15				
32.53	79638.92999	795.5547.92999	794.7558.19998	794.3861.88998	794.21				
65.97	794 75.97	793.4677.35999	793.4 82.37	792.96 83.22	792.87				
84.14999	792.8289.73999	792.59 95.44	792.1297.60999	792 99.34	791.9				
102.27	791.67 103.44	791.58 103.55	791.57 115.09	790.84 116.85	790.67				
123.17	790 131.24	789.17 134.68	788.83 135.47	788.82 138.42	788.68				

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140.01	788.65	146.01	788	146.74	787.92	152.15	787.18	156.77	786.75
157.61	786	159.77	784.05	167.86	778	169.67	776.64	169.95	776.43
193.33	772.82	220.67	776.43	223.08	778	225.23	779.47	225.55	779.71
232.82	782	235.3	782.78	236.68	783.32	238.77	783.57	242.61	784
246.66	784.31	251.74	784.68	256.23	784.82	262.75	784.78	271.15	784.69
281.18	784.05	287.17	783.61	297.89	784.04	303.55	784.27	306.38	784.36
307.04	784.67	315.12	788	315.28	788.07	320.61	788.93	324.76	789.72
330.86	790	337.67	790.32	339.78	790.4	344.95	790.74	353.24	791.28
358.36	791.26	369.74	791.28	378.49	791.51	382.02	791.61	383.85	792
384.21	792.08	387.49	792.77	391.38	793.22	392.95	793.41	401.06	793.02
402.47	792.97	402.99	793.03	404.44	793.15	406.32	793.09	407.49	793.08
409.45	793.72	410.25	794	412.87	794.67	415.21	795.27	416.05	795.46
416.88	795.64	420.13	796.37	423.67	797.11	426.09	797.89	432.19	800
436.24	801.4	446.62	804						

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.06	159.77	.055	236.68	.06			

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	159.77	236.68		116.53	119.3	117.86		.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 493.69

INPUT

Description:

Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7946.950012	793.6317.76001	792.93	28.91	792.4634.10001	792.31			
34.70001	79235.73999	791.3437.51001	791.5339.17001	791.57	43.59	791.34			
47.76001	791.1449.20999	791.0957.92999	790.0259.42999	789.8661.89001	789.68				
67.39999	789.370.23999	788.9374.17001	788.4879.73001	78886.14001	787.46				
92.42999	787.46	97.44	787.4499.92001	787.42	109.61	787.23	121.29	786.15	
123.9	786.01	125.13	784.67	132.75	776.43	156.88	772.53	175.1	776.43
176.17	776.77	177.1	777.17	181.98	777.12	183.28	777.15	183.92	777.5
187.37	779.15	192.58	782	193.04	782.25	194.7	783.09	197.79	782.95
204.96	782.9	208.86	783.12	212.59	783.23	219.13	783.17	227.95	783.13
233.13	783.25	247.48	783.44	248.62	783.38	250.63	783.5	265.4	784.23
266.28	784.28	268.13	784.74	272.13	785.96	276.35	787.56	277.8	787.89
280.56	788.52	281.86	788.81	286.82	789.04	294.4	789.4	298.21	789.63
305.85	790.14	308.04	790.29	322.22	790.75	323.77	790.79	331.75	791.06
335.37	791.29	336.8	791.66	340.36	792.93	341.72	793.04	345.95	793.39
354	793.39	355.2	793.4	355.38	793.39	358.08	793.44	358.11	793.44
360.76	793.21	363.15	794.48	364.21	794.79	365.23	795.01	367.18	795.55

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372.7 796.96 379.12 798.47 382.13 799.09 384.16 799.58 385.75 800

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 125.13 .055 194.7 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 125.13 194.7 63.07 78.64 78.79 .1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 415.05

INPUT

Description:

Station Elevation Data num= 93
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 79412.09998 793.5814.39999 793.58 28.31 793.5934.34998 793.54
 45.21997 793.6648.68997 793.62 52.28 793.5957.31998 793.4980.82999 792.91
 84.51999 792.8385.26999 792.8585.54999 792.8685.92999 792.87 87.87 792.6
 91.21997 792.1994.51999 79296.20999 791.8497.97998 791.7 103.92 791.37
 113.59 790.74 119.92 790.15 121.04 790 135.95 788 142.64 787.08
 150.35 786.75 151.58 786.66 153.26 786.7 163.53 786.83 169.6 786.74
 179.36 786.78 186.02 786.65 196.09 786.06 197.99 785.96 198.86 785.91
 199.37 785.39 207.58 776.73 208.1 776.43 232.39 772.47 256.09 776.43
 256.16 776.47 256.31 776.56 266.19 782.68 267.96 782.78 271.81 782.75
 278.35 781.72 280.1 781.42 286.21 781.36 288.12 781.4 292.61 781.26
 294.83 781.21 295.97 781.4 298.8 782 306.09 783.53 308.61 783.98
 309.2 784.08 309.6 784.13 311.37 784.24 317.61 784.56 320.17 784.76
 320.5 784.79 321.22 784.99 326.01 786 331.47 787.19 332.03 787.26
 347.72 789.64 360.44 790.5 362.67 790.67 369.01 791.27 376.81 792
 378.81 792.07 391.26 792.41 400.71 793.03 403.75 793.28 404.26 793.31
 406.57 794 407.62 794.31 407.97 794.37 411.67 794.86 416.47 794.81
 420.94 794.73 422.58 794.86 426.37 795.34 426.92 795.36 430.48 795.44
 432.54 795.66 437.67 796.12 441.28 796.49 447.37 796.93 449.37 797.11
 453.33 797.56 456.63 797.83 459.36 798

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 198.86 .055 266.19 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 198.86 266.19 34.7 156.1 171.52 .1 .3

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 258.95

INPUT

Description:

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.330017	795.688.789978	795.310.40997	795.4415.79999	795.4				
32.40997	794.9447.33002	794.7157.20996	794.5577.35999	794.3382.77002	794.23				
94.98999	794	102.8	793.76	104.39	793.76	128.11	793.57	133.05	793.63
138.85	793.6	141.18	793.59	154.56	793.43	164.84	793.33	172.49	793.06
173.67	793.02	179.93	792.86	180.62	792.88	182.66	792.96	189.11	793.11
193.3	793.29	202.23	793.01	204.44	792.93	205.17	792.86	213.66	792
214.84	791.87	214.92	791.86	230.01	791.25	237.24	791.09	250.05	791
251.02	790.98	264.75	790.56	278.27	790	288.42	789.49	298.73	788
309.34	786.45	311.98	786.03	315.5	785.98	323.17	785.86	326.61	785.97
328.1	785.98	338.03	786.11	347.35	786.11	356.32	785.79	366.97	785.17
377.9	784.59	384.12	784	395.03	782.94	395.98	782.85	397.07	782.73
398.53	782.62	414.49	781.18	418.76	781.06	420.3	780.66	421.15	780
422.77	778.74	425.59	776.43	447.8	772.47	467.59	776.43	467.74	776.47
469.54	776.62	474.48	777.08	475.47	777.4	476.41	778	486.24	783.28
496.78	785.8	500.11	786.62	500.92	786.88	506.04	788.49	513.69	791.41
514.67	791.74	522.54	793.11	526.23	793.72	526.65	793.8	529.64	794
538.12	794.28	539.03	794.35	543.39	794.56	557.58	795.03	572.49	795.22
574.1	795.22	575.71	795.29	586.86	795.68	594.95	795.79	595.9	795.8
595.95	795.8	595.98	795.8	596.01	795.81	596.18	795.81	606.2	795.87
608.11	795.94	610.42	796.24	615.65	796.31	618.06	796.42	621.21	796.57
628.52	796.78	632.84	797.1	644.22	798.17	651.28	798.88	656.06	799.35
666.56	800.38	674.12	800.63	684.49	800.98				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	418.76	.055	486.24	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	418.76	486.24		0	0	.1	.3

CROSS SECTION

RIVER: Middle Island Cr
 REACH: MIDDLE ISLAND CR RS: 50

INPUT

Description:

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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0	7967.190002	795.69	8.72998	795.2910	.45996	795.4415	.32996	795.41	
32.88	794.9145	.39996	794.757	.45996	794.573	.61996	794.3184	.77997	794.08
88.86996	794	101.38	793.64	115.4	793.47	131.65	793.3	135.21	793.27
148.59	793	149.85	792.99	155.08	792.9	182.04	792	183.08	791.96
183.15	791.96	183.25	791.95	183.36	791.94	183.48	791.93	184.98	791.87
197.8	791.27	209.94	791.03	211.02	791.03	211.11	791.02	211.3	791
211.52	790.98	211.71	790.97	212.64	790.93	214.98	790.73	223.8	790.58
237.63	790	248.4	789.38	256.91	789.13	271.09	788.72	276.38	788.59
287.87	788	299.46	787.46	299.79	787.45	319.69	786.73	320.92	786.65
328.75	786	340.18	784.93	345.95	784.29	347.4	784.11	351.35	783.49
359.11	782.3	360.21	782.22	365.45	782.11	366.71	782	371.03	781.62
372.43	781.52	391.1	781.35	391.84	781.33	393.48	781.04	398.96	780.11
401.51	779.68	402.68	779.59	405.35	778.92	413.27	777.3	418.1	776.04
418.26	776	419.17	775.76	419.64	775.59	442.83	775.59	455.13	775.63
486.04	775.72	487.7	778.45	492.83	784.08	494.67	784.24	496.08	784.4
503.78	789.33	505.69	790.51	508.49	792.62	515.7	798.03	519.99	798.55
528.52	799.96	531.73	800.5	540.37	800.4	544.44	800.57	546.8	800.7
550.47	800.86	551.85	800.74	556.2	800.54	559.97	803.72563	569.99	808.08
572.9	816.03	572.93	816.06	572.95	816.07573	.2599	816.2	579.6	818.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	391.1	.04	492.83	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	391.1	492.83		30	30		.1	.3

CROSS SECTION

RIVER: Middle Island Cr
 REACH: MIDDLE ISLAND CR RS: 20

INPUT

Description:

Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7966.820007	795.718	.609985	795.2311	.33002	795.4413	.08002	795.43	
25.69	795.03	33.44	794.736	.95001	794.6437	.08002	794.63	37.31	794.63
37.57001	794.6237	.83002	794.6138	.08002	794.6157	.39999	794.1558	.06998	794.14
63.22	794.04	63.78	794.0364	.60999	794.0265	.73999	794	68.28	793.93
71.91	793.8375	.82999	793.7284	.81998	793.6	87.69	793.56	89.66	793.52
102.9	793.2	108.48	793.13	121.72	792.82	136.06	792.46	142.42	792.39
150.76	792.42	159.8	792.35	164.4	792.2	166.29	792.14	170.24	792
175.22	791.77	191.14	791.51	192.36	791.48	193.74	791.42	198.69	791.2
211.06	790.61	216.24	790.36	221.71	790	240.83	789.21	258.3	788.38
260.29	788.29	261.88	788.21	265.18	788	275.62	787.29	277.98	786.85
279.83	786.42	282.4	786	287.82	785.11	288.71	785	296.75	784.74

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302.56	784.61	305.67	784.52	308.79	784.26	313.16	784	319.44	783.62
327.39	783.1	341.05	782.9	343.43	782.87	358.21	782.27	359	782.26
359.25	782.24	361.95	782.09	363.11	782	369.19	781.52	374.34	781.14
378.47	780.71	380.81	780.6	383.95	780.25	387.81	780	391.14	779.78
399.18	776.77	399.84	776.59	400.09	776.52	401.62	776	402.78	775.59
429.21	775.59	441.84	775.59	469.94	775.59	474.56	780.42	479.2	784.7
485.03	787.82	489.72	790.43	495.78	795.43	498.82	798	498.85	798.02
510.93	799.47	515.54	800.08	519.95	800.23	528.2	800.57	532.34	800.8
535.1	800.87	538.71	800.75	541.07	800.56	545.7	806.63	546.82	808.01
548.73	810	553.61	814.23	559.64	817.24	563.74	819.09		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	391.14	.04	474.56	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	391.14	474.56		0	0		.1	.3

SUMMARY OF MANNING'S N VALUES

River: Buckeye Creek

Reach	River Sta.	n1	n2	n3
BUCKEYE CREEK	1266.73	.06	.055	.06
BUCKEYE CREEK	1166.73	.06	.055	.06
BUCKEYE CREEK	1066.73	.06	.055	.06
BUCKEYE CREEK	966.73	.06	.055	.06
BUCKEYE CREEK	866.35	.06	.055	.06
BUCKEYE CREEK	726.73	.06	.055	.06
BUCKEYE CREEK	626.73	.06	.055	.06
BUCKEYE CREEK	526.73	.06	.055	.06
BUCKEYE CREEK	426.73	.06	.055	.06
BUCKEYE CREEK	326.73	.06	.055	.06
BUCKEYE CREEK	226.73	.06	.055	.06
BUCKEYE CREEK	136.73	.06	.055	.06

River: Meathouse Fork

Reach	River Sta.	n1	n2	n3
MEATHOUSE FORK	1933.09	.06	.055	.06
MEATHOUSE FORK	1860	.06	.055	.06
MEATHOUSE FORK	1810	.06	.055	.06
MEATHOUSE FORK	1785	Bridge		

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MEATHOUSE FORK	1760	.06	.055	.06
MEATHOUSE FORK	1733.17	.06	.055	.06
MEATHOUSE FORK	1595.2	.06	.055	.06
MEATHOUSE FORK	1449.39	.06	.055	.06
MEATHOUSE FORK	1279.24	.06	.055	.06
MEATHOUSE FORK	1152.99	.06	.055	.06
MEATHOUSE FORK	1052.99	.06	.055	.06
MEATHOUSE FORK	952.99	.06	.055	.06
MEATHOUSE FORK	852.99	.06	.055	.06
MEATHOUSE FORK	752.99	.06	.055	.06
MEATHOUSE FORK	612.99	.06	.055	.06
MEATHOUSE FORK	493.69	.06	.055	.06
MEATHOUSE FORK	415.05	.06	.055	.06
MEATHOUSE FORK	258.95	.06	.055	.06

River: Middle Island Cr

Reach	River Sta.	n1	n2	n3
MIDDLE ISLAND CR	50	.06	.04	.06
MIDDLE ISLAND CR	20	.06	.04	.06

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

Reach	River Sta.	Left	Channel	Right
BUCKEYE CREEK	1266.73	102.48	100	91.88
BUCKEYE CREEK	1166.73	97.82	100	98.73
BUCKEYE CREEK	1066.73	100.89	100	98.69
BUCKEYE CREEK	966.73	118.09	100.38	66.66
BUCKEYE CREEK	866.35	146.5	139.62	119.7
BUCKEYE CREEK	726.73	98.8	100	91.86
BUCKEYE CREEK	626.73	105.28	100	89.4
BUCKEYE CREEK	526.73	101.52	100	54.01
BUCKEYE CREEK	426.73	90.53	100	148.77
BUCKEYE CREEK	326.73	110.54	100	104.62
BUCKEYE CREEK	226.73	56.16	90	93.21
BUCKEYE CREEK	136.73	0	0	0

River: Meathouse Fork

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Reach	River Sta.	Left	Channel	Right
MEATHOUSE FORK	1933.09	76.85	73.09	73.93
MEATHOUSE FORK	1860	57.5	50	36.5
MEATHOUSE FORK	1810	53.2	50	39.49
MEATHOUSE FORK	1785	Bridge		
MEATHOUSE FORK	1760	11.7	26.8	43.8
MEATHOUSE FORK	1733.17	128.75	137.97	138.79
MEATHOUSE FORK	1595.2	148.13	145.81	146.27
MEATHOUSE FORK	1449.39	200.19	170.15	123.67
MEATHOUSE FORK	1279.24	130.76	126.25	120.77
MEATHOUSE FORK	1152.99	99.55	100	94.11
MEATHOUSE FORK	1052.99	96.56	100	110.74
MEATHOUSE FORK	952.99	98.39	100	97.56
MEATHOUSE FORK	852.99	101.32	100	101.18
MEATHOUSE FORK	752.99	138.39	140	137.57
MEATHOUSE FORK	612.99	116.53	119.3	117.86
MEATHOUSE FORK	493.69	63.07	78.64	78.79
MEATHOUSE FORK	415.05	34.7	156.1	171.52
MEATHOUSE FORK	258.95	0	0	0

River: Middle Island Cr

Reach	River Sta.	Left	Channel	Right
MIDDLE ISLAND CR	50	30	30	30
MIDDLE ISLAND CR	20	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Buckeye Creek

Reach	River Sta.	Contr.	Expan.
BUCKEYE CREEK	1266.73	.1	.3
BUCKEYE CREEK	1166.73	.1	.3
BUCKEYE CREEK	1066.73	.1	.3
BUCKEYE CREEK	966.73	.1	.3
BUCKEYE CREEK	866.35	.1	.3
BUCKEYE CREEK	726.73	.1	.3
BUCKEYE CREEK	626.73	.1	.3
BUCKEYE CREEK	526.73	.1	.3
BUCKEYE CREEK	426.73	.1	.3
BUCKEYE CREEK	326.73	.1	.3

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BUCKEYE CREEK	226.73	.1	.3
BUCKEYE CREEK	136.73	.1	.3

River: Meathouse Fork

Reach	River Sta.	Contr.	Expan.
MEATHOUSE FORK	1933.09	.1	.3
MEATHOUSE FORK	1860	.3	.5
MEATHOUSE FORK	1810	.3	.5
MEATHOUSE FORK	1785	Bridge	
MEATHOUSE FORK	1760	.3	.5
MEATHOUSE FORK	1733.17	.1	.5
MEATHOUSE FORK	1595.2	.3	.3
MEATHOUSE FORK	1449.39	.1	.3
MEATHOUSE FORK	1279.24	.1	.3
MEATHOUSE FORK	1152.99	.1	.3
MEATHOUSE FORK	1052.99	.1	.3
MEATHOUSE FORK	952.99	.1	.3
MEATHOUSE FORK	852.99	.1	.3
MEATHOUSE FORK	752.99	.1	.3
MEATHOUSE FORK	612.99	.1	.3
MEATHOUSE FORK	493.69	.1	.3
MEATHOUSE FORK	415.05	.1	.3
MEATHOUSE FORK	258.95	.1	.3

River: Middle Island Cr

Reach	River Sta.	Contr.	Expan.
MIDDLE ISLAND CR	50	.1	.3
MIDDLE ISLAND CR	20	.1	.3

Profile Output Table - Standard Table 1

River	Reach	River Sta	Profile	Q Total	Min Ch El
W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Flow Area	Top Width
Froude #	Chl		Vel	Chnl	
(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(ft)
				(cfs)	(ft)
				(sq ft)	(ft)

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Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	16950.00	775.59
792.82	793.73	0.001355	8.42	2862.09	351.29
0.37					
Middle Island Cr	MIDDLE ISLAND CR	20	PF 1	16950.00	775.59
792.70	786.84 793.68	0.001459	9.06	2903.98	365.97
0.39					
Meathouse Fork	MEATHOUSE FORK	1933.09	PF 1	9600.00	775.34
795.32	795.75	0.001115	5.65	2328.03	385.33
0.25					
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	9600.00	774.64
794.94	795.62	0.001674	6.96	1777.76	320.71
0.30					
Meathouse Fork	MEATHOUSE FORK	1810	PF 1	9600.00	775.85
794.84	786.11 795.53	0.001718	6.89	1662.05	277.77
0.30					
Meathouse Fork	MEATHOUSE FORK	1785		Bridge	
Meathouse Fork	MEATHOUSE FORK	1760	PF 1	9600.00	775.18
794.76	795.40	0.001632	6.67	1725.56	254.71
0.29					
Meathouse Fork	MEATHOUSE FORK	1733.17	PF 1	9600.00	775.00
794.85	795.23	0.001072	5.34	2283.04	306.34
0.24					
Meathouse Fork	MEATHOUSE FORK	1595.2	PF 1	9600.00	774.74
794.80	795.06	0.000653	4.32	2756.29	339.04
0.19					
Meathouse Fork	MEATHOUSE FORK	1449.39	PF 1	9600.00	774.51
794.61	794.92	0.000942	5.09	2654.31	395.89
0.22					
Meathouse Fork	MEATHOUSE FORK	1279.24	PF 1	9600.00	774.29
794.41	794.77	0.000988	5.38	2566.82	395.42
0.23					
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	9600.00	774.10
794.39	794.63	0.000707	4.55	2977.97	371.65
0.19					
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	9600.00	773.91
794.21	794.54	0.000912	5.44	2588.07	322.35
0.22					
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	9600.00	773.66
794.02	794.43	0.001107	5.80	2315.16	296.86
0.24					
Meathouse Fork	MEATHOUSE FORK	852.99	PF 1	9600.00	773.40
793.89	794.32	0.001102	5.72	2264.57	307.58
0.24					
Meathouse Fork	MEATHOUSE FORK	752.99	PF 1	9600.00	773.16
793.84	794.19	0.000968	5.39	2419.63	300.76

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0.23						
Meathouse Fork	MEATHOUSE FORK	612.99	PF 1	9600.00	772.82	
793.73	794.05	0.000915	5.23	2566.81	338.43	
0.22						
Meathouse Fork	MEATHOUSE FORK	493.69	PF 1	9600.00	772.53	
793.65	793.93	0.000879	5.07	2731.41	354.99	
0.22						
Meathouse Fork	MEATHOUSE FORK	415.05	PF 1	9600.00	772.47	
793.55	793.86	0.000959	5.29	2627.60	352.46	
0.22						
Meathouse Fork	MEATHOUSE FORK	258.95	PF 1	9600.00	772.47	
793.41	785.05 793.73	0.000968	5.41	2646.22	367.38	
0.23						
Buckeye Creek	BUCKEYE CREEK	1266.73	PF 1	7350.00	776.03	
794.65	795.12	0.001259	5.75	1511.16	178.60	
0.26						
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	7350.00	776.00	
794.47	794.99	0.001361	5.92	1412.83	166.32	
0.27						
Buckeye Creek	BUCKEYE CREEK	1066.73	PF 1	7350.00	775.97	
794.36	794.85	0.001365	5.81	1515.39	229.93	
0.27						
Buckeye Creek	BUCKEYE CREEK	966.73	PF 1	7350.00	775.94	
794.32	794.69	0.001030	5.00	1658.77	213.25	
0.23						
Buckeye Creek	BUCKEYE CREEK	866.35	PF 1	7350.00	775.97	
794.21	785.60 794.58	0.001186	5.36	1728.20	268.39	
0.24						
Buckeye Creek	BUCKEYE CREEK	726.73	PF 1	7350.00	776.03	
794.02	794.42	0.001113	5.32	1603.21	175.11	
0.24						
Buckeye Creek	BUCKEYE CREEK	626.73	PF 1	7350.00	775.78	
793.97	794.30	0.000950	5.00	1778.44	172.48	
0.22						
Buckeye Creek	BUCKEYE CREEK	526.73	PF 1	7350.00	775.52	
793.82	794.20	0.001041	5.37	1652.54	150.19	
0.23						
Buckeye Creek	BUCKEYE CREEK	426.73	PF 1	7350.00	775.23	
793.83	794.08	0.000750	4.53	2052.33	209.01	
0.20						
Buckeye Creek	BUCKEYE CREEK	326.73	PF 1	7350.00	774.81	
793.59	793.97	0.001092	5.39	1671.21	166.58	
0.23						
Buckeye Creek	BUCKEYE CREEK	226.73	PF 1	7350.00	774.36	
793.40	793.85	0.001271	5.78	1612.75	209.34	
0.25						
Buckeye Creek	BUCKEYE CREEK	136.73	PF 1	7350.00	773.97	
793.26	784.45 793.73	0.001366	5.93	1636.13	249.62	

0.26

Profile Output Table - Standard Table 2

River Elev Width	Vel Head	Reach Frctn Loss	C & E Loss	River Sta Q Left	Profile Q Channel	E.G. Elev Q Right	W.S. Top
(ft) (ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft) (cfs)	
Middle Island Cr 792.82 351.29	0.91	MIDDLE ISLAND CR 0.04	50 0.01	3041.65	PF 1 13703.07	793.73 205.28	
Middle Island Cr 792.70 365.97	0.98	MIDDLE ISLAND CR	20	4049.32	PF 1 12620.27	793.68 280.41	
Meathouse Fork 795.32 385.33	0.42	MEATHOUSE FORK 0.10	1933.09 0.03	389.26	PF 1 8035.85	795.75 1174.89	
Meathouse Fork 794.94 320.71	0.68	MEATHOUSE FORK 0.08	1860 0.00	357.51	PF 1 8597.03	795.62 645.46	
Meathouse Fork 794.84 277.77	0.69	MEATHOUSE FORK 0.02	1810 0.00	269.43	PF 1 8956.83	795.53 373.75	
Meathouse Fork		MEATHOUSE FORK	1785			Bridge	
Meathouse Fork 794.76 254.71	0.64	MEATHOUSE FORK 0.04	1760 0.13	110.65	PF 1 8890.81	795.40 598.54	
Meathouse Fork 794.85 306.34	0.39	MEATHOUSE FORK 0.11	1733.17 0.06	19.02	PF 1 8199.79	795.23 1381.19	
Meathouse Fork 794.80 339.04	0.26	MEATHOUSE FORK 0.11	1595.2 0.02	129.84	PF 1 8383.90	795.06 1086.26	
Meathouse Fork 794.61 395.89	0.32	MEATHOUSE FORK 0.15	1449.39 0.00	71.22	PF 1 7269.11	794.92 2259.67	
Meathouse Fork 794.41 395.42	0.36	MEATHOUSE FORK 0.10	1279.24 0.04	76.23	PF 1 7326.97	794.77 2196.81	

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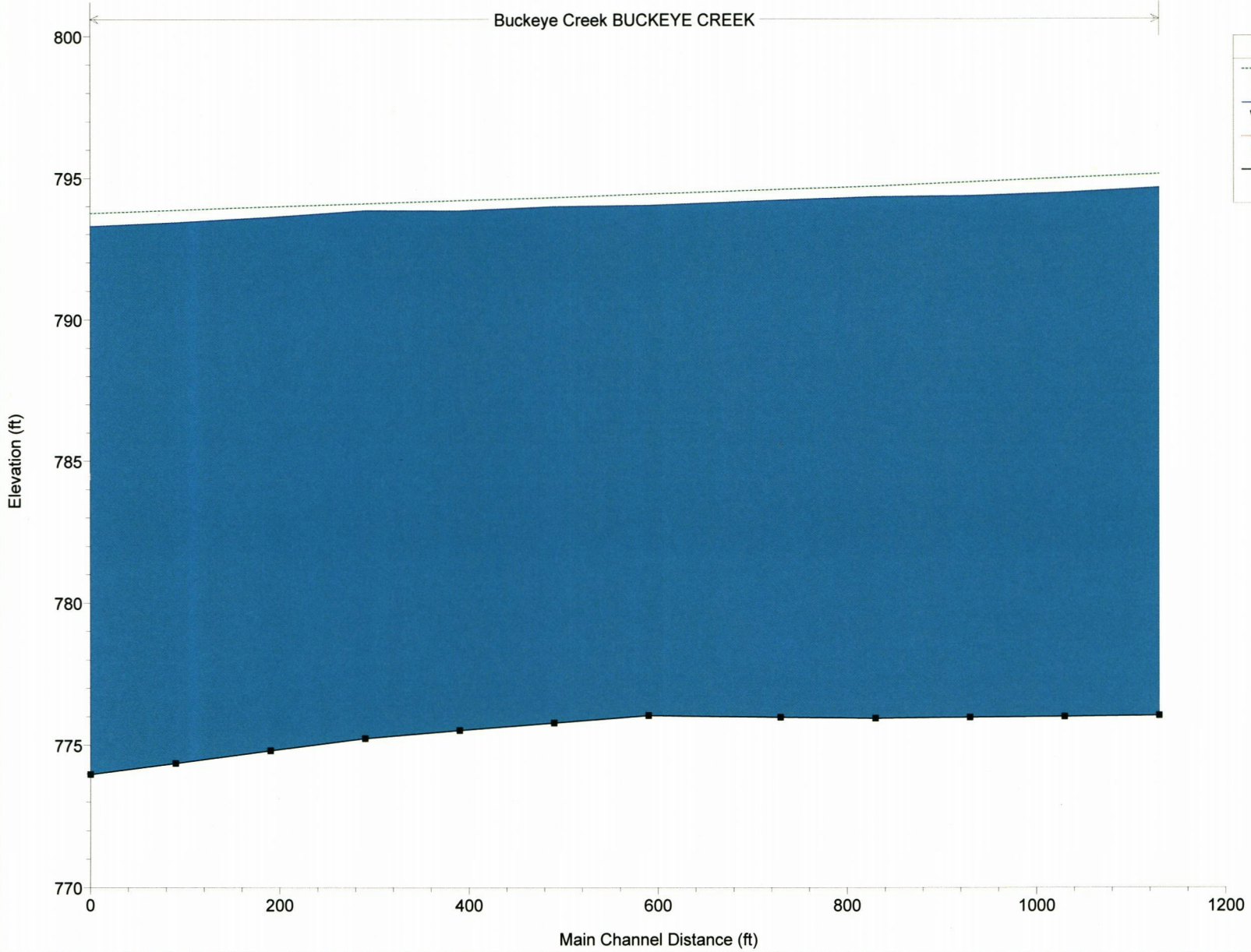
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	794.63
794.39 0.24	0.08	0.01 33.94	6479.57	3086.50
371.65				
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	794.54
794.21 0.33	0.10	0.01 295.67	6319.44	2984.89
322.35				
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	794.43
794.02 0.41	0.11	0.00 214.22	7036.63	2349.16
296.86				
Meathouse Fork	MEATHOUSE FORK	852.99	PF 1	794.32
793.89 0.42	0.10	0.02 206.12	7726.99	1666.89
307.58				
Meathouse Fork	MEATHOUSE FORK	752.99	PF 1	794.19
793.84 0.36	0.13	0.01 335.20	7183.74	2081.06
300.76				
Meathouse Fork	MEATHOUSE FORK	612.99	PF 1	794.05
793.73 0.33	0.11	0.01 479.53	6893.84	2226.63
338.43				
Meathouse Fork	MEATHOUSE FORK	493.69	PF 1	793.93
793.65 0.29	0.07	0.00 884.21	6096.89	2618.90
354.99				
Meathouse Fork	MEATHOUSE FORK	415.05	PF 1	793.86
793.55 0.31	0.13	0.00 1129.49	6206.67	2263.84
352.46				
Meathouse Fork	MEATHOUSE FORK	258.95	PF 1	793.73
793.41 0.33		2885.48	6303.45	411.08
367.38				
Buckeye Creek	BUCKEYE CREEK	1266.73	PF 1	795.12
794.65 0.47	0.13	0.00 79.95	6668.06	601.99
178.60				
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	794.99
794.47 0.52	0.14	0.01 58.15	6935.61	356.24
166.32				
Buckeye Creek	BUCKEYE CREEK	1066.73	PF 1	794.85
794.36 0.49	0.12	0.04 51.05	6819.16	479.80
229.93				
Buckeye Creek	BUCKEYE CREEK	966.73	PF 1	794.69
794.32 0.37	0.11	0.00 21.64	7016.90	311.46
213.25				
Buckeye Creek	BUCKEYE CREEK	866.35	PF 1	794.58
794.21 0.38	0.16	0.00 196.06	5968.99	1184.95
268.39				
Buckeye Creek	BUCKEYE CREEK	726.73	PF 1	794.42
794.02 0.40	0.10	0.02 41.54	6674.19	634.26
175.11				
Buckeye Creek	BUCKEYE CREEK	626.73	PF 1	794.30
793.97 0.33	0.10	0.00 103.28	5778.91	1467.81
172.48				

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Buckeye Creek	BUCKEYE CREEK	526.73	PF 1	794.20
793.82 0.37	0.08	0.04	160.62	5632.16
150.19				1557.22
Buckeye Creek	BUCKEYE CREEK	426.73	PF 1	794.08
793.83 0.25	0.10	0.01	461.91	5254.74
209.01				1633.35
Buckeye Creek	BUCKEYE CREEK	326.73	PF 1	793.97
793.59 0.38	0.12	0.01	771.94	5793.43
166.58				784.63
Buckeye Creek	BUCKEYE CREEK	226.73	PF 1	793.85
793.40 0.45	0.11	0.00	943.72	6229.72
209.34				176.57
Buckeye Creek	BUCKEYE CREEK	136.73	PF 1	793.73
793.26 0.47		985.61	6149.54	214.85
249.62				

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

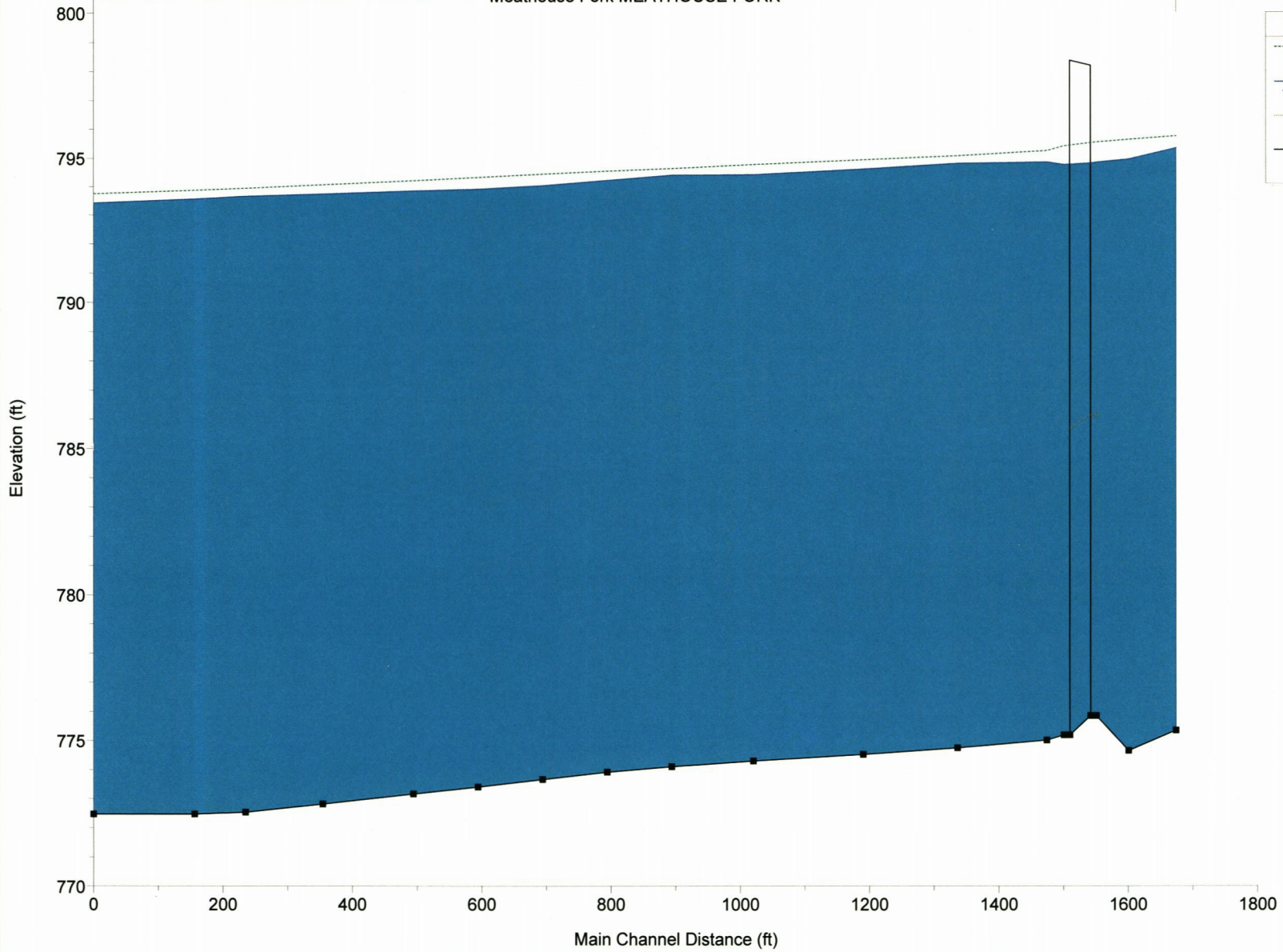
Buckeye Creek BUCKEYE CREEK



Legend	
EG PF 1
WS PF 1	————
Crit PF 1	- - - - -
Ground	—■—

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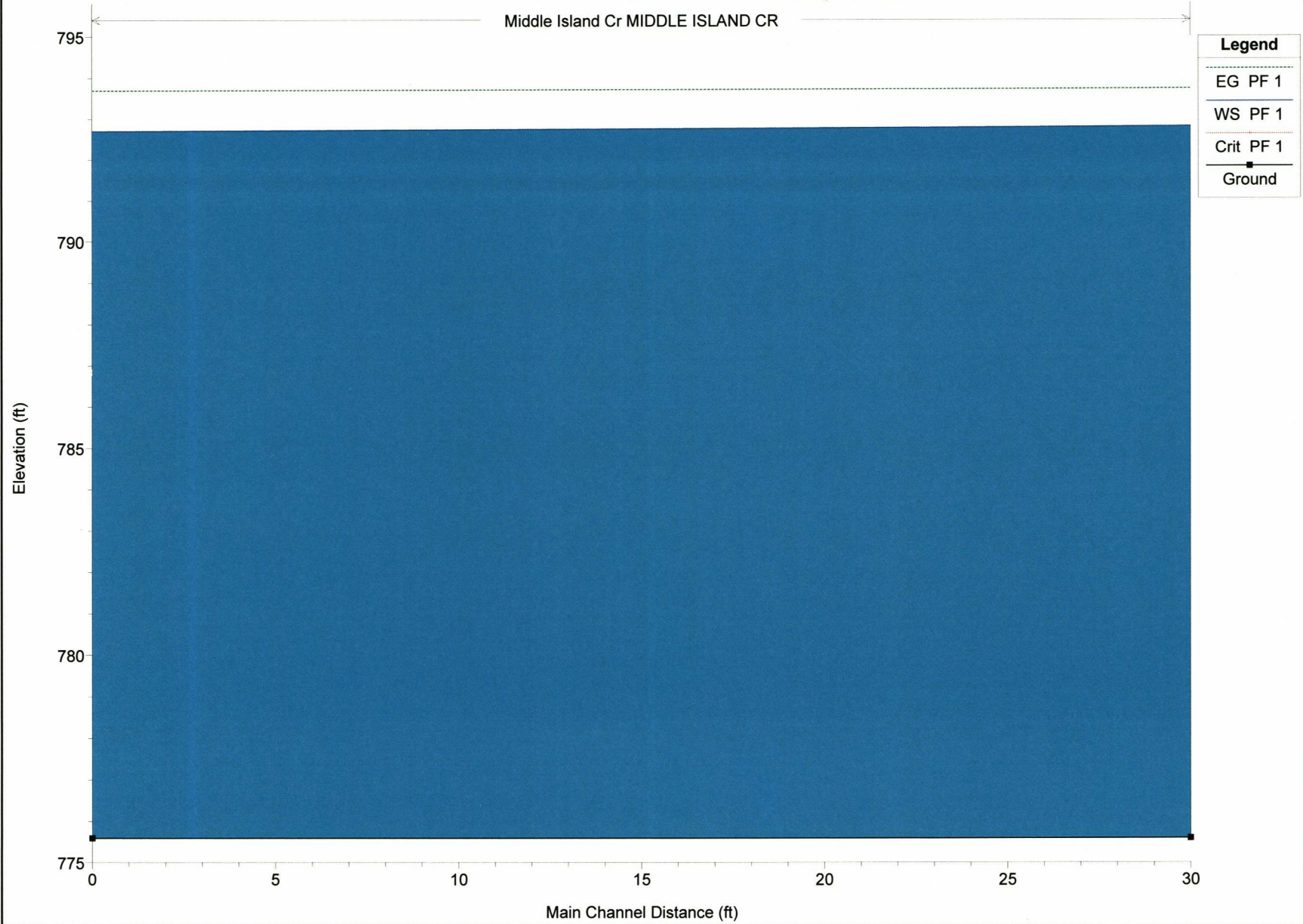
Meathouse Fork MEATHOUSE FORK



Legend	
EG PF 1	---
WS PF 1	Blue Area
Crit PF 1	—■—
Ground	—■—

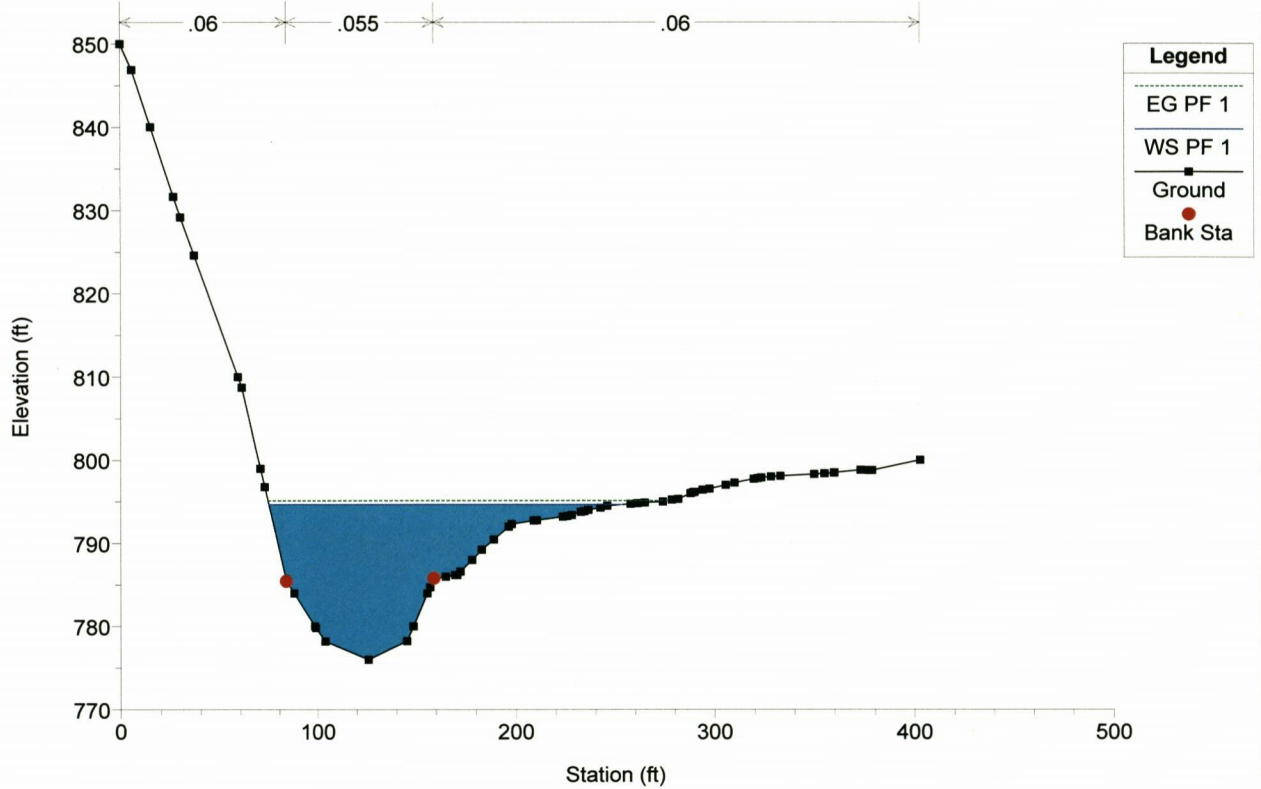
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

Middle Island Cr MIDDLE ISLAND CR



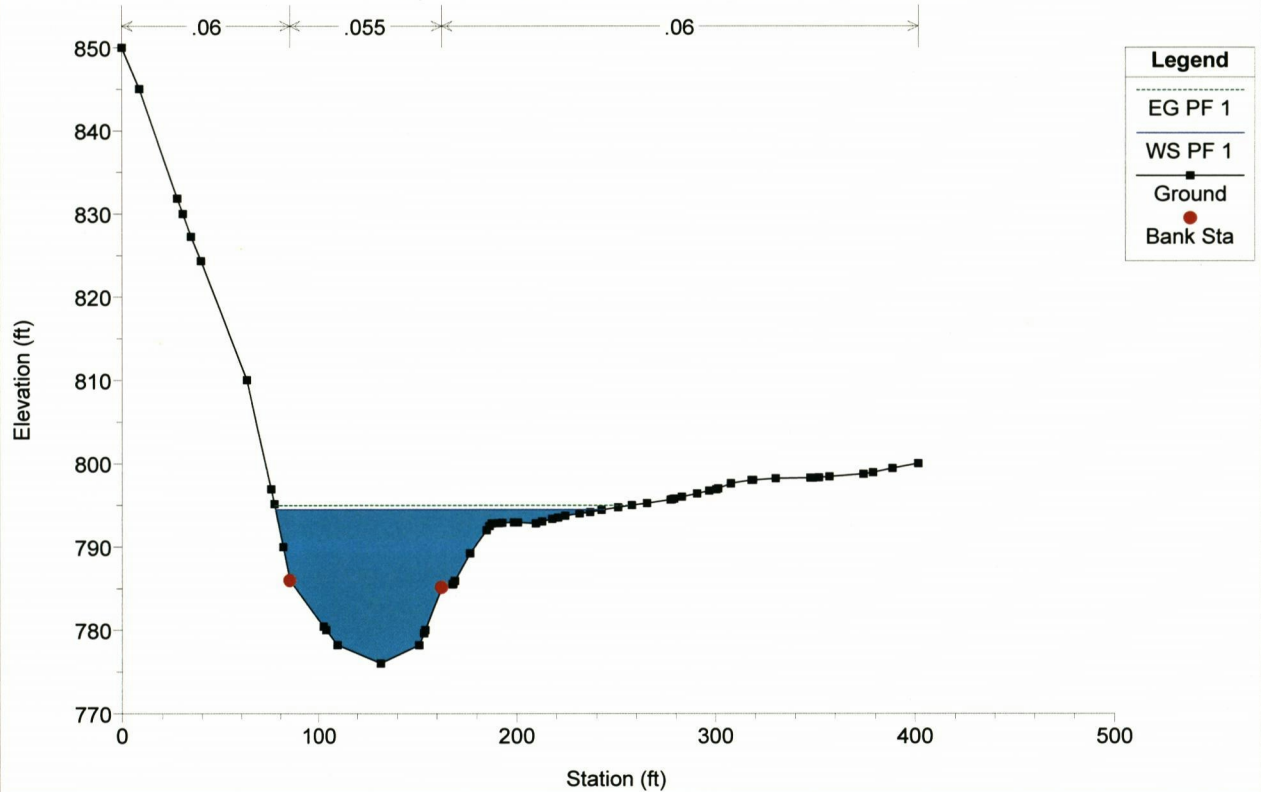
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1266.73



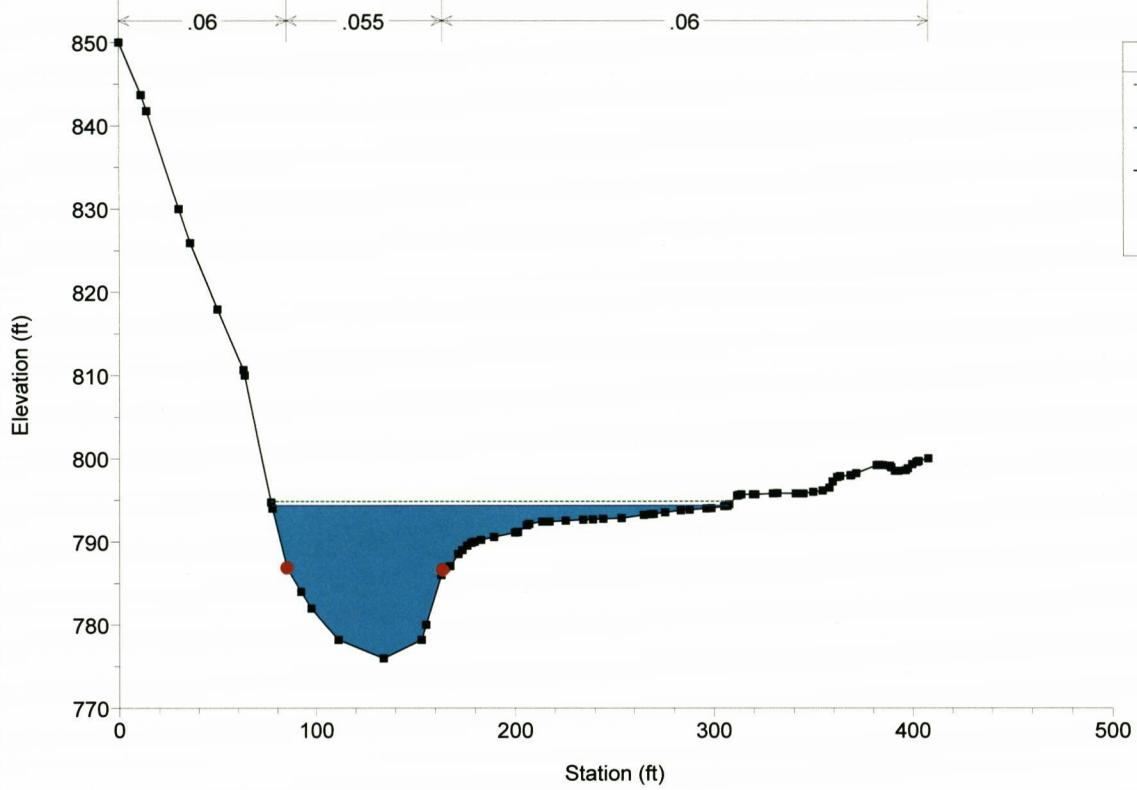
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1166.73



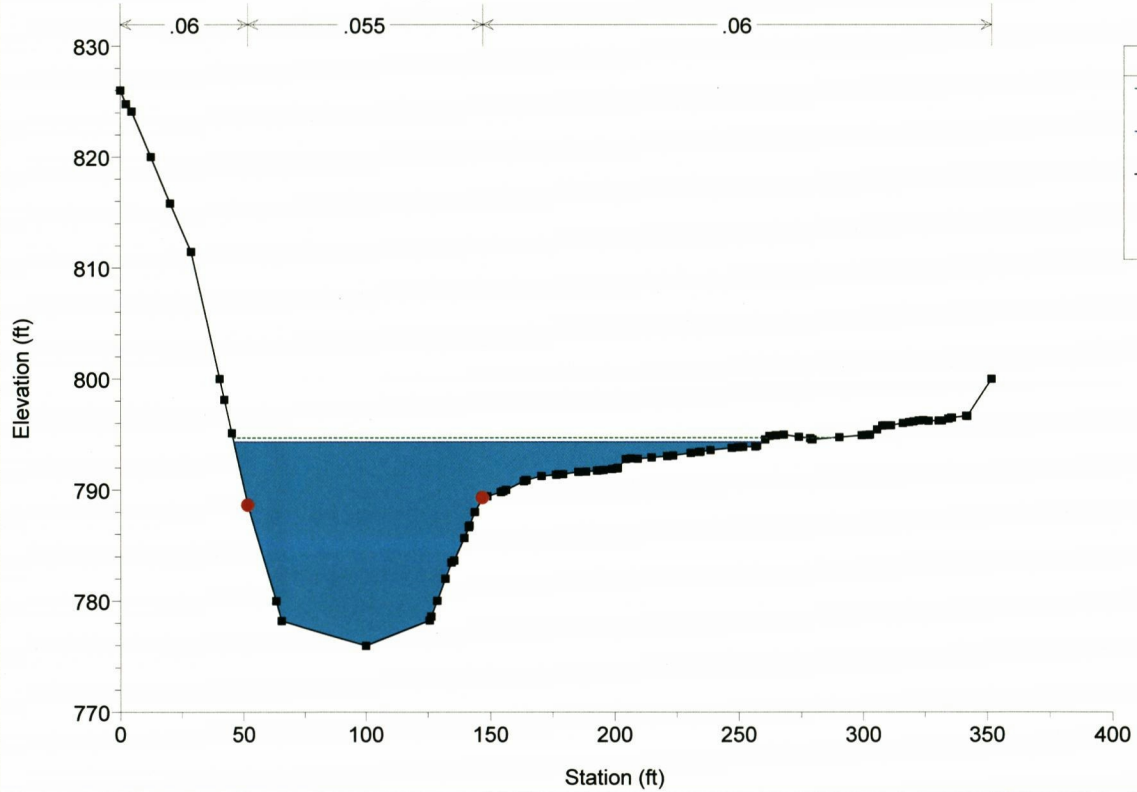
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1066.73



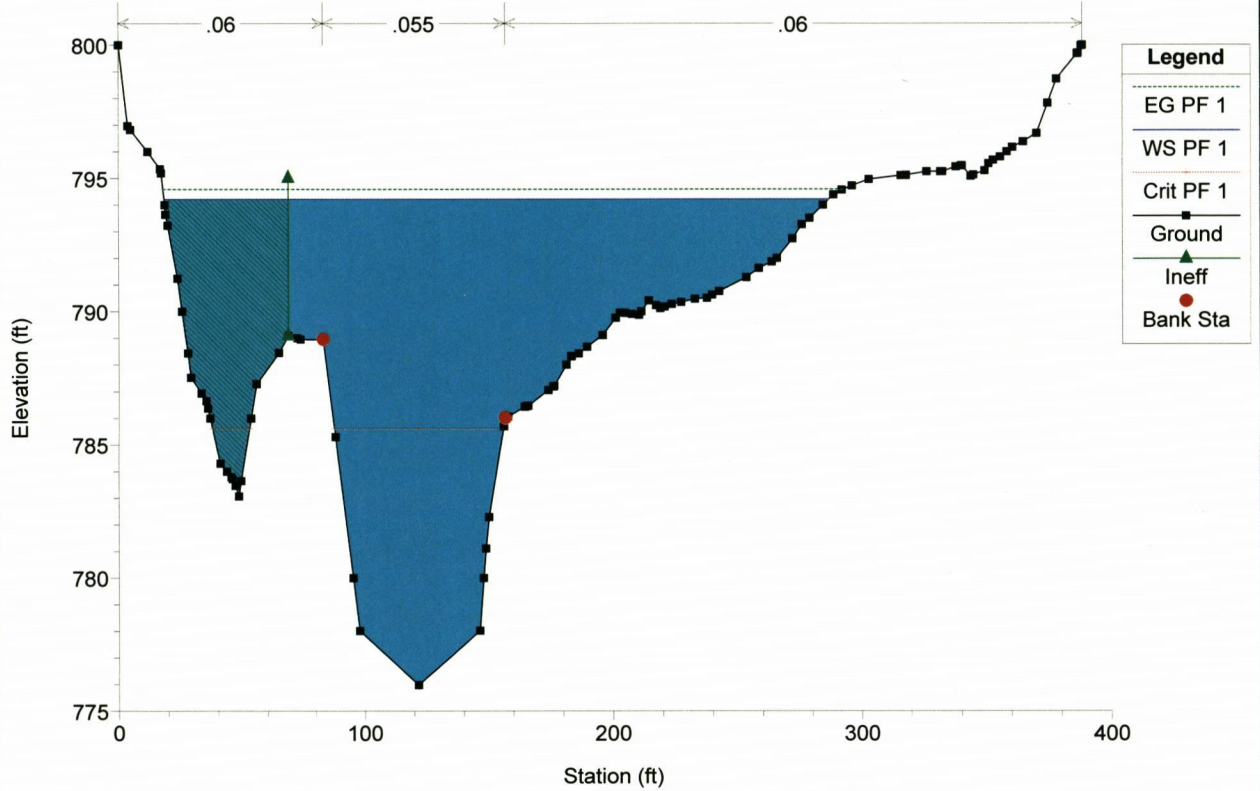
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 966.73



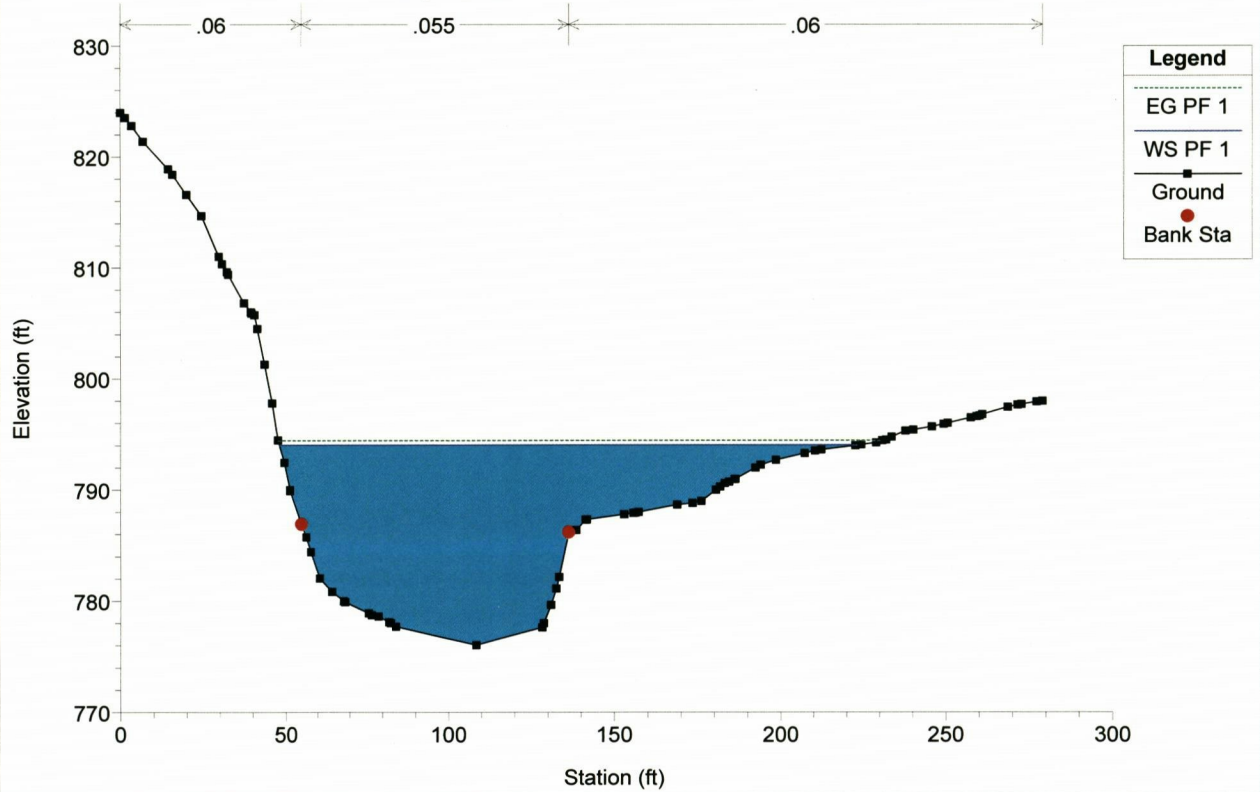
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 866.35



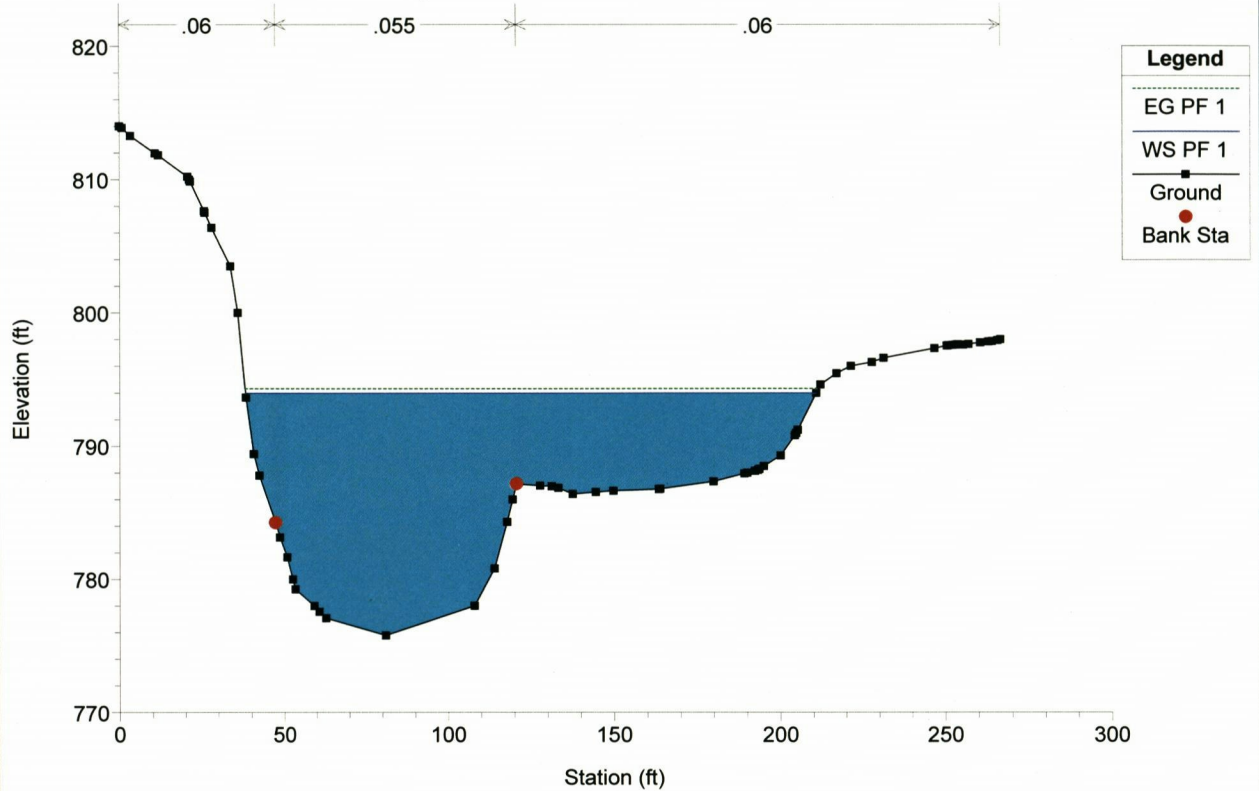
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 726.73



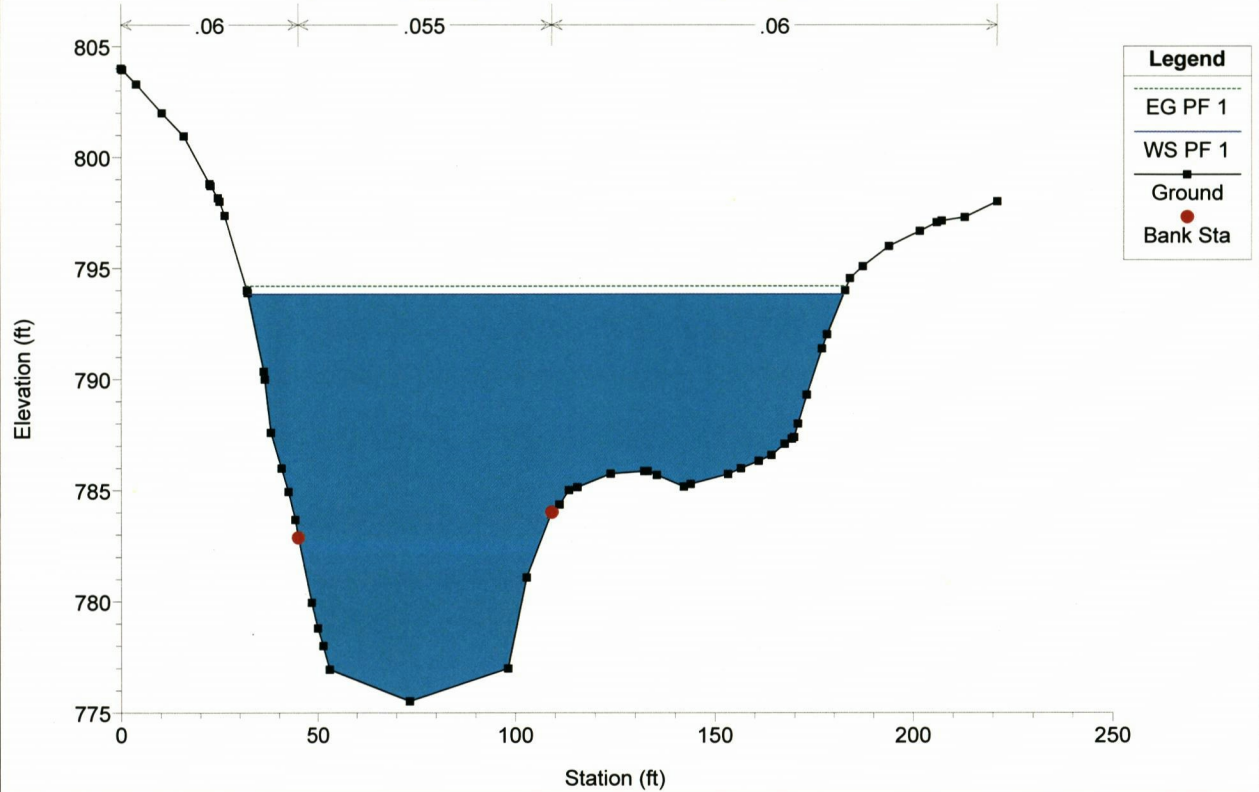
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 626.73



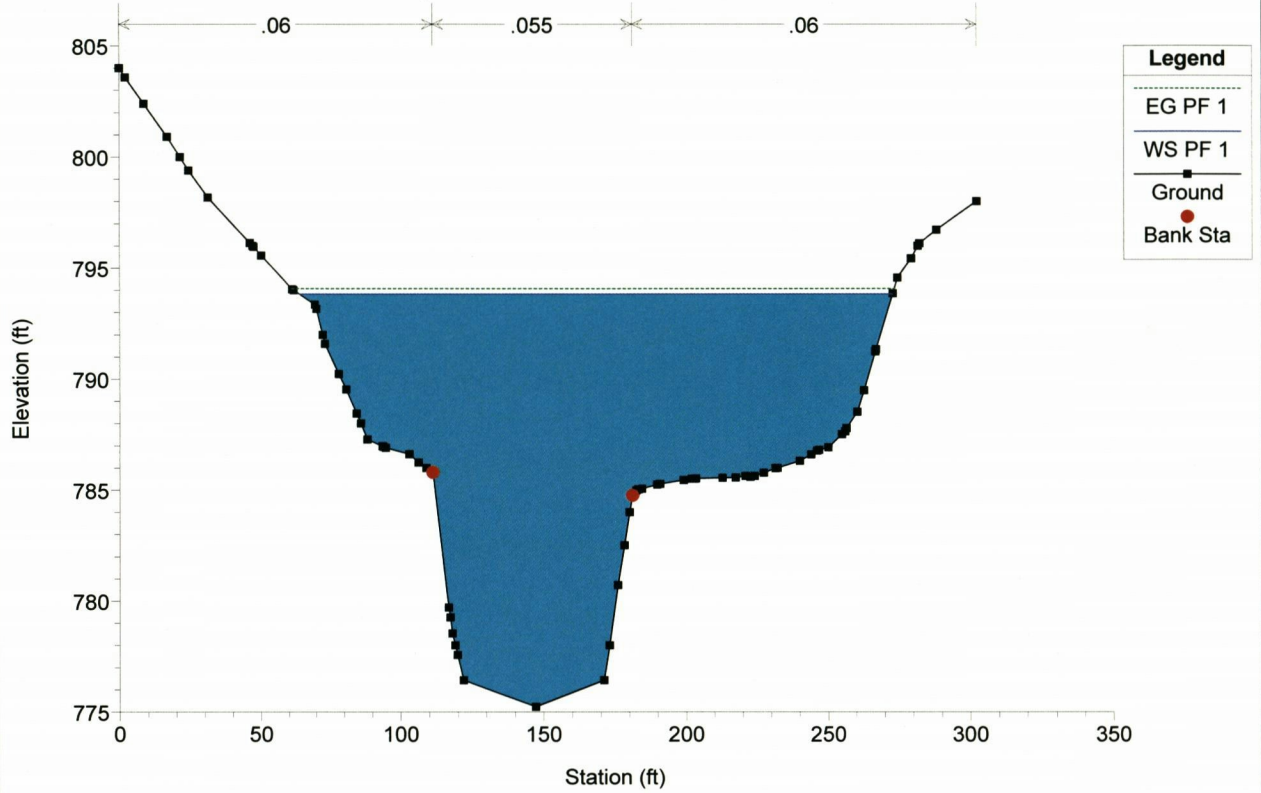
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 526.73



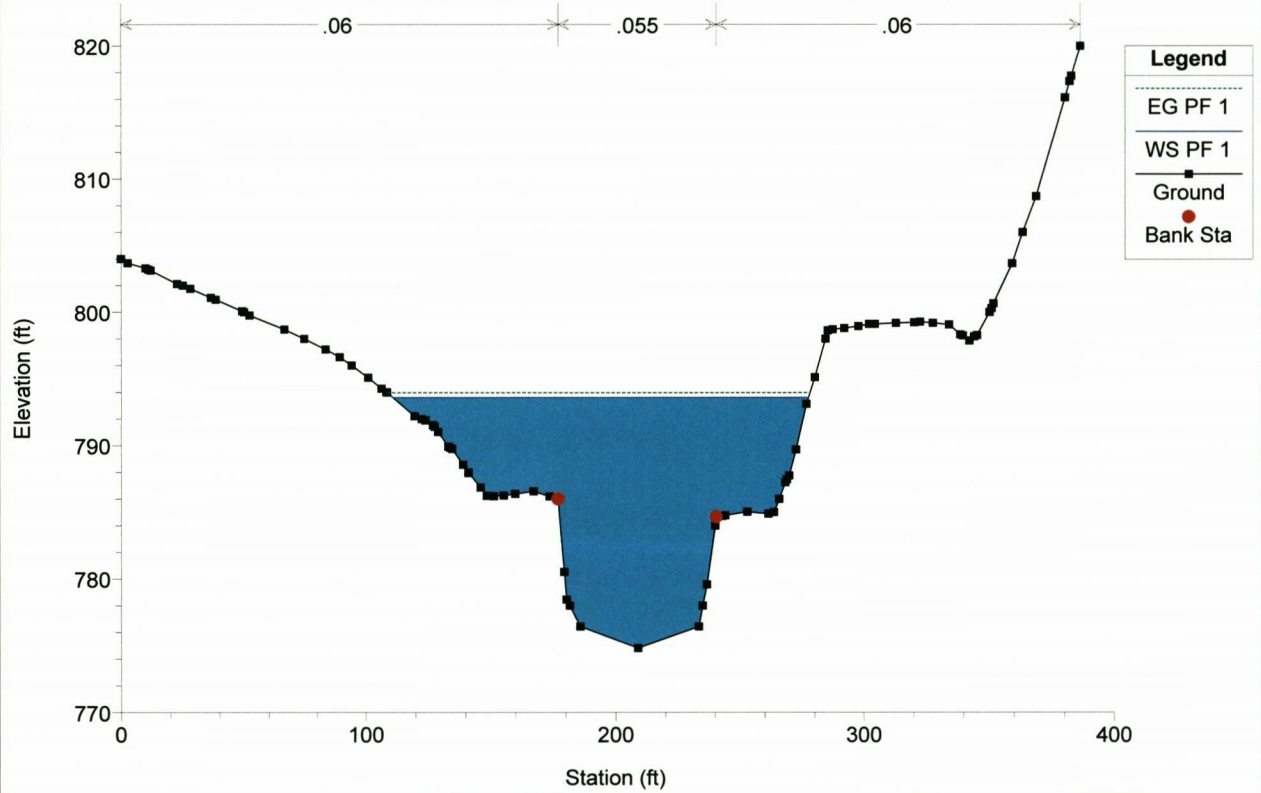
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

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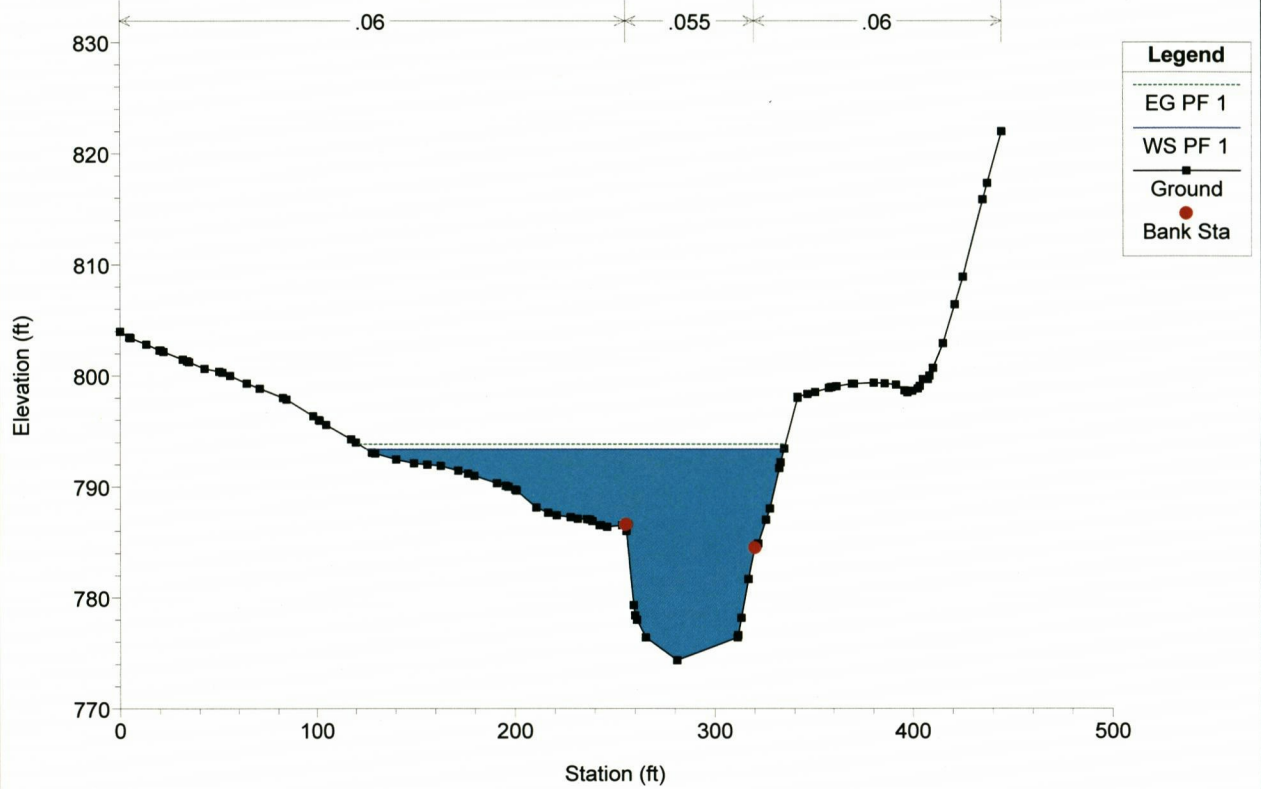
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 326.73



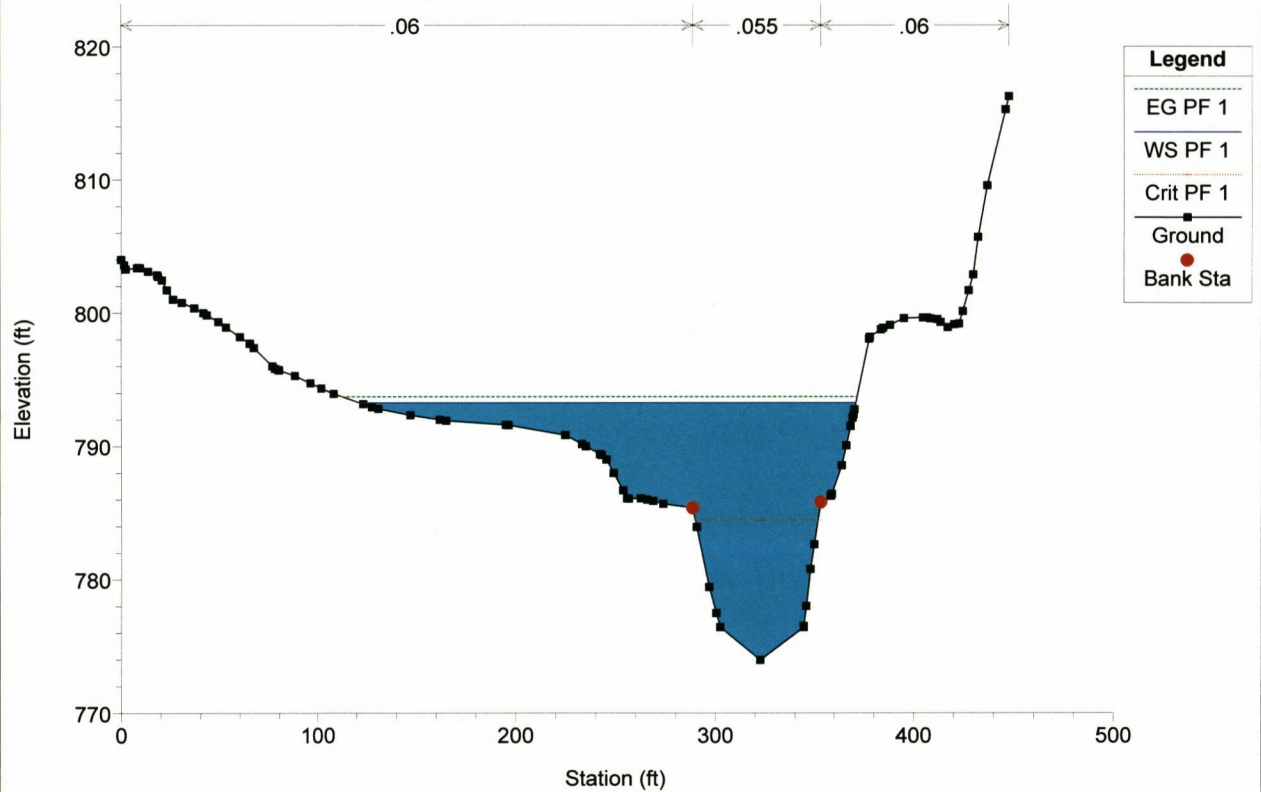
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

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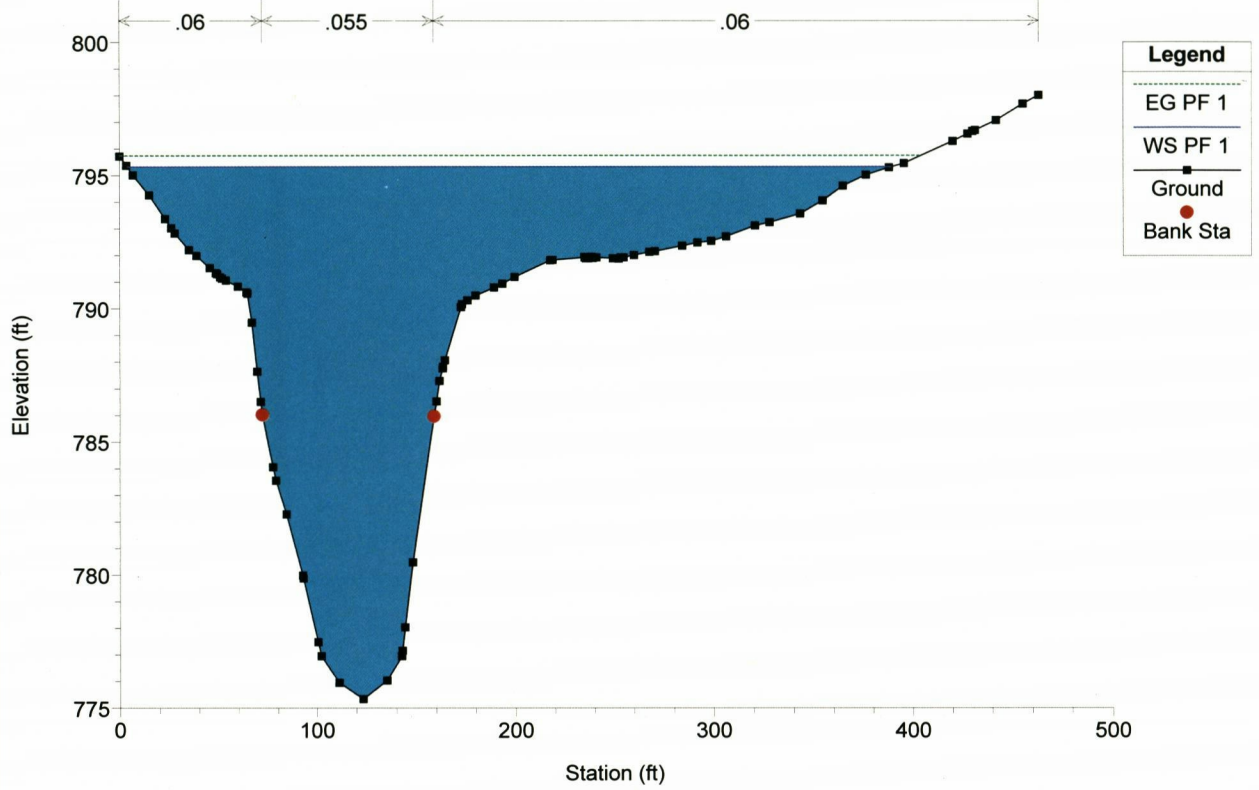
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 136.73



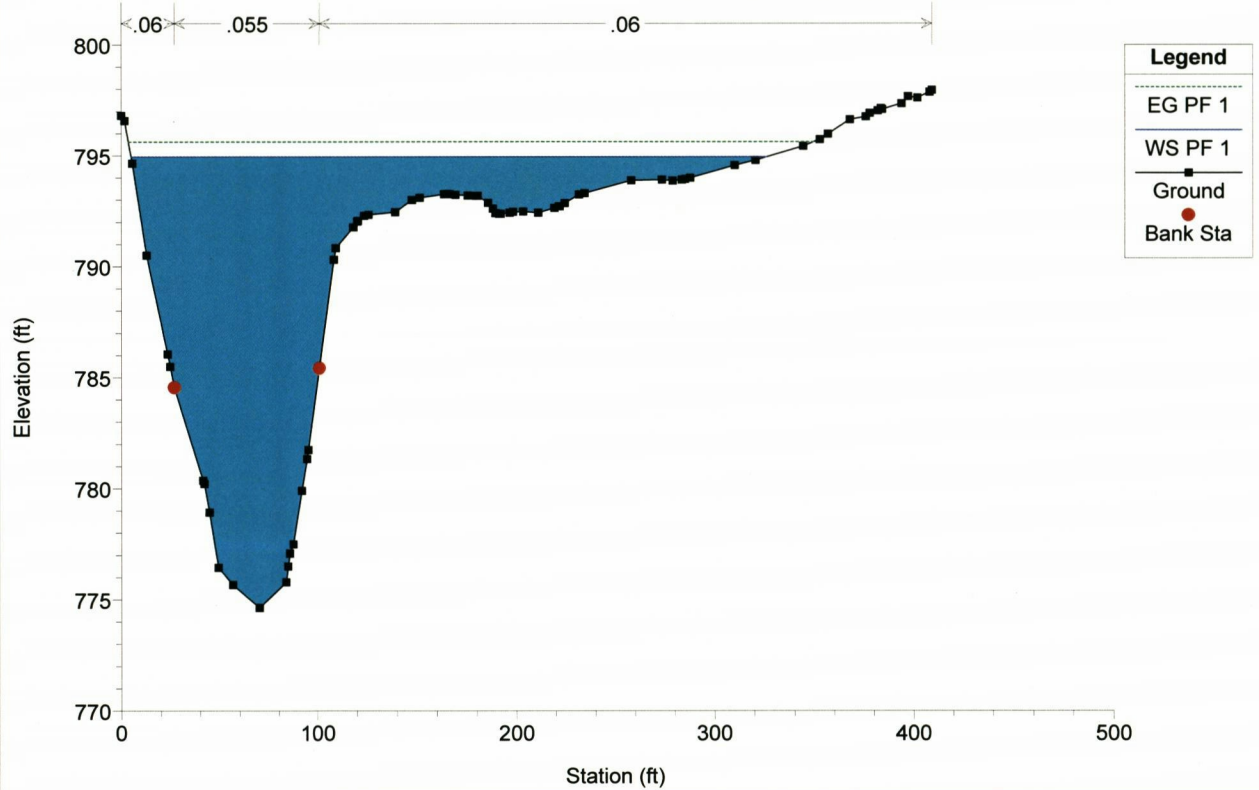
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1933.09



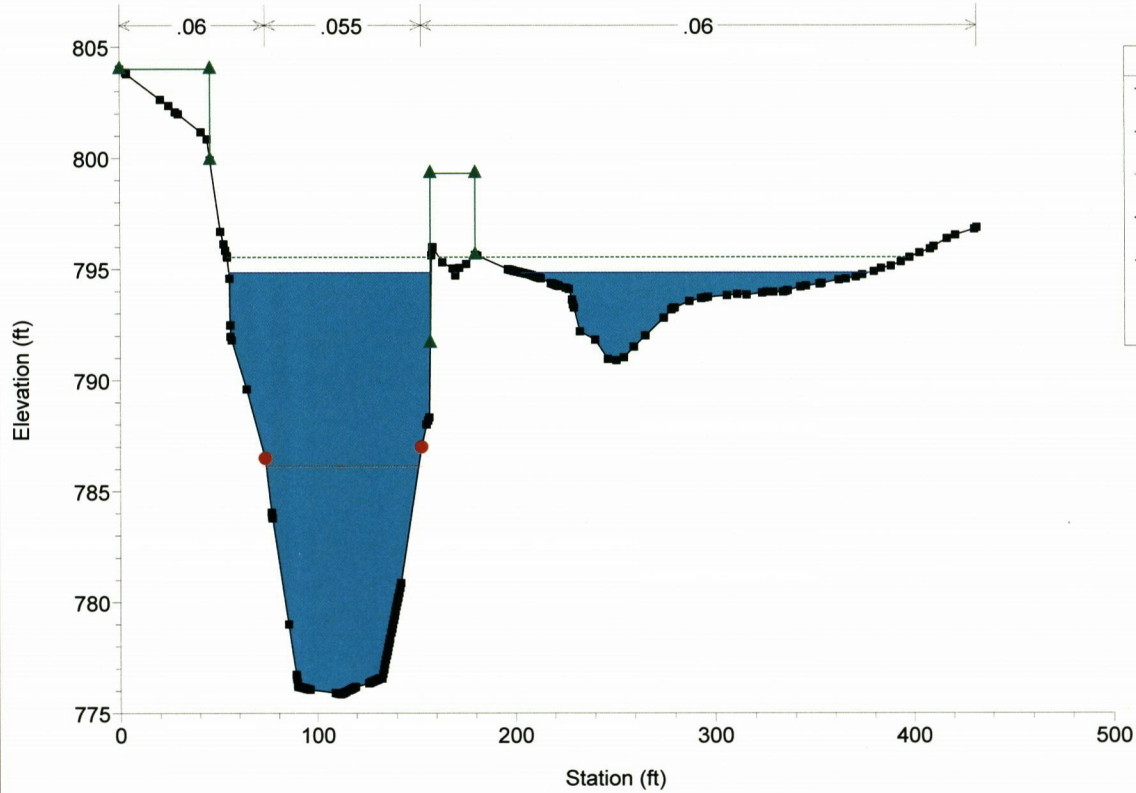
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1860



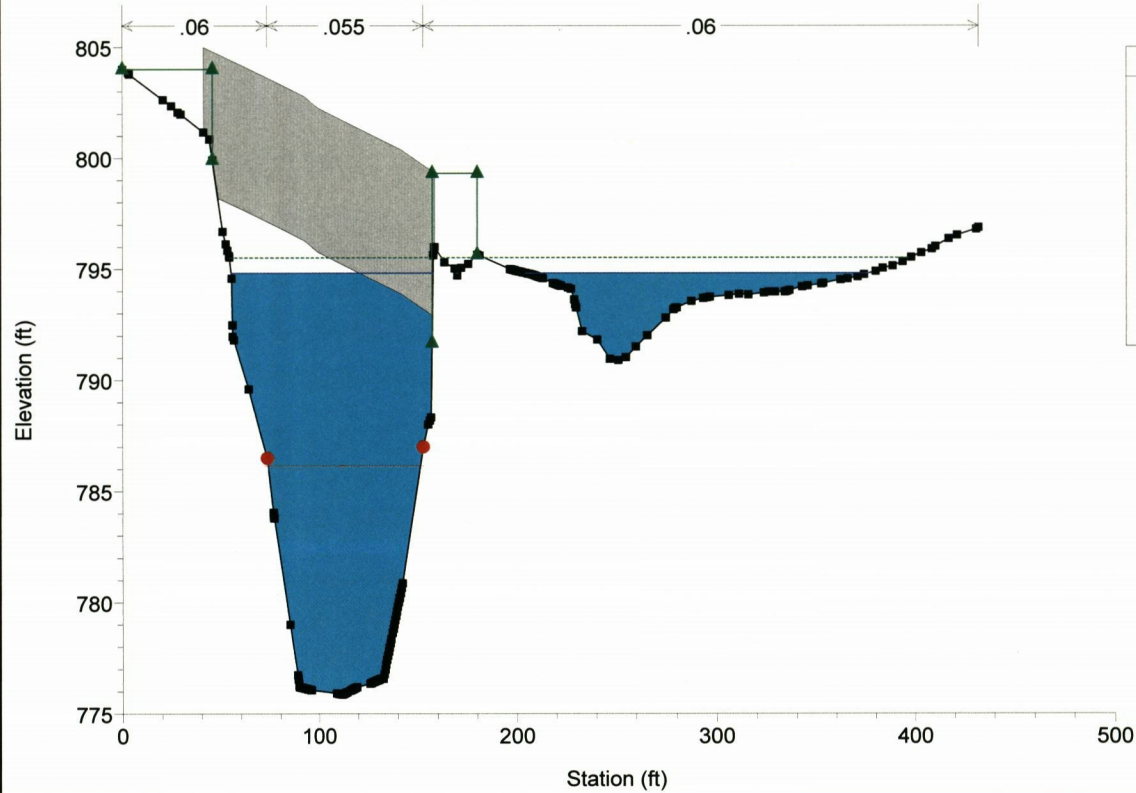
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1810

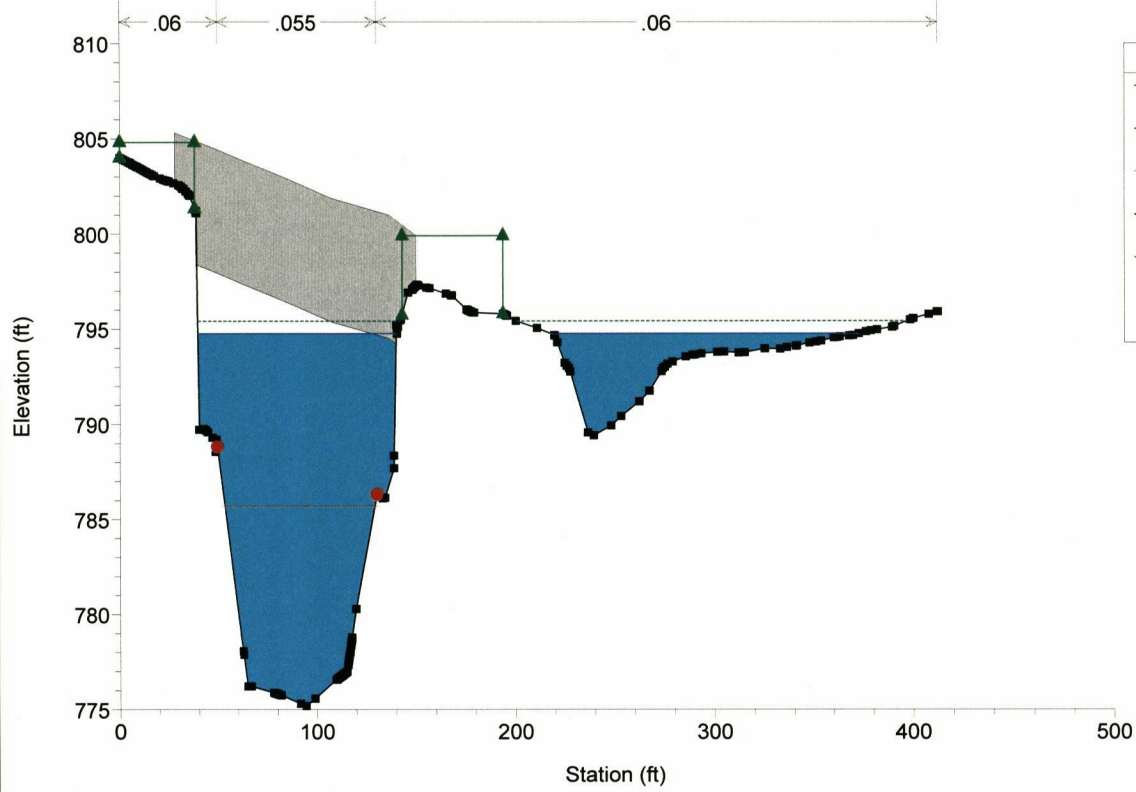


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

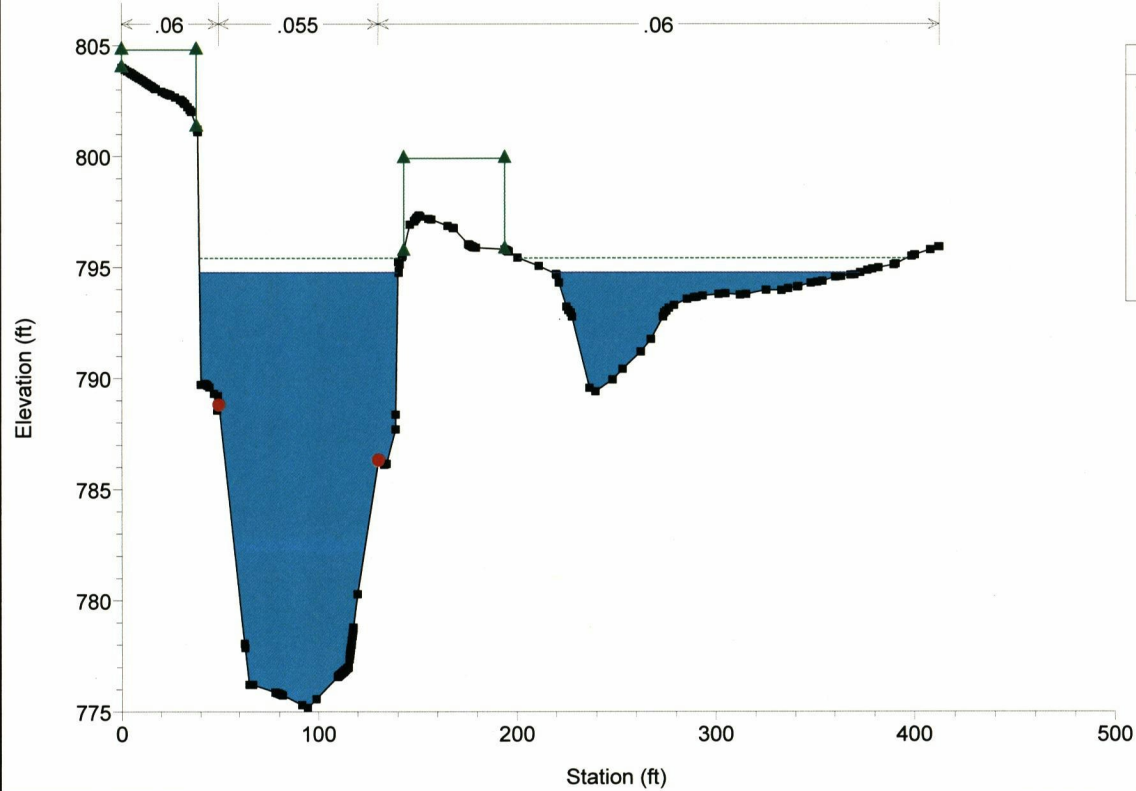
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR



130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
 River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR

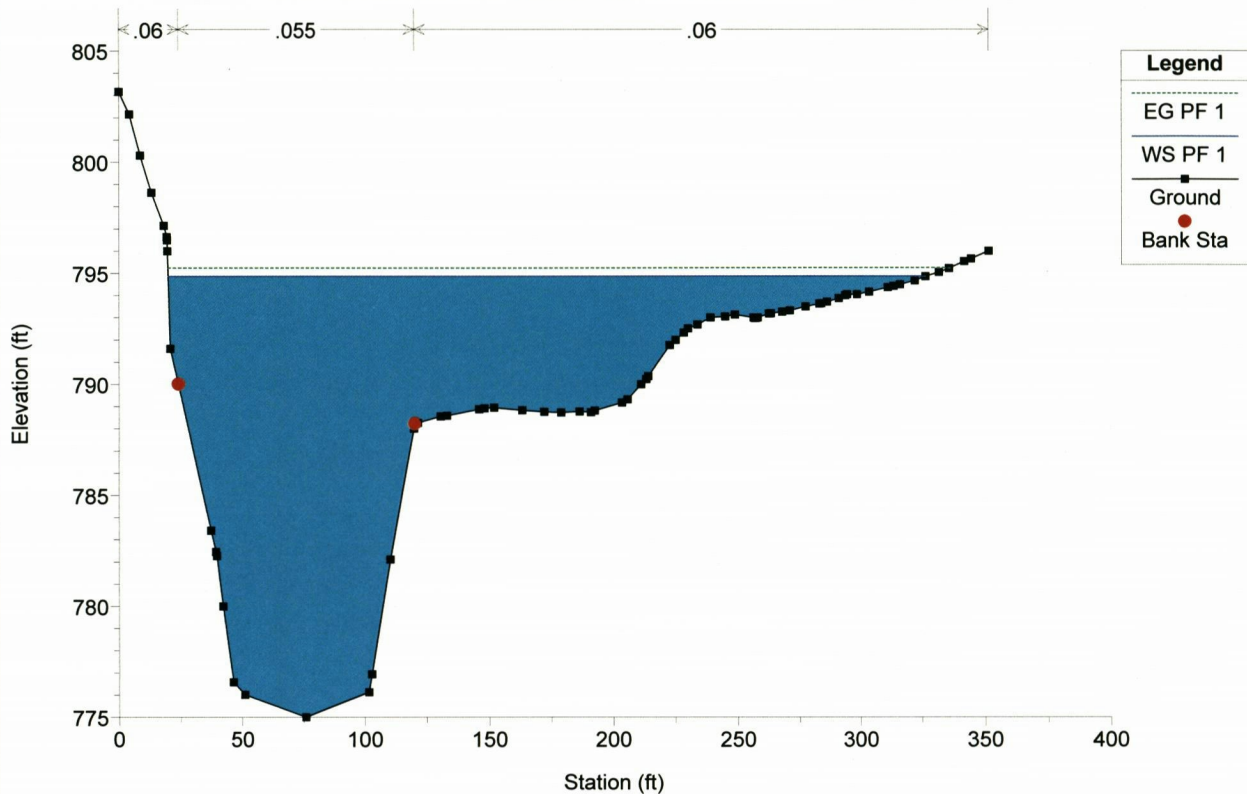


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
 River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1760



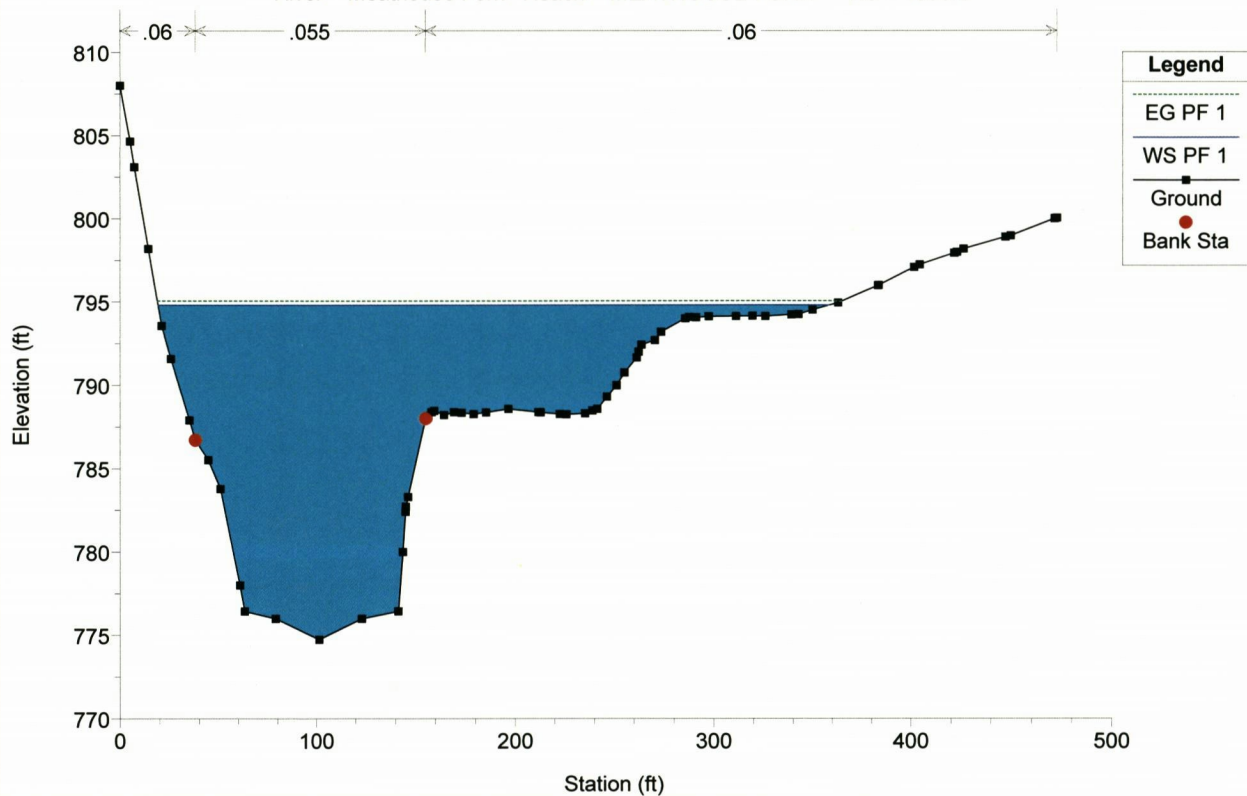
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1733.17



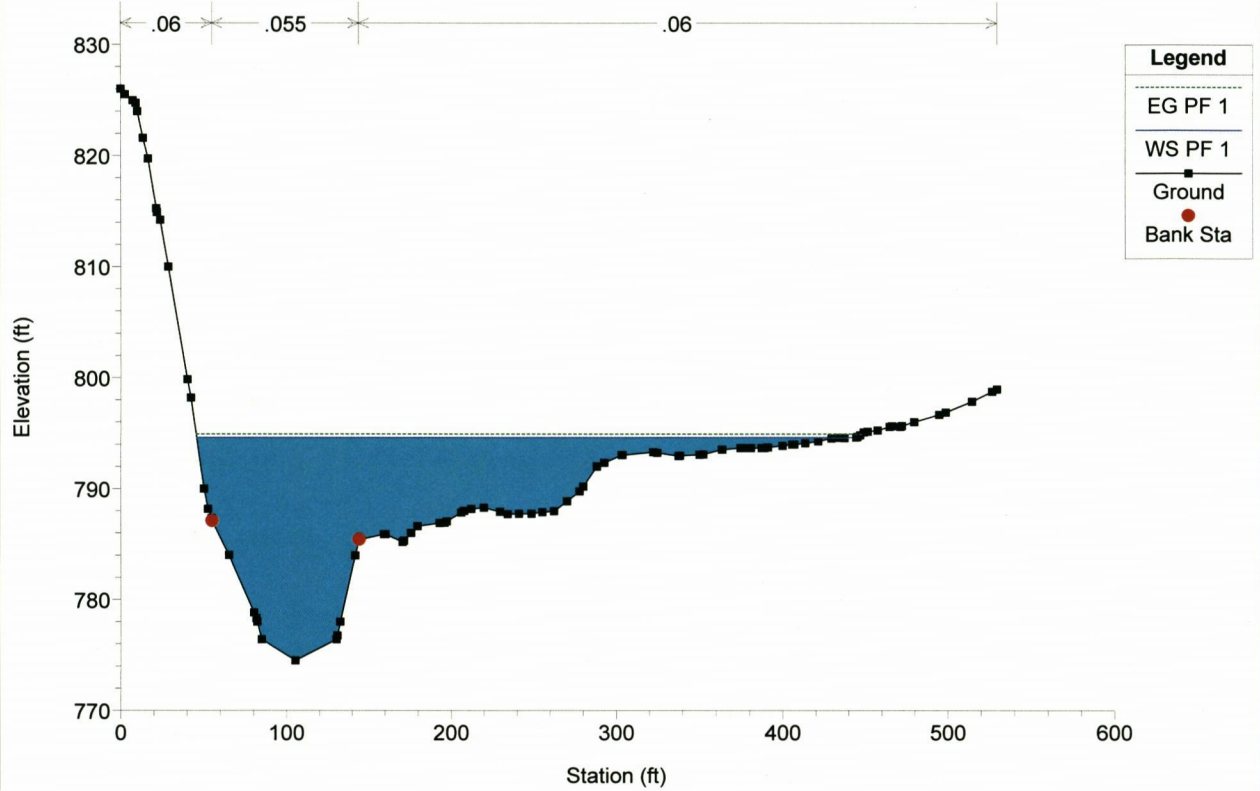
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1595.2



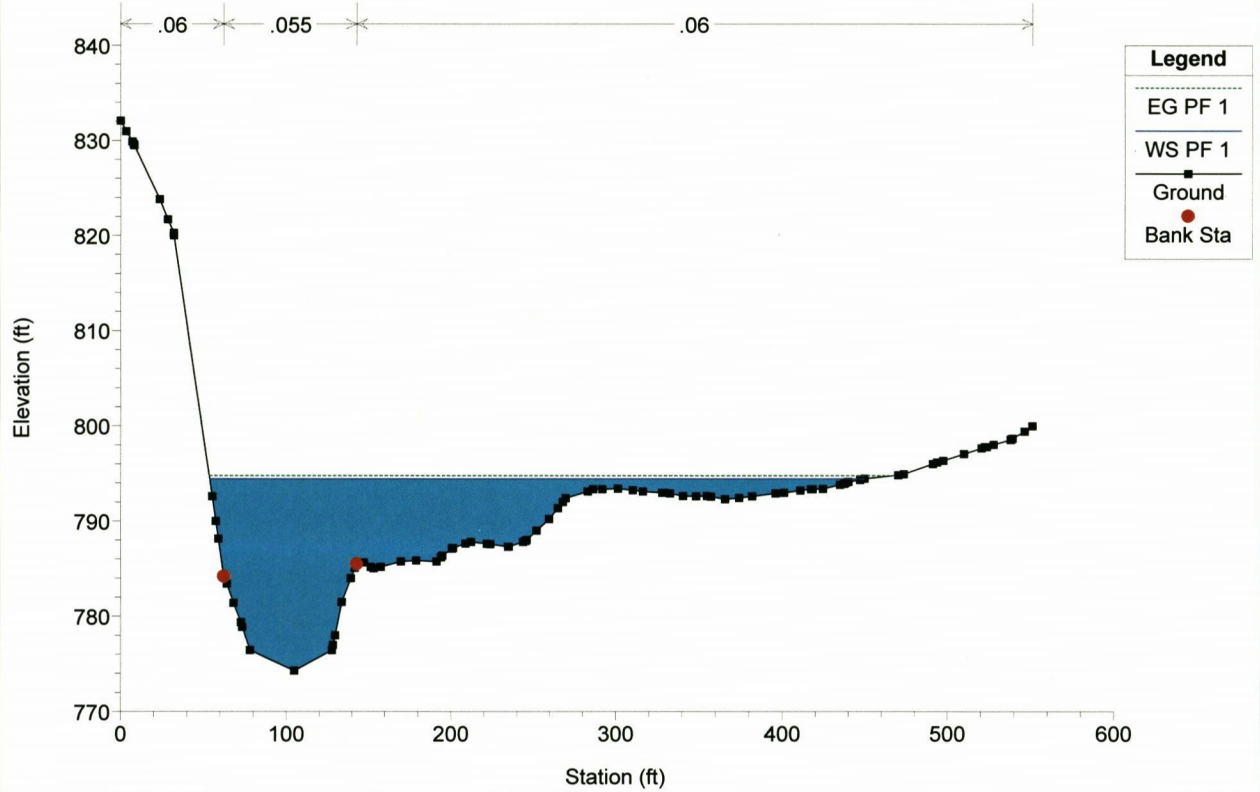
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1449.39



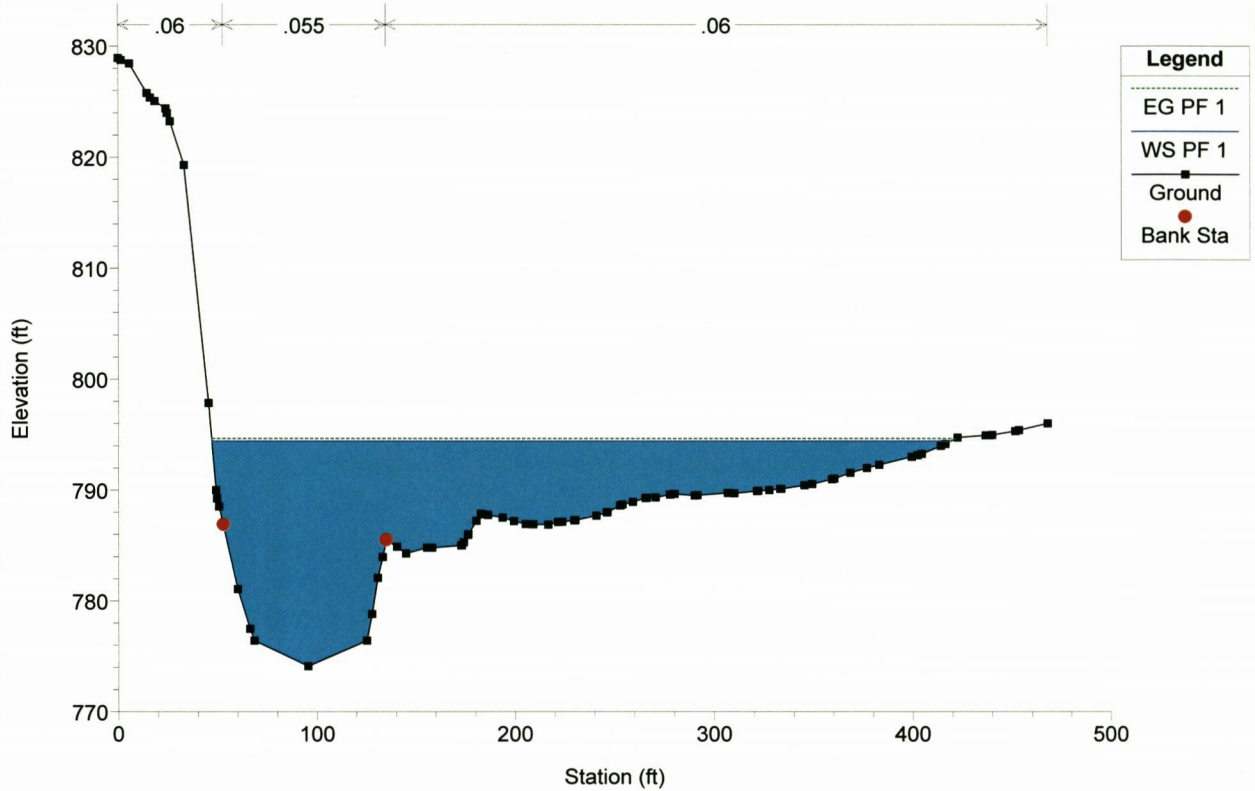
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1279.24



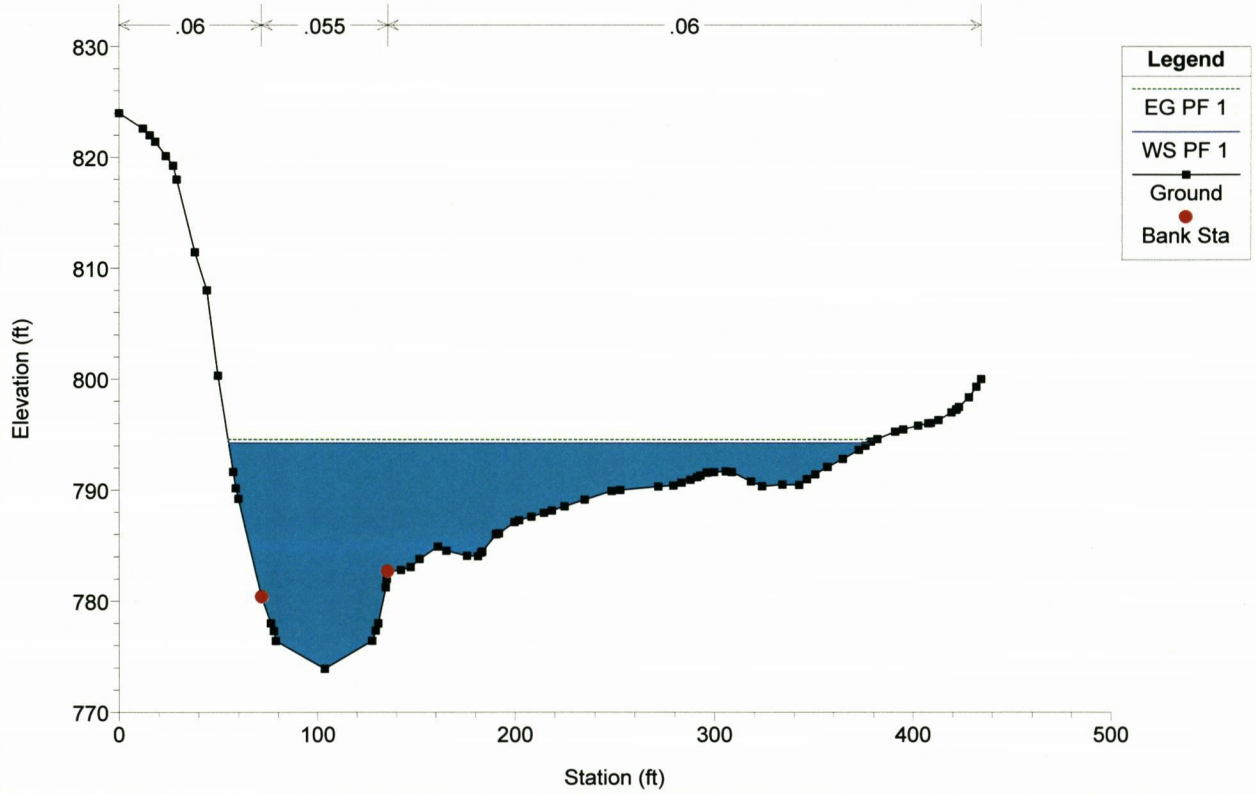
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1152.99



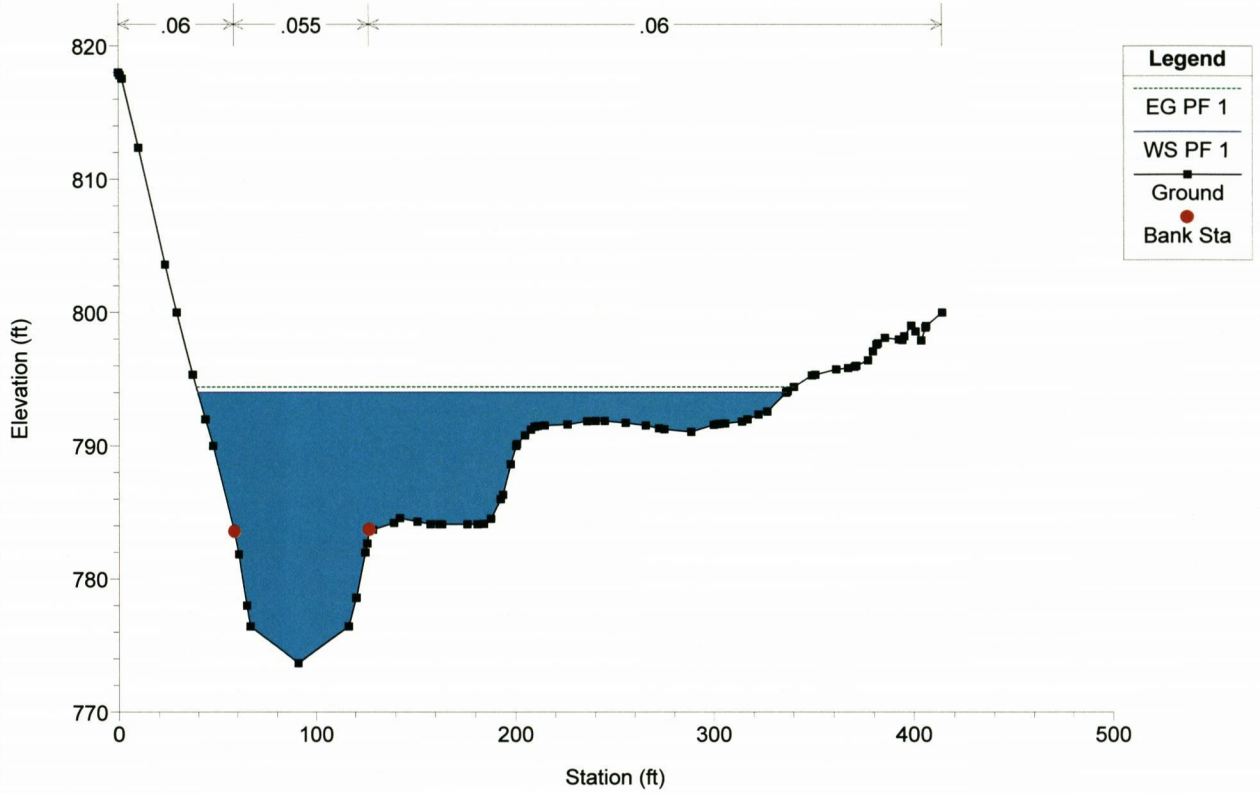
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1052.99



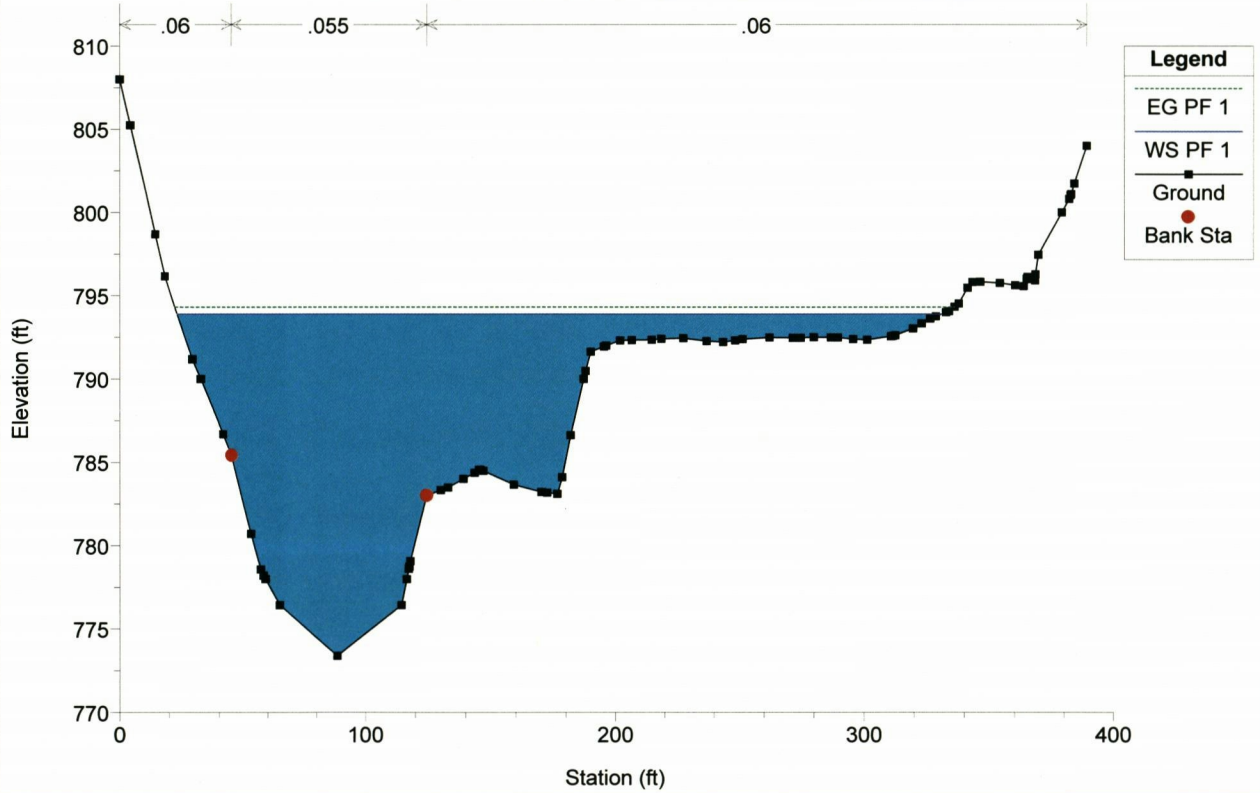
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 952.99



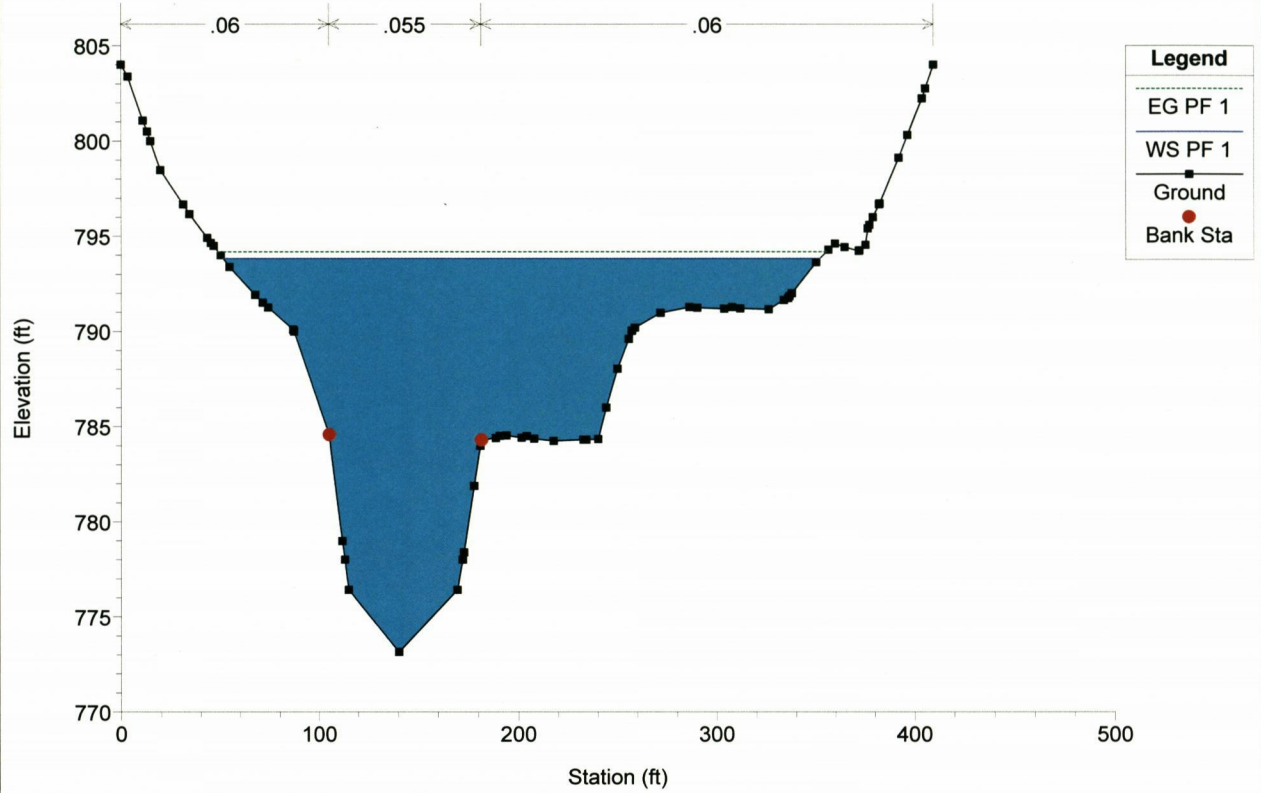
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 852.99



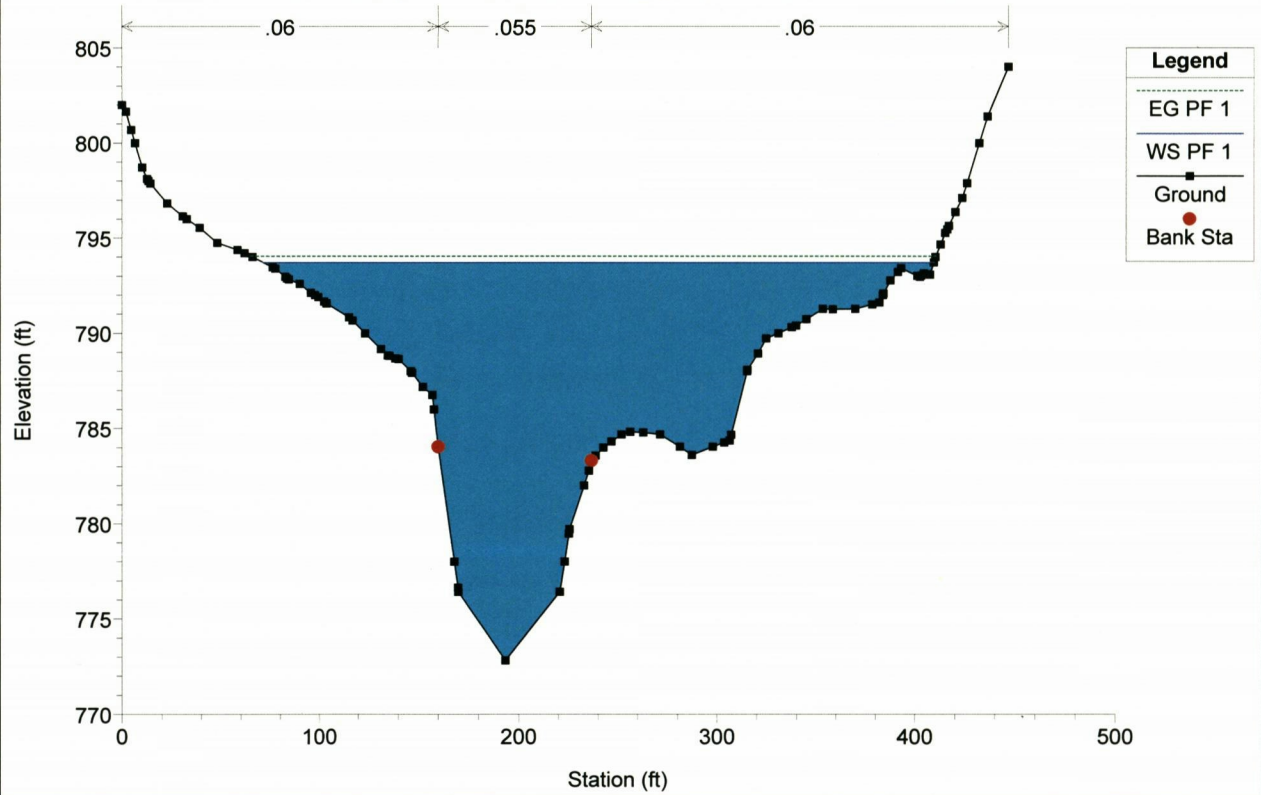
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 752.99



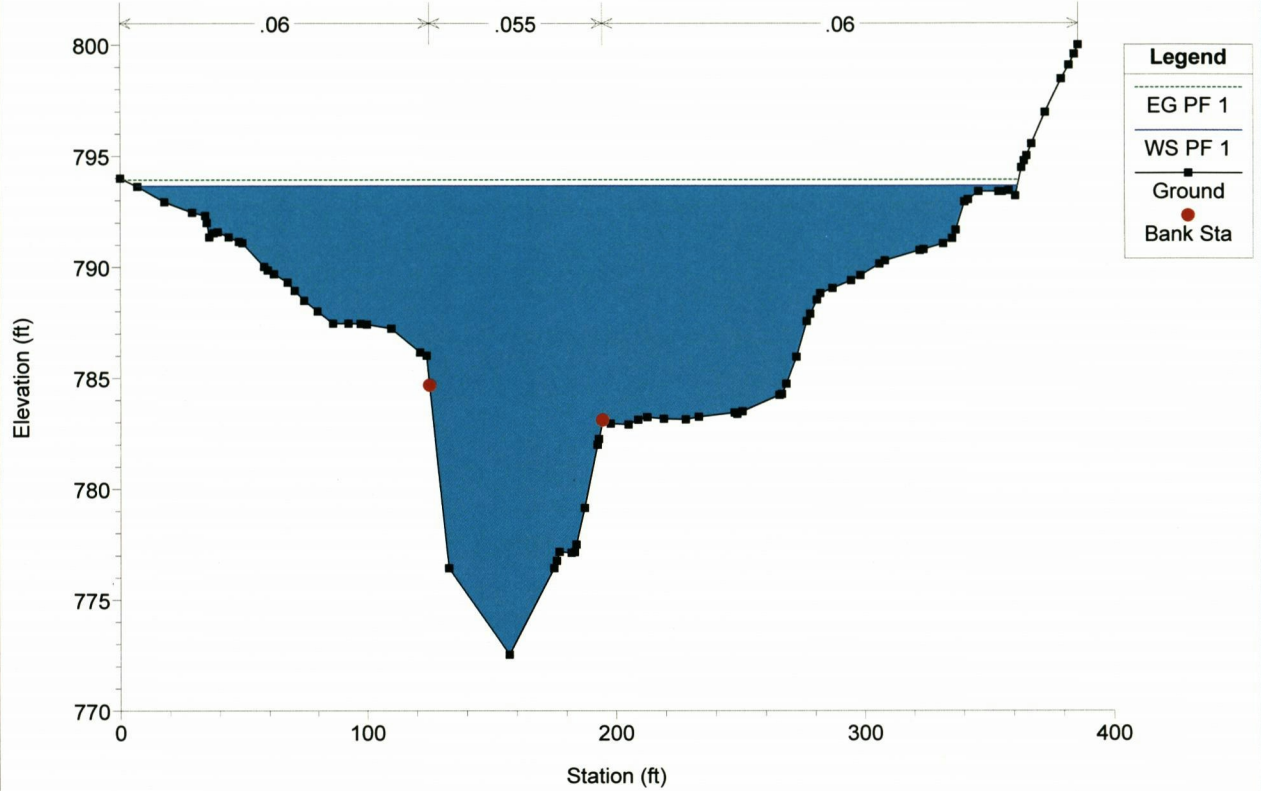
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 612.99



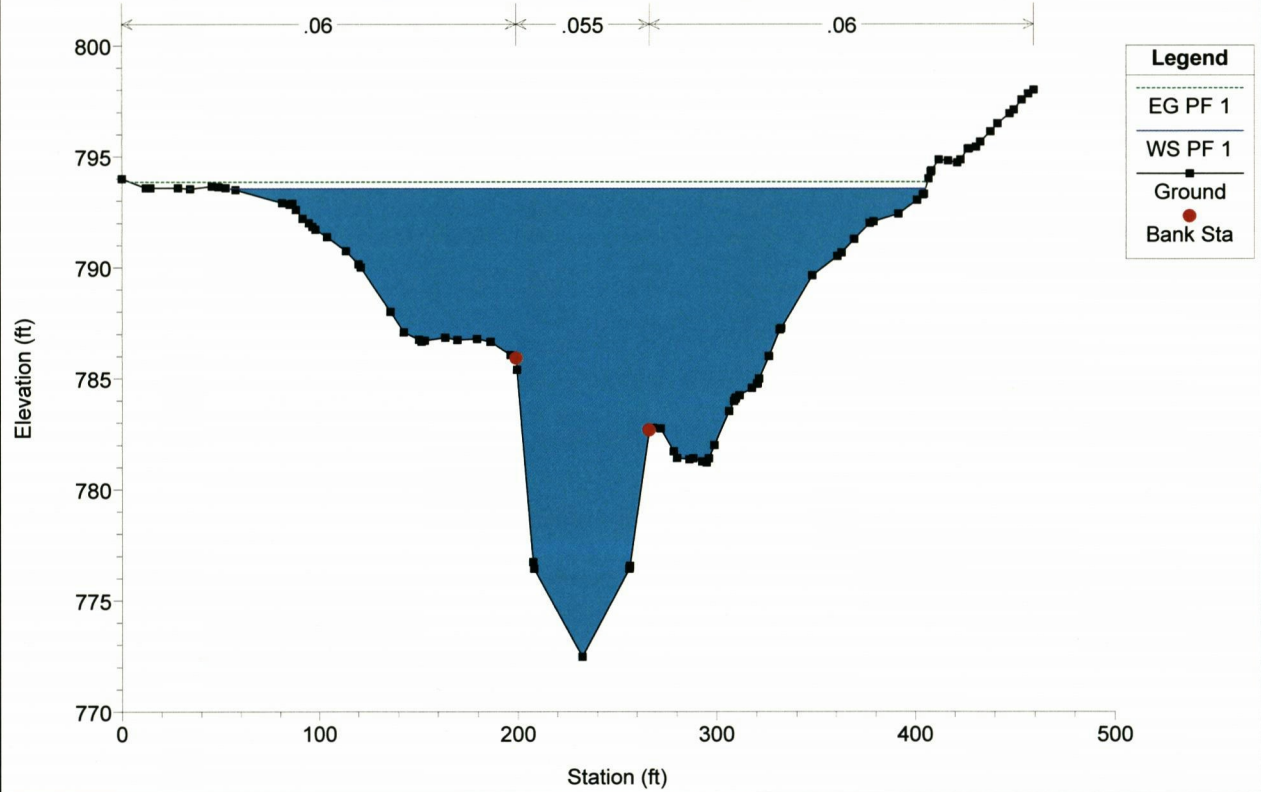
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 493.69



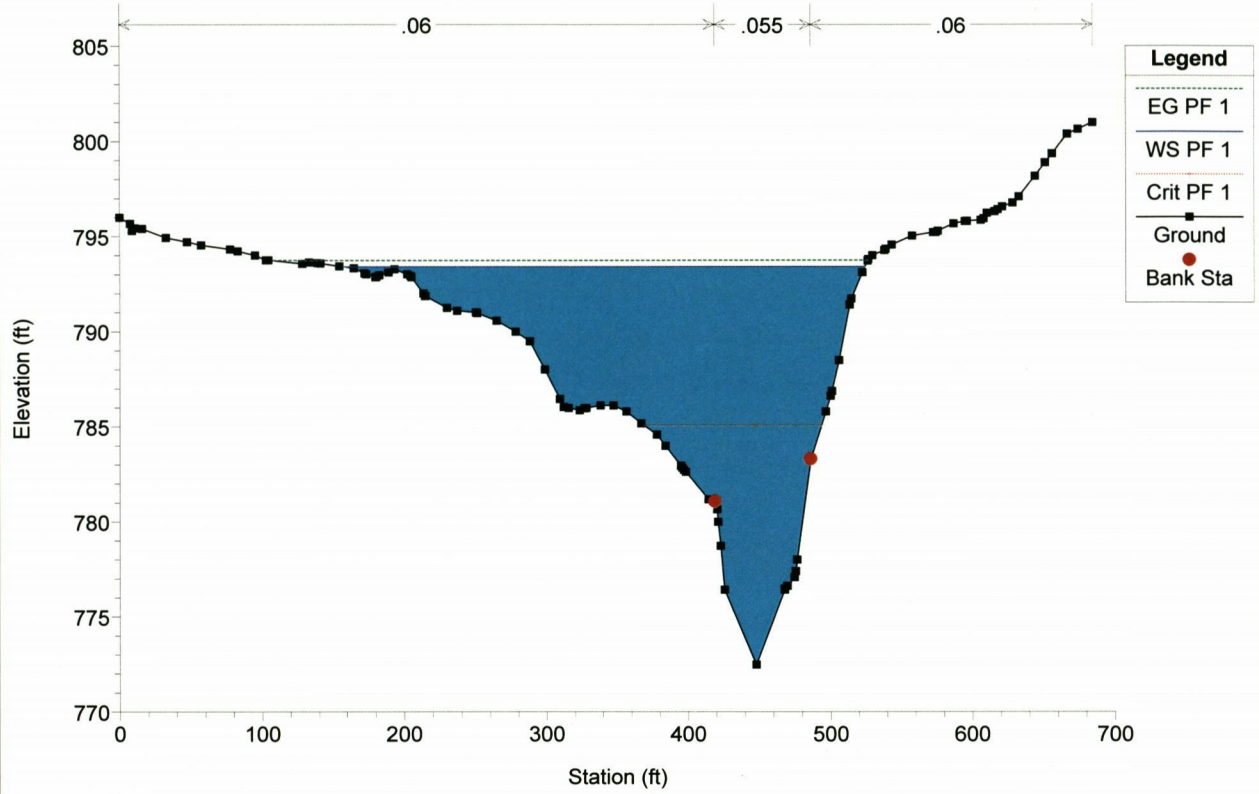
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 415.05



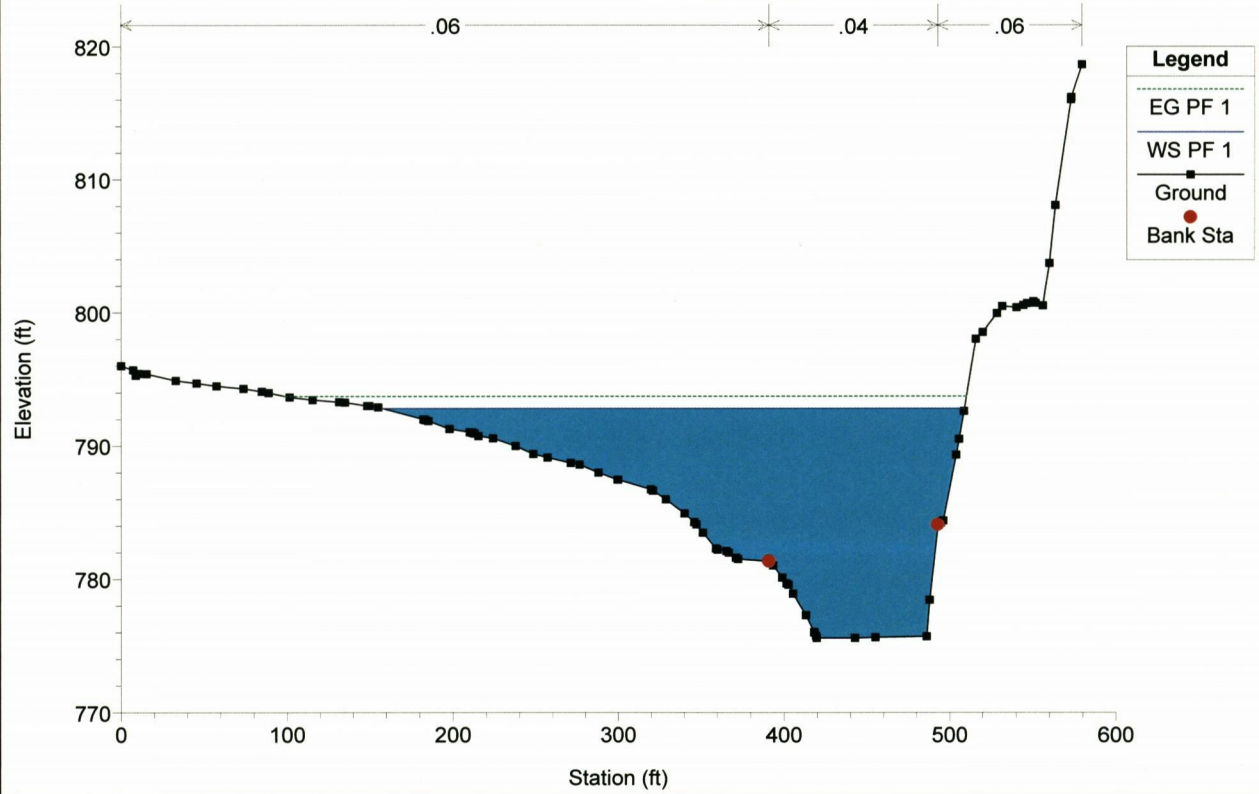
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 258.95



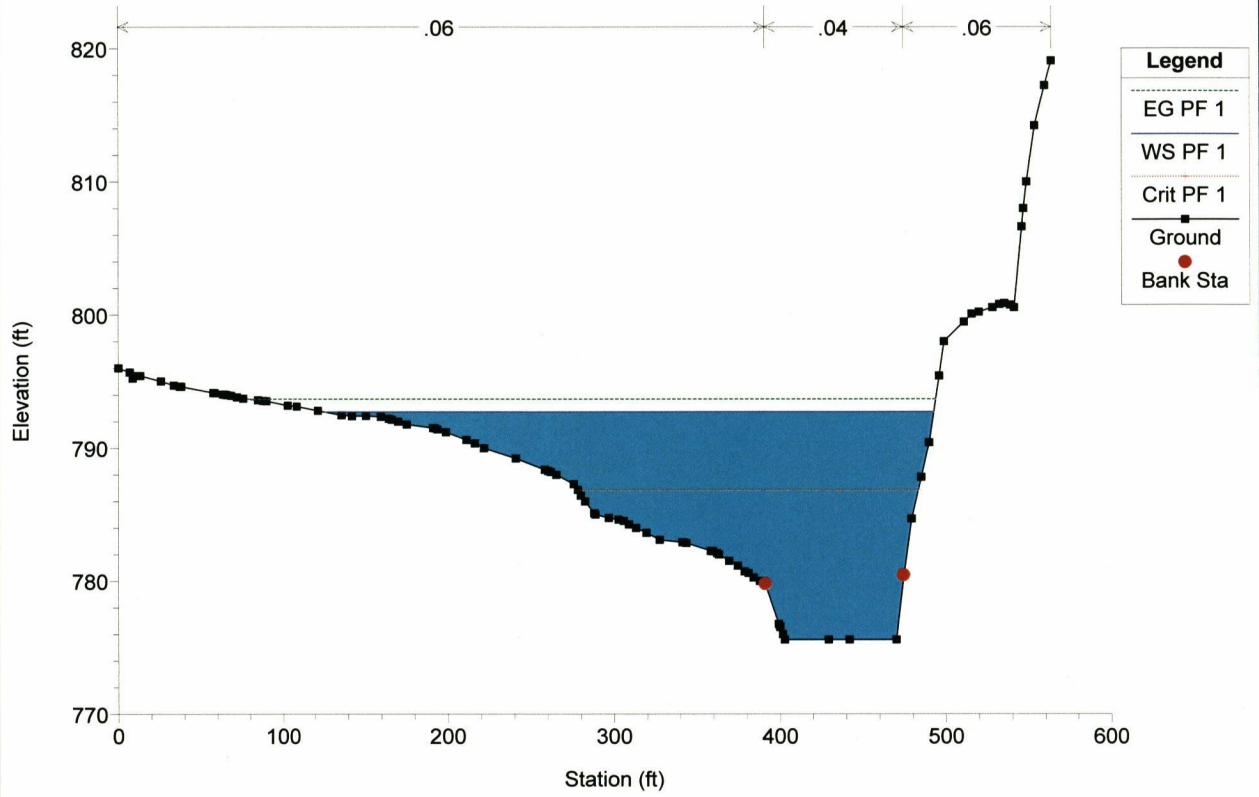
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

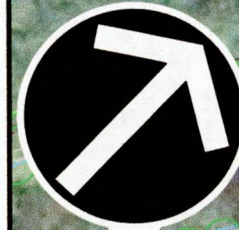
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 50



130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017

River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 20





NORTH



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	APPROXIMATE STREAM CENTERLINE
	HEC-RAS CROSS SECTION
	SECTION END LABEL
	PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
	FEMA ZONE AE FLOODPLAIN
	EXISTING EPHEMERAL STREAM
	EXISTING INTERMITTANT STREAM
	EXISTING PERENNIAL STREAM
	EXISTING WETLAND

REVISION RECORD

NO.	DATE	DESCRIPTION

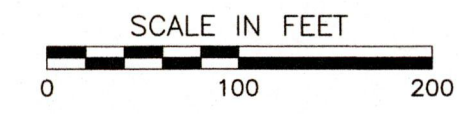
Civil & Environmental Consultants, Inc.
 333 Baldwin Road - Pittsburgh, PA 15205
 412-429-2324 - 800-365-2324
 www.cecinc.com

**SHERWOOD MIDSTREAM LLC
 SMITHBURG NATURAL GAS
 PROCESSING FACILITY
 DODDRIDGE COUNTY, WEST VIRGINIA**

**PRE-DEVELOPMENT
 100-YEAR FLOODPLAIN MAP**

DATE: 9/8/17 DRAWN BY: MEC/ARC
 PWS SCALE: 1"=100' CHECKED BY: ARG
 PROJECT NO.: 130-355.0209
 APPROVED BY: *HAND SIGNATURE ON FILE *RRC

DRAWING NO.: **SP01**



A:\2017\130-355-0209-0101-SP01.mxd (15/09/2017 - 2:03 PM) - LP: 9/8/2017 2:03 PM

- REFERENCE**
- EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING AERIAL SURVEY DATA PREPARED BY NOR EAST MAPPING, INC. AND SUPPLEMENTED BY FIELD SURVEYS CONDUCTED BY CEC. CONTRACTOR IS TO ALL VERIFY ELEVATIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
 - STREAM AND WETLAND DELINEATION COMPLETED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. IN JUNE 2017.
 - EXISTING GAS LINES LOCATED BY CEC IN JUNE AND JULY 2017.
 - FLOODPLAIN LOCATION FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

APPENDIX D

**PROPOSED CONDITIONS HYDRAULIC CALCULATIONS, CROSS
SECTIONS, AND FLOODPLAIN MAPS**

130359_SMITH_HECRAS.rep

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X      X  XXXXXX   XXXX      XXXX      XX      XXXX
X      X  X        X  X      X  X      X  X      X
X      X  X        X          X  X      X  X      X
XXXXXXXX XXXX     X          XXX XXXX     XXXXXX     XXXX
X      X  X        X          X  X      X  X          X
X      X  X        X  X      X  X      X  X          X
X      X  XXXXXX   XXXX     X  X      X  X      XXXXX
```

PROJECT DATA

Project Title: 130-359-SMITHBURG-HEC-RAS
Project File : 130359_SMITH_HECRAS.prj
Run Date and Time: 9/7/2017 3:30:32 PM

Project in English units

Project Description:

Sherwood Holdings, LLC

CEC #130-359

4600 J. Barry Ct., Suite 500

Canonsburg, PA 15317

September 2017

Smithburg Natural Gas Processing Plant

FEMA Zone AE from the Doddridge County FIS shown on FEMA FIRM Panel
#54017C0140C, effective October 4, 2011.

CEC Engineering Team:

Principal: Rick Celender, C.E.T., CPESC, CPSWQ

Project Manager: Andy Gullone, P.E., CPESC, CFM

Hydraulic Modeler: Andy Celender

Reviewers: Andy Gullone, Dustin Kuhlman

Model Creation:

Existing (Pre-project): CEC Created Model File, "130-359-Existing," Plan File,

130359_SMITH_HECRAS.rep

"Existing."

Proposed (Post-project): CEC Created Model File, "130-359-Proposed" Plan File, "Proposed."

Geometry file created in Civil 3D and imported/modified in HEC-RAS.

Steady flow file based on data from FEMA FIS effective July 17, 1989.

Data Sources:

Geometry - Existing surface created from Noreast Aerial.

Flow - Total Meathouse Fork 100-year flow = 9,600 CFS.

Downstream Boundary - Junction. Approximate stream distance of 1,933 feet.

Flow - Total Buckeye Creek 100-year flow = 7,350 CFS.

Downstream Boundary - Junction. Approximate stream distance of 1,267 feet.

Flow - Total Middle Island Creek 100-year flow = 16,950 CFS.

Downstream Boundary - Known WSEL = 792.70. Approximate stream distance of 190 feet.

PLAN DATA

Plan Title: Proposed

Plan File : p:\2013\130-359\Calculations\Phase
2\20170821_H&H\130359_SMITH_HECRAS.p01

Geometry Title: 130-359-Proposed

Geometry File : p:\2013\130-359\Calculations\Phase
2\20170821_H&H\130359_SMITH_HECRAS.g01

Flow Title : Existing Flow

Flow File : p:\2013\130-359\Calculations\Phase
2\20170821_H&H\130359_SMITH_HECRAS.f01

Plan Summary Information:

Number of:	Cross Sections =	31	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	1	Lateral Structures =	0

Computational Information

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

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only

130359_SMITH_HECRAS.rep
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing Flow
 Flow File : p:\2013\130-359\Calculations\Phase
 2\20170821_H&H\130359_SMITH_HECRAS.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Buckeye Creek	BUCKEYE CREEK	1266.73	7350
Meathouse Fork	MEATHOUSE FORK	1933.09	9600
Middle Island Cr	MIDDLE ISLAND CR50		16950

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			

Middle Island CrMIDDLE ISLAND CRPF 1
 Known WS = 792.7

GEOMETRY DATA

Geometry Title: 130-359-Proposed
 Geometry File : p:\2013\130-359\Calculations\Phase
 2\20170821_H&H\130359_SMITH_HECRAS.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Buckeye Creek	BUCKEYE CREEK		junction
Meathouse Fork	MEATHOUSE FORK		junction
Middle Island Cr	MIDDLE ISLAND CR	junction	

JUNCTION INFORMATION

Name: junction
 Description:
 Momentum computation Method
 Add Friction
 Do Not Add Weight

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
Meathouse Fork	MEATHOUSE FORK	to Middle Island Cr	MIDDLE ISLAND CR	258.95	0
Buckeye Creek	BUCKEYE CREEK	to Middle Island Cr	MIDDLE ISLAND CR	136.73	50

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1266.73

INPUT

Description:

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	5.76001	846.8715	06003	840	26.38	831.6429	82001	829.18
36.76001	824.6258	5.93002	81060.84003	808.7470	70.34003	798.9872	72.48001	796.79	
83.61002	785.4387	5.56003	78498.61002	78099.06003	779.84	103.96	778.22		
125.84	776.03	145.27	778.26	148.42	780	155.58	784	157.02	784.71
158.99	785.78	164.78	786	169.56	786.17	170.54	786.19	172.15	786.59
177.97	788	182.93	789.21	188.95	790.48	196.42	792	197.98	792.31
209.04	792.73	209.75	792.76	210.55	792.78	223.59	793.21	225.76	793.27
228.03	793.38	232.48	793.76	233.81	793.85	234.09	793.87	236.22	794
242.41	794.29	245.83	794.52	257.47	794.73	261.16	794.82	264.72	794.88
273.9	795	278.43	795.24	281.63	795.31	287.94	796	288.98	796.11
289.82	796.16	293.88	796.43	297.36	796.54	305.43	797.03	309.85	797.28
319.57	797.75	321.43	797.83	323.23	797.89	328.17	798	332.92	798.11
349.84	798.32	354.92	798.4	359.62	798.49	359.86	798.5	372.81	798.82
376.88	798.79	378.66	798.77	402.67	800				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0683	61002	.055	158.99	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	83.61002	158.99		102.48	100	91.88	.1	.3

CROSS SECTION

130359_SMITH_HECRAS.rep

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1166.73

INPUT

Description:

Station Elevation Data num= 64									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8508.649994	845.0327.57001	831.8630.35001	83034.45999	827.26				
39.48999	824.3362.85001	810.05	75.06	796.95	76.72	795.17	81.28	790	
84.84	785.97	102.57	780.44	103.96	780	109.69	778.2	131.77	776
150.91	778.2	153.39	779.64	153.98	780	162.39	785.11	167.69	785.51
168.07	785.55	168.94	785.92	176.61	789.23	184.89	792	186.42	792.51
187.44	792.81	190.97	792.87	192.67	792.88	198.65	792.94	200.56	792.93
209.55	792.81	212.6	793.05	217.66	793.34	220.59	793.51	224.29	793.75
231.41	794	236.61	794.15	242.27	794.42	250.59	794.74	257.69	795.02
265.28	795.23	277.29	795.68	278.09	795.71	278.99	795.77	283.03	796
290.63	796.39	296.65	796.74	300.34	796.91	301.32	797.03	307.61	797.61
307.67	797.62	318.05	798	318.47	798.02	318.57	798.02	318.71	798.02
330.17	798.22	347.52	798.29	348.8	798.29	351.81	798.31	357.02	798.43
374.1	798.75	378.76	798.94	388.52	799.45	401.4	800		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.84	.055	162.39	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	84.84	162.39		97.82	100	98.73	.1
							.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1066.73

INPUT

Description:

Station Elevation Data num= 88									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	10.97	843.67	13.72	841.76	30.06	830	35.72	825.93
49.39999	817.95	62.84	810.6663.41998	81076.66998	794.7477.29999	794.02			
84.62	786.8392.10999	784	97.5	781.97	111.36	778.2	133.95	775.97	
153.11	778.2	155.41	780	162.96	786	163.71	786.59	165.16	786.85
167.46	787.06	171.55	788.53	173.51	789.01	175.9	789.52	178.04	789.9
179.44	790	182.71	790.23	189.25	790.58	199.84	791.11	201.06	791.16
201.42	791.18	205.98	792	206.85	792.16	207.16	792.17	213.6	792.42
217.28	792.43	225.36	792.54	234.12	792.65	239.08	792.71	244.33	792.76
253.6	792.84	264.83	793.23	267.9	793.33	269.79	793.37	275.53	793.55

130359_SMITH_HECRAS.rep

283.3	793.76	287.71	793.84	296.1	794	298.67	794.05	305.21	794.28
306.84	794.33	307.53	794.52	311.65	795.55	312.53	795.61	313.73	795.7
319.71	795.69	320.84	795.69	329.64	795.82	331.68	795.85	340.99	795.82
344.36	795.81	344.74	795.82	349.66	796	354.36	796.17	354.51	796.18
357.87	796.52	359.57	797.23	361.81	797.79	363.28	797.91	363.3	797.91
368.53	797.99	368.75	798	371.4	798.23	381.77	799.22	382.75	799.25
383	799.25	384.8	799.2	388.41	799.13	389.08	798.94	390.84	798.52
392.67	798.53	396.38	798.61	397.38	798.82	399.6	799.33	401.72	799.6
402.41	799.63	402.9	799.7	407.83	800				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.62	.055	163.71	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	84.62	163.71		100.89	100	98.69	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 966.73

INPUT

Description:

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	826	2.25	824.774	490021	824.1112	17999	82019	98001	815.81
28.42001	811.4539	99002	80041	89999	798.11	45	795.11	51.72	788.61
63.06	78065	27002	778.22	100.02	775.94	125.62	778.24	126.19	778.58
128.55	780	131.86	782	134.32	783.46	135.4	783.64	139.39	785.66
141.27	786.66	141.47	786.8	143.64	788	146.69	789.28	147.12	789.31
148.52	789.41	154.03	789.81	155.01	789.88	156.08	790	163.3	790.79
163.98	790.86	164.19	790.87	164.41	790.89	170.42	791.24	176.28	791.37
177.34	791.42	178.26	791.41	178.93	791.41	185.11	791.62	188.21	791.65
192.65	791.74	193.74	791.77	195.26	791.79	198.68	791.87	200.67	791.95
200.77	791.95	201	792	204.28	792.77	206.2	792.82	209.19	792.79
214.72	792.91	221.04	793.03	223.32	793.1	230.44	793.33	233.77	793.41
234.37	793.44	238.44	793.59	246.96	793.79	249.56	793.83	251.56	793.86
256.59	793.9	257.15	794	260.43	794.55	262.17	794.85	264.74	794.91
267.93	794.98	273.86	794.78	278.45	794.64	279.05	794.53	279.08	794.53
279.1	794.53	279.13	794.53	279.33	794.53	290.18	794.74	299.26	794.91
300.98	794.93	301.8	794.95	302.46	794.97	305.32	795.43	307.47	795.79
308.34	795.8	310.93	795.82	315.75	796	318.22	796.1	320.05	796.15
322.18	796.23	324.02	796.27	326.23	796.2	330.34	796.24	331.3	796.25
331.56	796.25	334.15	796.42	335.32	796.49	335.66	796.5	341.42	796.69
341.82	796.66	351.6	800						

130359_SMITH_HECRAS.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 51.72 .055 146.69 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 51.72 146.69 118.09 100.38 66.66 .1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 866.35

INPUT

Description:

Station Elevation Data num= 110
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 8003.660004 796.964.709991 796.8211.66998 79616.73999 795.35
 17.16 795.1918.51999 79418.85999 793.64 19.69 793.2323.63998 791.24
 25.47998 790 27.78 788.44 29 787.53 33.13 786.9435.07999 786.65
 35.82999 786.37 36.72 78640.89999 784.343.51999 784 45.31 783.79
 45.88 783.7246.95999 783.4748.44998 783.07 49.31 783.6553.35001 786
 55.60999 787.2864.60999 788.4568.51999 789.09 72.25 78973.57999 788.96
 83.10999 788.94 88.16 785.395.28998 78097.95999 778.01 121.7 775.97
 146.46 778.02 148.02 780 148.9 781.11 150.26 782.29 156.29 785.69
 156.89 785.99 157.95 786.05 164.61 786.43 165.21 786.45 165.93 786.47
 173.98 787.05 176 787.19 176.43 787.21 181.29 788 183.28 788.32
 183.39 788.33 186.23 788.43 189.69 788.68 195.95 789.11 201.11 789.76
 202.9 789.96 205.05 789.95 207.58 789.91 210.46 789.87 211.32 790
 214.37 790.42 217.24 790.23 218.89 790.12 220.68 790.18 223.56 790.28
 227.23 790.36 232.83 790.47 237.6 790.51 239.64 790.63 242.61 790.76
 253.5 791.28 258.52 791.63 263.71 791.87 265.76 792 272.02 792.74
 275.91 793.27 279.03 793.51 284.41 794 288.68 794.39 291.98 794.57
 296.08 794.72 302.88 794.97 315.81 795.11 316.92 795.11 317.68 795.11
 317.94 795.12 326.11 795.26 331.62 795.26 332.32 795.26 337.77 795.43
 339.91 795.48 340.04 795.49 340.2 795.47 343.79 795.09 344.74 795.13
 349.3 795.29 350.87 795.56 352.71 795.69 355.57 795.81 358.16 796
 360.45 796.17 364.7 796.37 370.08 796.69 374.56 797.82 378.07 798.72
 386.43 799.68 386.65 799.7 388 799.97 388.1 799.98 388.43 800

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0683.10999 .055 156.89 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 83.10999 156.89 146.5 139.62 119.7 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent

0 68.52 795

F

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 726.73

INPUT

Description:

Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8241.399994	823.543	359985	822.816	720001	821.3814	41998	818.89	
15.64999	818.41	19.88	816.5824	35999	814.6829	67999	811.0130	65999	810.36
32.07999	809.6232	50999	809.437	40999	806.8139	43999	806	39.7	805.9
40.51999	805.7641	39999	804.5243	53999	801.3	45.87	797.79	47.56	794.49
49.50999	792.4551	25999	79051	32999	789.9154	87999	786.8856	40999	785.74
57.81999	784.4360	65999	782.04	64.56	780.8468	14999	780	68.5	779.92
75.73999	778.8976	68999	778.74	78.75	778.61	81.95	778.0982	42999	778
84.03	777.68	108.4	776.03	128.22	777.62	128.72	778	130.86	779.65
132.46	781.12	133.34	782.17	136.18	786	136.3	786.17	138.53	786.39
141.38	787.3	141.47	787.33	141.58	787.31	141.74	787.33	152.9	787.8
155.64	787.92	156.31	787.94	157.26	788	168.77	788.66	173.38	788.82
176	789	180.44	790	181.71	790.29	183.06	790.6	184.43	790.73
186.14	790.96	186.33	790.99	192.41	792	193.97	792.26	198.55	792.68
207.27	793.29	210.44	793.54	212.34	793.6	222.61	794	224.45	794.07
228.94	794.24	230.76	794.46	231.93	794.51	233.64	794.76	237.86	795.32
240.17	795.4	245.8	795.69	249.33	795.92	250.48	796	257.43	796.51
259.19	796.61	260.1	796.68	260.79	796.79	268.59	797.47	271.5	797.66
272.68	797.72	277.19	797.96	278.93	798				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0654	87999	.055	136.3	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.87999	136.3		98.8	100	91.86	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 626.73

INPUT

Description:

Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-----	------	-----	------	-----	------	-----	------	-----	------

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0	814	.75	813.883	369995	813.27	10.8	811.97	11.77	811.83
20.69	810.23	21.19	81021.46001	809.87	25.63	807.6525.84001	807.53		
27.89	806.3933.73001		803.4935.93001	800	38.39	793.64	40.75	789.42	
42.39	787.847.34001		784.2348.59001	783.1450.79001		781.6652.59001		780	
53.39	779.2559.23001		778	60.77	777.5762.84001	777.0781.01001		775.78	
107.9	778	113.99	780.82	117.8	784.31	119.49	786	120.66	787.16
127.74	787.03	131.32	786.97	133.25	786.86	137.61	786.41	144.48	786.55
149.83	786.65	163.39	786.77	163.6	786.78	163.82	786.78	179.84	787.35
189.13	787.94	190	788	192.32	788.14	193.24	788.2	193.68	788.29
195	788.49	200.12	789.3	204.37	790.8	204.72	790.98	205.2	791.22
210.8	794	212.03	794.61	217.01	795.45	221.41	796	227.73	796.31
231.28	796.62	246.6	797.34	250.32	797.54	250.74	797.55	252.03	797.58
253.03	797.61	253.6	797.63	255.15	797.61	256.86	797.64	260.32	797.77
262.84	797.84	263.86	797.86	265.57	797.95	266.38	798		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0647.34001	.055	120.66	.06	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.34001	120.66		105.28	100		.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 526.73

INPUT

Description:

Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.3099976	803.943.830002	803.310.32001	802	15.84	800.96			
22.32001	798.822.57001	798.7224.46001	798.17	24.86	798	26.23	797.37		
31.89999	794	32.08	793.89	36.09	790.35	36.31	79037.82001	787.6	
40.53999	786	42.38	784.94	44.13	783.68	44.95	782.86	48.39	779.96
50.00999	778.851.42999	77853.03999	776.94	73.34	775.52	98.18	776.99		
102.8	781.08	108.95	783.93	109.02	783.96	109.17	784	111.04	784.36
113.42	785.02	115.56	785.15	123.87	785.75	132.3	785.86	133.07	785.87
135.34	785.7	142.1	785.17	143.83	785.29	153.21	785.74	156.5	786
161.01	786.33	164.19	786.59	167.51	787.09	169.29	787.32	169.85	787.4
170.85	788	173.04	789.31	176.92	791.39	178.22	792.03	182.75	794
184.03	794.55	187.24	795.09	193.84	796	201.62	796.68	205.84	797.06
207.07	797.14	212.9	797.3	221	798				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	44.95	.055	109.17	.06

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 44.95 109.17 101.52 100 54.01 .1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 426.73

INPUT

Description:

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.029999	803.588	549988	802.4	16.78	800.9121	32999	800	
24.34	799.4	31.22	798.1846	17999	796.1347	02998	796	47.37	795.95
50.17999	795.5661	16998	794.0561	21999	794.0461	72998	794	69.60999	793.35
70.10999	793.1772	44998	79273.24998		791.5978	07999	790.2380	75999	789.54
84.39999	788.4585	84999	78888.15999		787.2993	53999	786.98	93.87	786.95
94.63998	786.91	103.01	786.62	106.18	786.24	108.97	786	111.27	785.79
116.76	779.71	117.36	779.27	118.03	778.54	119.02	778	119.8	777.57
122.04	776.43	147.26	775.23	171.15	776.43	173.1	778	176.02	780.72
178.28	782.51	180.15	784	181.15	784.76	182.49	784.98	183.23	785.03
184.5	785.06	189.8	785.25	190.93	785.28	199.11	785.45	201.92	785.51
202.24	785.5	202.44	785.5	203.02	785.51	203.47	785.52	212.86	785.55
217.48	785.56	220.87	785.64	222.61	785.59	224.17	785.64	227.37	785.78
231.46	785.98	231.94	785.99	232.12	786	239.96	786.32	243.95	786.6
246.04	786.78	246.68	786.8	250.06	786.92	254.88	787.51	255.97	787.65
256.42	787.79	260.37	788.52	262.74	789.5	266.72	791.25	266.96	791.35
272.89	793.86	274.55	794.56	279.34	795.44	281.61	796	282.11	796.11
288.04	796.72	302.3	798						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	111.27	.055	181.15	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 111.27 181.15 90.53 100 148.77 .1 .3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 326.73

INPUT

Description:

Station Elevation Data num= 92

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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.600006	803.79.820007	803.3	10.94	803.21	11.88	803.13		
22.64999	802.14	24.94	80227.95001	801.77	36.31	801.1	38.19	800.94	
49.14001	800.0749.82001	800	52.13	799.7866.17001	798.7174.48001	798			
83.5	797.21	89.34	796.6494.14999	796	100.83	795.1	106.15	794.27	
108.14	794.02	108.3	794	119.51	792.2	122.34	792	123.74	791.9
126.77	791.53	127.36	791.4	128.81	791.02	132.87	789.92	133.63	789.84
134.47	789.76	138.94	788.58	140.94	788	141.14	787.94	145.91	786.86
148.45	786.23	151.27	786.22	155.27	786.25	159.78	786.37	167.07	786.58
173.49	786.19	176.88	786.08	176.91	786	179.35	780.52	180.33	778.45
181.6	778	185.83	776.43	208.91	774.81	233.34	776.43	234.91	778
236.56	779.59	239.89	784	240.38	784.64	242.82	784.72	243.93	784.76
252.85	785.02	261.3	784.89	263.52	785	265.61	786	268.2	787.24
268.81	787.45	269.69	787.76	272.39	789.69	276.57	793.12	280.07	795.11
284.34	798	285.27	798.63	287.21	798.71	291.85	798.81	297.66	798.94
302.01	799.11	304.31	799.13	312.74	799.18	320.15	799.24	322.3	799.28
327.35	799.19	333.97	799.08	338.49	798.32	339.5	798.25	342.12	797.87
344.03	798.19	345.11	798.28	350.17	800	350.89	800.29	351.64	800.66
359.09	803.66	363.36	806.01	368.61	808.7	379.99	816.12	381.81	817.34
382.55	817.77	386.22	820						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	176.91	.055	240.38	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	176.91	240.38		110.54	100	104.62	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 226.73

INPUT

Description:

Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8044.600006	803.464.880005	803.435.290009	803.41	13.16	802.83			
19.98001	802.31	20.34	802.2921.89999	802.1831.45001	801.46	33.56	801.32		
34.60001	801.25	42.38	800.63	49.97	800.3851.48999	800.28	55.47	800	
63.91	799.370.41998	798.84	82.31	79884.10001	797.8798.01001	796.35			
101.07	796	101.54	795.94	104.78	795.57	117.54	794.27	117.55	794.27
119.97	794	128.06	793.1	128.3	793.06	128.41	793.05	129.71	793
140.28	792.47	149.3	792.12	156.05	792	162.77	791.88	171.54	791.44
176.37	791.18	179.6	790.99	191.02	790.32	195.46	790.08	196.85	790
200.2	789.74	200.38	789.73	200.82	789.65	210.68	788.11	216.58	787.67
220.71	787.44	227.8	787.25	231.46	787.12	236.05	787.07	237.36	787.06

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238.81	786.92	242.25	786.53	243.02	786.53	246.09	786.39	253.64	786.53
255.35	786.58	255.67	786	259.33	779.34	259.94	778.42	260.89	778
265.29	776.43	281.02	774.36	311.42	776.43	311.61	776.61	313.28	778.18
316.97	781.67	319.98	784.52	320.84	784.67	321.76	784.89	325.67	787.01
327.67	788.03	332.49	791.69	333.11	792.19	334.79	793.43	341.49	798
341.62	798.09	346.62	798.34	350.5	798.52	357.55	798.91	358.5	798.97
358.93	798.98	361.24	799.05	361.43	799.05	369.37	799.29	370.34	799.28
380.26	799.36	385.82	799.31	391.42	799.2	395.75	798.68	397.2	798.51
399.7	798.64	402.34	798.85	403.34	799.08	405.06	799.69	407.4	799.69
408.22	800	410.08	800.7	415.15	802.91	420.94	806.42	425.09	808.89
435.12	815.87	437.37	817.34	444.56	822				

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .06	255.35 .055	319.98 .06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
255.35	319.98	56.16	90	93.21	.1	.3	

CROSS SECTION

RIVER: Buckeye Creek

REACH: BUCKEYE CREEK

RS: 136.73

INPUT

Description:

Station Elevation Data	num=	99		
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
0 8041.439972	803.592.289978	803.28 7.98999	803.378.609985	803.4
9.419983 803.3713.53998	803.1118.07999	802.8618.54999	802.7420.62997	802.46
22.93997 801.72 26.09	801.0230.48999	800.7736.67999	800.3641.21997	800
43.04999 799.8548.95999	799.3352.93997	798.9360.09998	798.2165.00998	797.71
65.14999 797.6967.14999	797.3876.41998	79677.62997	795.82 79.25	795.74
79.34998 795.7379.85999	795.7187.95999	795.2996.07999	794.74 101.87	794.34
108.25 793.94 123.17	793.17 127.67	792.92 130.8	792.82 147.05	792.32
161.73 792 164.94	791.91 165.05	791.91 195.21	791.61 195.68	791.61
196.4 791.59 224.69	790.84 224.85	790.83 233.21	790.16 235.15	790
242.12 789.41 242.96	789.33 245.39	789.01 249.05	788 253.68	786.69
255.63 786.08 256.53	786.07 262.57	786.1 265.89	785.99 268.72	785.9
273.85 785.68 288.14	785.39 288.54	785.36 290.58	783.94 296.91	779.43
300.48 777.5 302.42	776.43 322.59	773.97 344.41	776.43 344.49	776.53
345.74 778.02 347.84	780.78 349.83	782.64 353.12	785.8 358.14	786.29
358.74 786.35 358.92	786.42 363.9	788.56 366.19	790.06 368.38	791.5
369.34 792.13 369.7	792.38 370.27	792.77 377.69	798.06 377.9	798.21
383.55 798.76 384.69	798.87 388.04	799.1 395.03	799.61 404.67	799.65
406.83 799.64 408.46	799.58 411.83	799.53 413.5	799.3 417.17	798.92
420.39 799.14 422.73	799.18 424.54	800.12 427.59	801.69 429.75	802.88

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432.35 805.7 436.85 809.57 446.05 815.28 447.61 816.26

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 288.54 .055 353.12 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 288.54 353.12 0 0 0 .1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1933.09

INPUT

Description:

Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	795.723	369995	795.376	710022	795.021	4.92001	794.272	2.80002	793.38
25.94	793.032	7.0001	792.83	34.94	792.213	8.68002	791.994	5.42001	791.54
48.44	791.344	9.05002	791.350	6.65002	791.19	51.5	791.14	53.47	791.07
59.62	790.836	3.99002	790.62	64.41	790.576	6.70001	789.496	9.29001	787.65
71.22	786.517	2.01001	786.01	77.38	784.057	8.74002	783.55	84.25	782.28
92.69	779.989	3.08002	779.88	100.63	777.48	102.24	776.95	111.23	775.95
123.23	775.34	135.23	776.03	142.58	776.95	142.91	777.16	144.29	778.04
148.13	780.48	158.85	785.95	160.02	786.52	161.63	787.3	163.13	787.76
163.37	787.83	164.31	788.06	172.54	790.07	172.97	790.17	175.83	790.32
179.83	790.5	189.07	790.8	193.42	790.95	199.57	791.2	217.65	791.82
218.37	791.84	218.83	791.84	234.97	791.93	234.98	791.94	235.65	791.9
236.76	791.89	238.63	791.95	239.25	791.91	241.05	791.93	249.28	791.9
249.69	791.9	252.31	791.88	253.41	791.93	253.82	791.93	254.28	791.93
254.74	791.93	260.01	792.01	267.75	792.14	270.64	792.16	284.19	792.36
291.93	792.49	298.84	792.54	306.32	792.72	320.76	793.12	328	793.24
343.34	793.57	354.56	794.06	364.86	794.62	376.44	795.03	388.06	795.3
395.49	795.46	420.15	796.29	427.64	796.57	430.23	796.66	431.41	796.7
442.09	797.07	455.53	797.69	463.26	798.01				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .06 72.01001 .055 158.85 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 72.01001 158.85 76.85 73.09 73.93 .1 .3

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1860

INPUT

Description:

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	796.782	70012	796.64	3.76001	796.565	.279999	795.667	.360016	794.7
11.56	793.47	21.41	789.21	23.31	788.393	2.29001	784.51	37.78	782.14
39.89001	781.38	43.59	781.134	3.73001	781.124	6.48001	778.85	49.19	776.44
56.5	775.66	70	774.64	83.5	775.798	4.52002	776.5	86.94	776.54
90.67001	776.59	94.84	779.479	5.11002	779.72	101.5	785.52	107	789.02
110.85	790.79	111.26	790.92	116.01	791.08	117.76	791.22	119.84	791.39
140.33	792.81	148.86	793.49	150.76	793.56	165.7	793.63	166.37	793.64
166.55	793.64	167.97	793.62	171.22	793.57	172.74	793.54	173.63	793.53
174.21	793.52	174.59	793.51	175.1	793.51	175.27	793.5	175.54	793.5
177.14	793.46	184.53	793.21	184.61	793.19	192.03	793.2	193.6	793.19
193.87	793.17	194.37	793.13	195.54	793.03	196.2	792.98	196.82	792.77
197.98	792.38	198.31	792.28	198.68	792.17	198.9	792.15	199.23	792.13
199.44	792.12	201.38	792.01	202.7	791.93	203.97	791.86	205.61	791.88
206.66	791.9	209.66	791.95	215.23	792.15	215.75	792.17	218.11	792.26
219.06	792.29	222.44	792.43	231.29	792.91	234.41	793.08	237.77	793.21
257.86	793.89	273.33	793.91	278.74	793.87	282.87	793.91	283.45	793.92
284.27	793.93	285.69	793.96	286.07	793.97	287.47	794.01	309.79	794.56
310.66	794.58	312.14	794.62	313.92	794.66	315.92	794.7	318	794.75
320	794.79	321.79	794.84	342.59	795.39	344.51	795.44	346.22	795.51
352.46	795.73	356.6	795.98	367.69	796.64	375.62	796.77	377.6	796.92
381.63	797.04	383.13	797.14	383.79	797.1	393.67	797.36	396.91	797.68
401.6	797.61	407.77	797.87	408.88	797.96				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	21.41	.055	110.85	.06	140.33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	32.29001	101.5		57.55	50	36.74	.3	.5

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1810

INPUT

Description:

Station Elevation Data num= 289

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.890015	803.862	970001	803.863	470001	803.782	0.45999	802.63	

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24.59	802.3527.85001	802.07	29.41	801.9840.73001	801.17	43.97	800.85
45.42001	799.9150.54999	796.69	51.22	796.4752.26001	796.1353.79999		795.6
54.01001	795.5355.17999	794.58	55.44	792.4755.67001	792.4955.67999		791.97
56.26001	791.81 63.87	789.6	73.03	786.4876.23999	784.0476.32001		783.99
76.45001	783.976.58002	783.8276.64001		783.7884.86002	779.01 88.81		776.73
88.94	776.6489.08002	776.5589.11002		776.5389.35001	776.38 89.37		776.36
89.48999	776.28 89.62	776.289.85001		776.1990.08002	776.19 90.31		776.18
90.54999	776.1890.79001	776.1791.04001		776.1791.29001	776.1691.51001		776.16
91.73001	776.1591.95001	776.1592.17001		776.1492.35001	776.14 92.53		776.13
92.81	776.13 93.09	776.12 93.34		776.12 93.59	776.1193.82001		776.11
94.04999	776.1 94.37	776.0994.70001		776.0995.04999	776.0895.32001		776.08
95.59	776.07 95.87	776.06 96.09		776.06 109.01	775.91 109.64		775.89
110.27	775.88 110.46	775.88 110.92		775.87 111.84	775.85 112.39		775.88
112.92	775.9 112.94	775.9 113.49		775.93 114.05	775.96 114.45		775.97
115.69	776.03 116.32	776.06 116.74		776.07 117.15	776.09 117.65		776.11
118.16	776.14 118.66	776.16 119.31		776.18 125.94	776.35 126.37		776.37
126.75	776.38 127.13	776.4 127.53		776.42 127.94	776.43 128.36		776.45
128.85	776.47 129.25	776.48 129.65		776.5 130.06	776.51 130.31		776.52
130.77	776.54 131.73	776.58 132.49		776.56 132.95	776.77 133.41		776.98
133.88	777.19 134.36	777.41 134.78		777.6 135.2	777.79 135.63		777.98
136.04	778.16 136.46	778.35 137.08		778.62 137.5	778.81 137.93		779.01
138.36	779.2 138.8	779.4 139.25		779.6 139.71	779.81 140.13		780
140.56	780.19 140.6	780.21 141.09		780.42 141.62	780.65 142.14		780.87
152.62	786.98 152.64	786.99 152.67		787 152.7	787.02 152.72		787.03
152.74	787.04 152.75	787.04 152.76		787.05 152.77	787.05 155.05		788
156.45	788.32 157.61	795.62 158.1		795.98 158.3	795.99 163.19		795.31
168.47	795.03 169.74	794.71 171.64		795.06 175.19	795.23 179.59		795.63
179.76	795.65 180.79	795.63 195.97		795.09 196.4	795.09 196.85		795.08
197.34	795.07 197.86	795.06 198.41		795.05 199.02	795.04 199.67		795.03
200.34	795.02 201.07	795.01 201.89		794.99 202.79	794.98 202.84		794.98
205.54	794.91 207.47	794.86 208.85		794.82 209.9	794.79 210.68		794.77
211.31	794.76 211.82	794.74 212.24		794.73 212.6	794.72 212.91		794.72
213.17	794.71 213.27	794.71 213.4		794.7 213.76	794.7 213.91		794.69
223.23	794.34 223.34	794.34 223.41		794.33 223.7	794.33 223.73		794.32
223.84	794.32 224.17	794.31 224.43		794.31 224.44	794.3 224.45		794.3
224.47	794.29 224.84	794.25 226.7		794 228.56	793.98 236.85		793.51
240.78	793.53 243.76	793.31 248.8		793.29 251.68	793.31 257.09		793.17
259.78	793.35 260.17	793.34 260.77		793.34 262.67	793.32 265.81		793.28
267.52	793.27 270.84	793.23 272.36		793.22 275.87	793.18 277.21		793.17
280.91	793.13 281.69	793.12 282.07		793.12 285.93	793.06 286.25		793.06
287.49	793.04 290.95	792.99 294.44		792.94 295.97	792.92 299.32		792.87
300.99	792.84 304.19	792.8 306.01		792.77 307.03	792.76 308.72		792.73
310.11	792.71 311.03	792.7 313.11		792.68 316.05	792.65 318.82		792.62
321.07	792.61 323.7	792.59 326.09		792.58 329.67	792.58 331.11		792.57
333.45	792.58 336.88	792.58 337.47		792.59 339.05	792.59 340.95		792.61
342.98	792.62 345.66	792.65 347.6		792.67 350.36	792.71 353.15		792.76
355.04	792.79 356.95	792.83 359.74		792.9 361.71	792.94 364.44		793.02
366.54	793.08 369.17	793.16 371.64		793.25 373.94	793.32 375.56		793.38

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376.44	793.41	378.71	793.49	380.88	793.58	383.5	793.68	386.33	793.8
388.32	793.89	390.14	793.99	393.19	794.12	396.64	794.29	397.09	794.32
398.12	794.37	399.41	794.45	403.12	794.64	406.38	794.82	406.97	794.86
407.15	794.87	408.21	794.93	408.79	794.97	411.98	795.15	413.33	795.22
418.01	795.47	418.3	795.49	418.59	795.5	423.27	795.76	428.11	796.02
428.26	796.03	428.4	796.04	433.27	796.31	433.31	796.31	436.42	796.48
438.24	796.58	438.33	796.59	438.59	796.6	443.43	796.88	447.72	797.14
448.6	797.18	449.34	797.23	452.45	797.42	452.76	797.44	453.81	797.51
455.19	797.59	458.96	797.84	460.79	797.96	461.44	798		

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .06 73.03 .055 152.62 .06 180.79 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 73.03 152.62 53.2 50 39.49 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 52.26 804 T
 157.61 195.97 799.3 T

BRIDGE

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1785

INPUT

Description:
 Distance from Upstream XS = 9
 Deck/Roadway Width = 32
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates
 num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
40.91	805	798.5	62.22	804.11	797.61	92.44	802.77	796.27
99.16	802.27	795.77	141.49	800.38	793.88	158.3	799.34	792.84

Upstream Bridge Cross Section Data

Station Elevation Data num= 289

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.890015	803.862.970001	803.863.470001	803.7820.45999	802.63				
24.59	802.3527.85001	802.07	29.41	801.9840.73001	801.17	43.97	800.85		
45.42001	799.9150.54999	796.69	51.22	796.4752.26001	796.1353.79999	795.6			
54.01001	795.5355.17999	794.58	55.44	792.4755.67001	792.4955.67999	791.97			
56.26001	791.81	63.87	789.6	73.03	786.4876.23999	784.0476.32001	783.99		
76.45001	783.976.58002	783.8276.64001	783.7884.86002	779.01	88.81	776.73			
88.94	776.6489.08002	776.5589.11002	776.5389.35001	776.38	89.37	776.36			

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89.48999	776.28	89.62	776.289.85001	776.1990.08002	776.19	90.31	776.18		
90.54999	776.1890.79001		776.1791.04001	776.1791.29001	776.1691.51001		776.16		
91.73001	776.1591.95001		776.1592.17001	776.1492.35001	776.14	92.53	776.13		
92.81	776.13	93.09	776.12	93.34	776.12	93.59	776.1193.82001	776.11	
94.04999	776.1	94.37	776.0994.70001	776.0995.04999	776.0895.32001		776.08		
95.59	776.07	95.87	776.06	96.09	776.06	109.01	775.91	109.64	775.89
110.27	775.88	110.46	775.88	110.92	775.87	111.84	775.85	112.39	775.88
112.92	775.9	112.94	775.9	113.49	775.93	114.05	775.96	114.45	775.97
115.69	776.03	116.32	776.06	116.74	776.07	117.15	776.09	117.65	776.11
118.16	776.14	118.66	776.16	119.31	776.18	125.94	776.35	126.37	776.37
126.75	776.38	127.13	776.4	127.53	776.42	127.94	776.43	128.36	776.45
128.85	776.47	129.25	776.48	129.65	776.5	130.06	776.51	130.31	776.52
130.77	776.54	131.73	776.58	132.49	776.56	132.95	776.77	133.41	776.98
133.88	777.19	134.36	777.41	134.78	777.6	135.2	777.79	135.63	777.98
136.04	778.16	136.46	778.35	137.08	778.62	137.5	778.81	137.93	779.01
138.36	779.2	138.8	779.4	139.25	779.6	139.71	779.81	140.13	780
140.56	780.19	140.6	780.21	141.09	780.42	141.62	780.65	142.14	780.87
152.62	786.98	152.64	786.99	152.67	787	152.7	787.02	152.72	787.03
152.74	787.04	152.75	787.04	152.76	787.05	152.77	787.05	155.05	788
156.45	788.32	157.61	795.62	158.1	795.98	158.3	795.99	163.19	795.31
168.47	795.03	169.74	794.71	171.64	795.06	175.19	795.23	179.59	795.63
179.76	795.65	180.79	795.63	195.97	795.09	196.4	795.09	196.85	795.08
197.34	795.07	197.86	795.06	198.41	795.05	199.02	795.04	199.67	795.03
200.34	795.02	201.07	795.01	201.89	794.99	202.79	794.98	202.84	794.98
205.54	794.91	207.47	794.86	208.85	794.82	209.9	794.79	210.68	794.77
211.31	794.76	211.82	794.74	212.24	794.73	212.6	794.72	212.91	794.72
213.17	794.71	213.27	794.71	213.4	794.7	213.76	794.7	213.91	794.69
223.23	794.34	223.34	794.34	223.41	794.33	223.7	794.33	223.73	794.32
223.84	794.32	224.17	794.31	224.43	794.31	224.44	794.3	224.45	794.3
224.47	794.29	224.84	794.25	226.7	794	228.56	793.98	236.85	793.51
240.78	793.53	243.76	793.31	248.8	793.29	251.68	793.31	257.09	793.17
259.78	793.35	260.17	793.34	260.77	793.34	262.67	793.32	265.81	793.28
267.52	793.27	270.84	793.23	272.36	793.22	275.87	793.18	277.21	793.17
280.91	793.13	281.69	793.12	282.07	793.12	285.93	793.06	286.25	793.06
287.49	793.04	290.95	792.99	294.44	792.94	295.97	792.92	299.32	792.87
300.99	792.84	304.19	792.8	306.01	792.77	307.03	792.76	308.72	792.73
310.11	792.71	311.03	792.7	313.11	792.68	316.05	792.65	318.82	792.62
321.07	792.61	323.7	792.59	326.09	792.58	329.67	792.58	331.11	792.57
333.45	792.58	336.88	792.58	337.47	792.59	339.05	792.59	340.95	792.61
342.98	792.62	345.66	792.65	347.6	792.67	350.36	792.71	353.15	792.76
355.04	792.79	356.95	792.83	359.74	792.9	361.71	792.94	364.44	793.02
366.54	793.08	369.17	793.16	371.64	793.25	373.94	793.32	375.56	793.38
376.44	793.41	378.71	793.49	380.88	793.58	383.5	793.68	386.33	793.8
388.32	793.89	390.14	793.99	393.19	794.12	396.64	794.29	397.09	794.32
398.12	794.37	399.41	794.45	403.12	794.64	406.38	794.82	406.97	794.86
407.15	794.87	408.21	794.93	408.79	794.97	411.98	795.15	413.33	795.22
418.01	795.47	418.3	795.49	418.59	795.5	423.27	795.76	428.11	796.02
428.26	796.03	428.4	796.04	433.27	796.31	433.31	796.31	436.42	796.48

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438.24	796.58	438.33	796.59	438.59	796.6	443.43	796.88	447.72	797.14
448.6	797.18	449.34	797.23	452.45	797.42	452.76	797.44	453.81	797.51
455.19	797.59	458.96	797.84	460.79	797.96	461.44	798		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	73.03	.055	152.62	.06	180.79	.015

Bank Sta: Left Right Coeff Contr. Expan.
 73.03 152.62 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	52.26	804	T
157.61	195.97	799.3	T

Downstream Deck/Roadway Coordinates

num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
28.24	805.32	798.82	72.64	803.44	796.94	107.92	801.87	795.37						
137.06	801	794.5	141.81	801	794.5	141.82	801	785						

Downstream Bridge Cross Section Data

Station Elevation Data num= 289

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.4700012	803.971.589996	803.912.800018	803.854.100006	803.78				
4.720001	803.745.240021	803.716.230011	803.657.190002	803.68.140015	803.54				
8.830017	803.519.890015	803.45 10.91	803.3911.89001	803.33 12.84	803.28				
13.74002	803.2214.60001	803.18 15.44	803.13 16.25	803.08 16.97	803.04				
17.39001	803.0320.42001	802.9222.04001	802.86 23.06	802.8223.76001	802.8				
24.26001	802.7824.64999	802.7724.96002	802.76 25.22	802.75 27.5	802.66				
30.02002	802.56 30.34	802.5530.35001	802.5531.30002	802.48 31.94	802.4				
32.51001	802.3733.79001	802.2234.89001	802.09 35.62	802.0135.82001	801.95				
38.49002	801.2238.60001	801.1438.67999	801.11 38.72	801.1 40.22	789.71				
42.13	789.7542.17001	789.7542.67001	789.7143.17001	789.67 43.66	789.63				
44.14001	789.5946.49002	789.3 48.19	788.5548.58002	789.248.61002	789.18				
48.62	789.18 48.63	789.1748.64001	789.1748.64001	789.1648.64999	789.16				
48.66	789.1548.67001	789.1448.67999	789.14 49.12	788.862.85001	778.06				
63.08002	777.8865.33002	776.22 65.34	776.2267.11002	776.2178.08002	775.87				
78.78	775.8479.48001	775.82 80.19	775.7980.89001	775.77 81.59	775.74				
91.54001	775.31 94.44	775.1898.98001	775.57 109.75	776.56 110.11	776.59				
110.47	776.62 110.82	776.65 111.18	776.67 111.53	776.7 111.88	776.73				
112.22	776.76 112.57	776.78 112.91	776.81 113.25	776.84 113.45	776.86				
113.72	776.88 114.34	776.93 114.62	776.95 114.9	776.97 115.18	776.99				
115.42	777.17 115.67	777.35 115.92	777.52 116.05	777.62 116.23	777.74				
116.4	777.87 116.6	778.01 116.88	778.21 117.14	778.39 117.34	778.54				
117.49	778.65 117.65	778.76 117.7	778.79 119.84	780.29 130.16	786.3				
132.95	786.11 134.25	786.15 138.8	787.7 138.93	788.36 140.17	795.23				
140.42	794.83 140.47	794.76 141.01	795.13 141.05	795.16 142.07	795.46				

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142.46	795.52	146.01	796.92	148.2	797.07	148.36	797.09	148.95	797.17
149.39	797.24	150.28	797.3	150.67	797.34	151.06	797.28	151.28	797.28
155.32	797.18	156.83	797.15	165.02	796.87	167.54	796.78	167.69	796.78
167.72	796.77	167.88	796.77	167.91	796.76	168.08	796.76	175.38	796.04
175.75	796.02	176.11	796	176.47	795.98	176.83	795.96	177.19	795.95
177.55	795.93	177.91	795.91	178.25	795.89	179.28	795.88	193.69	795.81
193.79	795.8	193.89	795.8	193.99	795.79	194.09	795.79	194.19	795.78
194.29	795.78	194.4	795.77	194.5	795.77	194.6	795.76	194.7	795.76
194.8	795.75	194.9	795.75	195	795.74	195.19	795.74	195.29	795.73
195.38	795.73	195.47	795.72	195.64	795.72	195.72	795.71	195.88	795.71
205.22	795.19	210.96	795.01	212.81	794.95	219.8	794.68	219.93	794.67
221.53	794.54	222.15	794.48	225.21	794.2	227.08	794.02	227.3	794
227.63	793.98	231.43	793.68	238.27	793.28	240.1	793.29	245.15	792.9
246.9	792.88	252.21	792.89	253.03	792.87	253.6	792.84	259.22	793.18
260.17	793.17	260.22	793.17	264.8	793.1	265.29	793.09	265.65	793.08
270.36	793.01	274.45	792.94	275.43	792.93	276.77	792.91	277.71	792.97
278.22	793.01	280.51	793.17	281.35	793.23	285.58	793.53	285.83	793.55
285.9	793.55	285.99	793.56	286.46	793.56	287.63	793.52	287.75	793.51
287.86	793.56	289.19	793.61	290.09	793.61	292.12	793.66	292.24	793.67
293.08	793.57	293.09	793.57	293.77	792.74	296.76	792.71	299.94	792.66
301.3	792.64	302.3	792.62	303.18	792.61	304.48	792.59	305.44	792.58
307.35	792.56	308.72	792.53	310.84	792.52	316.33	792.52	341.12	792.84
345.32	792.88	346.41	792.89	349.88	793.01	352.33	793.04	355.47	793.09
358.45	793.14	362.99	793.34	365.22	793.39	367.36	793.43	369.44	793.49
375.05	793.82	375.77	793.84	377.24	793.93	377.54	793.94	377.84	793.96
378.4	794	379.17	794.02	380.67	794.06	394.47	795.08	407.64	796
407.66	796	408.51	796.06	408.59	796.06	413.08	796.35	415.38	796.49
417.09	796.59	417.95	796.64	420.44	796.76	420.61	796.77	420.73	796.78
421.56	796.81	422.77	796.49	423.61	796.33	424.38	796.37	425.43	796.42
425.97	796.45	427.46	796.51	428.97	796.58	430.53	796.64	432.11	796.72
432.15	796.72	432.19	796.73	433.12	796.99	433.21	797.01	440.74	797.15
441.23	797.16	442.98	797.19	443.28	797.2	443.85	797.21	443.89	797.23
443.92	797.24	445.13	797.3	445.63	797.33	446.17	797.35	446.91	797.39
454.23	797.64	456.69	797.82	457.68	797.86	459.32	797.95		

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .06 49.12 .055 130.16 .06 175.38 .015

Bank Sta: Left Right Coeff Contr. Expan.
 49.12 130.16 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 38.49 804.8 T
 141.77 205.22 800 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical

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Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Meathouse Fork

REACH: MEATHOUSE FORK RS: 1760

INPUT

Description:

Station Elevation Data num= 289

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.4700012	803.971.589996	803.912.800018	803.854.100006	803.78				
4.720001	803.745.240021	803.716.230011	803.657.190002	803.68.140015	803.54				
8.830017	803.519.890015	803.45 10.91	803.3911.89001	803.33 12.84	803.28				
13.74002	803.2214.60001	803.18 15.44	803.13 16.25	803.08 16.97	803.04				
17.39001	803.0320.42001	802.9222.04001	802.86 23.06	802.8223.76001	802.8				
24.26001	802.7824.64999	802.7724.96002	802.76 25.22	802.75 27.5	802.66				
30.02002	802.56 30.34	802.5530.35001	802.5531.30002	802.48 31.94	802.4				
32.51001	802.3733.79001	802.2234.89001	802.09 35.62	802.0135.82001	801.95				
38.49002	801.2238.60001	801.1438.67999	801.11 38.72	801.1 40.22	789.71				
42.13	789.7542.17001	789.7542.67001	789.7143.17001	789.67 43.66	789.63				
44.14001	789.5946.49002	789.3 48.19	788.5548.58002	789.248.61002	789.18				
48.62	789.18 48.63	789.1748.64001	789.1748.64001	789.1648.64999	789.16				
48.66	789.1548.67001	789.1448.67999	789.14 49.12	788.862.85001	778.06				
63.08002	777.8865.33002	776.22 65.34	776.2267.11002	776.2178.08002	775.87				
78.78	775.8479.48001	775.82 80.19	775.7980.89001	775.77 81.59	775.74				
91.54001	775.31 94.44	775.1898.98001	775.57 109.75	776.56 110.11	776.59				

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110.47	776.62	110.82	776.65	111.18	776.67	111.53	776.7	111.88	776.73
112.22	776.76	112.57	776.78	112.91	776.81	113.25	776.84	113.45	776.86
113.72	776.88	114.34	776.93	114.62	776.95	114.9	776.97	115.18	776.99
115.42	777.17	115.67	777.35	115.92	777.52	116.05	777.62	116.23	777.74
116.4	777.87	116.6	778.01	116.88	778.21	117.14	778.39	117.34	778.54
117.49	778.65	117.65	778.76	117.7	778.79	119.84	780.29	130.16	786.3
132.95	786.11	134.25	786.15	138.8	787.7	138.93	788.36	140.17	795.23
140.42	794.83	140.47	794.76	141.01	795.13	141.05	795.16	142.07	795.46
142.46	795.52	146.01	796.92	148.2	797.07	148.36	797.09	148.95	797.17
149.39	797.24	150.28	797.3	150.67	797.34	151.06	797.28	151.28	797.28
155.32	797.18	156.83	797.15	165.02	796.87	167.54	796.78	167.69	796.78
167.72	796.77	167.88	796.77	167.91	796.76	168.08	796.76	175.38	796.04
175.75	796.02	176.11	796	176.47	795.98	176.83	795.96	177.19	795.95
177.55	795.93	177.91	795.91	178.25	795.89	179.28	795.88	193.69	795.81
193.79	795.8	193.89	795.8	193.99	795.79	194.09	795.79	194.19	795.78
194.29	795.78	194.4	795.77	194.5	795.77	194.6	795.76	194.7	795.76
194.8	795.75	194.9	795.75	195	795.74	195.19	795.74	195.29	795.73
195.38	795.73	195.47	795.72	195.64	795.72	195.72	795.71	195.88	795.71
205.22	795.19	210.96	795.01	212.81	794.95	219.8	794.68	219.93	794.67
221.53	794.54	222.15	794.48	225.21	794.2	227.08	794.02	227.3	794
227.63	793.98	231.43	793.68	238.27	793.28	240.1	793.29	245.15	792.9
246.9	792.88	252.21	792.89	253.03	792.87	253.6	792.84	259.22	793.18
260.17	793.17	260.22	793.17	264.8	793.1	265.29	793.09	265.65	793.08
270.36	793.01	274.45	792.94	275.43	792.93	276.77	792.91	277.71	792.97
278.22	793.01	280.51	793.17	281.35	793.23	285.58	793.53	285.83	793.55
285.9	793.55	285.99	793.56	286.46	793.56	287.63	793.52	287.75	793.51
287.86	793.56	289.19	793.61	290.09	793.61	292.12	793.66	292.24	793.67
293.08	793.57	293.09	793.57	293.77	792.74	296.76	792.71	299.94	792.66
301.3	792.64	302.3	792.62	303.18	792.61	304.48	792.59	305.44	792.58
307.35	792.56	308.72	792.53	310.84	792.52	316.33	792.52	341.12	792.84
345.32	792.88	346.41	792.89	349.88	793.01	352.33	793.04	355.47	793.09
358.45	793.14	362.99	793.34	365.22	793.39	367.36	793.43	369.44	793.49
375.05	793.82	375.77	793.84	377.24	793.93	377.54	793.94	377.84	793.96
378.4	794	379.17	794.02	380.67	794.06	394.47	795.08	407.64	796
407.66	796	408.51	796.06	408.59	796.06	413.08	796.35	415.38	796.49
417.09	796.59	417.95	796.64	420.44	796.76	420.61	796.77	420.73	796.78
421.56	796.81	422.77	796.49	423.61	796.33	424.38	796.37	425.43	796.42
425.97	796.45	427.46	796.51	428.97	796.58	430.53	796.64	432.11	796.72
432.15	796.72	432.19	796.73	433.12	796.99	433.21	797.01	440.74	797.15
441.23	797.16	442.98	797.19	443.28	797.2	443.85	797.21	443.89	797.23
443.92	797.24	445.13	797.3	445.63	797.33	446.17	797.35	446.91	797.39
454.23	797.64	456.69	797.82	457.68	797.86	459.32	797.95		

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .06 49.12 .055 130.16 .06 175.38 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

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49.12 130.16 11.7 26.8 43.8 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 38.49 804.8 T
 141.77 205.22 800 T

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1733.17

INPUT

Description:

Station Elevation Data num= 103
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 803.18 8000183 803.141.480011 803.11.990021 803.072.380005 803.05
 2.690002 803.032.940002 803.023.149994 803.014.809998 802.935.100006 802.91
 5.52002 802.8514.14999 799.29 15.94 798.6518.64001 797.6819.49002 796.99
 19.52002 796.97 20.37 796.6221.05002 790.8623.20001 791.0223.89999 791.24
 24.37 791.426.52002 789.5828.79001 788.4628.96002 788.7730.79001 788.37
 32.07001 788.0132.39001 787.7535.51001 785.3137.21002 783.9742.10001 780.2
 46.37003 776.57 51 776.01 76 775 101.61 776.13 102.77 776.94
 104.36 779.64 105.72 780.54 117.9 788.58 118.53 789 119.67 788.66
 120.8 788.32 122.69 788.42 129.79 788.81 134.94 788.62 139.97 788.43
 141.06 788.39 155.63 788.28 155.84 788.28 159.31 790 163.09 791.89
 163.57 792.12 165.99 793.32 168.13 793.31 169.81 793.3 203.92 793.67
 206.73 793.7 211.66 793.71 214.6 793.74 217.91 793.78 222.06 793.78
 224.75 793.8 227.57 793.81 228.62 793.81 236.27 793.83 238.37 793.83
 246.26 793.86 247.74 793.86 255.88 793.88 256.55 793.88 264.97 793.91
 266.19 793.91 274.69 793.94 283.58 793.97 283.62 793.97 286.49 794
 287.28 793.99 292.73 794 292.9 794 293.8 794.01 297.02 794.05
 297.31 794.06 300.75 794.12 301.25 794.13 303.52 794.13 304.18 794.15
 306.89 794.17 309.58 794.2 310.62 794.23 313.35 794.28 313.81 794.29
 314.29 794.31 314.83 794.33 315.43 794.36 318.29 794.43 320.6 794.54
 328.68 794.79 332.68 795.01 334.51 795.11 339.38 795.28 341.22 795.39
 343.43 795.49 345.94 795.59 346.57 795.61

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .0614.14999 .055 117.9 .06 139.97 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 32.07001 118.53 128.75 137.97 138.01 .1 .3

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1595.2

INPUT

Description:

Station Elevation Data num= 100									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8085.079987	804.647	209991	803.11	14.16	798.192	0.95999	793.56	
25.60999	791.5838	03998	786.69	44.62	785.52	50.72	783.776	0.81998	778
63.35999	776.43	79	776	101.5	774.74	123	776	141.3	776.43
143.58	780	144.95	782.41	145.13	782.72	146.22	783.3	155.11	787.98
155.24	788	159	788.42	159.14	788.43	164.32	788.15	170.73	788.33
176.89	788.23	185.15	788.35	187.4	788.38	189.13	789.24	190.28	789.81
197.31	793.32	209.87	793.51	210.83	793.52	231.71	793.83	233.67	793.87
242.83	794.01	247.88	794.08	250.44	794.13	251.09	794.14	259.88	794.3
262.36	794.33	332.11	795.25	333.05	795.27	333.17	795.27	334.45	795.3
340.28	795.44	340.75	795.44	342.76	795.48	345.59	795.55	345.93	795.55
347.5	795.59	349.12	795.63	349.45	795.62	351.89	795.68	352.22	795.68
354.09	795.72	356.01	795.76	356.33	795.76	356.45	795.76	358.51	795.8
360.6	795.84	362.7	795.88	363.02	795.89	365.13	795.93	365.17	795.93
366.21	795.95	367.81	795.98	368.75	796	369.42	796.01	371.09	796.04
372.15	796.06	373.8	796.09	374.85	796.12	376.29	796.14	376.56	796.15
377.61	796.18	420.77	797.31	421.57	797.33	423.14	797.36	424.09	797.38
426.43	797.42	427.25	797.44	428.34	797.46	429.13	797.48	429.93	797.49
431.08	797.51	432.98	798.46	433.32	798.63	446.54	799.2	446.63	799.2
446.71	799.2	446.79	799.2	446.85	799.2	446.9	799.2	448.37	799.25
448.69	799.23	461.83	799.76	469.28	800.03	473.47	800.18	480.96	803.92

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.0638	03998	.055	155.11	.06	187.4	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	38.03998	155.11		145.81	145.81		.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1449.39

INPUT

Description:

Station Elevation Data num= 206									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8262.579956	825.517	209961	824.989	070007	824.751	0.08997	824	
13.32001	821.5816	53998	819.7521	39999	815.2621	78998	814.9223	73999	814.21
28.54999	810	40.25	799.8542	32999	798.2250	06998	79052	53998	788.19

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55.08997787	.094355	.09998	787.0965	.17999	784.0280	.47998	778.8581	.87997	778.31
82.52997	77885.08997		776.43	105.3	774.51	130.62	776.43	131.11	776.76
132.99	778	141.97	784	144.34	785.41	159.36	785.91	159.84	785.91
160.26	785.9	170.62	785.19	171.41	785.33	175.6	786	179.56	786.63
192.97	786.9	195.86	786.93	197.2	787.06	207.65	788.01	207.73	788.02
210.03	788.1	211.52	788.15	219.87	792.3	220.36	792.53	222.04	793.32
269.93	793.83	272.14	793.86	273.62	793.88	274.6	793.89	279.41	793.94
284.9	794	285.26	794	288.41	794.03	291.53	794.06	293.44	794.08
295.16	794.1	296.8	794.12	298.31	794.13	298.93	794.14	299.98	794.15
300.58	794.15	300.98	794.16	301.19	794.16	301.24	794.16	301.99	794.17
312.47	794.27	315.59	794.3	323.9	794.38	328.84	794.43	331.89	794.46
340.1	794.54	343.05	794.56	344.5	794.57	344.66	794.57	347.54	794.59
351.29	794.62	353.36	794.63	356.49	794.66	386.25	795.06	386.5	795.07
386.92	795.07	387.27	795.08	388.89	795.12	390.76	795.11	391.33	795.13
392.15	795.15	393.63	795.15	394.09	795.16	394.57	795.17	396.11	795.17
396.84	795.19	398.43	795.19	399.01	795.2	399.61	795.21	401.23	795.21
401.83	795.23	402.5	795.24	403.18	795.26	403.88	795.27	405.58	795.3
406.31	795.32	406.37	795.32	406.38	795.31	409.8	795.39	410.38	795.4
416.27	795.53	417.43	795.55	417.62	795.55	417.87	795.56	419.37	795.59
421.84	795.63	422.47	795.65	424.8	795.69	425.57	795.72	427.77	795.76
428.67	795.78	429.34	795.8	429.65	795.81	430.35	795.83	431.77	795.86
433.69	795.93	434.87	795.98	435.75	796.02	436.66	796.07	437.92	796.14
439.23	796.23	440.94	796.33	442.57	796.45	443.96	796.56	445.53	796.7
446.98	796.83	448.49	797	450	797.15	453.2	797.53	454.59	797.69
455.53	797.82	456.05	797.89	457.57	798.09	459.07	798.29	460.49	798.49
462.09	798.7	463.44	798.88	465.11	799.11	466.86	799.34	468.13	799.52
469.34	799.68	471.15	799.92	472.29	800.08	474.18	800.33	476.15	800.6
477.2	800.74	478.2	800.87	480.22	801.15	481.1	801.26	481.49	801.32
482.01	801.39	483.24	801.55	484.1	801.66	486.26	801.94	488.53	802.22
489.28	802.32	490	802.4	492.3	802.68	492.95	802.75	495.33	803.02
497.82	803.3	498.35	803.36	498.85	803.41	501.37	803.67	501.8	803.71
504.39	803.97	507.11	804.23	507.41	804.26	507.51	804.26	508.38	804.34
510.28	804.51	510.43	804.53	510.65	804.54	513.46	804.78	514.92	804.9
514.98	804.9	516.44	805.02	516.48	805.02	516.56	805.03	519.5	805.25
519.52	805.25	520.37	805.31	522.13	805.43	522.16	805.43	522.2	805.43
522.21	805.43	522.51	805.45	525.59	805.65	525.67	805.65	525.68	805.65
526.75	805.72	526.78	805.72	526.81	805.72	527.51	805.76	527.63	805.77
531.04	805.96	531.38	805.97	531.4	805.97	531.41	805.98	531.74	805.99
531.86	806								

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .0665.17999 .055 144.34 .06 211.52 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 55.08997 144.34 170.15 170.15 170.15 . .3 .5

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1279.24

INPUT

Description:

Station Elevation Data num= 68										
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	832.093	18	830.957	08	829.87	7.77	002	829.658	14	0015
23.52	823.828	32	821.683	1.99	820.27	32.22		82055.23	001	792.59
57.41	79062.33	002	784.166	4.02	783.42	68.17	001	781.41	72.66	779.36
73.49	778.88	78.14	776.43	104.77	774.29	127.86	776.43	128.52	776.97	
129.77	778	133.99	781.49	139.51	784	141.72	785.01	142.66	785.42	
142.98	785.444	143.06	785.45	147.21	785.63	150.97	785.2	153.03	785.03	
158.13	785.19	169.32	785.72	179.87	785.81	180.18	785.81	180.58	785.94	
182.83	786.69	196.94	791.39	270.07	815.76	283.29	820.16	285.8	821	
293.97	821	301.67	821	328.54	812.04	382.25	794.14	385.46	793.08	
393.96	793.29	395.36	793.32	396.27	793.34	399.05	793.31	403.62	793.4	
403.97	793.4	404.19	793.44	405.97	793.6	406.82	793.72	407.2	793.72	
416.18	793.93	418.63	794.04	434.47	794.41	438.36	794.53	452.13	795.16	
456.5	795.32	471.54	795.96	482.56	796.41	492.69	796.89	503.04	797.51	
509.05	797.79	509.63	797.8	511.85	797.94					

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.0662	33	.055	142.98	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	62.33	002	142.98	130.76	126.25	126.25	.1
							.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1152.99

INPUT

Description:

Station Elevation Data num= 85									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	828.921	41	828.775	6.19	828.44	14.56	825.79	16.07	999
18.41	825.07	24	824.39	24.67	824	26.03	823.23	33.12	819.31
45.31	797.87	49.19	790.01	49.57	789.25	52.70	786.84	60.04	999
66.31	777.5	68.31	776.42	68.32	776.41	95.38	774.1	125.12	776.43
127.83	778.81	130.75	782.08	133.08	783.97	134.95	785.46	139.88	784.96
144.91	784.31	154.49	784.79	158.29	784.81	159.55	784.82	160.62	784.84
163.87	784.88	164.02	784.88	167.24	785.95	238.63	809.74	269.22	819.94

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272.4	821	282.13	821	291.33	821	294.32	820	310.82	814.52
316.7	812.56	345.07	803.13	372.23	794.11	379.33	791.77	379.46	791.77
380.84	791.79	385.32	791.84	387.07	791.88	388.82	791.36	389.22	791.3
389.26	791.31	389.63	791.36	389.97	791.33	391.21	791.29	394.25	791.45
395.41	791.47	396.57	791.47	397.09	791.47	398.18	791.92	398.25	791.98
398.34	792.04	399.34	792.35	399.43	792.36	401.27	792.64	418.67	793.37
422.91	793.55	429.51	794	438.75	794.6	445.63	795.05	451.76	795.57
455.31	795.76	456.12	795.81	458.49	795.92	460.24	796	461.88	796.07
471.85	796.54	474.21	796.72	485.05	797.41	486.21	797.62	488.25	797.83
490.48	798.05	490.91	798.1	492.53	798.29	500.79	799.5	504.31	800.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0652	70001	.055	134.95	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	52.70001	134.95		99.55	100		.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1052.99

INPUT

Description:

Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82411.89001	822.5915	27002	82218.17001	821.43	23.59	820.13		
27.11002	819.2528	92999	818	37.97	811.45	44.09	80849.60001	800.33	
58.61002	790.1759	82001	789.2171	61002	780.3676	24002	77877.60001	777.31	
78.66	776.43	103.55	773.91	127.55	776.43	129.35	777.33	130.72	777.98
130.75	778	134.52	781.24	135.01	782	135.45	782.67	142.14	782.8
146.96	783.07	151.63	783.78	160.96	784.9	165.15	784.55	175.65	784.07
179.16	784.06	181	784.06	187.13	786.11	187.91	786.37	190.35	787.18
206.03	792.4	206.21	792.5	206.46	792.62	206.49	792.63	207.86	793.32
208.55	793.33	208.81	793.33	255.1	808.76	288.36	819.85	291.82	821
308.98	821	311.65	821	318.08	818.86	368.43	802.07	392.09	794.19
393.32	793.81	395.92	793.96	399.65	794.17	407.63	794.5	410.61	794.62
412.59	794.71	421.24	795.14	429.23	795.93	429.96	796	430.12	796.01
430.2	796.02	438.72	796.86	440.77	797.07	447.65	798.14	455.45	799.42
458.82	799.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0671	61002	.055	135.45	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
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71.61002 135.45

96.56 100 110.74

.3

.5

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 952.99

INPUT

Description:

Station Elevation Data num= 84									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	818.710022	817.81.610016	817.559.650024	812.3723.37003	803.59				
29.31003	80037.20001	795.3343.26001	791.9847.15002	790	47.19	789.98			
58.22	783.56	60.72	781.8664.96002	778	66.69	776.4390.71002	773.66		
116.66	776.43	120.47	778.57	120.57	778.61	125.02	782	125.93	782.68
127.02	783.7	128.68	783.7	139.29	784.22	142.31	784.58	151.09	784.31
157.71	784.12	161.97	784.12	163.32	784.12	175.92	784.12	181	784.12
184.14	784.14	187.61	784.53	192.54	786	193.74	786.34	197.66	788.62
200.41	790	200.68	790.13	204.85	790.78	207.76	791.22	209.63	791.44
211.21	791.48	214.66	791.52	225.96	791.61	235.93	791.84	240.13	791.86
244.77	791.88	255.33	791.72	265.58	791.54	272.12	791.32	275.01	791.25
288.54	791.06	299.92	791.57	301.63	791.63	302.81	791.66	305.58	791.68
314.1	791.82	316.91	792	322.51	792.35	326.81	792.57	336.29	794
336.73	794.07	337.06	794.1	340.21	794.42	349.29	795.28	350.88	795.34
361.24	795.75	367.14	795.84	370.4	795.94	371.13	796	371.3	796.01
377.04	796.41	379.58	797.09	381.43	797.6	382.08	797.7	385.58	798.11
392.57	797.98	394.3	797.93	395.19	798.23	398.65	799.03	400.86	798.58
403.54	797.92	405.69	798.88	406.06	799.01	413.92	800		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.06	58.22	.055	127.02	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	58.22	127.02		98.39	100	97.6	.1 .3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 852.99

INPUT

Description:

Station Elevation Data num= 86									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8084.070007	805.25	14.06	798.6918.20001	796.16	29.19	791.2		

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29.23999	791.1832	45999	79041.45999	786.6845	07999	785.42	53.44	780.71
57.29001	778.5758	42001	778.2159	14999	77864.70999	776.43	88.59	773.4
114.39	776.43	116.48	778	117.28	778.61	117.44	778.75	117.87
124.4	783	129.99	783.34	132.94	783.49	139.02	784	143.49
145.17	784.54	145.57	784.56	146.9	784.48	159.15	783.66	170.2
172.42	783.18	176.45	783.11	178.47	784.1	181.79	786.62	187.06
187.82	790.48	189.89	791.64	195.28	791.95	196.23	792	201.8
206.57	792.33	214.64	792.35	218.58	792.41	227.42	792.45	236.77
243.48	792.21	248.26	792.32	251.27	792.38	262.18	792.49	271.57
274.71	792.47	279.93	792.51	286.65	792.49	289.48	792.48	295.62
301.14	792.36	310.73	792.57	311.48	792.59	312.37	792.63	319.4
322.86	793.33	326.2	793.63	328.51	793.75	332.49	794	333.64
335.84	794.34	337.64	794.53	341.15	795.48	343.08	795.82	346.23
354	795.76	360.21	795.63	363.57	795.56	364.81	796	365.01
365.17	796.12	365.28	796.11	368.14	795.91	368.29	796.28	369.44
378.93	800	381.97	800.81	382.52	801.04	382.71	801.09	384.13
389.22	804							801.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0645	07999	.055	124.4	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45.07999	124.4		101.32	100	101.18	.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 752.99

INPUT

Description:

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8043.44	0002	803.38	10.92	001	801.08	13.01	999	800
19.72	798.47	31.20	796.67	34.29	999	796.17	43.22	794.92	44.98
46.51	794.49	50.06	794.54	45.00	1	793.39	67.51	001	791.91
74.11	791.26	86.59	790.1	86.78	790.08	87.06	790	105.04	784.58
111.78	778.98	113.05	778	115.06	776.43	140.26	773.16	169.58	776.43
172.23	778	172.8	778.4	177.82	781.88	180.97	784	181.41	784.29
188.66	784.4	190.6	784.52	193.9	784.54	201.52	784.41	204.21	784.5
207.96	784.36	217.62	784.25	232.65	784.31	234.2	784.32	240.15	784.35
244.28	786	249.97	788.04	255.64	789.6	257.11	790.03	257.32	790.05
258.82	790.19	271.71	790.97	286.22	791.28	290.14	791.25	303.74	791.2
307.75	791.27	311.87	791.21	326.27	791.16	333.89	791.65	335.95	791.75
336.59	791.85	337.72	792	350.06	793.63	356.3	794.29	359.74	794.61
364.54	794.43	371.68	794.22	372.03	794.26	375.09	794.55	376.37	795.41

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377.08	795.59	378.96	796	382.02	796.67	382.15	796.7	382.29	796.73
391.98	799.12	396.43	800.32	403.73	802.24	405.31	802.75	409.44	804

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	105.04	.055	181.41	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
105.04	181.41	138.39	140	137.57	.1	.3	

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 612.99

INPUT

Description:

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8022.019989	801.64	4.5	800.68	6.47998	80010.04001	798.71		
12.51999	798.1	13.28	798	14.19	797.8722.69998	796.8330.51999	796.15		
32.53	79638.92999	795.5547.92999	794.7558.19998	794.3861.88998	794.21				
65.97	794	75.97	793.4677.35999	793.4	82.37	792.96	83.22	792.87	
84.14999	792.8289.73999	792.59	95.44	792.1297.60999	792	99.34	791.9		
102.27	791.67	103.44	791.58	103.55	791.57	115.09	790.84	116.85	790.67
123.17	790	131.24	789.17	134.68	788.83	135.47	788.82	138.42	788.68
140.01	788.65	146.01	788	146.74	787.92	152.15	787.18	156.77	786.75
157.61	786	159.77	784.05	167.86	778	169.95	776.43	193.33	772.82
220.67	776.43	223.08	778	225.23	779.47	225.55	779.71	232.82	782
235.3	782.78	236.68	783.32	238.77	783.57	242.61	784	246.66	784.31
251.74	784.68	256.23	784.82	262.75	784.78	271.15	784.69	281.18	784.05
287.17	783.61	297.89	784.04	303.55	784.27	306.38	784.36	307.04	784.67
315.12	788	315.28	788.07	320.61	788.93	324.76	789.72	330.86	790
337.67	790.32	339.78	790.4	344.95	790.74	353.24	791.28	358.36	791.26
369.74	791.28	378.49	791.51	382.02	791.61	383.85	792	384.21	792.08
387.49	792.77	391.38	793.22	392.95	793.41	401.06	793.02	402.47	792.97
402.99	793.03	404.44	793.15	406.32	793.09	407.49	793.08	409.45	793.72
410.25	794	412.87	794.67	415.21	795.27	416.05	795.46	416.88	795.64
420.13	796.37	423.67	797.11	426.09	797.89	432.19	800	436.24	801.4
446.62	804								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	159.77	.055	236.68	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
159.77	236.68	116.53	119.3	117.86	.1	.3	

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 493.69

INPUT

Description:

Station Elevation Data num= 85									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7946.950012	793.6317.76001	792.93	28.91	792.4634.10001	792.31			
34.70001	79235.73999	791.3437.51001	791.5339.17001	791.57	43.59	791.34			
47.76001	791.1449.20999	791.0957.92999	790.0259.42999	789.8661.89001	789.68				
67.39999	789.370.23999	788.9374.17001	788.4879.73001	78886.14001	787.46				
92.42999	787.46	97.44	787.4499.92001	787.42	109.61	787.23	121.29	786.15	
123.9	786.01	125.13	784.67	132.75	776.43	156.88	772.82	175.1	776.43
176.17	776.77	177.1	777.17	181.98	777.12	183.28	777.15	183.92	777.5
187.37	779.15	192.58	782	193.04	782.25	194.7	783.09	197.79	782.95
204.96	782.9	208.86	783.12	212.59	783.23	219.13	783.17	227.95	783.13
233.13	783.25	247.48	783.44	248.62	783.38	250.63	783.5	265.4	784.23
266.28	784.28	268.13	784.74	272.13	785.96	276.35	787.56	277.8	787.89
280.56	788.52	281.86	788.81	286.82	789.04	294.4	789.4	298.21	789.63
305.85	790.14	308.04	790.29	322.22	790.75	323.77	790.79	331.75	791.06
335.37	791.29	336.8	791.66	340.36	792.93	341.72	793.04	345.95	793.39
354	793.39	355.2	793.4	355.38	793.39	358.08	793.44	358.11	793.44
360.76	793.21	363.15	794.48	364.21	794.79	365.23	795.01	367.18	795.55
372.7	796.96	379.12	798.47	382.13	799.09	384.16	799.58	385.75	800

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.06	125.13	.055	194.7	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	125.13	194.7		63.07	78.64	78.79	.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 415.05

INPUT

Description:

Station Elevation Data num= 93									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	79412.09998	793.5814.39999	793.58	28.31	793.5934.34998	793.54			
45.21997	793.6648.68997	793.62	52.28	793.5957.31998	793.4980.82999	792.91			

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84.51999	792.8385	26999	792.8585	54999	792.8685	92999	792.87	87.87	792.6
91.21997	792.1994	51999	79296.20999	791.8497	97998	791.7	103.92	791.37	
113.59	790.74	119.92	790.15	121.04	790	135.95	788	142.64	787.08
150.35	786.75	151.58	786.66	153.26	786.7	163.53	786.83	169.6	786.74
179.36	786.78	186.02	786.65	196.09	786.06	197.99	785.96	198.86	785.91
199.37	785.39	207.58	776.73	208.1	776.43	232.39	772.47	256.09	776.43
256.16	776.47	256.31	776.56	266.19	782.68	267.96	782.78	271.81	782.75
278.35	781.72	280.1	781.42	286.21	781.36	288.12	781.4	292.61	781.26
294.83	781.21	295.97	781.4	298.8	782	306.09	783.53	308.61	783.98
309.2	784.08	309.6	784.13	311.37	784.24	317.61	784.56	320.17	784.76
320.5	784.79	321.22	784.99	326.01	786	331.47	787.19	332.03	787.26
347.72	789.64	360.44	790.5	362.67	790.67	369.01	791.27	376.81	792
378.81	792.07	391.26	792.41	400.71	793.03	403.75	793.28	404.26	793.31
406.57	794	407.62	794.31	407.97	794.37	411.67	794.86	416.47	794.81
420.94	794.73	422.58	794.86	426.37	795.34	426.92	795.36	430.48	795.44
432.54	795.66	437.67	796.12	441.28	796.49	447.37	796.93	449.37	797.11
453.33	797.56	456.63	797.83	459.36	798				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	198.86	.055	266.19	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	198.86	266.19		34.7	156.1	171.52	.1	.3

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 258.95

INPUT

Description:

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.330017	795.688	789978	795.310	40997	795.4415	79999	795.4	
32.40997	794.9447	33002	794.7157	20996	794.5577	35999	794.3382	77002	794.23
94.98999	794	102.8	793.76	104.39	793.76	128.11	793.57	133.05	793.63
138.85	793.6	141.18	793.59	154.56	793.43	164.84	793.33	172.49	793.06
173.67	793.02	179.93	792.86	180.62	792.88	182.66	792.96	189.11	793.11
193.3	793.29	202.23	793.01	204.44	792.93	205.17	792.86	213.66	792
214.84	791.87	214.92	791.86	230.01	791.25	237.24	791.09	250.05	791
251.02	790.98	264.75	790.56	278.27	790	288.42	789.49	298.73	788
309.34	786.45	311.98	786.03	315.5	785.98	323.17	785.86	326.61	785.97
328.1	785.98	338.03	786.11	347.35	786.11	356.32	785.79	366.97	785.17
377.9	784.59	384.12	784	395.03	782.94	395.98	782.85	397.07	782.73
398.53	782.62	414.49	781.18	418.76	781.06	420.3	780.66	421.15	780
422.77	778.74	425.59	776.43	447.8	772.47	467.59	776.43	467.74	776.47

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469.54	776.62	474.48	777.08	475.47	777.4	476.41	778	486.24	783.28
496.78	785.8	500.11	786.62	500.92	786.88	506.04	788.49	513.69	791.41
514.67	791.74	522.54	793.11	526.23	793.72	526.65	793.8	529.64	794
538.12	794.28	539.03	794.35	543.39	794.56	557.58	795.03	572.49	795.22
574.1	795.22	575.71	795.29	586.86	795.68	594.95	795.79	595.9	795.8
595.95	795.8	595.98	795.8	596.01	795.81	596.18	795.81	606.2	795.87
608.11	795.94	610.42	796.24	615.65	796.31	618.06	796.42	621.21	796.57
628.52	796.78	632.84	797.1	644.22	798.17	651.28	798.88	656.06	799.35
666.56	800.38	674.12	800.63	684.49	800.98				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	418.76	.055	486.24	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	418.76	486.24		0	0		.1	.3

CROSS SECTION

RIVER: Middle Island Cr
 REACH: MIDDLE ISLAND CR RS: 50

INPUT

Description:

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.190002	795.69	8.72998	795.2910	4.5996	795.4415	3.2996	795.41	
32.88	794.9145	3.9996	794.757	4.5996	794.573	6.1996	794.3184	4.77997	794.08
88.86996	794	101.38	793.64	115.4	793.47	131.65	793.3	135.21	793.27
148.59	793	149.85	792.99	155.08	792.9	182.04	792	183.08	791.96
183.15	791.96	183.25	791.95	183.36	791.94	183.48	791.93	184.98	791.87
197.8	791.27	209.94	791.03	211.02	791.03	211.11	791.02	211.3	791
211.52	790.98	211.71	790.97	212.64	790.93	214.98	790.73	223.8	790.58
237.63	790	248.4	789.38	256.91	789.13	271.09	788.72	276.38	788.59
287.87	788	299.46	787.46	299.79	787.45	319.69	786.73	320.92	786.65
328.75	786	340.18	784.93	345.95	784.29	347.4	784.11	351.35	783.49
359.11	782.3	360.21	782.22	365.45	782.11	366.71	782	371.03	781.62
372.43	781.52	391.1	781.35	391.84	781.33	393.48	781.04	398.96	780.11
401.51	779.68	402.68	779.59	405.35	778.92	413.27	777.3	418.1	776.04
418.26	776	419.17	775.76	419.64	775.59	442.83	775.59	455.13	775.63
486.04	775.72	487.7	778.45	492.83	784.08	494.67	784.24	496.08	784.4
503.78	789.33	505.69	790.51	508.49	792.62	515.7	798.03	519.99	798.55
528.52	799.96	531.73	800.5	540.37	800.4	544.44	800.57	546.8	800.7
550.47	800.86	551.85	800.74	556.2	800.54	559.97	803.72563	5699	808.08
572.9	816.03	572.93	816.06	572.95	816.07573	2.599	816.2	579.6	818.65

Manning's n Values num= 3

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Sta	n Val	Sta	n Val	Sta	n Val
0	.06	391.1	.04	492.83	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	391.1	492.83		30	30		.1	.3

CROSS SECTION

RIVER: Middle Island Cr
 REACH: MIDDLE ISLAND CR RS: 20

INPUT

Description:

Station Elevation Data		num=	104							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	7966.820007	795.718.609985	795.2311.33002	795.4413.08002	795.43					
25.69	795.03	33.44	794.736.95001	794.6437.08002	794.63	37.31	794.63			
37.57001	794.6237.83002	794.6138.08002	794.6157.39999	794.1558.06998	794.14					
63.22	794.04	63.78	794.0364.60999	794.0265.73999	794	68.28	793.93			
71.91	793.8375.82999	793.7284.81998	793.6	87.69	793.56	89.66	793.52			
102.9	793.2	108.48	793.13	121.72	792.82	136.06	792.46	142.42	792.39	
150.76	792.42	159.8	792.35	164.4	792.2	166.29	792.14	170.24	792	
175.22	791.77	191.14	791.51	192.36	791.48	193.74	791.42	198.69	791.2	
211.06	790.61	216.24	790.36	221.71	790	240.83	789.21	258.3	788.38	
260.29	788.29	261.88	788.21	265.18	788	275.62	787.29	277.98	786.85	
279.83	786.42	282.4	786	287.82	785.11	288.71	785	296.75	784.74	
302.56	784.61	305.67	784.52	308.79	784.26	313.16	784	319.44	783.62	
327.39	783.1	341.05	782.9	343.43	782.87	358.21	782.27	359	782.26	
359.25	782.24	361.95	782.09	363.11	782	369.19	781.52	374.34	781.14	
378.47	780.71	380.81	780.6	383.95	780.25	387.81	780	391.14	779.78	
399.18	776.77	399.84	776.59	400.09	776.52	401.62	776	402.78	775.59	
429.21	775.59	441.84	775.59	469.94	775.59	474.56	780.42	479.2	784.7	
485.03	787.82	489.72	790.43	495.78	795.43	498.82	798	498.85	798.02	
510.93	799.47	515.54	800.08	519.95	800.23	528.2	800.57	532.34	800.8	
535.1	800.87	538.71	800.75	541.07	800.56	545.7	806.63	546.82	808.01	
548.73	810	553.61	814.23	559.64	817.24	563.74	819.09			

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.06	391.14	.04	474.56	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	391.14	474.56		0	0		.1	.3

SUMMARY OF MANNING'S N VALUES

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River: Buckeye Creek

Reach	River Sta.	n1	n2	n3
BUCKEYE CREEK	1266.73	.06	.055	.06
BUCKEYE CREEK	1166.73	.06	.055	.06
BUCKEYE CREEK	1066.73	.06	.055	.06
BUCKEYE CREEK	966.73	.06	.055	.06
BUCKEYE CREEK	866.35	.06	.055	.06
BUCKEYE CREEK	726.73	.06	.055	.06
BUCKEYE CREEK	626.73	.06	.055	.06
BUCKEYE CREEK	526.73	.06	.055	.06
BUCKEYE CREEK	426.73	.06	.055	.06
BUCKEYE CREEK	326.73	.06	.055	.06
BUCKEYE CREEK	226.73	.06	.055	.06
BUCKEYE CREEK	136.73	.06	.055	.06

River: Meathouse Fork

Reach	River Sta.	n1	n2	n3	n4
MEATHOUSE FORK	1933.09	.06	.055	.06	
MEATHOUSE FORK	1860	.06	.055	.06	.015
MEATHOUSE FORK	1810	.06	.055	.06	.015
MEATHOUSE FORK	1785	Bridge			
MEATHOUSE FORK	1760	.06	.055	.06	.015
MEATHOUSE FORK	1733.17	.06	.055	.06	.015
MEATHOUSE FORK	1595.2	.06	.055	.06	.015
MEATHOUSE FORK	1449.39	.06	.055	.06	.015
MEATHOUSE FORK	1279.24	.06	.055	.04	
MEATHOUSE FORK	1152.99	.06	.055	.04	
MEATHOUSE FORK	1052.99	.06	.055	.04	
MEATHOUSE FORK	952.99	.06	.055	.06	
MEATHOUSE FORK	852.99	.06	.055	.06	
MEATHOUSE FORK	752.99	.06	.055	.06	
MEATHOUSE FORK	612.99	.06	.055	.06	
MEATHOUSE FORK	493.69	.06	.055	.06	
MEATHOUSE FORK	415.05	.06	.055	.06	
MEATHOUSE FORK	258.95	.06	.055	.06	

River: Middle Island Cr

Reach	River Sta.	n1	n2	n3
MIDDLE ISLAND CR	50	.06	.04	.06

MIDDLE ISLAND CR 20 .06 .04 .06

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

Reach	River Sta.	Left	Channel	Right
BUCKEYE CREEK	1266.73	102.48	100	91.88
BUCKEYE CREEK	1166.73	97.82	100	98.73
BUCKEYE CREEK	1066.73	100.89	100	98.69
BUCKEYE CREEK	966.73	118.09	100.38	66.66
BUCKEYE CREEK	866.35	146.5	139.62	119.7
BUCKEYE CREEK	726.73	98.8	100	91.86
BUCKEYE CREEK	626.73	105.28	100	89.4
BUCKEYE CREEK	526.73	101.52	100	54.01
BUCKEYE CREEK	426.73	90.53	100	148.77
BUCKEYE CREEK	326.73	110.54	100	104.62
BUCKEYE CREEK	226.73	56.16	90	93.21
BUCKEYE CREEK	136.73	0	0	0

River: Meathouse Fork

Reach	River Sta.	Left	Channel	Right
MEATHOUSE FORK	1933.09	76.85	73.09	73.93
MEATHOUSE FORK	1860	57.55	50	36.74
MEATHOUSE FORK	1810	53.2	50	39.49
MEATHOUSE FORK	1785	Bridge		
MEATHOUSE FORK	1760	11.7	26.8	43.8
MEATHOUSE FORK	1733.17	128.75	137.97	138.01
MEATHOUSE FORK	1595.2	145.81	145.81	145.81
MEATHOUSE FORK	1449.39	170.15	170.15	170.15
MEATHOUSE FORK	1279.24	130.76	126.25	126.25
MEATHOUSE FORK	1152.99	99.55	100	100
MEATHOUSE FORK	1052.99	96.56	100	110.74
MEATHOUSE FORK	952.99	98.39	100	97.6
MEATHOUSE FORK	852.99	101.32	100	101.18
MEATHOUSE FORK	752.99	138.39	140	137.57
MEATHOUSE FORK	612.99	116.53	119.3	117.86
MEATHOUSE FORK	493.69	63.07	78.64	78.79
MEATHOUSE FORK	415.05	34.7	156.1	171.52
MEATHOUSE FORK	258.95	0	0	0

River: Middle Island Cr

Reach	River Sta.	Left	Channel	Right
MIDDLE ISLAND CR	50	30	30	30
MIDDLE ISLAND CR	20	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Buckeye Creek

Reach	River Sta.	Contr.	Expan.
BUCKEYE CREEK	1266.73	.1	.3
BUCKEYE CREEK	1166.73	.1	.3
BUCKEYE CREEK	1066.73	.1	.3
BUCKEYE CREEK	966.73	.1	.3
BUCKEYE CREEK	866.35	.1	.3
BUCKEYE CREEK	726.73	.1	.3
BUCKEYE CREEK	626.73	.1	.3
BUCKEYE CREEK	526.73	.1	.3
BUCKEYE CREEK	426.73	.1	.3
BUCKEYE CREEK	326.73	.1	.3
BUCKEYE CREEK	226.73	.1	.3
BUCKEYE CREEK	136.73	.1	.3

River: Meathouse Fork

Reach	River Sta.	Contr.	Expan.
MEATHOUSE FORK	1933.09	.1	.3
MEATHOUSE FORK	1860	.3	.5
MEATHOUSE FORK	1810	.3	.5
MEATHOUSE FORK	1785	Bridge	
MEATHOUSE FORK	1760	.3	.5
MEATHOUSE FORK	1733.17	.1	.3
MEATHOUSE FORK	1595.2	.1	.3
MEATHOUSE FORK	1449.39	.3	.5
MEATHOUSE FORK	1279.24	.1	.3
MEATHOUSE FORK	1152.99	.1	.3
MEATHOUSE FORK	1052.99	.3	.5
MEATHOUSE FORK	952.99	.1	.3
MEATHOUSE FORK	852.99	.1	.3

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MEATHOUSE FORK	752.99	.1	.3
MEATHOUSE FORK	612.99	.1	.3
MEATHOUSE FORK	493.69	.1	.3
MEATHOUSE FORK	415.05	.1	.3
MEATHOUSE FORK	258.95	.1	.3

River: Middle Island Cr

Reach	River Sta.	Contr.	Expan.
MIDDLE ISLAND CR	50	.1	.3
MIDDLE ISLAND CR	20	.1	.3

Profile Output Table - Standard Table 1

River	Reach	River Sta	Profile	Q Total	Min Ch El
W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Flow Area	Top Width
Froude # Chl			Vel Chnl	(cfs)	(ft)
(ft)	(ft)	(ft)	(ft/ft)	(sq ft)	(ft)
Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	16950.00	775.59
792.82		793.73	8.42	2862.09	351.29
0.37					
Middle Island Cr	MIDDLE ISLAND CR	20	PF 1	16950.00	775.59
792.70	786.84	793.68	9.06	2903.98	365.97
0.39					
Meathouse Fork	MEATHOUSE FORK	1933.09	PF 1	9600.00	775.34
795.17		795.61	5.75	2268.15	376.99
0.25					
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	9600.00	774.64
794.98		795.51	6.30	1750.77	320.16
0.27					
Meathouse Fork	MEATHOUSE FORK	1810	PF 1	9600.00	775.85
794.93	786.11	795.43	5.96	1753.54	307.97
0.26					
Meathouse Fork	MEATHOUSE FORK	1785		Bridge	
Meathouse Fork	MEATHOUSE FORK	1760	PF 1	9600.00	775.18
794.85		795.35	5.93	1747.54	276.54

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0.26						
Meathouse Fork	MEATHOUSE FORK	1733.17	PF 1	9600.00	775.00	
794.86	795.27	0.001067	5.39	1936.59	309.33	
0.23						
Meathouse Fork	MEATHOUSE FORK	1595.2	PF 1	9600.00	774.74	
794.82	795.11	0.000696	4.46	2354.32	280.77	
0.19						
Meathouse Fork	MEATHOUSE FORK	1449.39	PF 1	9600.00	774.51	
794.63	794.98	0.001000	5.19	2145.97	307.10	
0.23						
Meathouse Fork	MEATHOUSE FORK	1279.24	PF 1	9600.00	774.29	
794.35	794.79	0.001069	5.58	1871.58	202.29	
0.24						
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	9600.00	774.10	
794.24	794.65	0.001019	5.43	1935.78	206.27	
0.23						
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	9600.00	773.91	
794.12	794.55	0.000965	5.58	1898.45	162.51	
0.23						
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	9600.00	773.66	
794.02	794.43	0.001107	5.80	2315.56	296.88	
0.24						
Meathouse Fork	MEATHOUSE FORK	852.99	PF 1	9600.00	773.40	
793.90	794.32	0.001101	5.72	2265.02	307.61	
0.24						
Meathouse Fork	MEATHOUSE FORK	752.99	PF 1	9600.00	773.16	
793.84	794.19	0.000968	5.39	2420.09	300.79	
0.23						
Meathouse Fork	MEATHOUSE FORK	612.99	PF 1	9600.00	772.82	
793.73	794.05	0.000914	5.23	2567.35	338.47	
0.22						
Meathouse Fork	MEATHOUSE FORK	493.69	PF 1	9600.00	772.82	
793.65	793.93	0.000888	5.08	2725.25	354.99	
0.22						
Meathouse Fork	MEATHOUSE FORK	415.05	PF 1	9600.00	772.47	
793.55	793.86	0.000959	5.29	2627.60	352.46	
0.22						
Meathouse Fork	MEATHOUSE FORK	258.95	PF 1	9600.00	772.47	
793.41	785.05 793.73	0.000968	5.41	2646.22	367.38	
0.23						
Buckeye Creek	BUCKEYE CREEK	1266.73	PF 1	7350.00	776.03	
794.65	795.12	0.001259	5.75	1511.16	178.60	
0.26						
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	7350.00	776.00	
794.47	794.99	0.001361	5.92	1412.83	166.32	
0.27						
Buckeye Creek	BUCKEYE CREEK	1066.73	PF 1	7350.00	775.97	
794.36	794.85	0.001365	5.81	1515.39	229.93	

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0.27							
Buckeye Creek		BUCKEYE CREEK	966.73	PF 1	7350.00	775.94	
794.32		794.69	0.001030	5.00	1658.77	213.25	
0.23							
Buckeye Creek		BUCKEYE CREEK	866.35	PF 1	7350.00	775.97	
794.21	785.60	794.58	0.001186	5.36	1728.20	268.39	
0.24							
Buckeye Creek		BUCKEYE CREEK	726.73	PF 1	7350.00	776.03	
794.02		794.42	0.001113	5.32	1603.21	175.11	
0.24							
Buckeye Creek		BUCKEYE CREEK	626.73	PF 1	7350.00	775.78	
793.97		794.30	0.000950	5.00	1778.44	172.48	
0.22							
Buckeye Creek		BUCKEYE CREEK	526.73	PF 1	7350.00	775.52	
793.82		794.20	0.001041	5.37	1652.54	150.19	
0.23							
Buckeye Creek		BUCKEYE CREEK	426.73	PF 1	7350.00	775.23	
793.83		794.08	0.000750	4.53	2052.33	209.01	
0.20							
Buckeye Creek		BUCKEYE CREEK	326.73	PF 1	7350.00	774.81	
793.59		793.97	0.001092	5.39	1671.21	166.58	
0.23							
Buckeye Creek		BUCKEYE CREEK	226.73	PF 1	7350.00	774.36	
793.40		793.85	0.001271	5.78	1612.75	209.34	
0.25							
Buckeye Creek		BUCKEYE CREEK	136.73	PF 1	7350.00	773.97	
793.26	784.45	793.73	0.001366	5.93	1636.13	249.62	
0.26							

Profile Output Table - Standard Table 2

River	Reach	River Sta	Profile	E.G. Elev	W.S.		
Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top
Width							
(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft)
(ft)						(cfs)	
Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	793.73			
792.82	0.91	0.04	0.01	3041.65	13703.07	205.28	
351.29							
Middle Island Cr	MIDDLE ISLAND CR	20	PF 1	793.68			
792.70	0.98			4049.32	12620.27	280.41	

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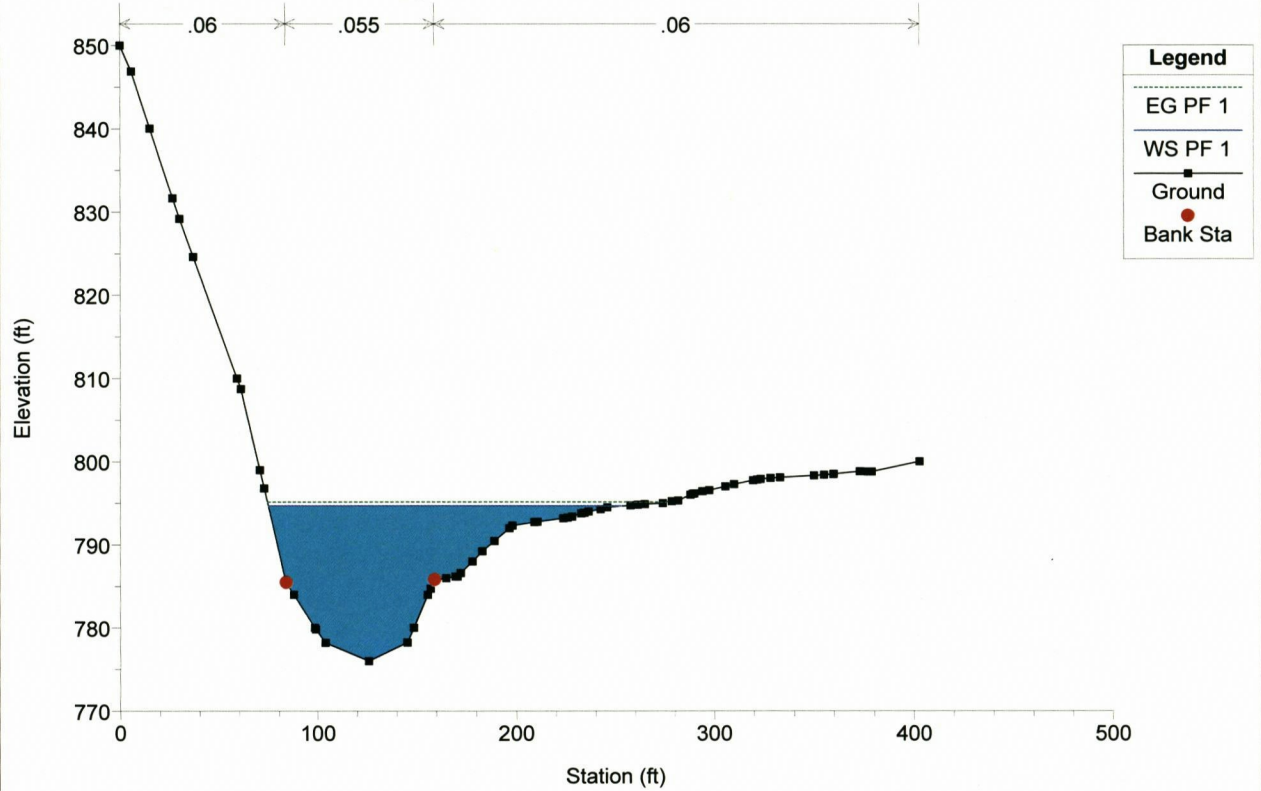
365.97							
Meathouse Fork	MEATHOUSE FORK	1933.09	PF 1	795.61			
795.17	0.44	0.09	0.01	372.67	8103.36	1123.98	
376.99							
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	795.51			
794.98	0.53	0.06	0.01	403.21	7508.32	1688.47	
320.16							
Meathouse Fork	MEATHOUSE FORK	1810	PF 1	795.43			
794.93	0.50	0.01	0.00	237.40	7790.11	1572.49	
307.97							
Meathouse Fork	MEATHOUSE FORK	1785				Bridge	
Meathouse Fork	MEATHOUSE FORK	1760	PF 1	795.35			
794.85	0.50	0.03	0.05	100.36	7945.66	1553.99	
276.54							
Meathouse Fork	MEATHOUSE FORK	1733.17	PF 1	795.27			
794.86	0.41	0.12	0.04	117.11	7761.31	1721.59	
309.33							
Meathouse Fork	MEATHOUSE FORK	1595.2	PF 1	795.11			
794.82	0.29	0.12	0.01	135.39	8680.20	784.41	
280.77							
Meathouse Fork	MEATHOUSE FORK	1449.39	PF 1	794.98			
794.63	0.36	0.18	0.02	73.70	7425.85	2100.46	
307.10							
Meathouse Fork	MEATHOUSE FORK	1279.24	PF 1	794.79			
794.35	0.44	0.13	0.01	78.17	7571.59	1950.24	
202.29							
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	794.65			
794.24	0.41	0.10	0.00	38.98	7666.23	1894.79	
206.27							
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	794.55			
794.12	0.43	0.11	0.01	299.35	6449.94	2850.71	
162.51							
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	794.43			
794.02	0.41	0.11	0.00	214.25	7036.05	2349.70	
296.88							
Meathouse Fork	MEATHOUSE FORK	852.99	PF 1	794.32			
793.90	0.42	0.10	0.02	206.17	7726.40	1667.43	
307.61							
Meathouse Fork	MEATHOUSE FORK	752.99	PF 1	794.19			
793.84	0.36	0.13	0.01	335.32	7183.19	2081.49	
300.79							
Meathouse Fork	MEATHOUSE FORK	612.99	PF 1	794.05			
793.73	0.33	0.11	0.01	479.70	6893.20	2227.11	
338.47							
Meathouse Fork	MEATHOUSE FORK	493.69	PF 1	793.93			
793.65	0.29	0.07	0.00	888.49	6079.94	2631.58	
354.99							

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Meathouse Fork	MEATHOUSE FORK	415.05	PF 1	793.86
793.55 0.31	0.13	0.00 1129.49	6206.67	2263.84
352.46				
Meathouse Fork	MEATHOUSE FORK	258.95	PF 1	793.73
793.41 0.33		2885.48	6303.45	411.08
367.38				
Buckeye Creek	BUCKEYE CREEK	1266.73	PF 1	795.12
794.65 0.47	0.13	0.00 79.95	6668.06	601.99
178.60				
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	794.99
794.47 0.52	0.14	0.01 58.15	6935.61	356.24
166.32				
Buckeye Creek	BUCKEYE CREEK	1066.73	PF 1	794.85
794.36 0.49	0.12	0.04 51.05	6819.16	479.80
229.93				
Buckeye Creek	BUCKEYE CREEK	966.73	PF 1	794.69
794.32 0.37	0.11	0.00 21.64	7016.90	311.46
213.25				
Buckeye Creek	BUCKEYE CREEK	866.35	PF 1	794.58
794.21 0.38	0.16	0.00 196.06	5968.99	1184.95
268.39				
Buckeye Creek	BUCKEYE CREEK	726.73	PF 1	794.42
794.02 0.40	0.10	0.02 41.54	6674.19	634.26
175.11				
Buckeye Creek	BUCKEYE CREEK	626.73	PF 1	794.30
793.97 0.33	0.10	0.00 103.28	5778.91	1467.81
172.48				
Buckeye Creek	BUCKEYE CREEK	526.73	PF 1	794.20
793.82 0.37	0.08	0.04 160.62	5632.16	1557.22
150.19				
Buckeye Creek	BUCKEYE CREEK	426.73	PF 1	794.08
793.83 0.25	0.10	0.01 461.91	5254.74	1633.35
209.01				
Buckeye Creek	BUCKEYE CREEK	326.73	PF 1	793.97
793.59 0.38	0.12	0.01 771.94	5793.43	784.63
166.58				
Buckeye Creek	BUCKEYE CREEK	226.73	PF 1	793.85
793.40 0.45	0.11	0.00 943.72	6229.72	176.57
209.34				
Buckeye Creek	BUCKEYE CREEK	136.73	PF 1	793.73
793.26 0.47		985.61	6149.54	214.85
249.62				

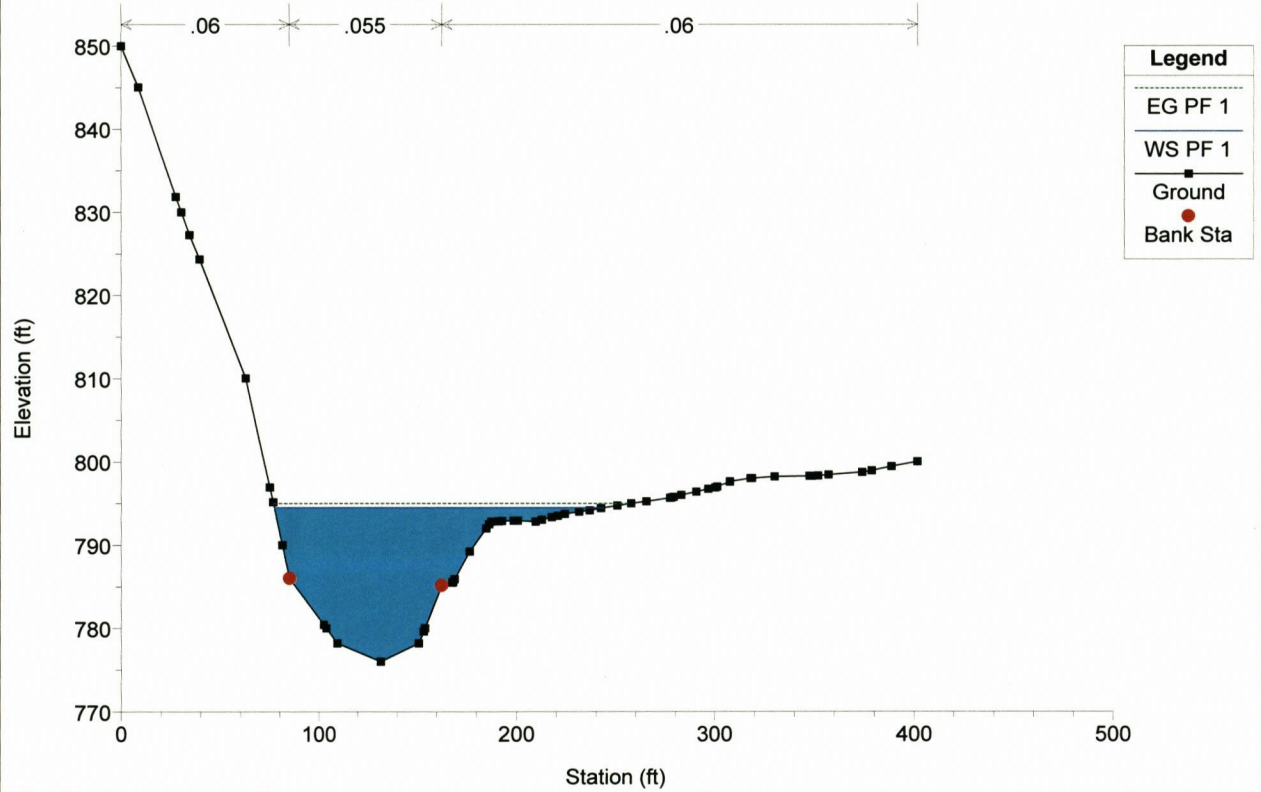
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1266.73



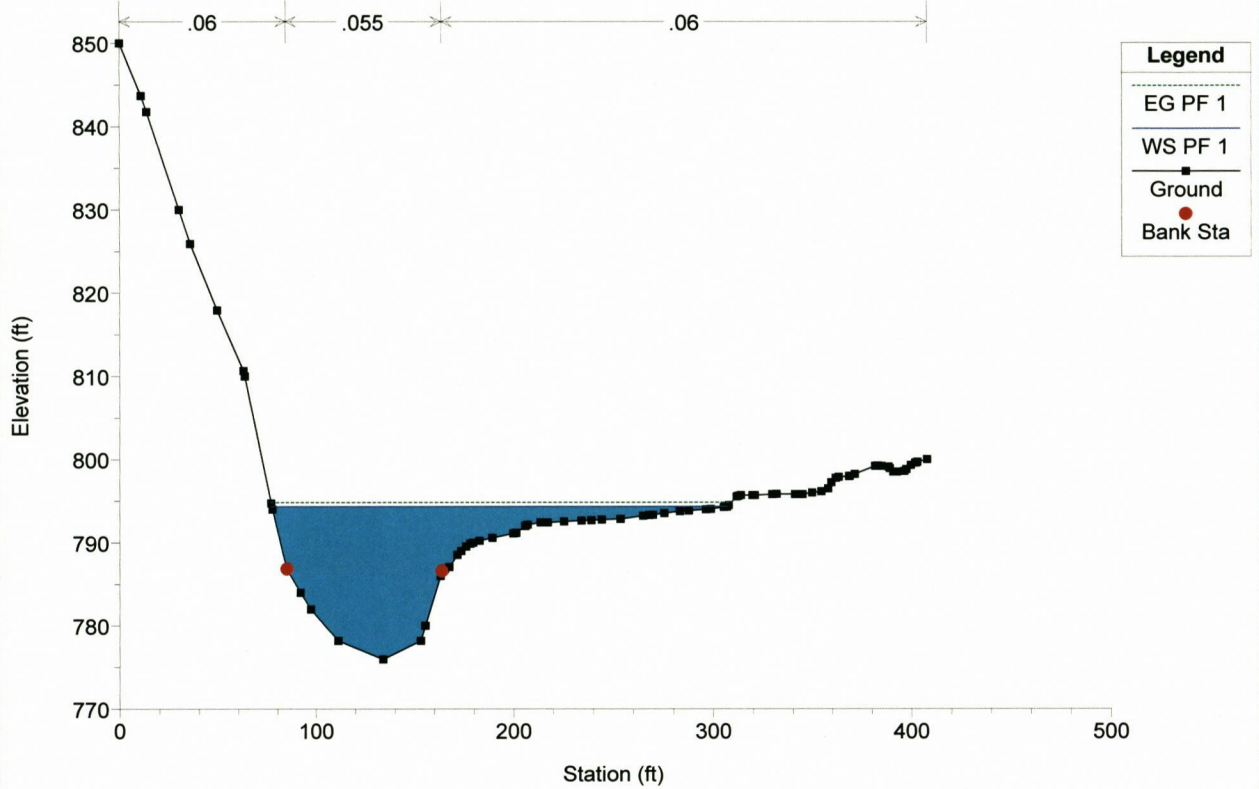
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1166.73



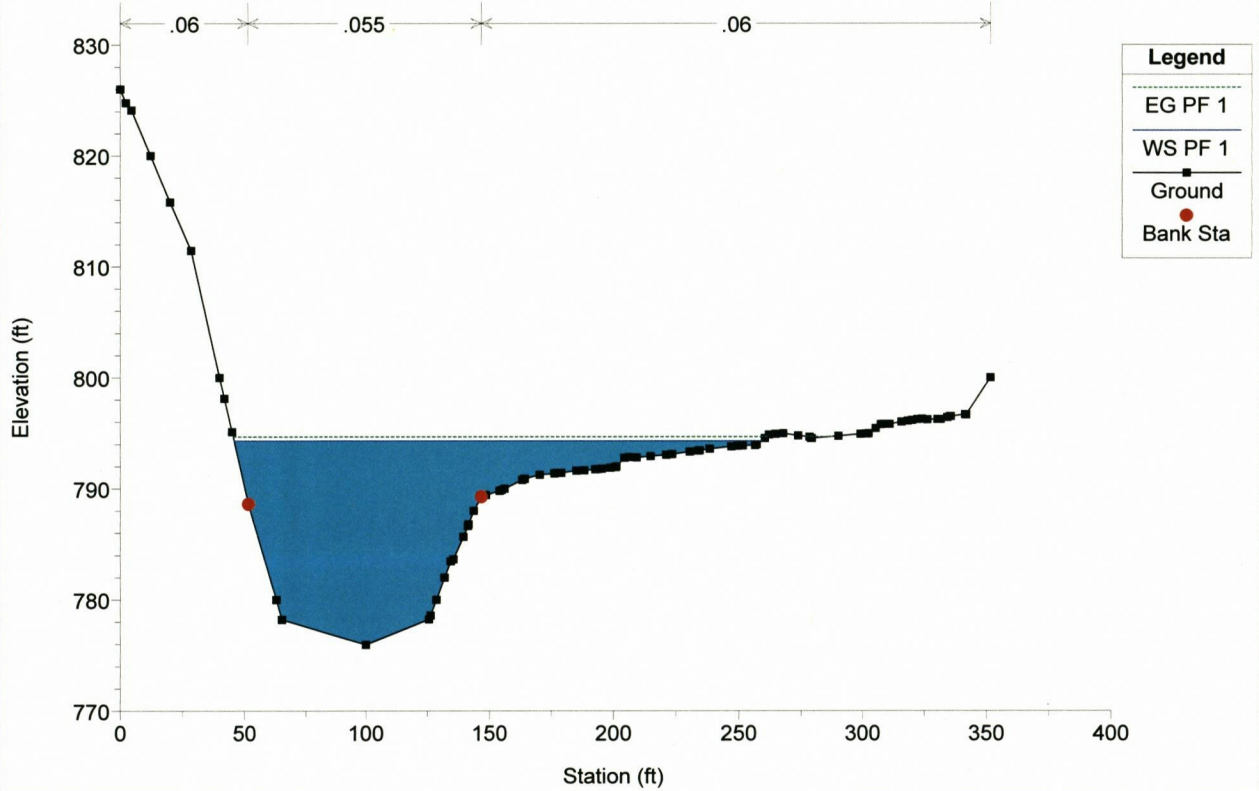
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1066.73



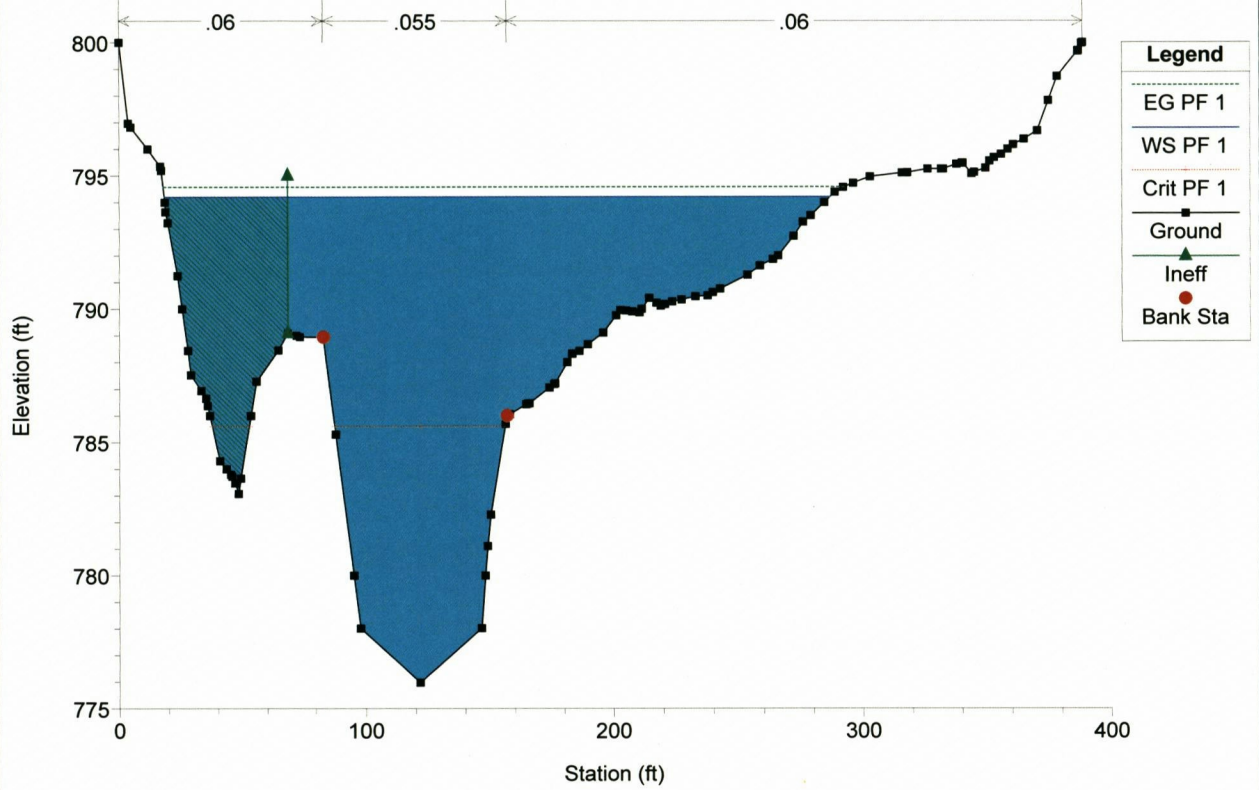
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 966.73



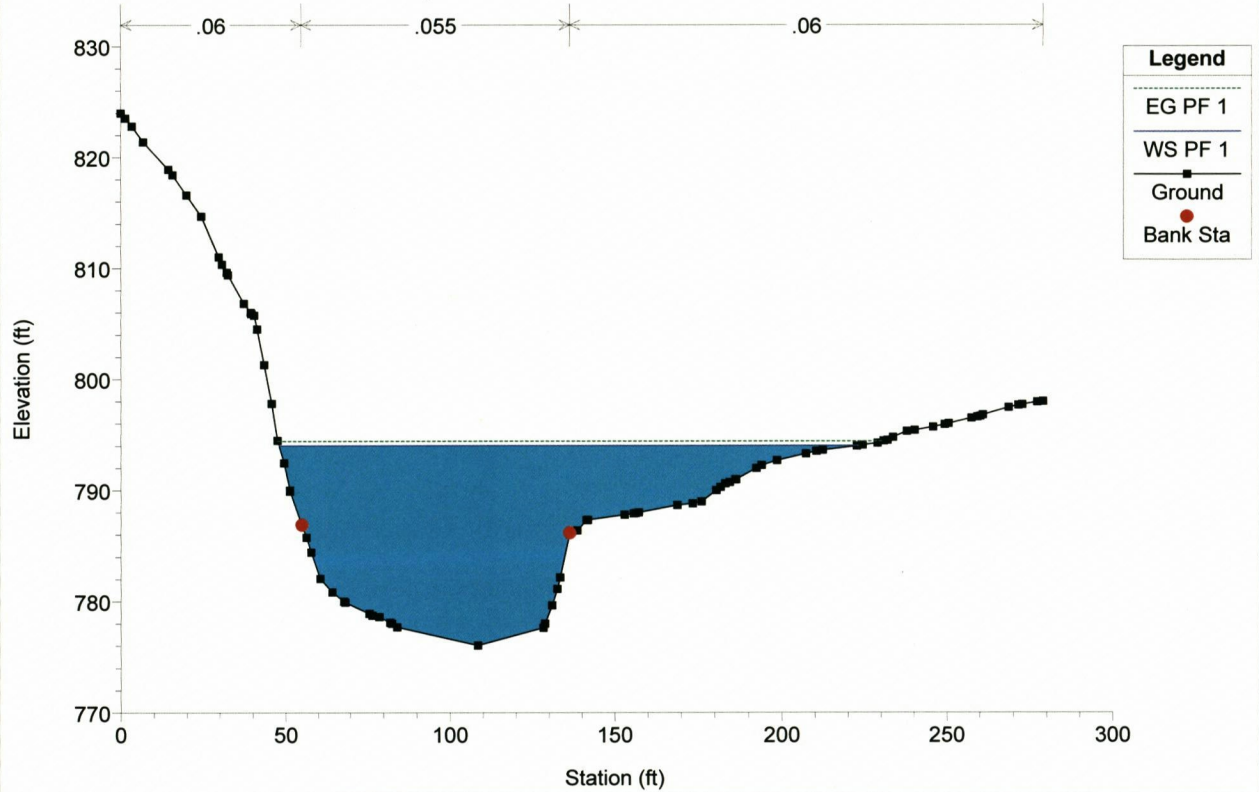
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 866.35



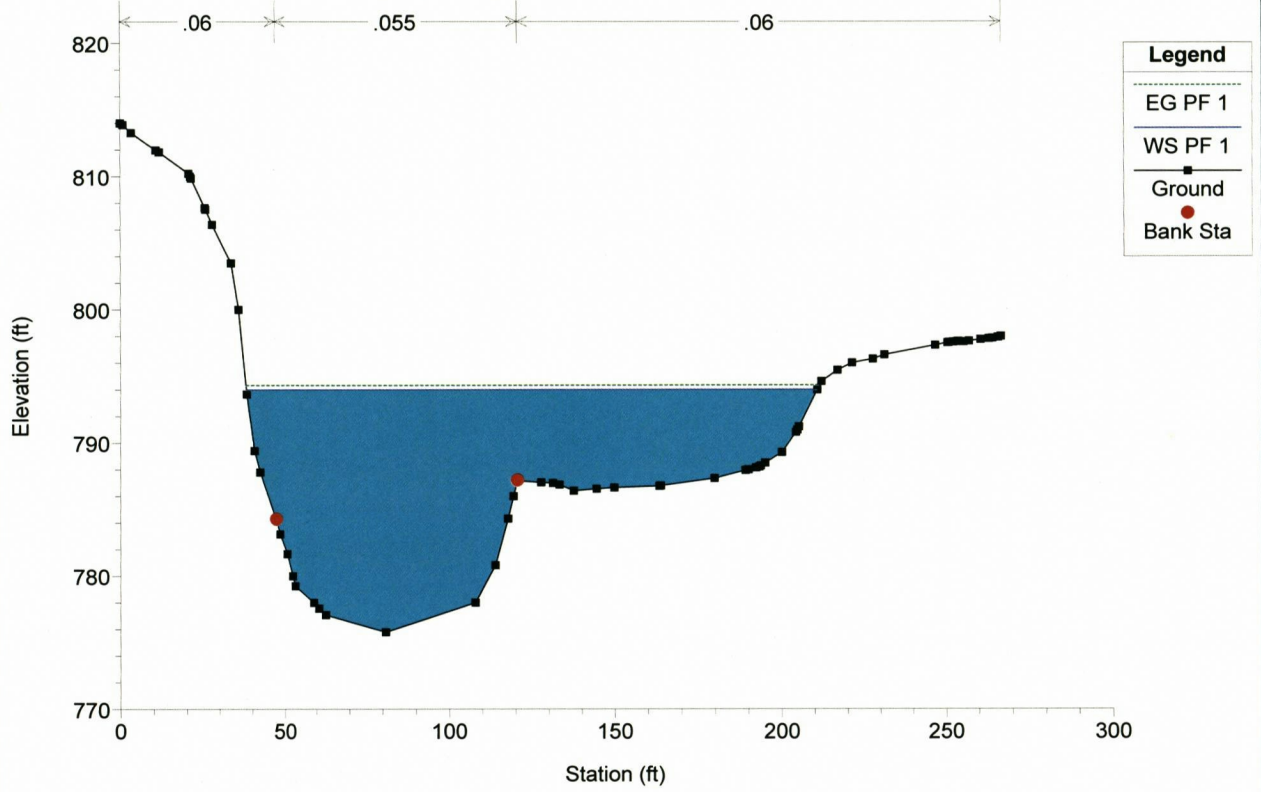
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 726.73



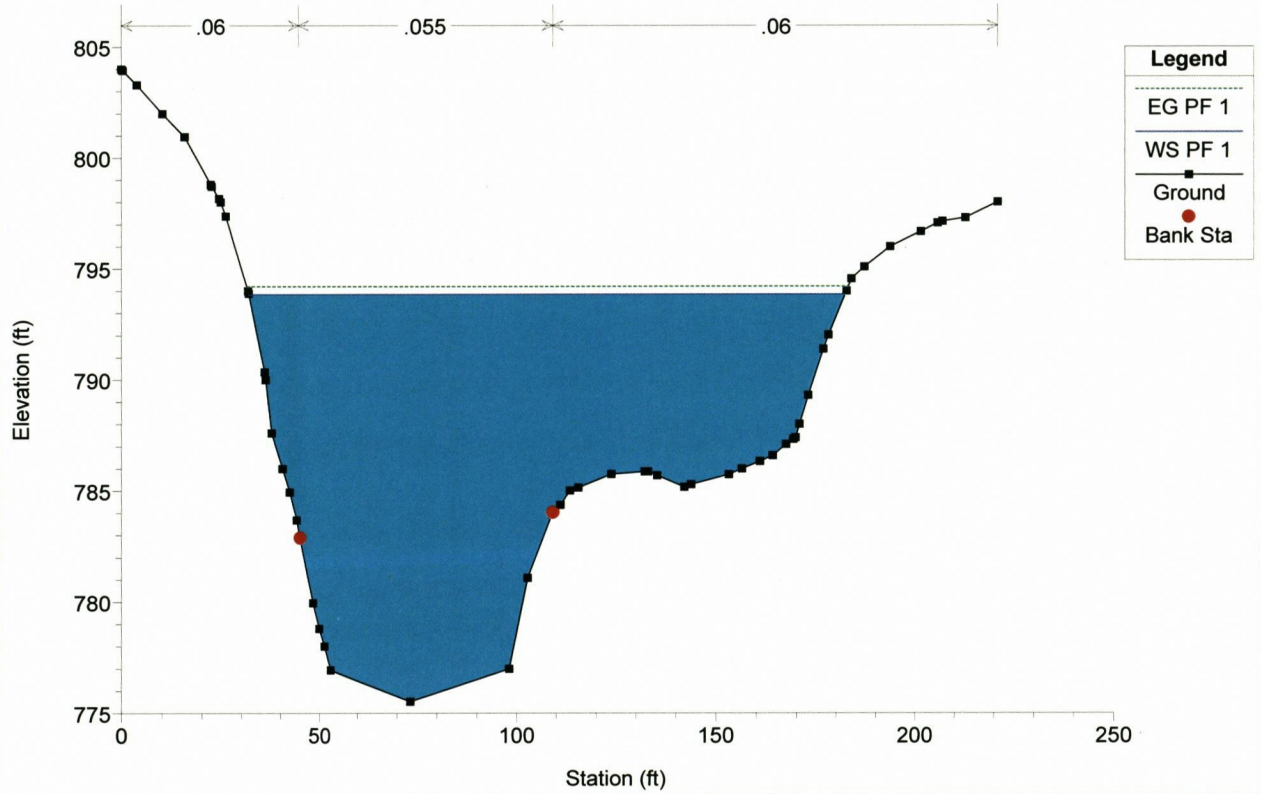
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 626.73



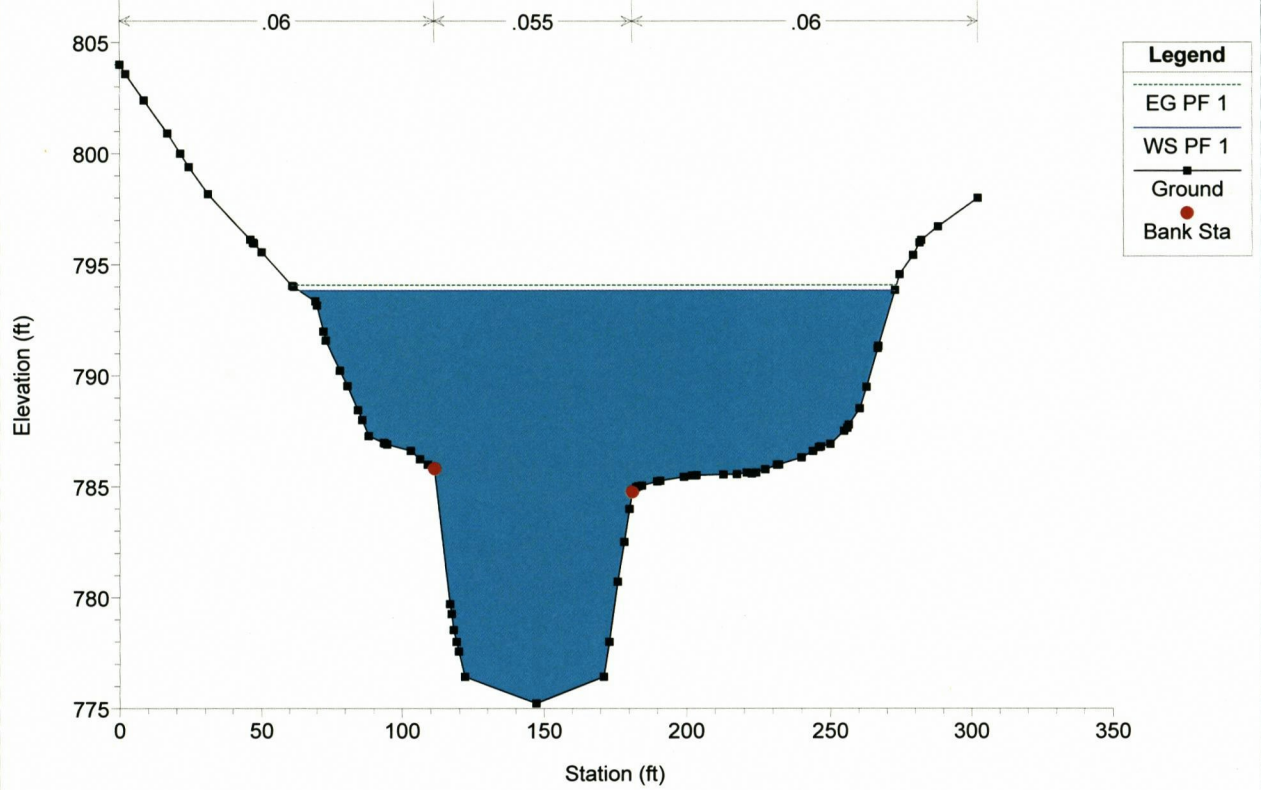
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 526.73



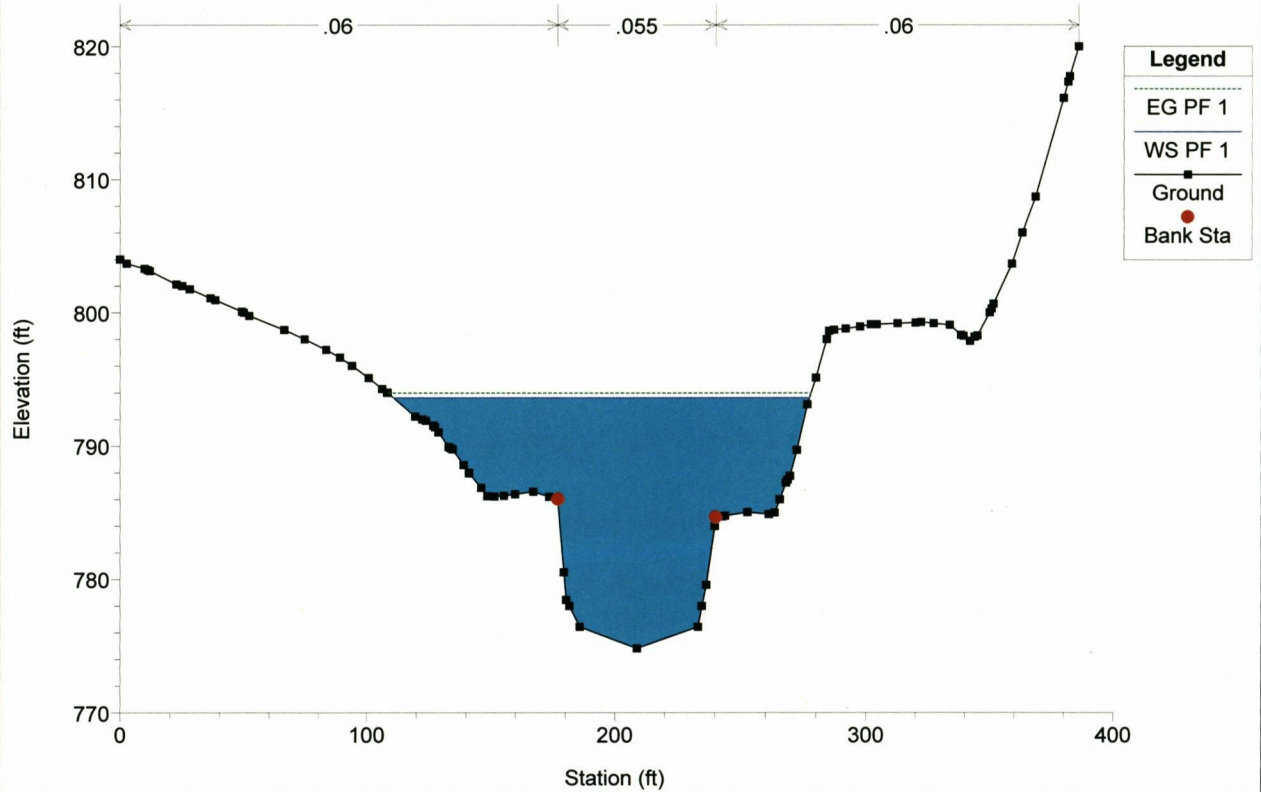
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 426.73



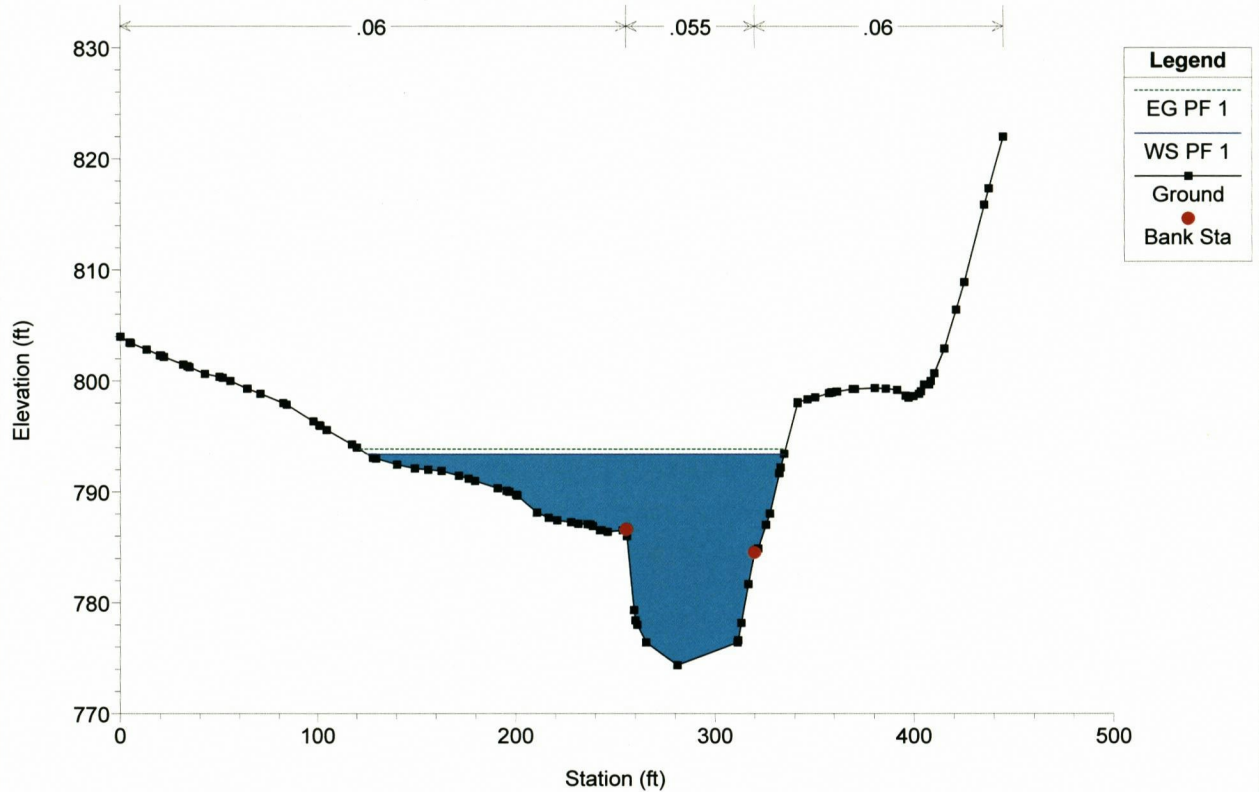
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 326.73



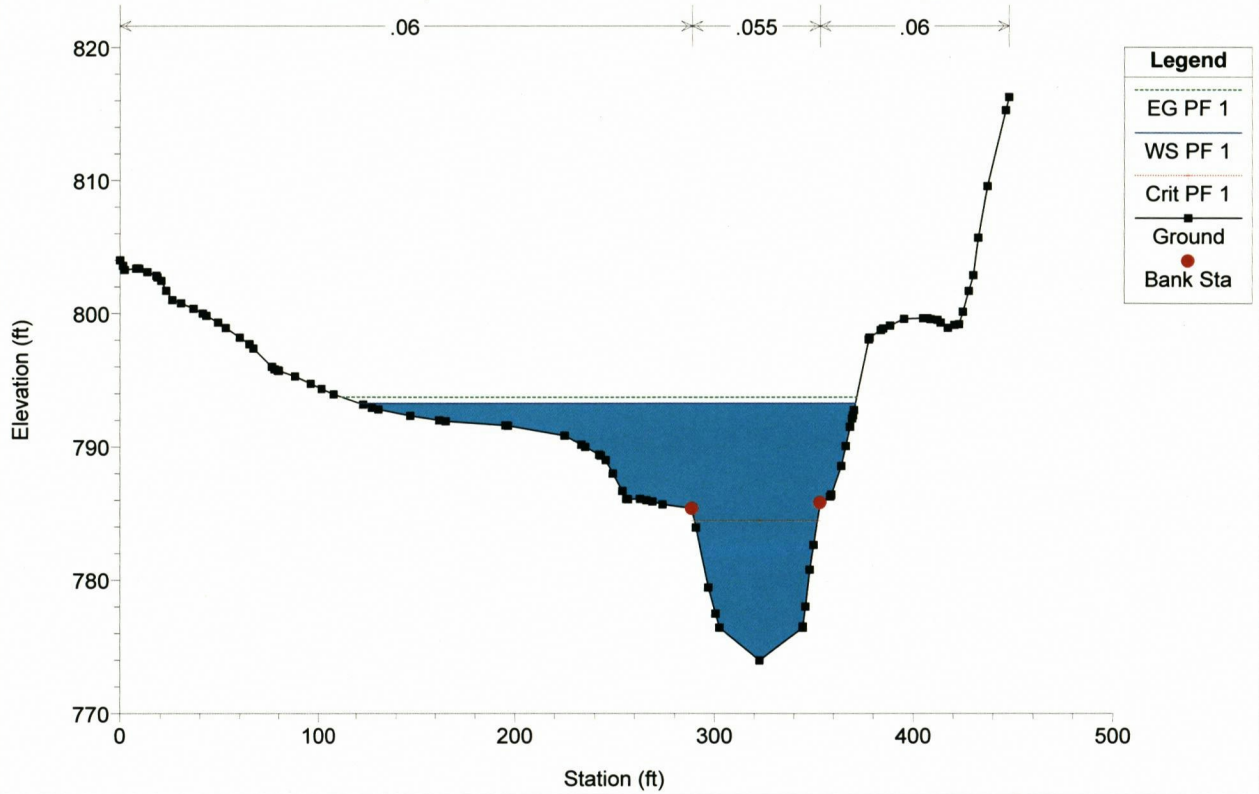
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 226.73



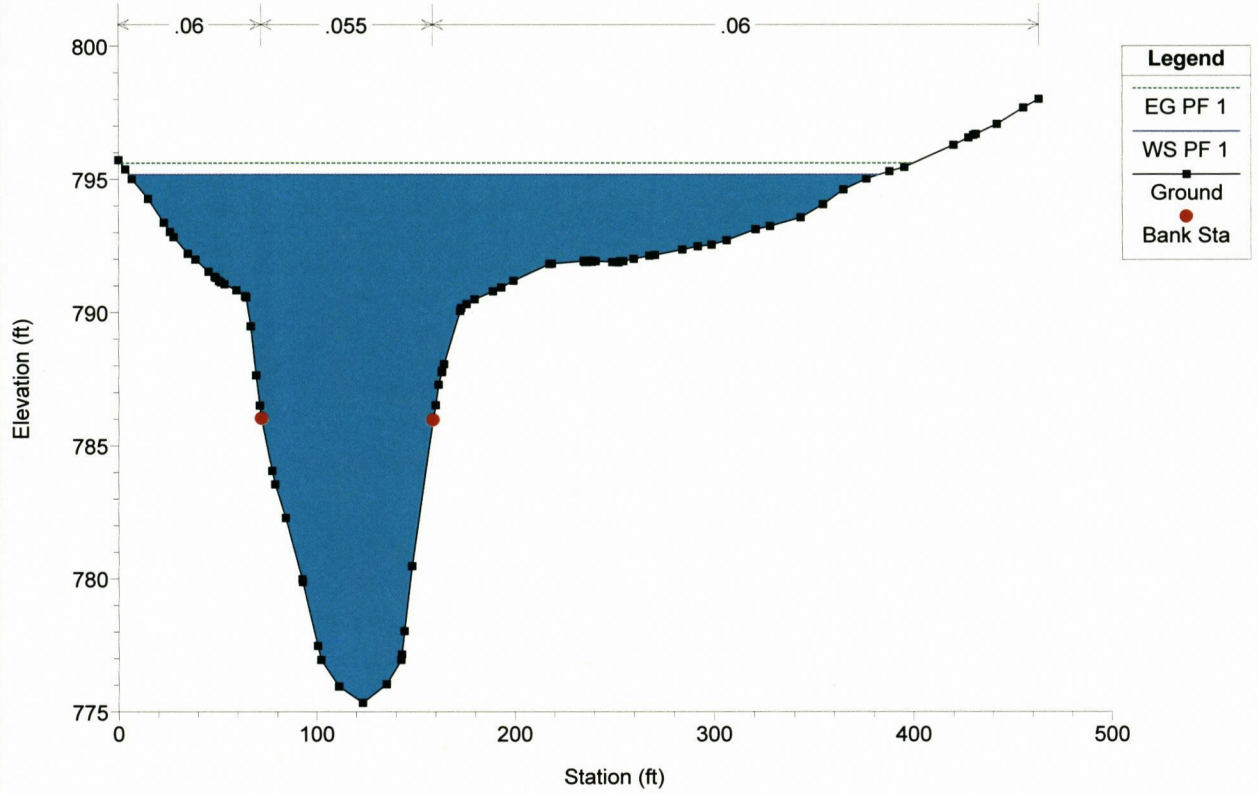
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Buckeye Creek Reach = BUCKEYE CREEK RS = 136.73



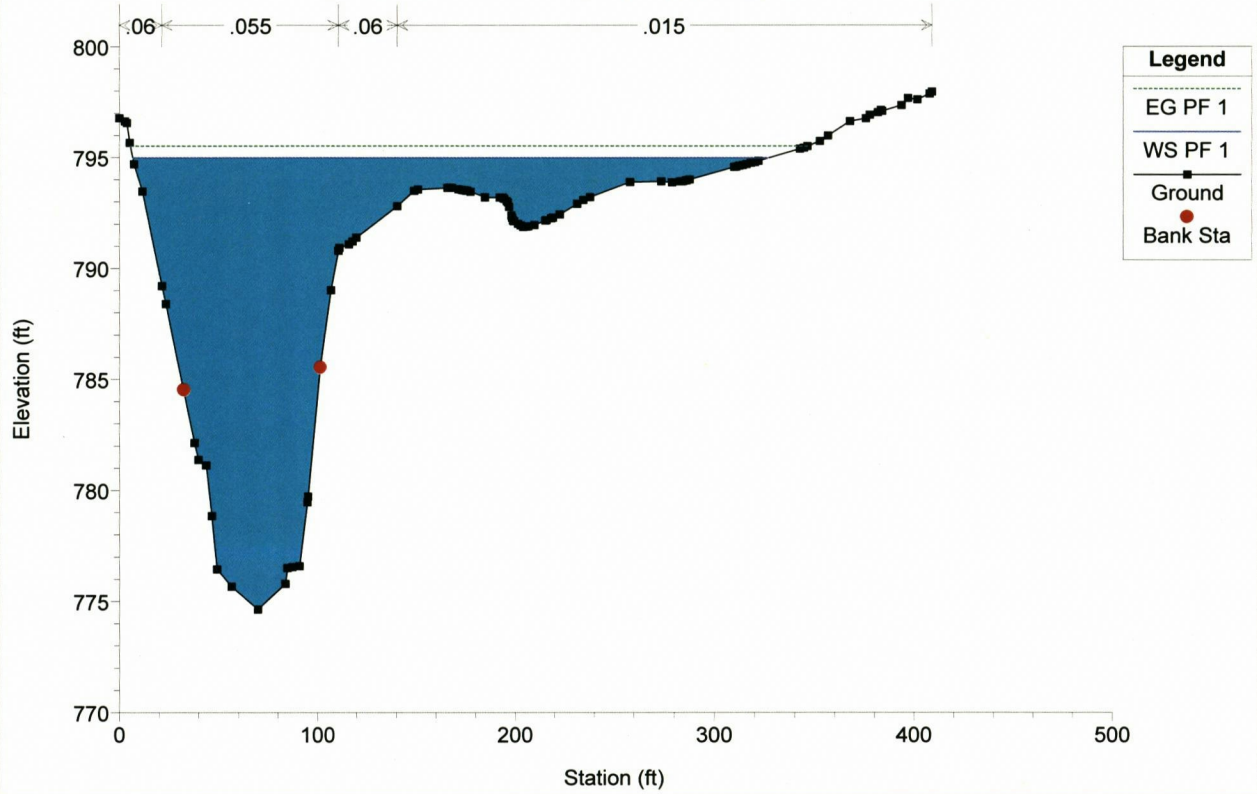
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1933.09



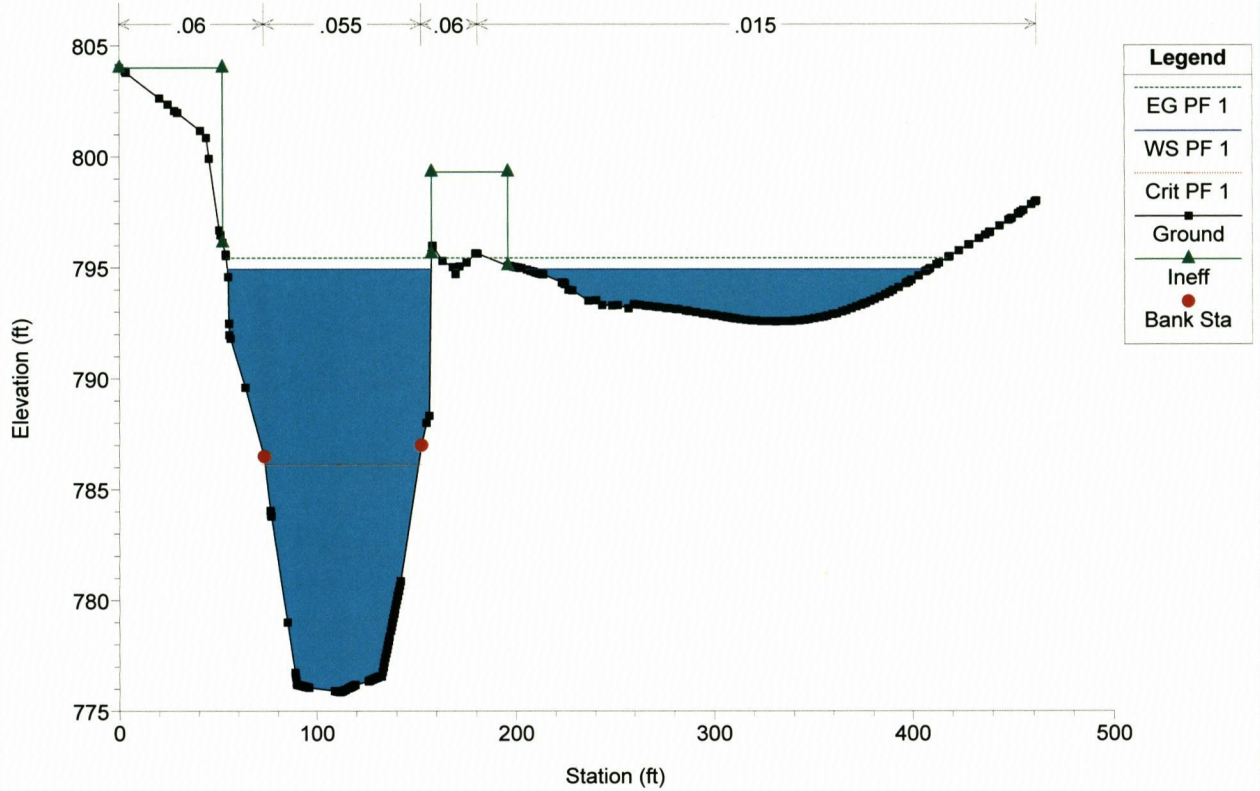
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

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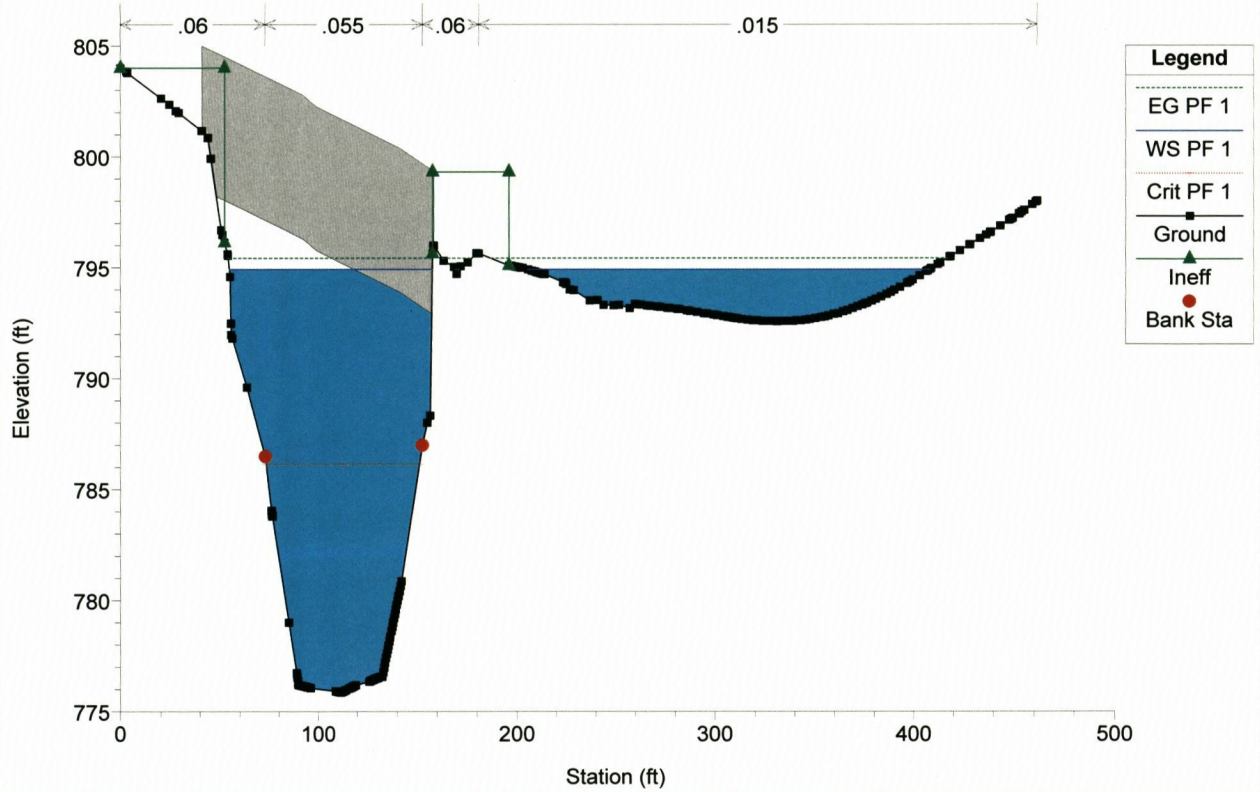
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1810



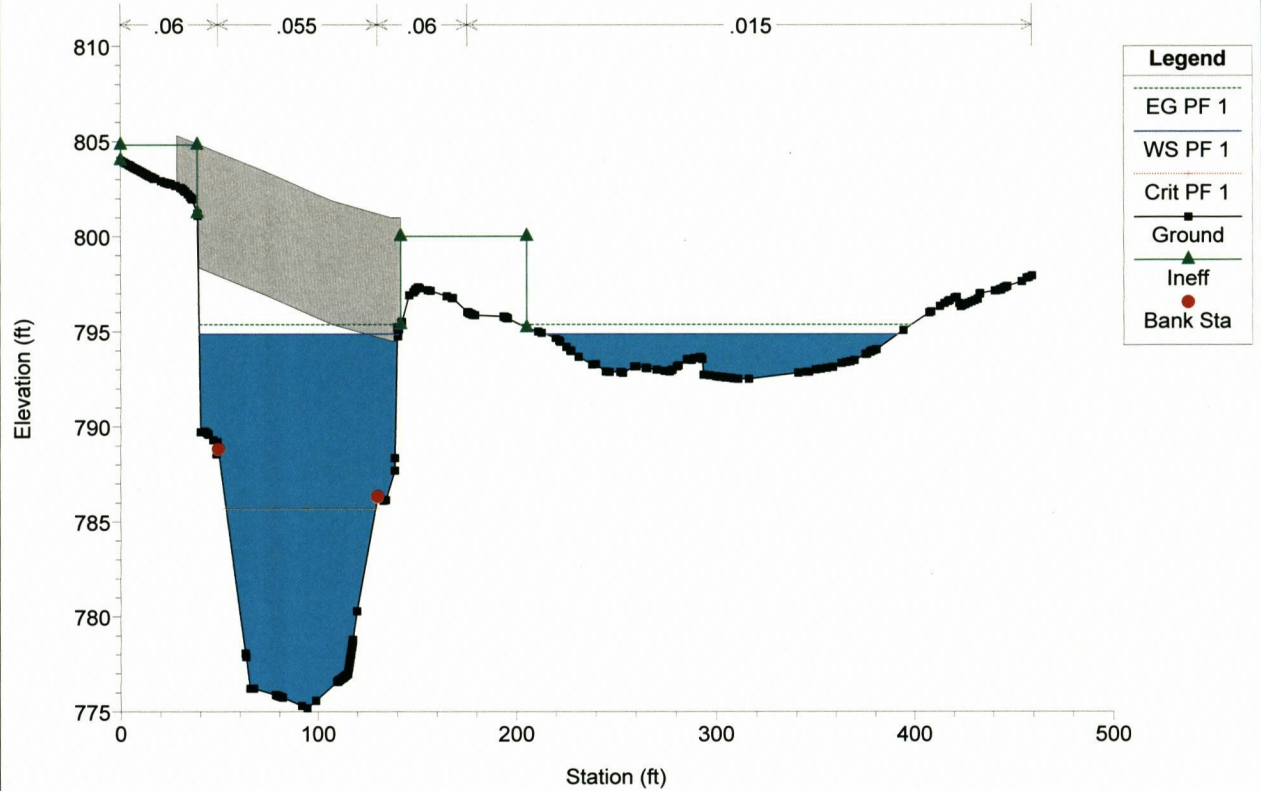
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR



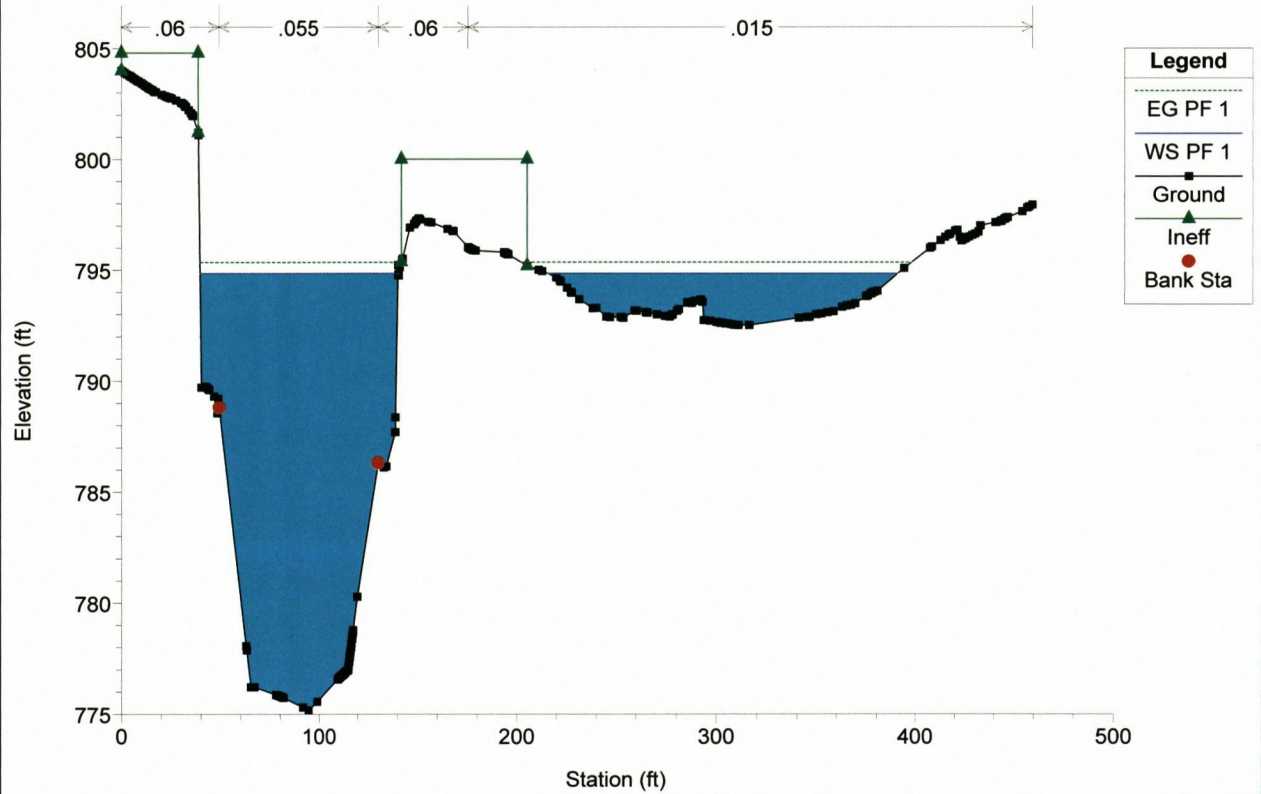
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR



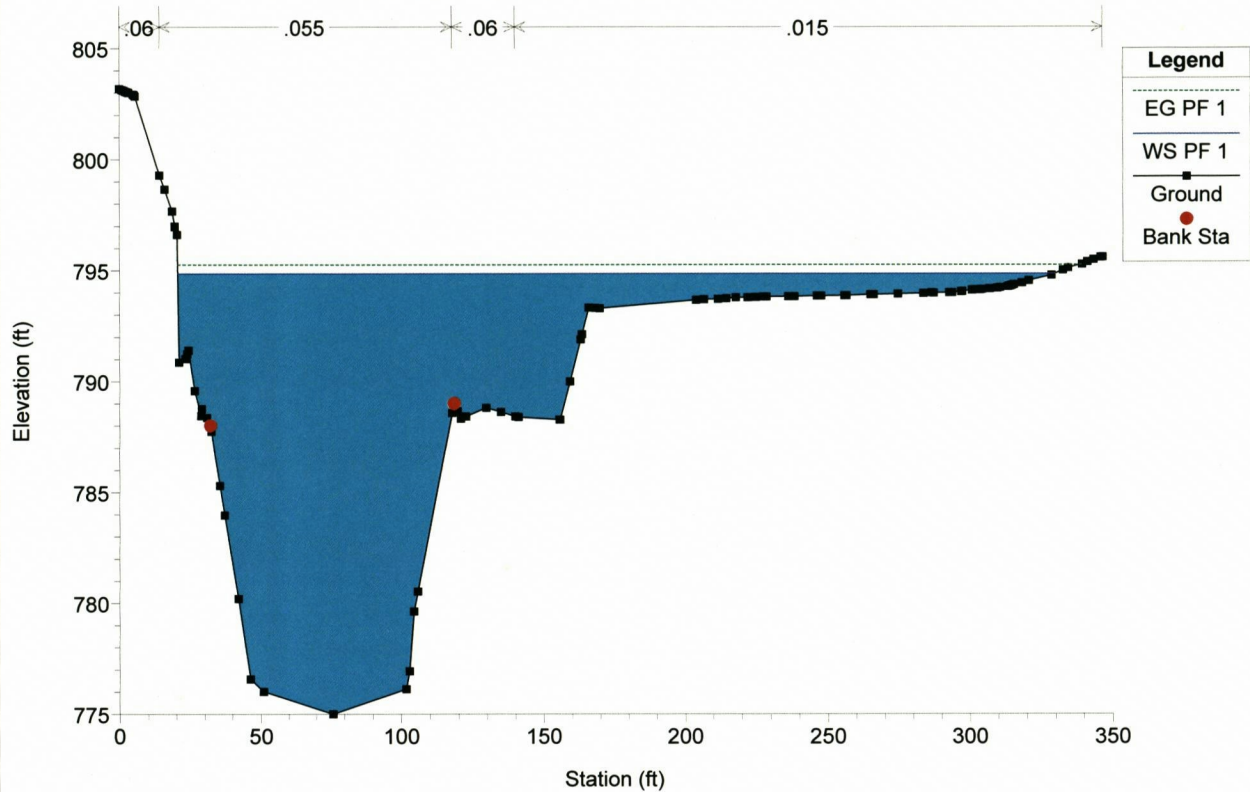
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1760



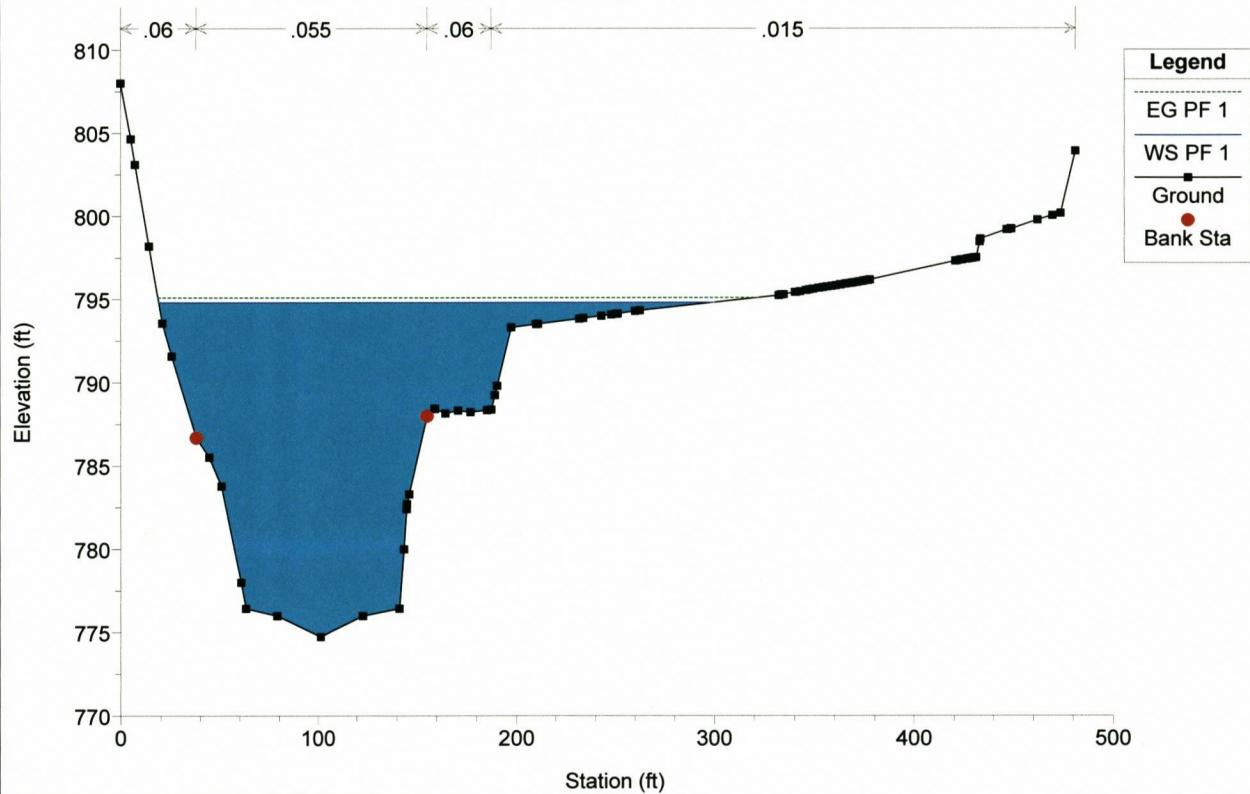
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1733.17



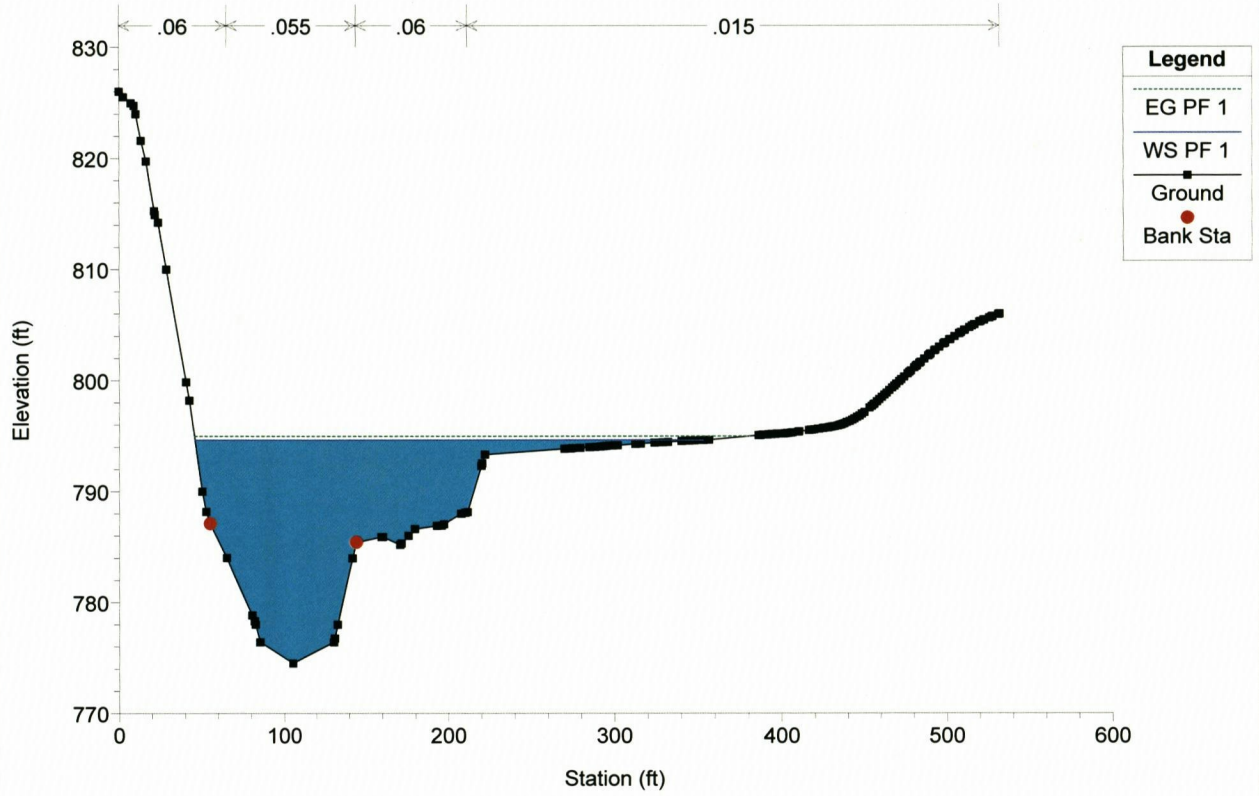
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1595.2



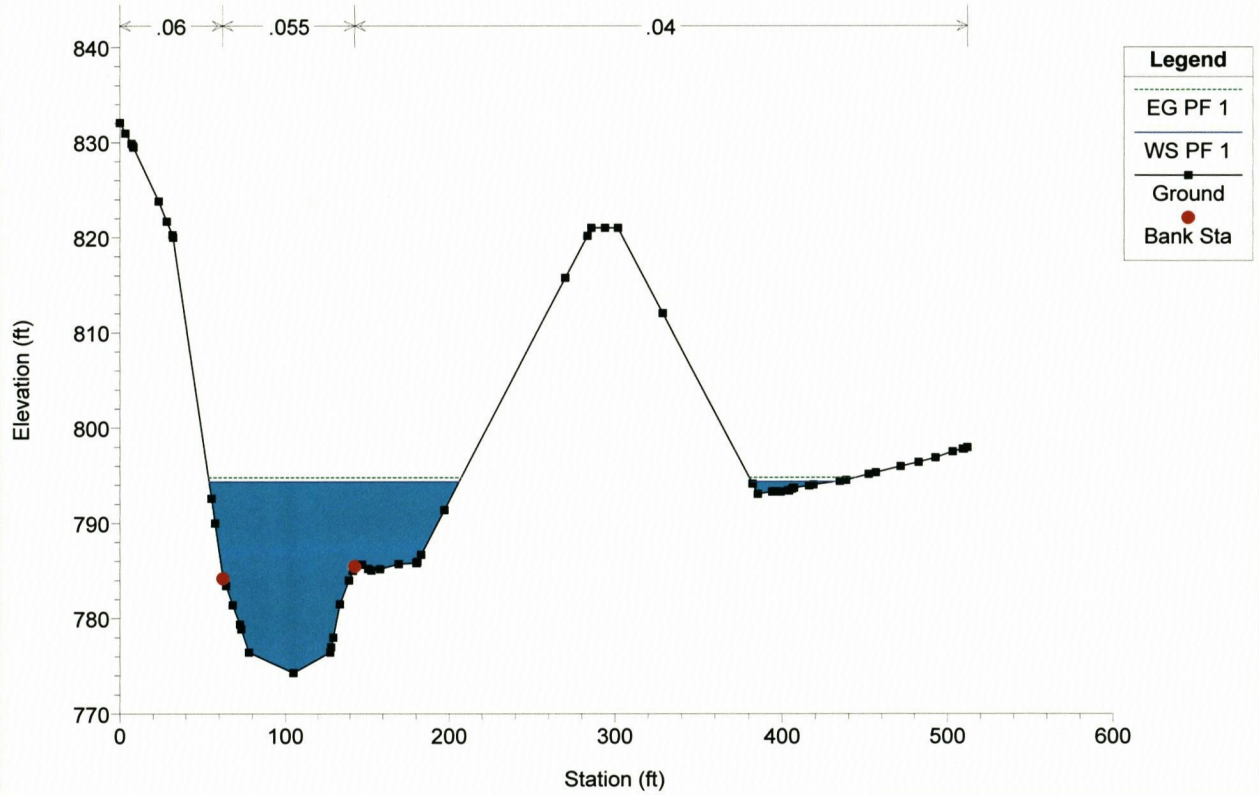
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1449.39



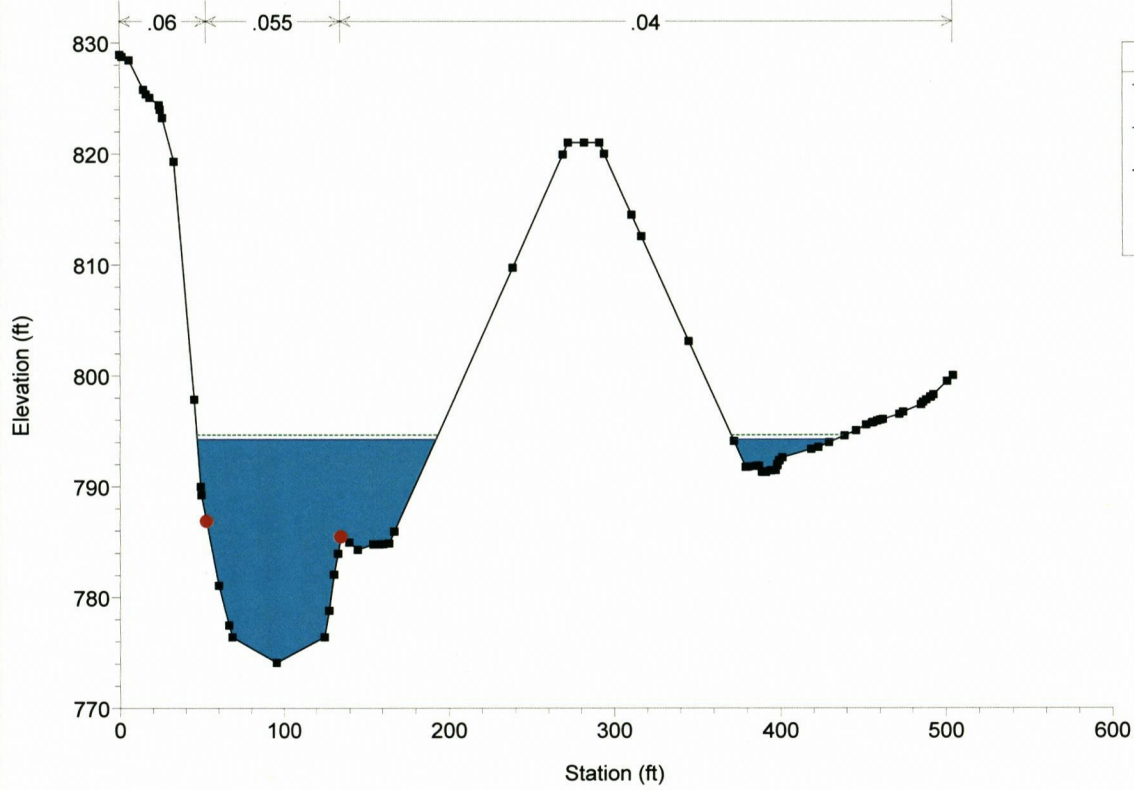
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1279.24



130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

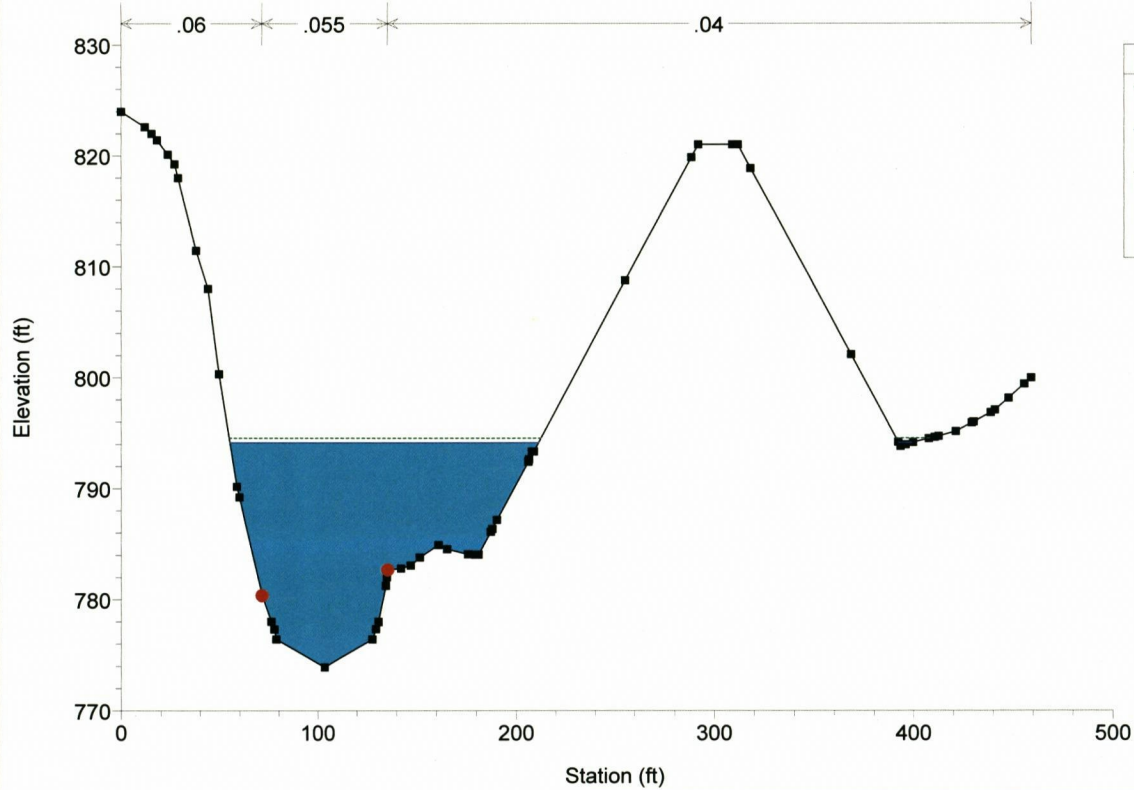
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1152.99



Legend	
---	EG PF 1
- - -	WS PF 1
■	Ground
●	Bank Sta

130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

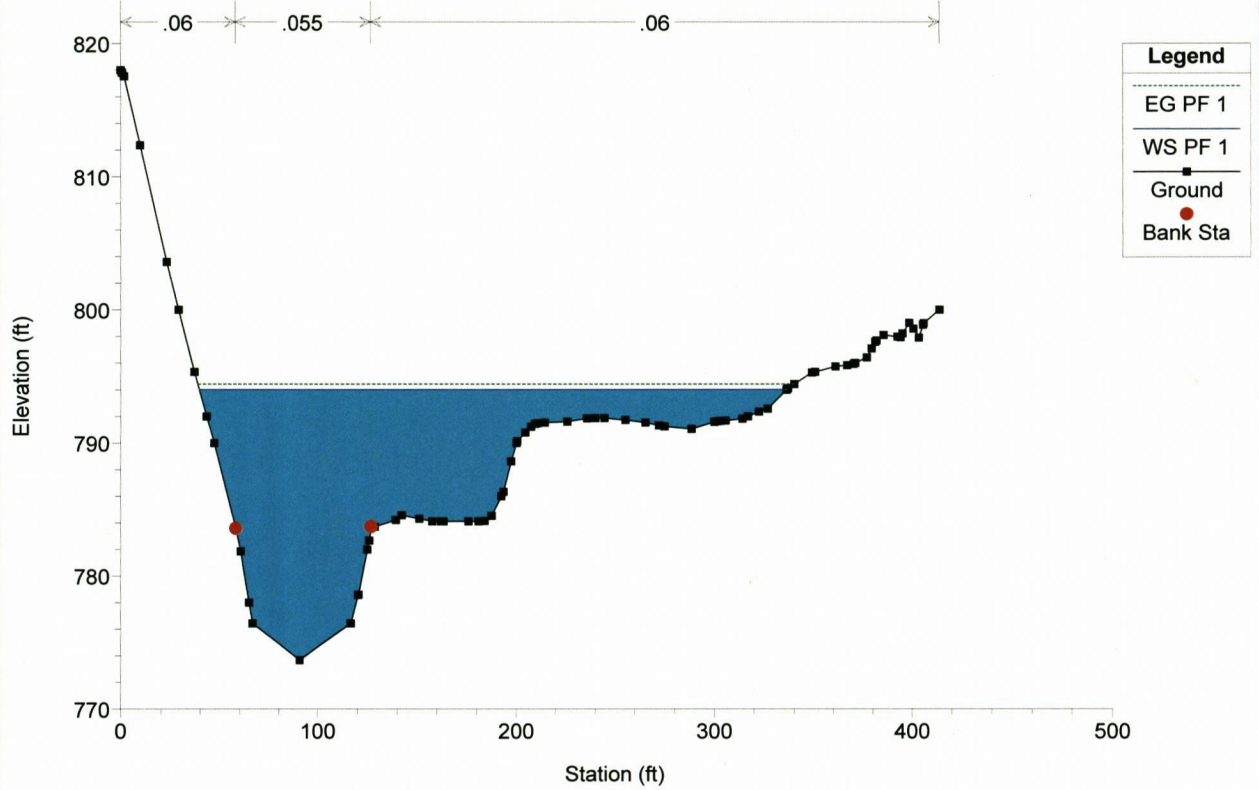
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1052.99



Legend	
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- - -	WS PF 1
■	Ground
●	Bank Sta

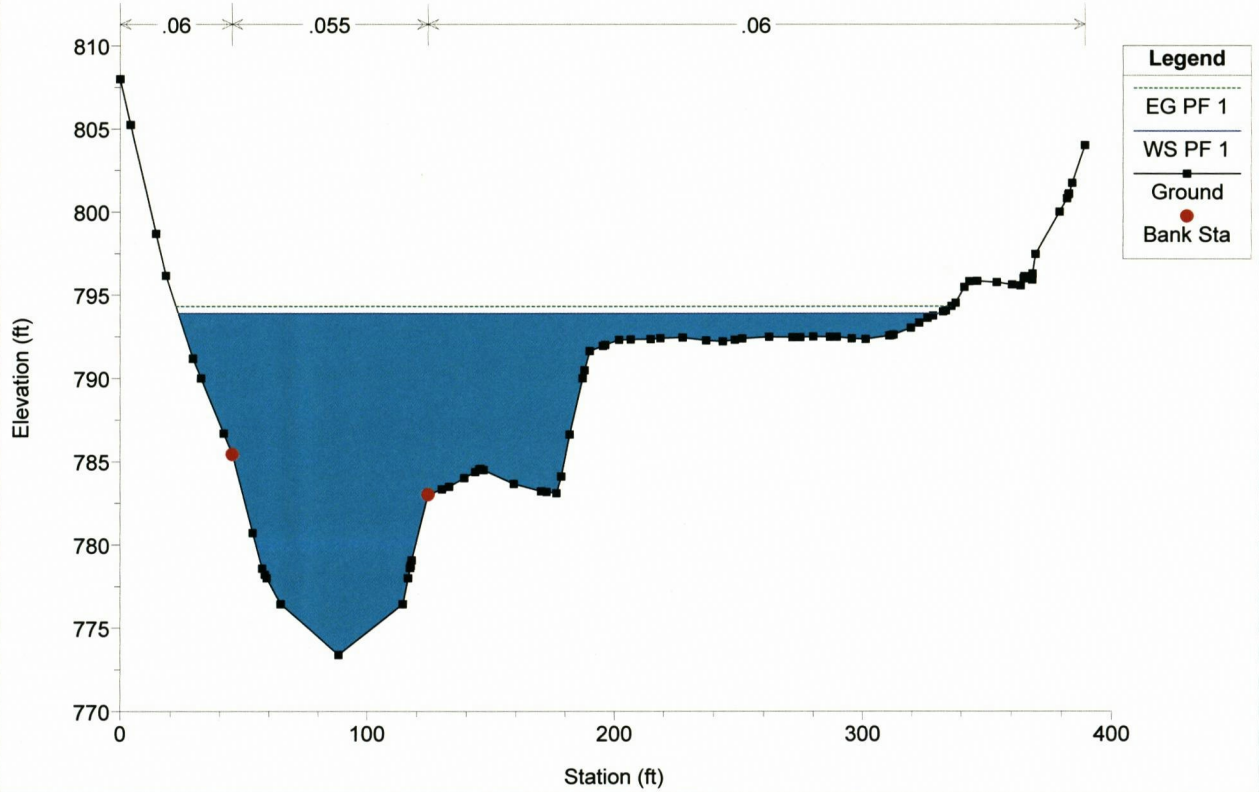
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 952.99



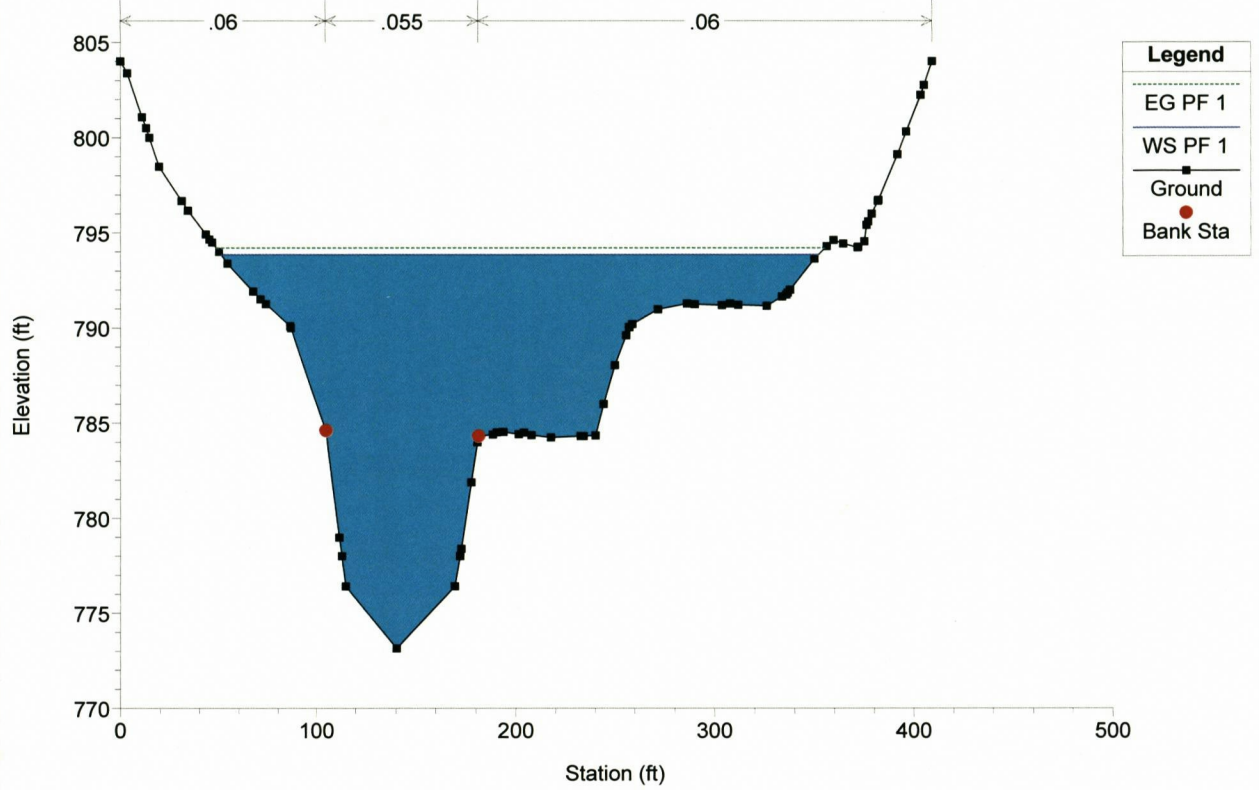
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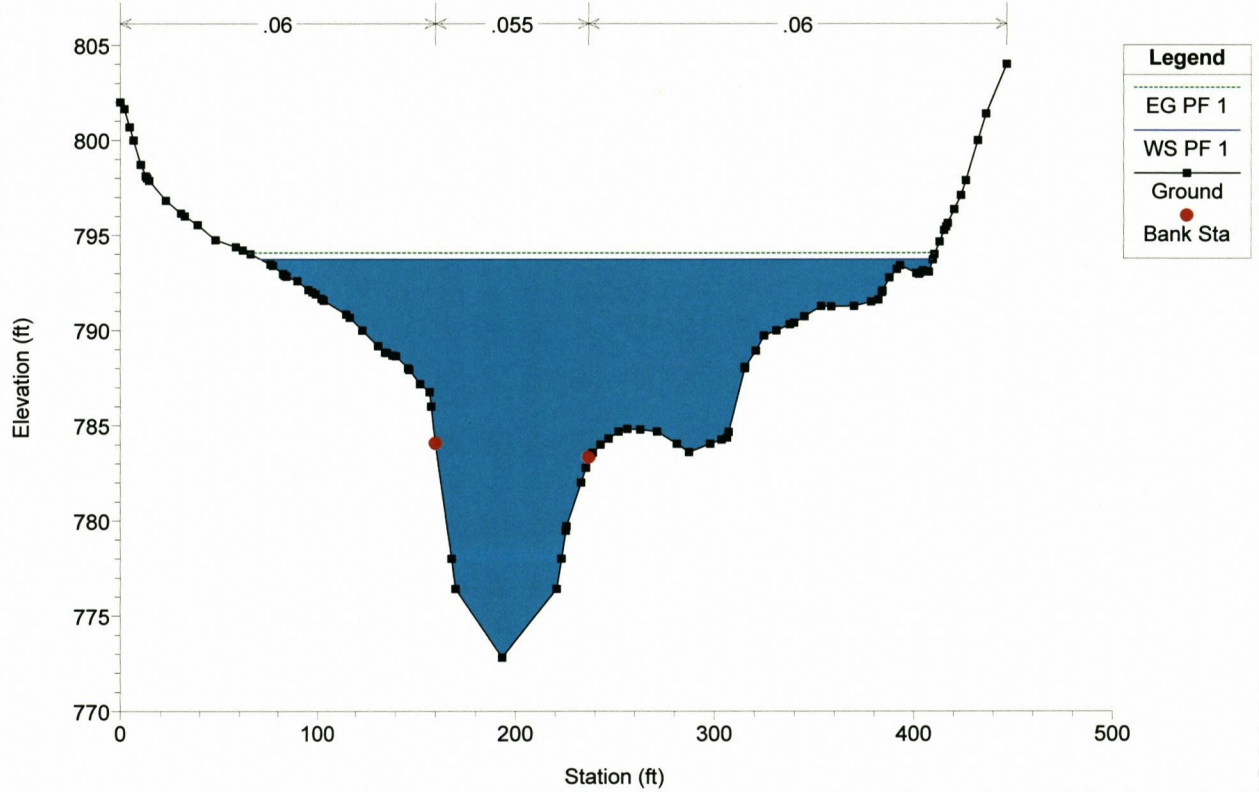
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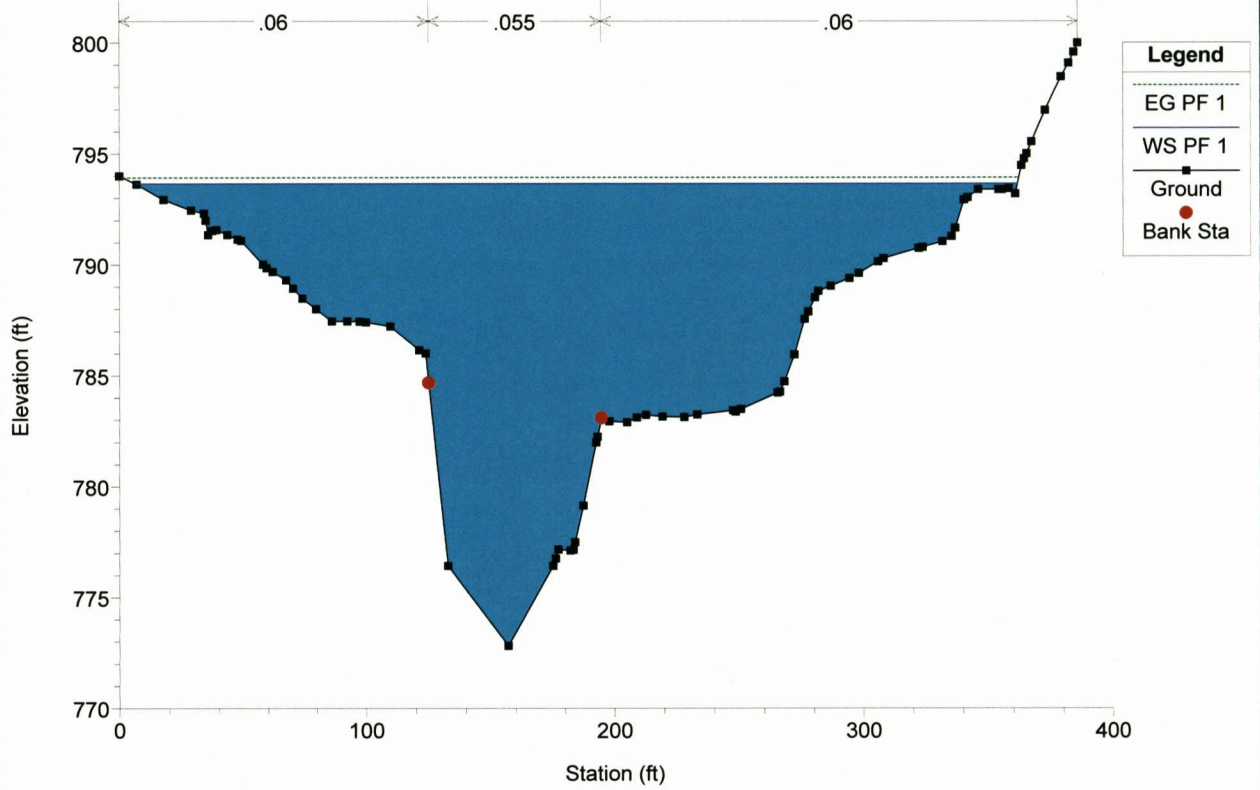
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 612.99



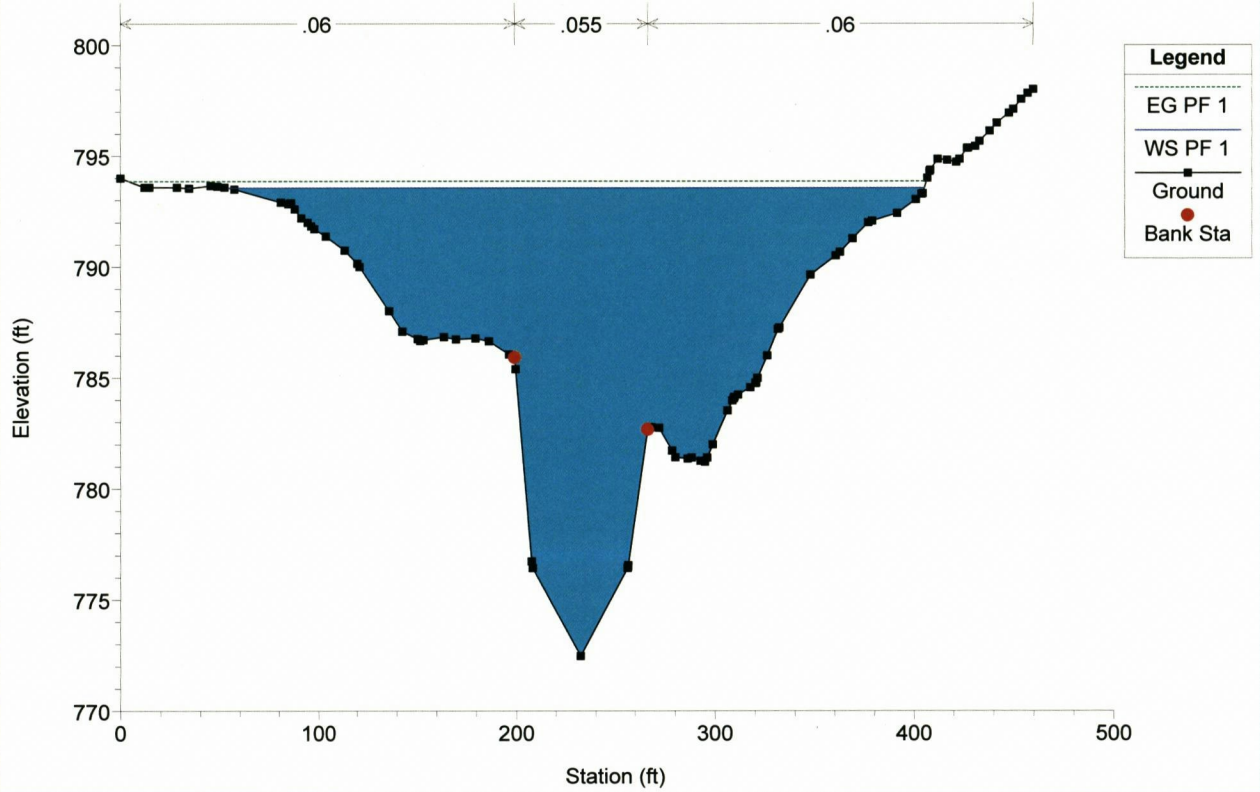
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 493.69



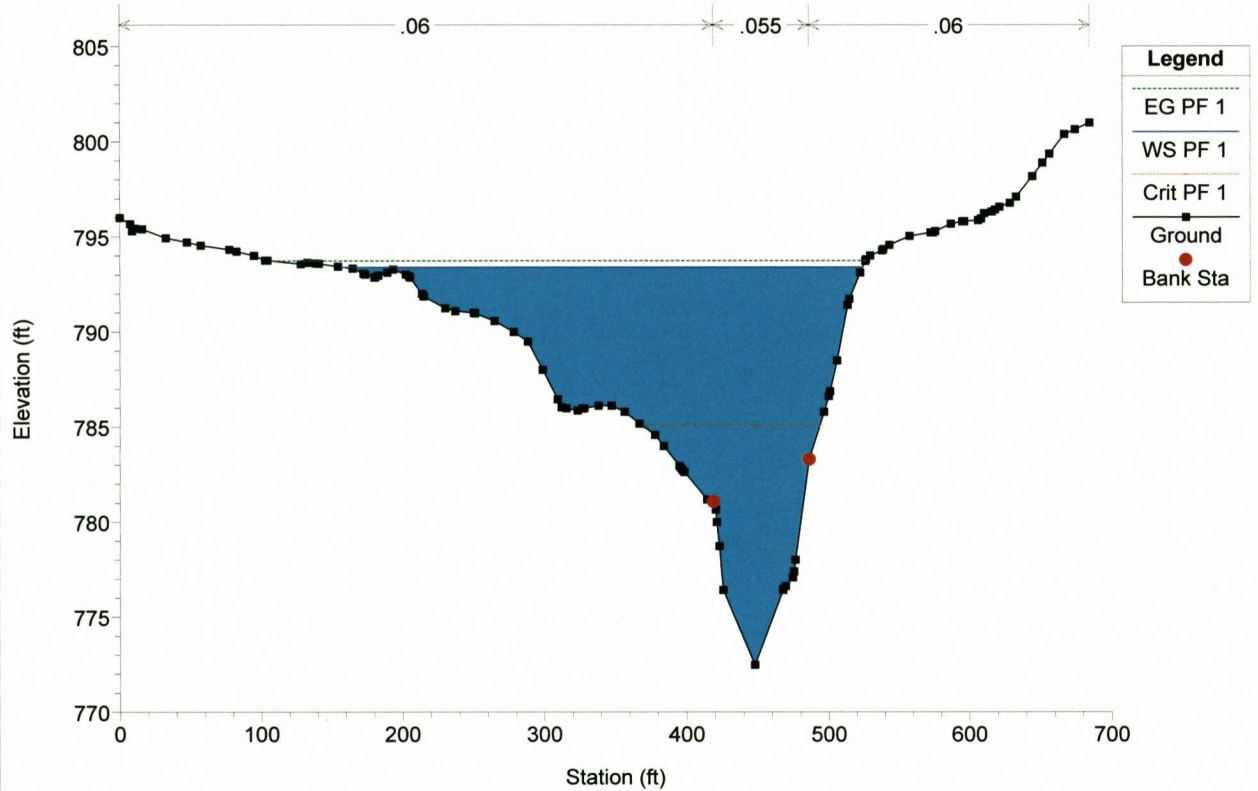
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 415.05



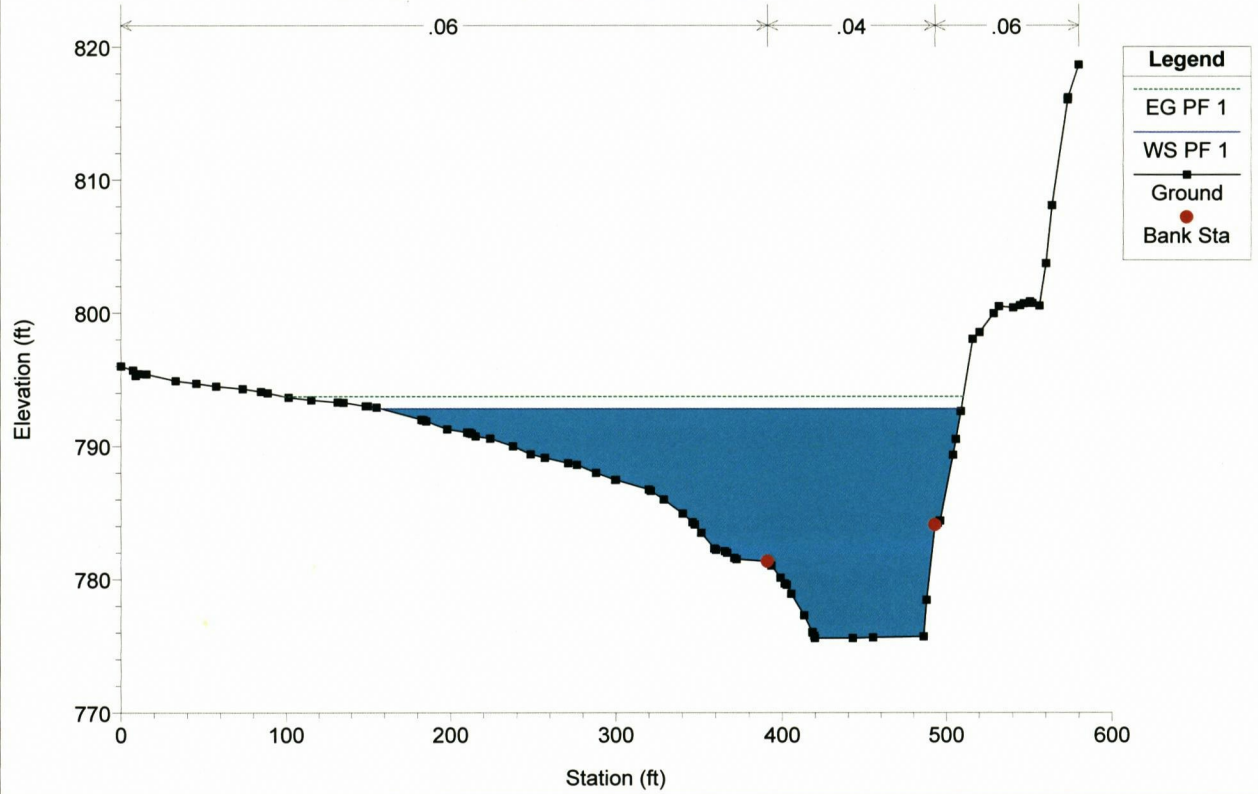
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Meathouse Fork Reach = MEATHOUSE FORK RS = 258.95



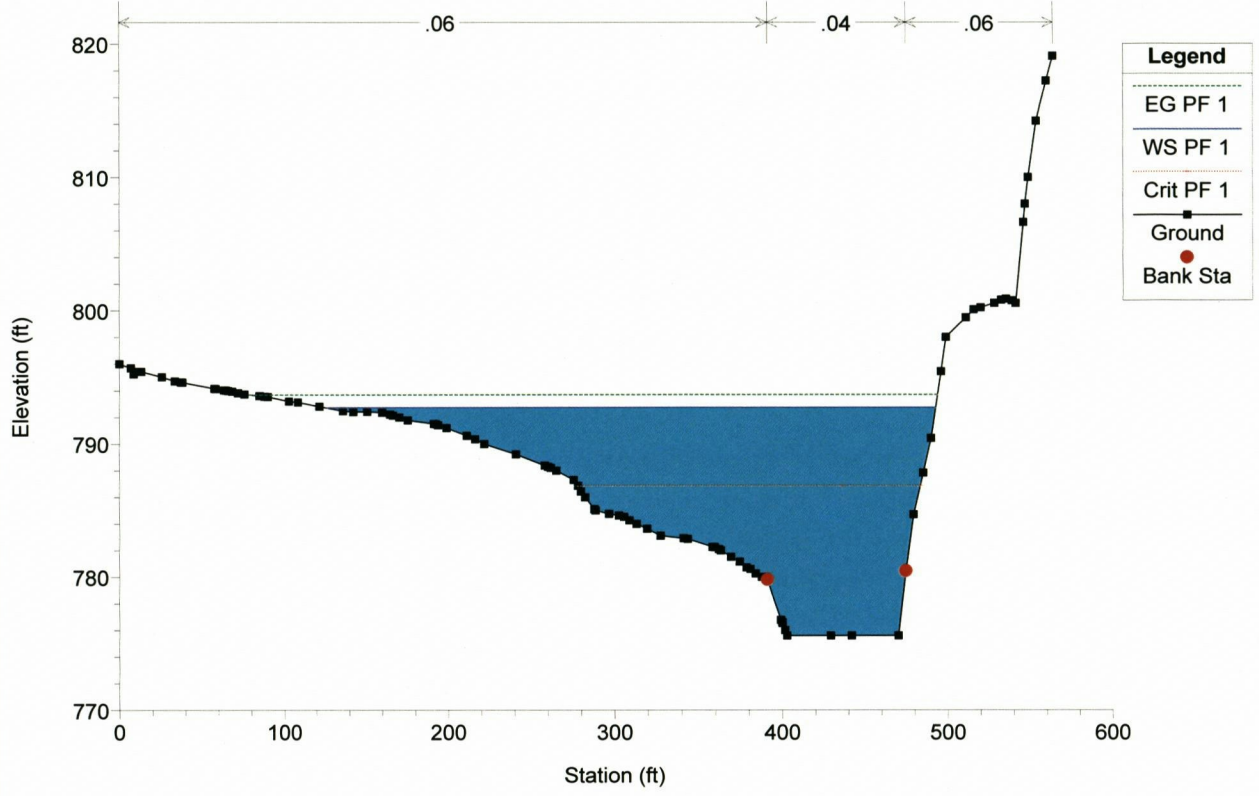
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 50



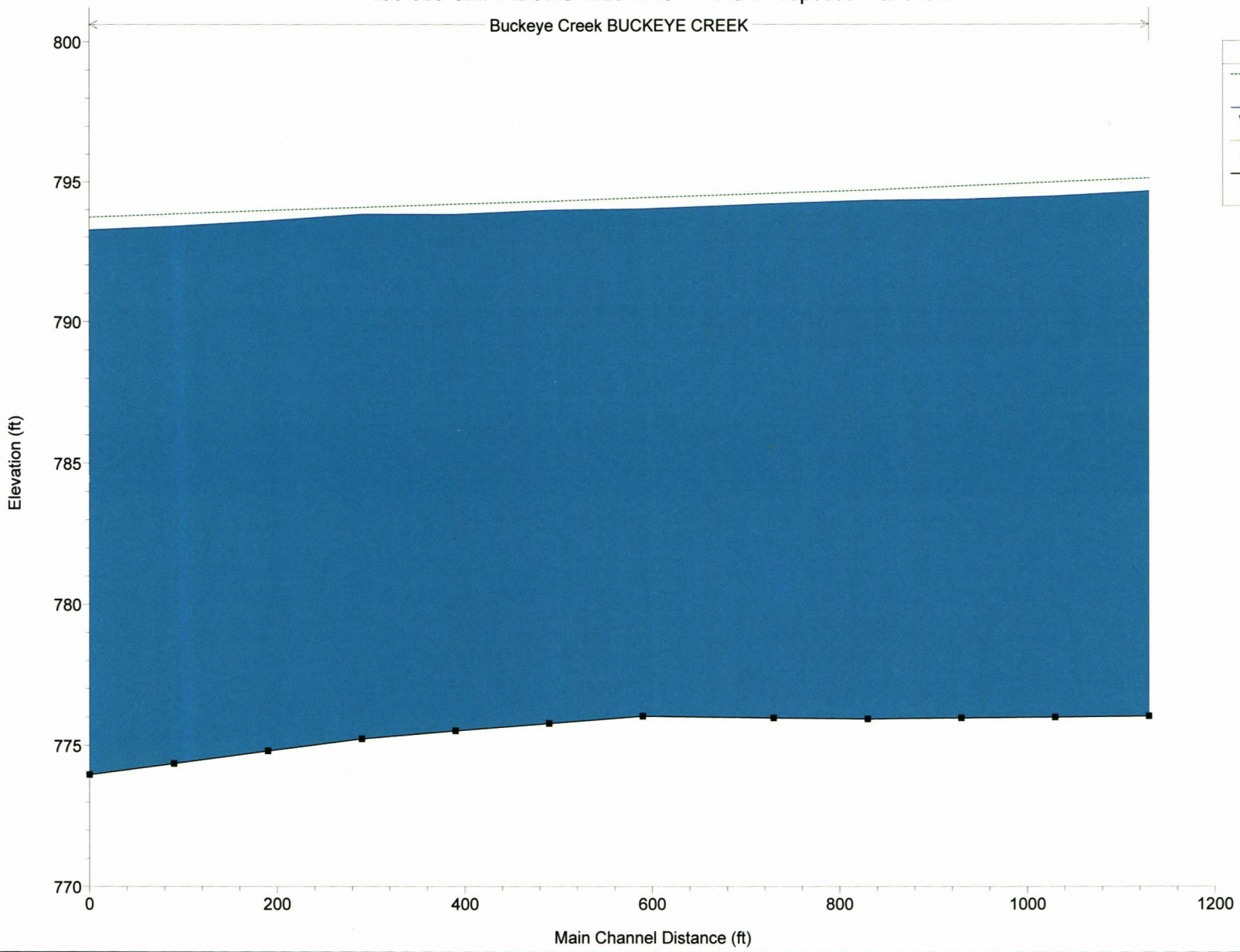
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 20



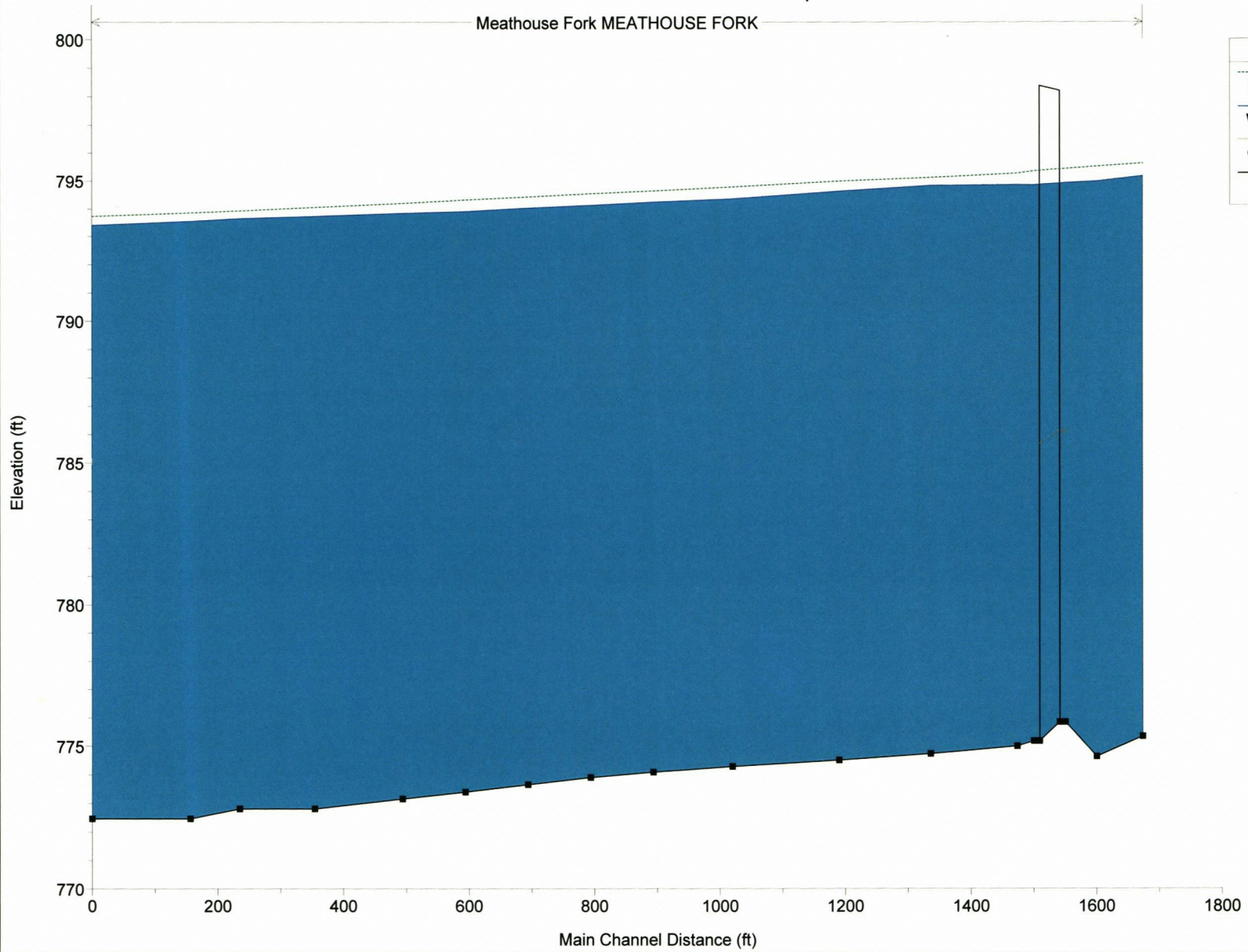
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

Buckeye Creek BUCKEYE CREEK

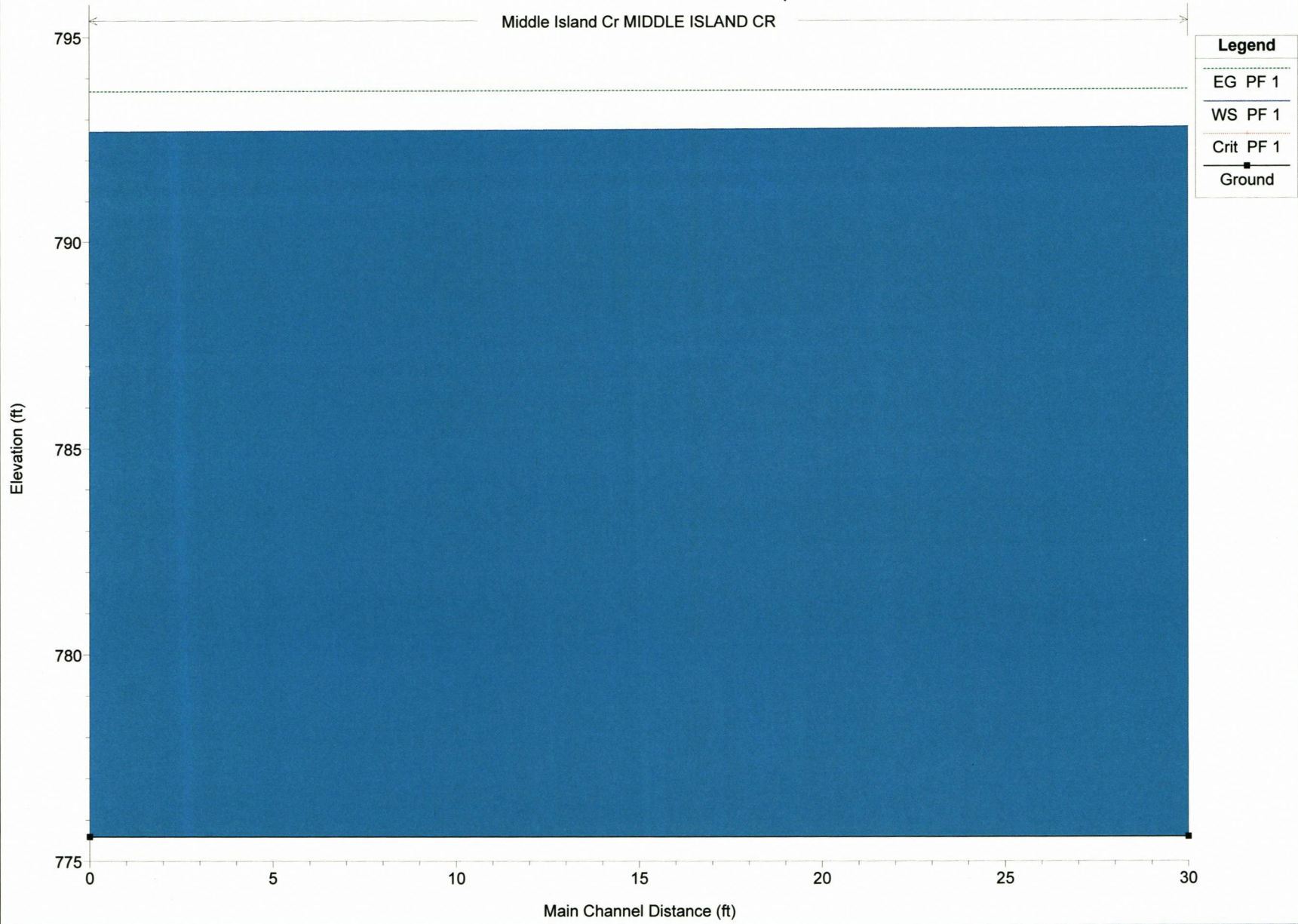


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017

Meathouse Fork MEATHOUSE FORK



Middle Island Cr MIDDLE ISLAND CR



APPENDIX E

**HEC-RAS SUMMARY OF EXISTING AND PROPOSED
HYDRAULIC CALCULATIONS**

HEC-RAS Plan Existing Profile: PF 1

River	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
Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	16950.00	775.59	792.82		793.73	0.001355	8.42	2862.09	351.29	0.37
Middle Island Cr	MIDDLE ISLAND CR	20	PF 1	16950.00	775.59	792.70	786.84	793.68	0.001459	9.06	2903.98	365.97	0.39
Meathouse Fork	MEATHOUSE FORK	1833.09	PF 1	9600.00	775.34	795.32		795.75	0.001115	5.65	2328.03	385.33	0.25
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	9600.00	774.64	794.94		795.62	0.001674	6.96	1777.76	320.71	0.30
Meathouse Fork	MEATHOUSE FORK	1810	PF 1	9600.00	775.85	794.84	786.11	795.53	0.001718	6.89	1662.05	277.77	0.30
Meathouse Fork	MEATHOUSE FORK	1785											
Meathouse Fork	MEATHOUSE FORK	1780	PF 1	9600.00	775.18	794.76		795.40	0.001632	6.67	1725.56	254.71	0.29
Meathouse Fork	MEATHOUSE FORK	1733.17	PF 1	9600.00	775.00	794.85		795.23	0.001072	5.34	2283.04	306.34	0.24
Meathouse Fork	MEATHOUSE FORK	1595.2	PF 1	9600.00	774.74	794.80		795.06	0.000853	4.32	2756.29	339.04	0.19
Meathouse Fork	MEATHOUSE FORK	1449.39	PF 1	9600.00	774.51	794.61		794.92	0.000942	5.09	2654.31	395.89	0.22
Meathouse Fork	MEATHOUSE FORK	1279.24	PF 1	9600.00	774.29	794.41		794.77	0.000988	5.38	2566.82	395.42	0.23
Meathouse Fork	MEATHOUSE FORK	1152.89	PF 1	9600.00	774.10	794.39		794.63	0.000707	4.55	2977.97	371.65	0.19
Meathouse Fork	MEATHOUSE FORK	1052.89	PF 1	9600.00	773.91	794.21		794.54	0.000912	5.44	2588.07	322.35	0.22
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	9600.00	773.86	794.02		794.43	0.001107	5.80	2315.16	296.86	0.24
Meathouse Fork	MEATHOUSE FORK	852.89	PF 1	9600.00	773.40	793.89		794.32	0.001102	5.72	2284.57	307.58	0.24
Meathouse Fork	MEATHOUSE FORK	752.89	PF 1	9600.00	773.16	793.84		794.19	0.000968	5.39	2419.63	300.76	0.23
Meathouse Fork	MEATHOUSE FORK	612.98	PF 1	9600.00	772.82	793.73		794.05	0.000915	5.23	2566.81	338.43	0.22
Meathouse Fork	MEATHOUSE FORK	493.69	PF 1	9600.00	772.53	793.65		793.93	0.000879	5.07	2731.41	354.99	0.22
Meathouse Fork	MEATHOUSE FORK	415.05	PF 1	9600.00	772.47	793.55		793.86	0.000959	5.29	2627.60	352.46	0.22
Meathouse Fork	MEATHOUSE FORK	258.95	PF 1	9600.00	772.47	793.41	785.05	793.73	0.000988	5.41	2646.22	367.38	0.23
Buckeye Creek	BUCKEYE CREEK	1266.73	PF 1	7350.00	776.03	794.65		795.12	0.001259	5.75	1511.16	178.60	0.26
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	7350.00	776.00	794.47		794.99	0.001361	5.92	1412.83	166.32	0.27
Buckeye Creek	BUCKEYE CREEK	1086.73	PF 1	7350.00	775.97	794.36		794.85	0.001365	5.81	1515.39	229.93	0.27
Buckeye Creek	BUCKEYE CREEK	866.73	PF 1	7350.00	775.94	794.32		794.69	0.001030	5.00	1658.77	213.25	0.23
Buckeye Creek	BUCKEYE CREEK	866.35	PF 1	7350.00	775.97	794.21	785.60	794.58	0.001186	5.36	1728.20	268.39	0.24
Buckeye Creek	BUCKEYE CREEK	726.73	PF 1	7350.00	776.03	794.02		794.42	0.001113	5.32	1603.21	175.11	0.24
Buckeye Creek	BUCKEYE CREEK	626.73	PF 1	7350.00	775.78	793.97		794.30	0.000950	5.00	1778.44	172.48	0.22
Buckeye Creek	BUCKEYE CREEK	526.73	PF 1	7350.00	775.52	793.82		794.20	0.001041	5.37	1652.54	150.19	0.23
Buckeye Creek	BUCKEYE CREEK	426.73	PF 1	7350.00	775.23	793.83		794.08	0.000750	4.53	2052.33	209.01	0.20
Buckeye Creek	BUCKEYE CREEK	326.73	PF 1	7350.00	774.81	793.59		793.97	0.001092	5.39	1871.21	188.58	0.23
Buckeye Creek	BUCKEYE CREEK	226.73	PF 1	7350.00	774.36	793.40		793.85	0.001271	5.78	1612.75	209.34	0.25
Buckeye Creek	BUCKEYE CREEK	136.73	PF 1	7350.00	773.97	793.26	784.45	793.73	0.001366	5.93	1636.13	249.62	0.26

HEC-RAS Plan: proposed Profile: PF 1

River	Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	793.73	792.82	0.91	0.04	0.01	3041.65	13703.07	205.28	351.29
Middle Island Cr	MIDDLE ISLAND CR	20	PF 1	793.68	792.70	0.98			4049.32	12620.27	280.41	365.97
Meathouse Fork	MEATHOUSE FORK	1933.09	PF 1	795.61	795.17	0.44	0.09	0.01	372.67	8103.36	1123.98	376.99
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	795.51	794.98	0.53	0.06	0.01	403.21	7508.32	1688.47	320.16
Meathouse Fork	MEATHOUSE FORK	1810	PF 1	795.43	794.93	0.50	0.01	0.00	237.40	7790.11	1572.49	307.97
Meathouse Fork	MEATHOUSE FORK	1785	Bridge									
Meathouse Fork	MEATHOUSE FORK	1760	PF 1	795.35	794.85	0.50	0.03	0.05	100.36	7945.66	1553.99	276.54
Meathouse Fork	MEATHOUSE FORK	1733.17	PF 1	795.27	794.86	0.41	0.12	0.04	117.11	7761.31	1721.59	309.33
Meathouse Fork	MEATHOUSE FORK	1595.2	PF 1	795.11	794.82	0.29	0.12	0.01	135.39	8680.20	784.41	280.77
Meathouse Fork	MEATHOUSE FORK	1449.39	PF 1	794.98	794.63	0.36	0.18	0.02	73.70	7425.85	2100.46	307.10
Meathouse Fork	MEATHOUSE FORK	1279.24	PF 1	794.79	794.35	0.44	0.13	0.01	78.17	7571.59	1950.24	202.29
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	794.65	794.24	0.41	0.10	0.00	38.98	7666.23	1894.79	206.27
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	794.55	794.12	0.43	0.11	0.01	299.35	6449.94	2850.71	162.51
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	794.43	794.02	0.41	0.11	0.00	214.25	7036.05	2349.70	296.88
Meathouse Fork	MEATHOUSE FORK	852.99	PF 1	794.32	793.90	0.42	0.10	0.02	206.17	7726.40	1667.43	307.61
Meathouse Fork	MEATHOUSE FORK	752.99	PF 1	794.19	793.84	0.36	0.13	0.01	335.32	7183.19	2081.49	300.79
Meathouse Fork	MEATHOUSE FORK	612.99	PF 1	794.05	793.73	0.33	0.11	0.01	479.70	6893.20	2227.11	338.47
Meathouse Fork	MEATHOUSE FORK	493.69	PF 1	793.93	793.65	0.29	0.07	0.00	888.49	8079.94	2631.58	354.99
Meathouse Fork	MEATHOUSE FORK	415.05	PF 1	793.86	793.55	0.31	0.13	0.00	1129.49	6206.67	2263.84	352.46
Meathouse Fork	MEATHOUSE FORK	258.95	PF 1	793.73	793.41	0.33			2885.48	6303.45	411.08	367.38
Buckeye Creek	BUCKEYE CREEK	1266.73	PF 1	795.12	794.65	0.47	0.13	0.00	79.95	6668.06	601.99	178.60
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	794.99	794.47	0.52	0.14	0.01	58.15	6935.61	356.24	166.32
Buckeye Creek	BUCKEYE CREEK	1066.73	PF 1	794.85	794.36	0.49	0.12	0.04	51.05	6819.16	479.80	229.93
Buckeye Creek	BUCKEYE CREEK	966.73	PF 1	794.69	794.32	0.37	0.11	0.00	21.64	7016.90	311.46	213.25
Buckeye Creek	BUCKEYE CREEK	866.35	PF 1	794.58	794.21	0.38	0.16	0.00	196.06	5968.99	1184.95	268.39
Buckeye Creek	BUCKEYE CREEK	726.73	PF 1	794.42	794.02	0.40	0.10	0.02	41.54	6674.19	634.26	175.11
Buckeye Creek	BUCKEYE CREEK	626.73	PF 1	794.30	793.97	0.33	0.10	0.00	103.28	5778.91	1467.81	172.48
Buckeye Creek	BUCKEYE CREEK	526.73	PF 1	794.20	793.82	0.37	0.08	0.04	160.62	5632.16	1557.22	150.19
Buckeye Creek	BUCKEYE CREEK	426.73	PF 1	794.08	793.83	0.25	0.10	0.01	461.91	5254.74	1633.35	209.01
Buckeye Creek	BUCKEYE CREEK	326.73	PF 1	793.97	793.59	0.38	0.12	0.01	771.94	5793.43	784.63	166.58
Buckeye Creek	BUCKEYE CREEK	226.73	PF 1	793.85	793.40	0.45	0.11	0.00	943.72	6229.72	176.57	209.34
Buckeye Creek	BUCKEYE CREEK	136.73	PF 1	793.73	793.26	0.47			985.61	6149.54	214.85	249.62

Buckeye Creek
 Existing vs. Proposed HEC-RAS Models
 100-Year Water Surface Elevations Summary
 Smithburg Natural Gas Processing Plant
 Project: 130-359

Prepared By: ARC 9/7/2017
 CHECKED: ARG 9/7/2017

	River Station	100-Year Peak Flow (cfs)	Water Surface Elevations Existing	Water Surface Elevations Proposed	Water Surface Elevations Existing vs. Proposed
P	1+37	7350	793.26	793.26	0.00
Q	2+27	7350	793.4	793.4	0.00
R	3+27	7350	793.59	793.59	0.00
S	4+27	7350	793.83	793.83	0.00
T	5+27	7350	793.82	793.82	0.00
U	6+27	7350	793.97	793.97	0.00
V	7+27	7350	794.02	794.02	0.00
W	8+66	7350	794.21	794.21	0.00
X	9+67	7350	794.32	794.32	0.00
Y	10+67	7350	794.36	794.36	0.00
Z	11+67	7350	794.47	794.47	0.00
AA	12+67	7350	794.65	794.65	0.00

Meathouse Fork
 Existing vs. Proposed HEC-RAS Models
 100-Year Water Surface Elevations Summary
 Smithburg Natural Gas Processing Plant
 Project: 130-359

Prepared By: ARC 9/7/2017
 CHECKED: ARG 9/7/2017

	River Station	100-Year Peak Flow (cfs)	Water Surface Elevations Existing	Water Surface Elevations Proposed	Water Surface Elevations Existing vs. Proposed
C	2+59	9600	793.41	793.41	0.00
D	4+15	9600	793.55	793.55	0.00
E	4+94	9600	793.65	793.65	0.00
F	6+13	9600	793.73	793.73	0.00
G	7+53	9600	793.84	793.84	0.00
H	8+53	9600	793.89	793.90	0.01
I	9+53	9600	794.02	794.02	0.00
J	10+53	9600	794.21	794.12	-0.09
K	11+53	9600	794.39	794.24	-0.15
L	12+79	9600	794.41	794.35	-0.06
M	14+49	9600	794.61	794.63	0.02
N	15+92	9600	794.8	794.82	0.02
O	17+13	9600	794.85	794.86	0.01
BB	17+60	9600	794.76	794.85	0.09
CC	18+10	9600	794.84	794.93	0.09
DD	18+60	9600	794.94	794.98	0.04
EE	19+33	9600	795.32	795.17	-0.15

Middle Island Creek
Existing vs. Proposed HEC-RAS Models
100-Year Water Surface Elevations Summary
Smithburg Natural Gas Processing Plant
Project: 130-359

Prepared By: ARC 9/7/2017
CHECKED: ARG 9/7/2017

	River Station	100-Year Peak Flow (cfs)	Water Surface Elevations Existing	Water Surface Elevations Proposed	Water Surface Elevations Existing vs. Proposed
A	0+20	16950	792.70	792.70	0.00
B	0+50	16950	792.82	792.82	0.00

SMITHBURG NATURAL GAS PROCESSING FACILITY WATER LINE AND BOOSTER STATION

DODDRIDGE COUNTY, WEST VIRGINIA

PRELIMINARY DRAWINGS

MAY 2019

DRAWING INDEX	
DRAWING NUMBER	SHEET TITLE
C000	COVER
C500	WATER LINE OVERALL SITE PLAN
C501	WATER LINE SITE PLAN
C502-C505	DETAILS



REFERENCE
1. USGS 7.5 MIN. TOPOGRAPHIC QUADRANGLES SMITHBURG, WV, DATED 2016.

SITE MAP
SCALE: 1" = 2000'

SCALE IN FEET
0 2000 4000

UTILITY COMPANIES

THE FOLLOWING COMPANIES ARE LISTED AS MEMBERS BY WEST VIRGINIA 811 IN THE PROJECT AREA. THE CONTRACTOR MUST SUBMIT A SEPARATE WEST VIRGINIA 811 LOCATE REQUEST AND COORDINATE WITH ALL AFFECTED UTILITIES TO RELOCATE OR ABANDON FACILITIES AS APPLICABLE.

AT&T TRANSMISSION	DOMINION TRANSMISSION INC.
FIRST ENERGY CORP	DOMINION TRANSMISSION CORP
FRONTIER COMMUNICATIONS	ENERGY CORPORATION OF AMERICA
DODDRIDGE COUNTY PSD	EOT PRODUCTION
LEATHERWOOD INC.	CONSOL ENERGY
XTO ENERGY INC.	ANTERO RESOURCES CORPORATION
DOMINION HOPE	PEOPLES GAS COMPANY WV LLC

PROJECT GENERAL NOTES

- EXISTING CONDITIONS AS DEPICTED ON THESE PLANS ARE GENERAL AND ILLUSTRATIVE IN NATURE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE SITE AND BE FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING ON THIS PROJECT. IF CONDITIONS ENCOUNTERED DURING EXAMINATION ARE SIGNIFICANTLY DIFFERENT THAN THOSE SHOWN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.
- THE CONTRACTOR AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR COMPLYING WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF PERSONS INCLUDING EMPLOYEES AND PROPERTY. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SUBCONTRACTORS TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
- THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND OWNER'S REPRESENTATIVE FOR ANY AND ALL INJURIES AND/OR DAMAGES TO PERSONNEL, EQUIPMENT AND/OR EXISTING FACILITIES OCCURRING IN THE COURSE OF THE DEMOLITION AND CONSTRUCTION DESCRIBED IN THE PLANS AND SPECIFICATIONS.
- ALL WORK PERFORMED BY THE CONTRACTOR SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
- CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS PLAN SET FOR OTHER PERTINENT INFORMATION. IT IS NOT THE ENGINEER'S INTENT THAT ANY SINGLE PLAN SHEET IN THIS SET OF DOCUMENTS FULLY DEPICT ALL WORK ASSOCIATED WITH THE PROJECT.
- CONTRACTOR TO COORDINATE ALL UTILITY TERMINATIONS, CONNECTIONS, ETC. WITH UTILITY COMPANIES AS REQUIRED.

DEVELOPER AND PROPERTY OWNER:

SHERWOOD MIDSTREAM LLC
4600 J. BARRY COURT, SUITE 500
CANONSBURG, PENNSYLVANIA 15317

CONTACT: TIM MILLER, P.E.

CIVIL ENGINEER:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
99 CAMBRIDGE PLACE
BRIDGEPORT, WEST VIRGINIA 26330

CONTACT: MATTHEW FLUHARTY, P.E.

REFERENCES

- EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING AERIAL SURVEY DATA PREPARED BY NOR EAST MAPPING, INC. AND SUPPLEMENTED BY FIELD SURVEYS CONDUCTED BY CEC. CONTRACTOR IS TO VERIFY ALL ELEVATIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- STREAM AND WETLAND DELINEATION COMPLETED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. IN JUNE 2017.
- EXISTING GAS LINES LOCATED BY CEC IN JUNE AND JULY 2017.
- FLOODPLAIN BOUNDARY FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

REVISION RECORD

NO. DATE DESCRIPTION

Civil & Environmental Consultants, Inc.
99 Cambridge Place - Bridgeport, WV 26330
PH: 304.933.3119 - 855.488.9539 - Fax: 304.933.3327
www.cecinc.com

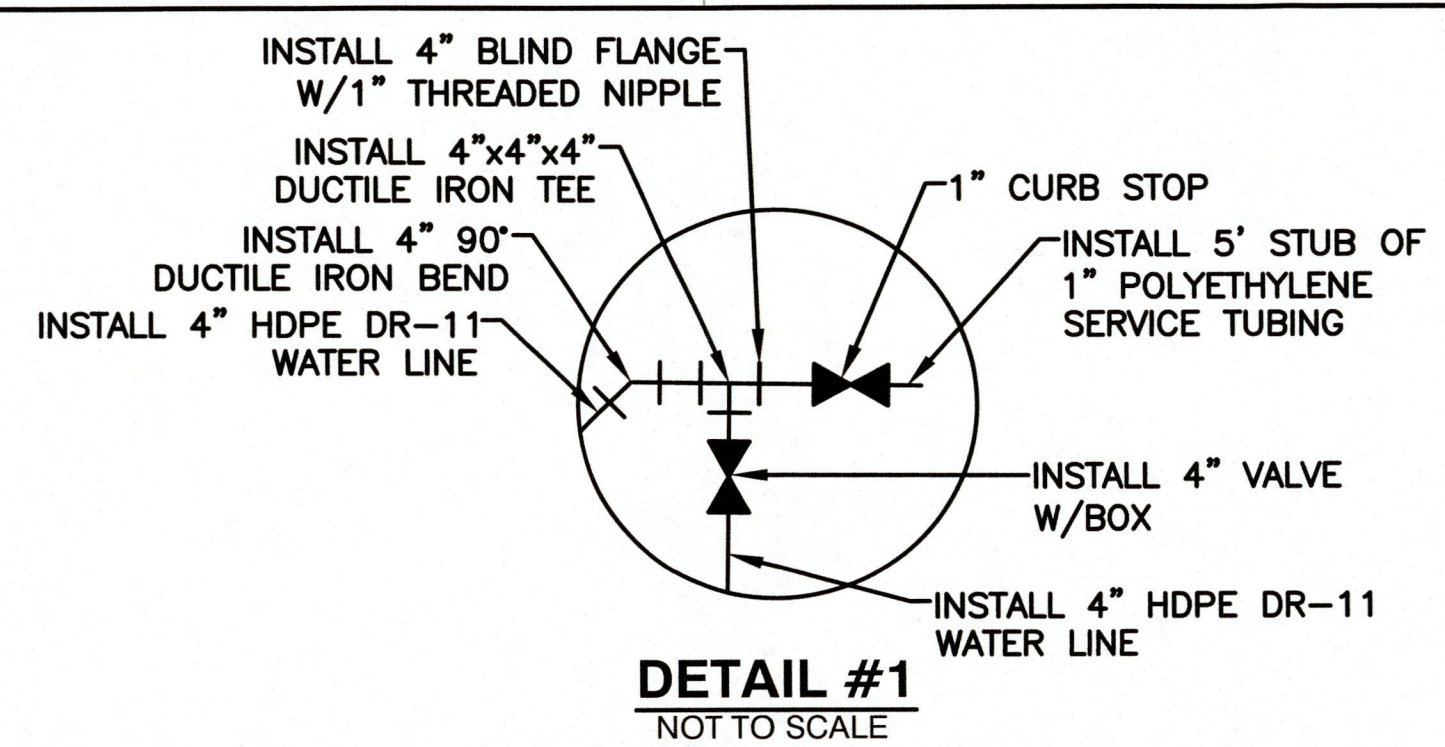
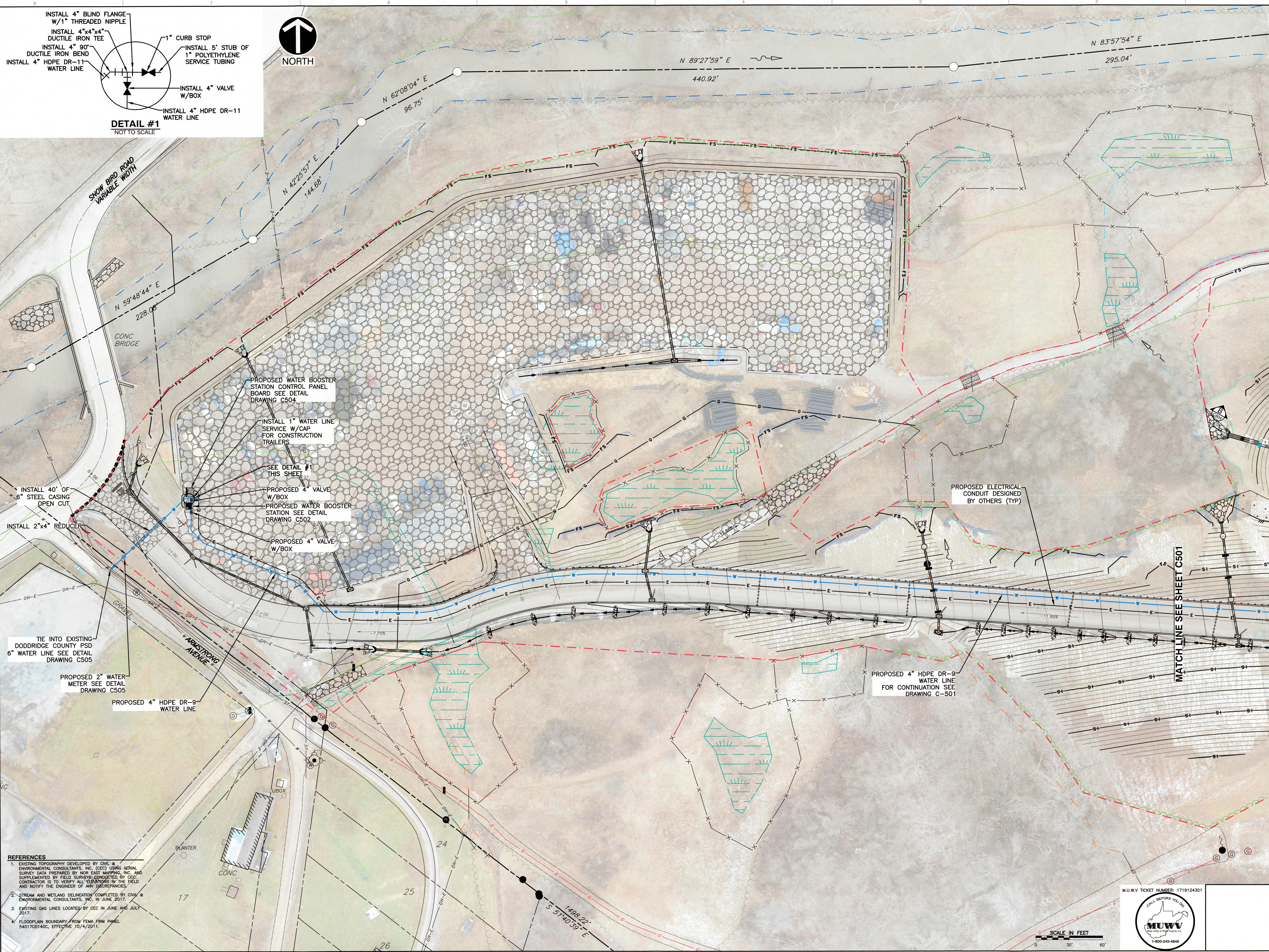
SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS
PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA

COVER
DATE: June 26, 2019
DRAWN BY: JBH
CHECKED BY: MWF
PROJECT NO: 130-559
APPROVED BY: MWF
HARD SIGNATURE ON FILE

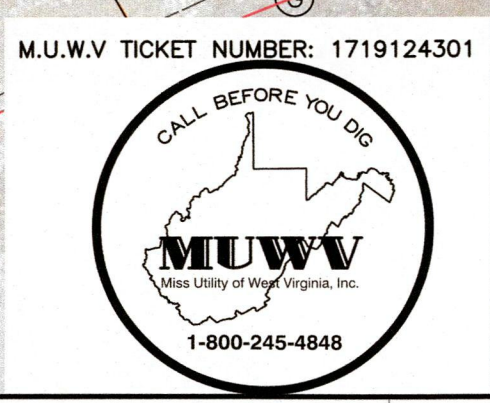
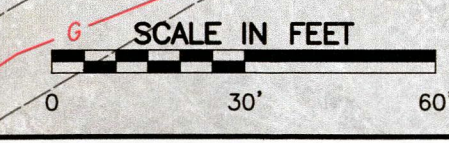
M.U.W.V. TICKET NUMBER: 1719124301



DRAWING NO.
C000



- REFERENCES**
1. EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING AERIAL SURVEY DATA PREPARED BY MOR EAST MAPPING, INC. AND SUPPLEMENTED BY FIELD SURVEYS CONDUCTED BY CEC. CONTRACTOR IS TO VERIFY ALL ELEVATIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
 2. STREAM AND WETLAND DELINEATION COMPLETED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. IN JUNE 2017.
 3. EXISTING GAS LINES LOCATED BY CEC IN JUNE AND JULY 2017.
 4. FLOODPLAIN BOUNDARY FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.



NO.	DATE	REVISION	DESCRIPTION

Civil & Environmental Consultants, Inc.
 99 Cambridge Place - Bridgeport, WV 26330
 Ph: 304.933.3119 - 855.488.9539 - Fax: 304.933.3327
 www.cecinc.com

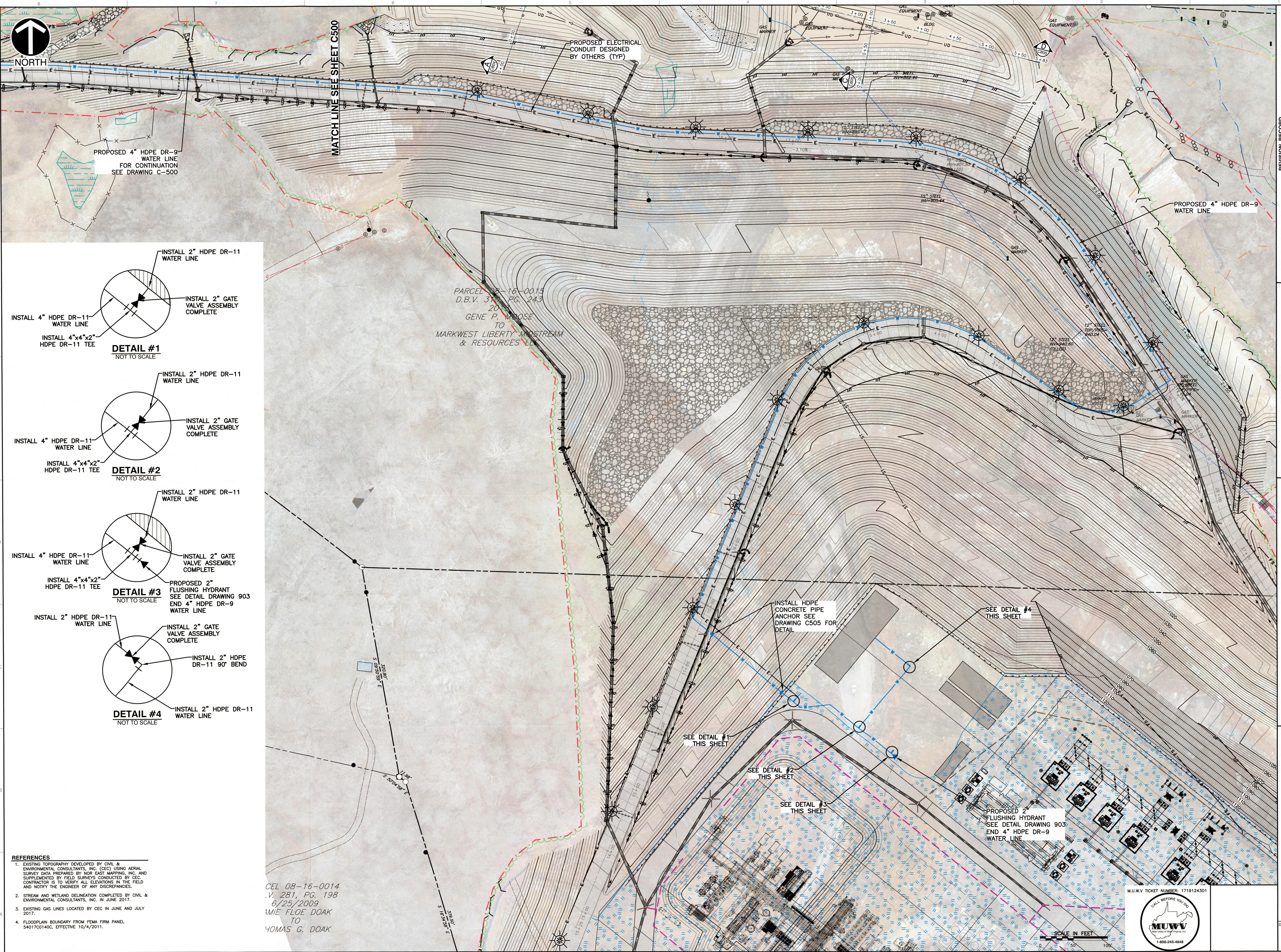
**SHERWOOD MIDSTREAM LLC
 SMITHBURG NATURAL GAS
 PROCESSING FACILITY
 DODDRIDGE COUNTY, WEST VIRGINIA**

WATER LINE SITE PLAN

DATE: APRIL 30, 2020 | DRAWN BY: JWB | MWF
 PROJECT NO: 190-5189 | CHECKED BY: ALS SHOWN | MWF
 APPROVED BY: | MWF

M.U.W.V. TICKET NUMBER: 1719124301

DRAWING NO. **C500**



- REFERENCES**
- EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING AERIAL SURVEY DATA PREPARED BY NOR EAST MAPPING, INC. AND SUPPLEMENTED BY FIELD SURVEYS CONDUCTED BY CEC. CONTRACTOR IS TO VERIFY ALL ELEVATIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
 - STREAM AND WETLAND DELINEATION COMPLETED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. IN JUNE 2017.
 - EXISTING GAS LINES LOCATED BY CEC IN JUNE AND JULY 2017.
 - FLOODPLAIN BOUNDARY FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

CEL 08-16-0014
V. 281, PG. 198
6/25/2009
MIE FLOE DOAK
TO
THOMAS G. DOAK

NO.	DATE	DESCRIPTION

CEC
Civil & Environmental Consultants, Inc.
99 Cambridge Place - Bridgeport, WV 26330
Ph: 304.933.3119 - 855.488.9539 - Fax: 304.933.3327
www.cecinc.com

**SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS
PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA**

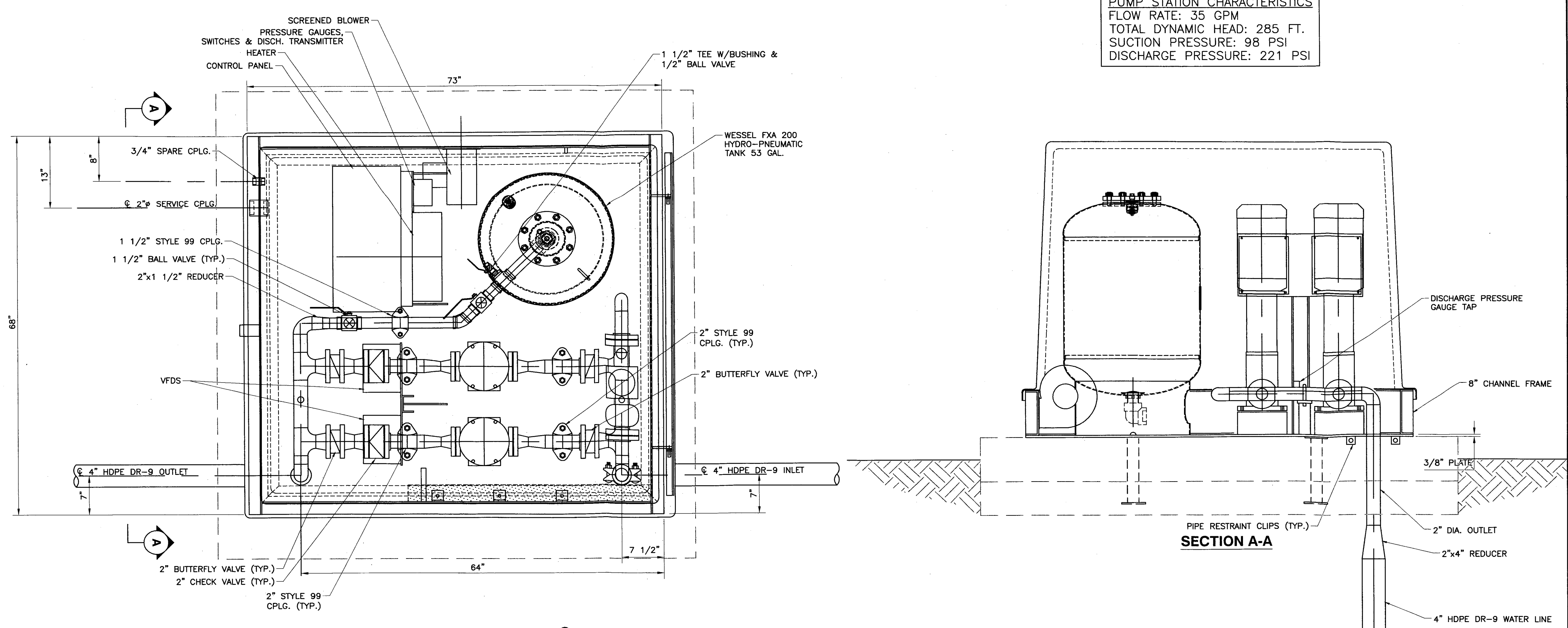
WATER LINE OVERALL SITE PLAN

DATE: April 30, 2020
DRAWN BY: JWB
CHECKED BY: MWF
PROJECT NO: 190-569
APPROVED BY: MWF

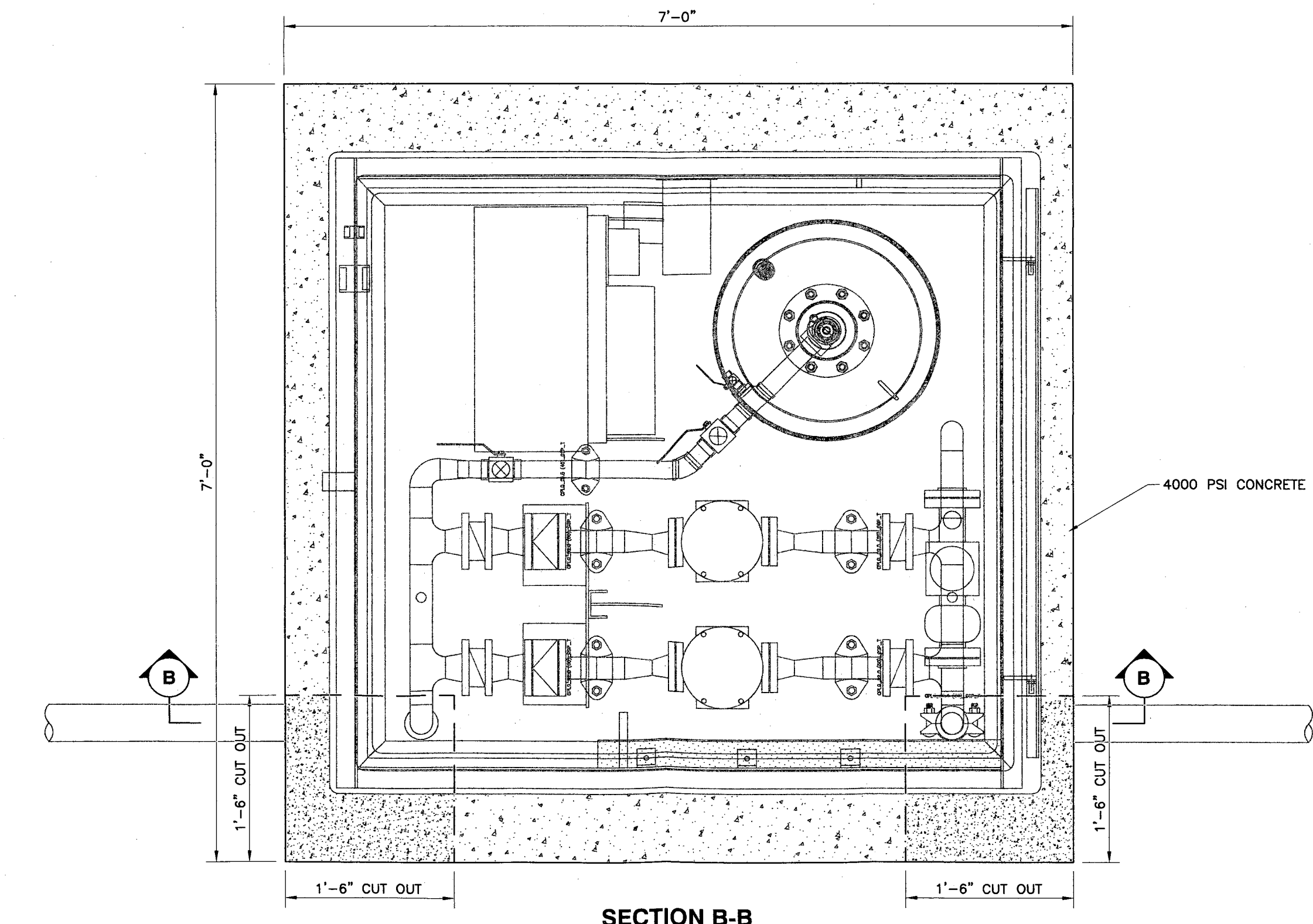
M.U.W.V. TICKET NUMBER: 1719124301

DRAWING NO. **C501**

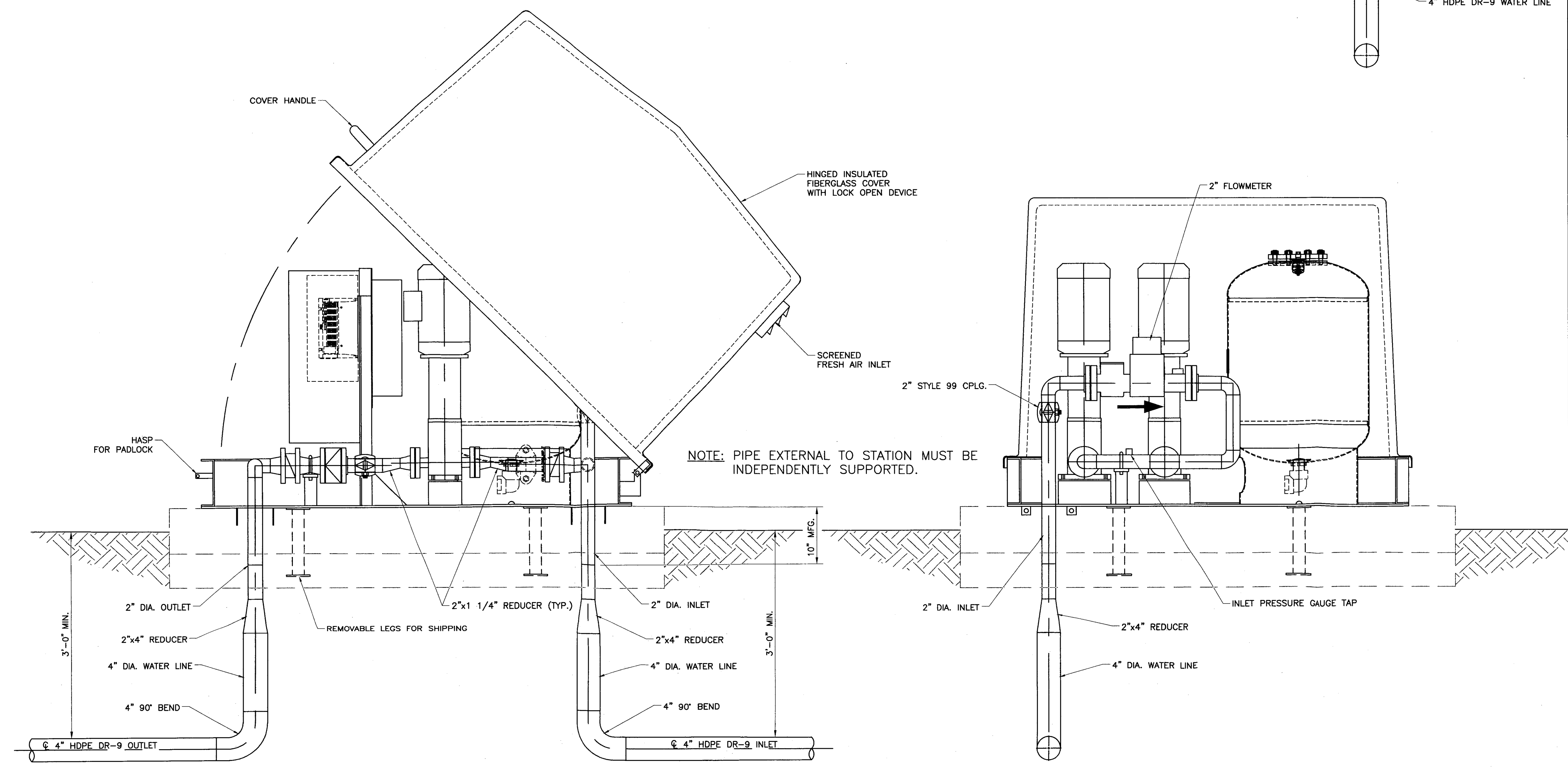
PUMP STATION CHARACTERISTICS
 FLOW RATE: 35 GPM
 TOTAL DYNAMIC HEAD: 285 FT.
 SUCTION PRESSURE: 98 PSI
 DISCHARGE PRESSURE: 221 PSI



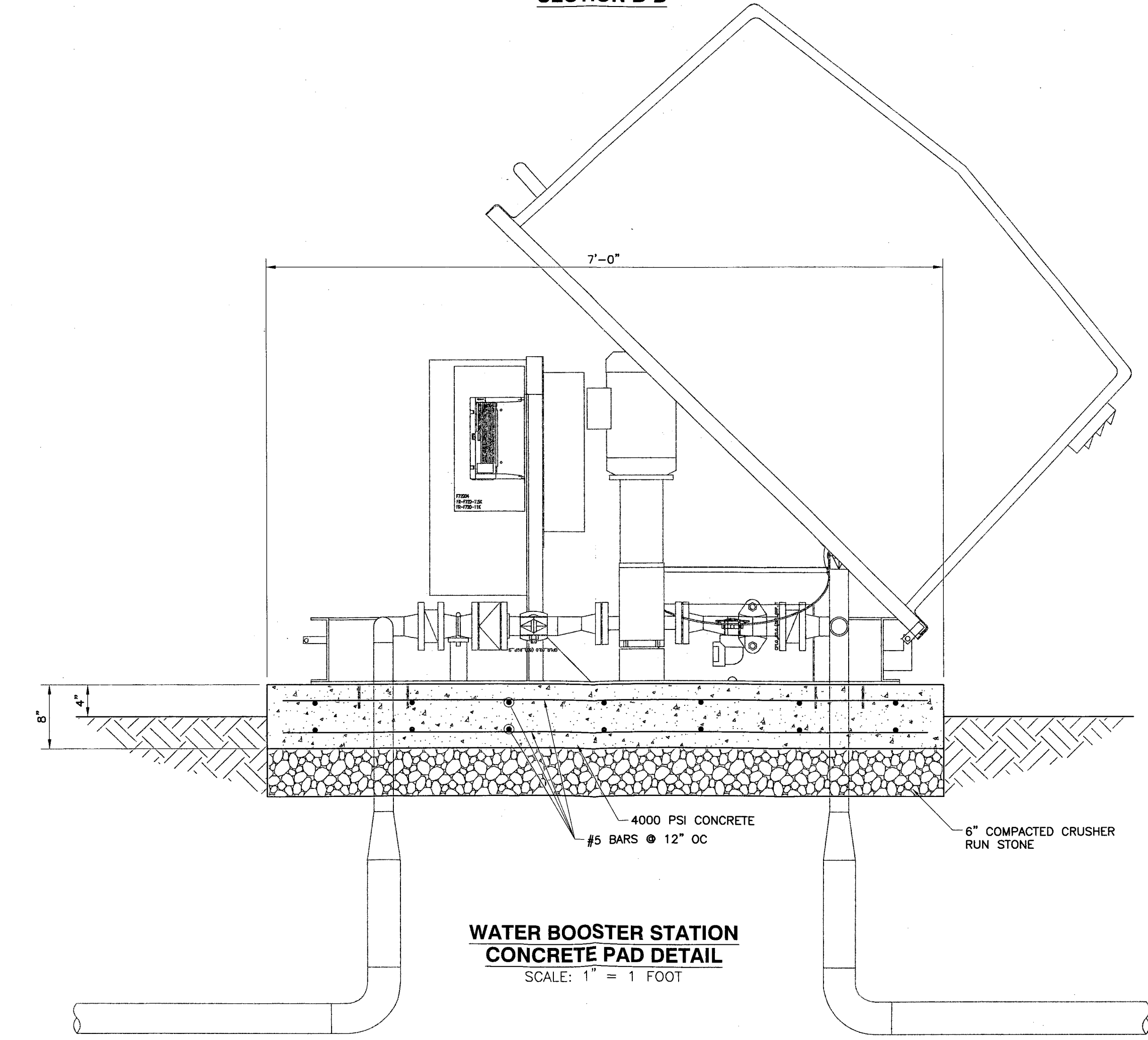
SECTION A-A



SECTION B-B



WATER BOOSTER STATION DETAIL
 SCALE: 1" = 1 FOOT



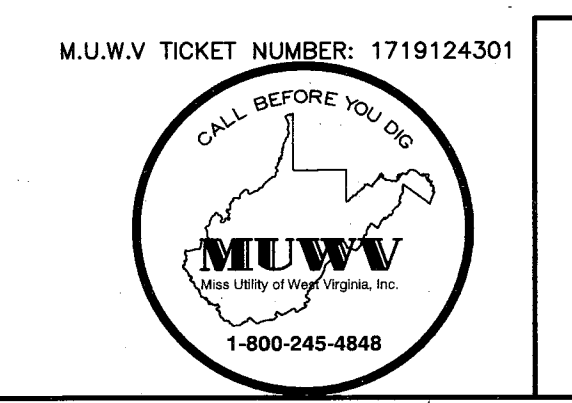
WATER BOOSTER STATION CONCRETE PAD DETAIL
 SCALE: 1" = 1 FOOT

NO.	DATE	REVISION RECORD	DESCRIPTION

C&E
 Civil & Environmental Consultants, Inc.
 99 Cambridge Place - Bridgeport, WV 26330
 Ph: 304.933.3119 - 855.488.9539 - Fax: 304.933.3327
 www.candecinc.com

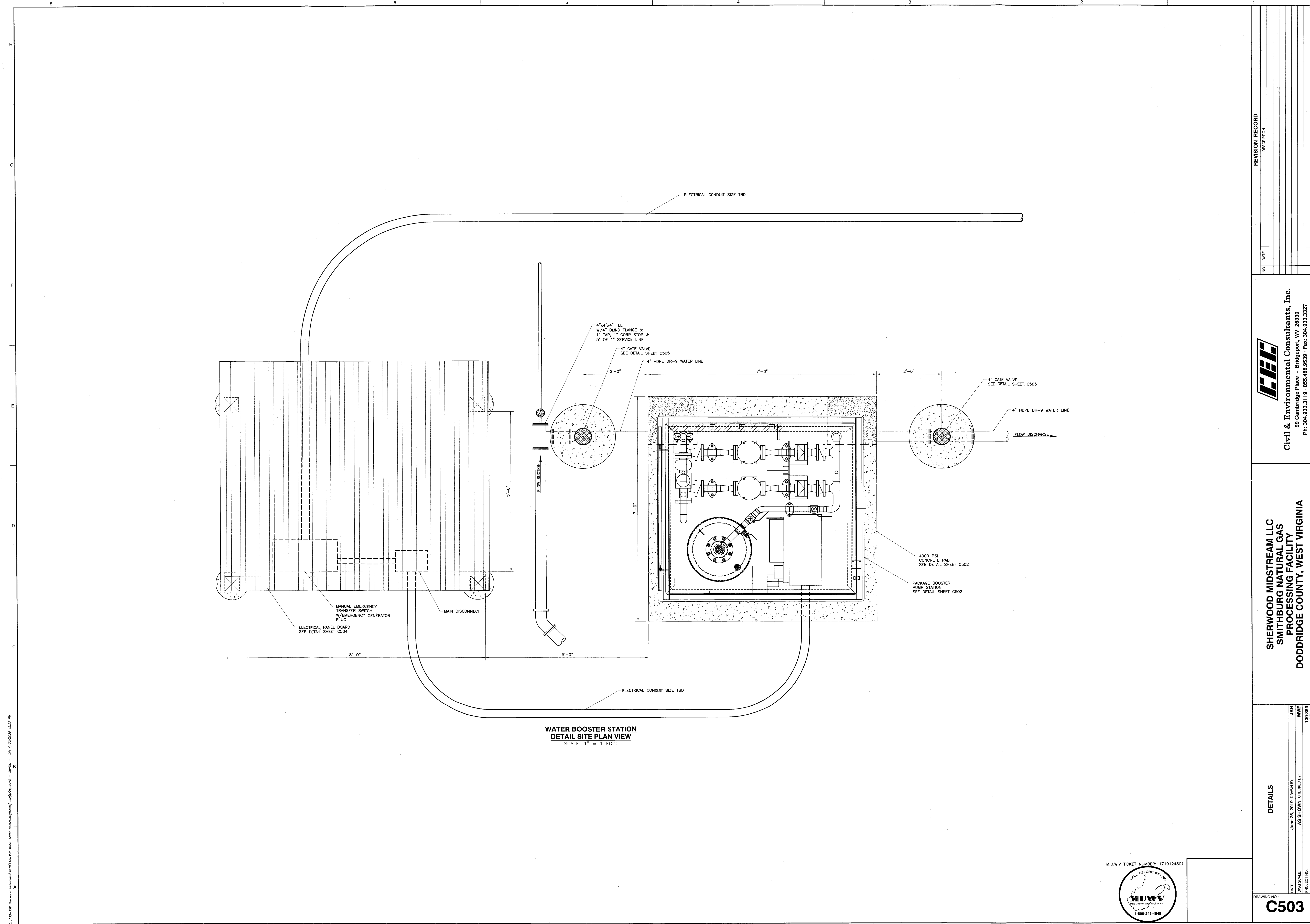
SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS
PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA

DETAILS	
DATE:	June 26, 2019
DWG SCALE:	AS SHOWN
PROJECT NO.:	190-559
APPROVED BY:	MWF
DRAWN BY:	MWF
CHECKED BY:	MWF
PROJECT NO.:	190-559
APPROVED BY:	MWF



USEMCO
 USEMCO INCORPORATED
 P.O. BOX 550 (608) 372-5911 TOMAH WI. 54660

DRAWING NO. **C502**



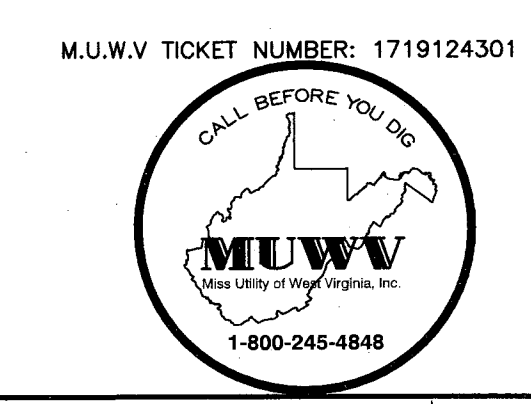
**WATER BOOSTER STATION
DETAIL SITE PLAN VIEW**
SCALE: 1" = 1 FOOT

NO.	DATE	DESCRIPTION

C&E
Civil & Environmental Consultants, Inc.
99 Cambridge Place - Bridgeport, WV 26330
PH: 304.933.3119 - 855.488.9539 - Fax: 304.933.3327
www.candec.com

**SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS
PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA**

DETAILS	
DATE:	JUNE 26, 2018
DWG SCALE:	AS SHOWN
PROJECT NO.:	190-5189
APPROVED BY:	MVF
DESIGNED BY:	JBH
CHECKED BY:	MVF
IN CHARGE:	MVF



M.U.W.V. TICKET NUMBER: 1719124301

DRAWING NO. **C503**

C:\Users\jrbrown\OneDrive\Documents\1719124301\1719124301.dwg (2018-06-26 10:57:27 AM) - PLOT - 4/20/2019 10:57 AM

THRUST BLOCKING
The thrust blocking must be formed against a solid trench wall and these fitting areas must be excavated by hand because mechanical equipment will damage the bearing surface of the trench wall.

The size and type of thrust block depends on the pipe size, line pressure, type of fitting, degree of bend and will be determined by the engineer. Thrust block size may be calculated by the procedures shown at right.

THRUSTS IN SOFT UNSTABLE SOILS
In soft, unstable soils such as muck or peat, thrusts are resisted by running corrosion-resistant tie-rods to solid foundations or by removing the soft material and replacing it with ballast of sufficient size and weight to resist thrusts developed.

UPWARD THRUSTS AT FITTINGS
Where a fitting is used to make a vertical bend, anchor the fitting to a thrust block braced against the undisturbed soil. The thrust block should have enough resistance to withstand upward and outward thrusts at the fitting.

SIDE THRUST ON CURVES
An outward pressure exists on all deflections from a straight line. Good soil, properly tamped, is sufficient to hold side thrust-unless soil conditions are unstable. In that case, to anchor against this side thrust, the blocking should be placed against the pipe on each side of the coupling. Do not thrust block the coupling itself.

SIDE THRUST

Pipe Size (inches)	Side Thrust (Pounds per Degree)
1 1/2"	5.1
2"	7.9
2 1/2"	11.6
3 1/2"	17.1
4"	22.4
5"	28.3
6"	43.1
8"	60.8
10"	103.0
12"	225.0

STEP 1. Multiply the pressure level desired for testing by the appropriate value shown in the following table:

Dead End	90° Elbow	45° Elbow	22 1/2° Elbow
1.5"	2.94	4.16	2.25
2"	4.56	6.45	3.50
2.5"	6.65	9.40	5.10
3"	9.80	13.9	7.51
3.5"	12.8	18.1	9.81
4"	16.2	23.0	12.4
5"	24.7	35.0	18.9
6"	34.8	49.2	26.7
8"	59.0	83.5	45.2
10"	91.5	130.0	70.0
12"	129.0	180.0	98.5

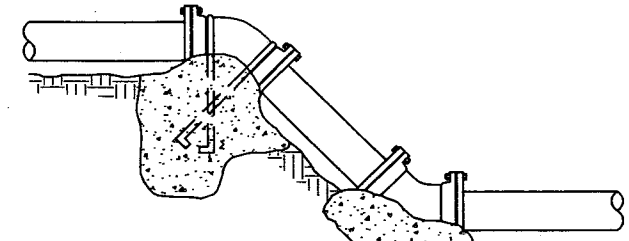
STEP 2. Determine the bearing strength of the soil from the table below:

Soils and Safe Bearing Loads	Lbs. Sq. Ft.
Sound Shale	10,000
Cemented Gravel and Sand - Difficult to pack	4,000
Coarse & Fine Compact Sand	3,000
Medium Clay - Can be spaded	2,000
Soft Clay	1,000
Muck	0

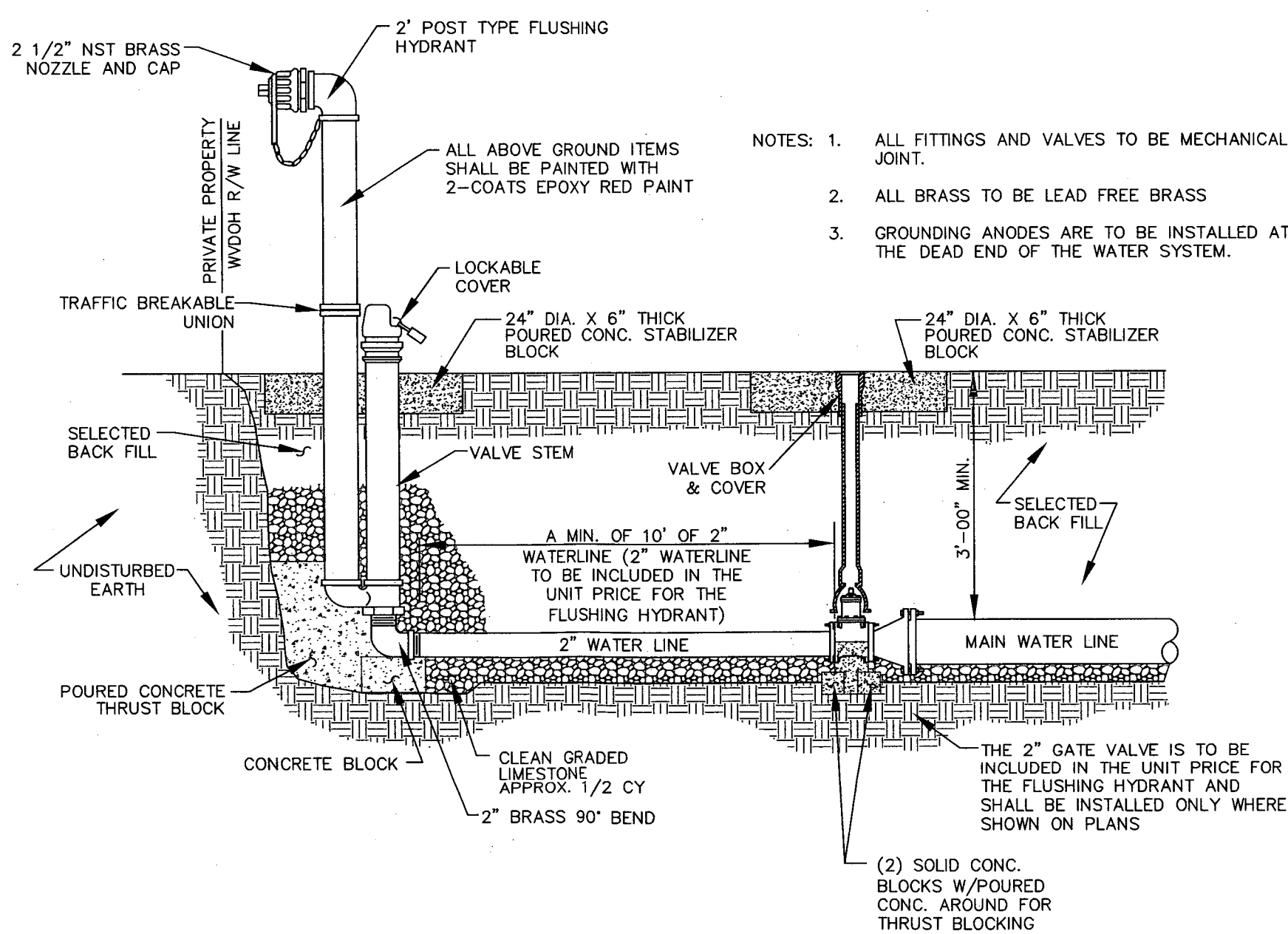
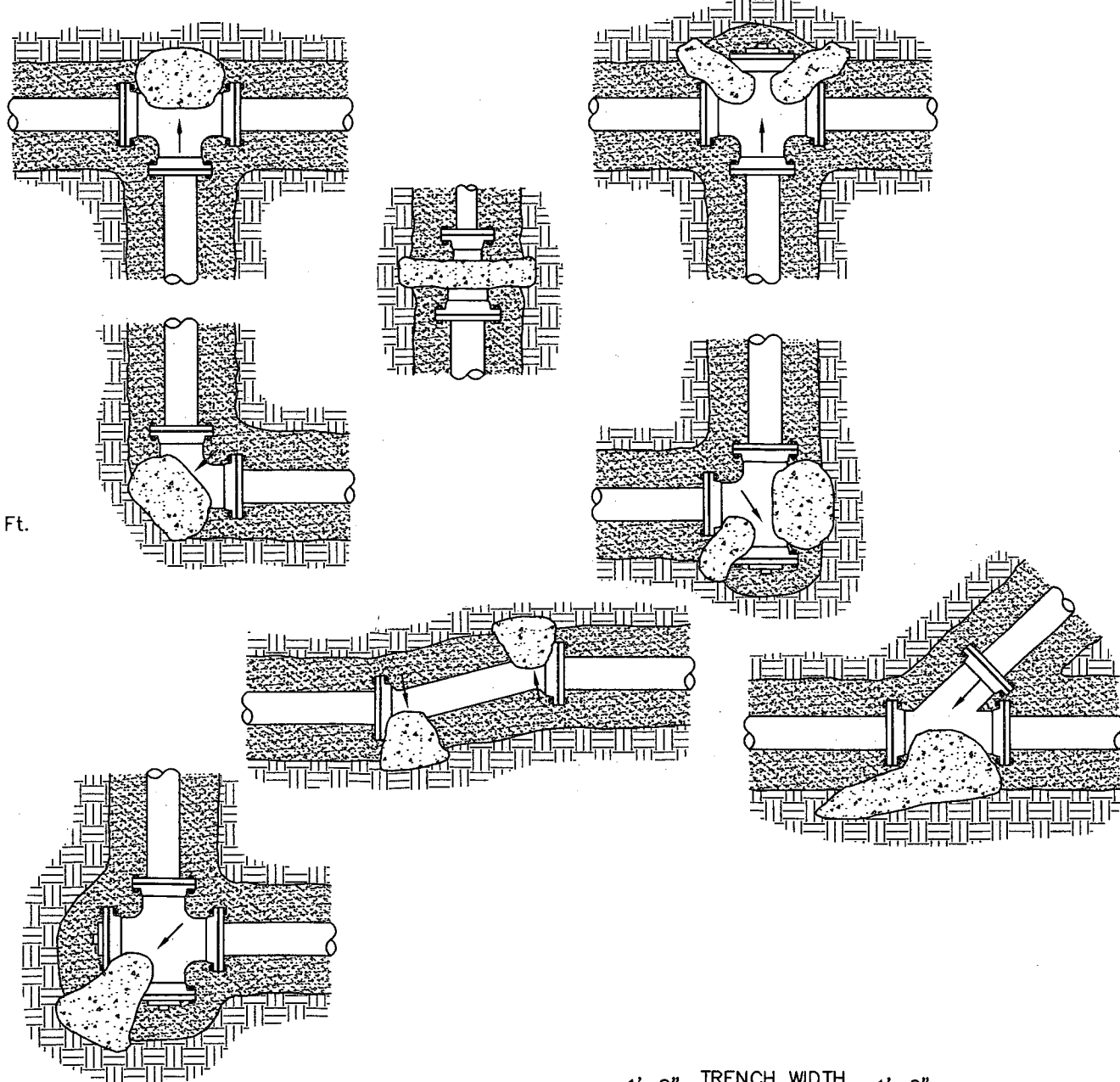
STEP 3. Divide the total thrust obtained in Step 1 by the bearing strength of the soil; this gives the square feet of area needed.

NOTE: ALL CONCRETE THRUST BLOCKING TO MEET 3000 P.S.I. CRUSH TEST.
NOTE: ALL FITTINGS TO BE WRAPPED WITH 4 MIL PLASTIC WRAP PRIOR TO PLACING CONCRETE THRUST BLOCKING.

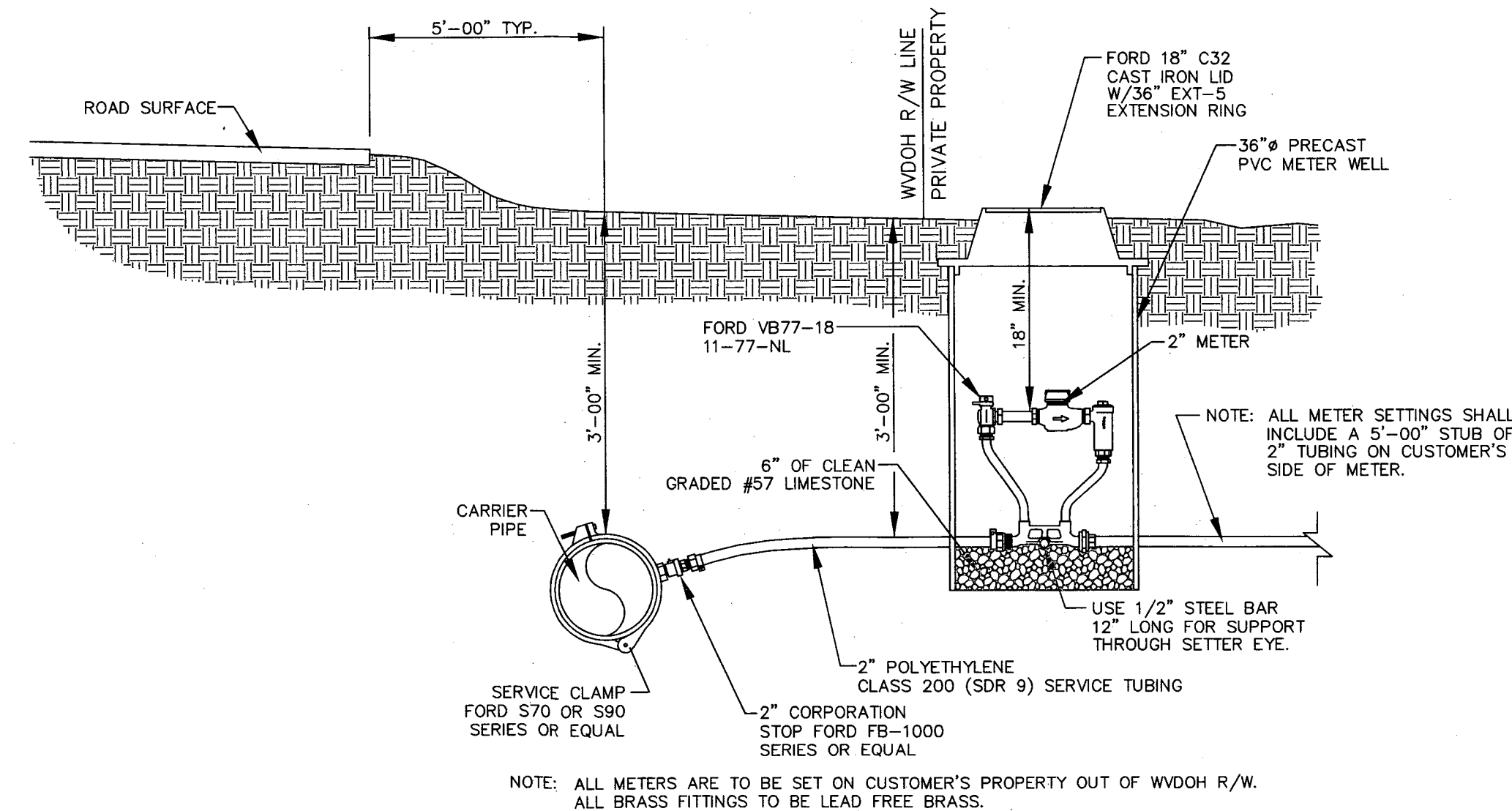
VERTICAL FITTINGS



HORIZONTAL FITTINGS

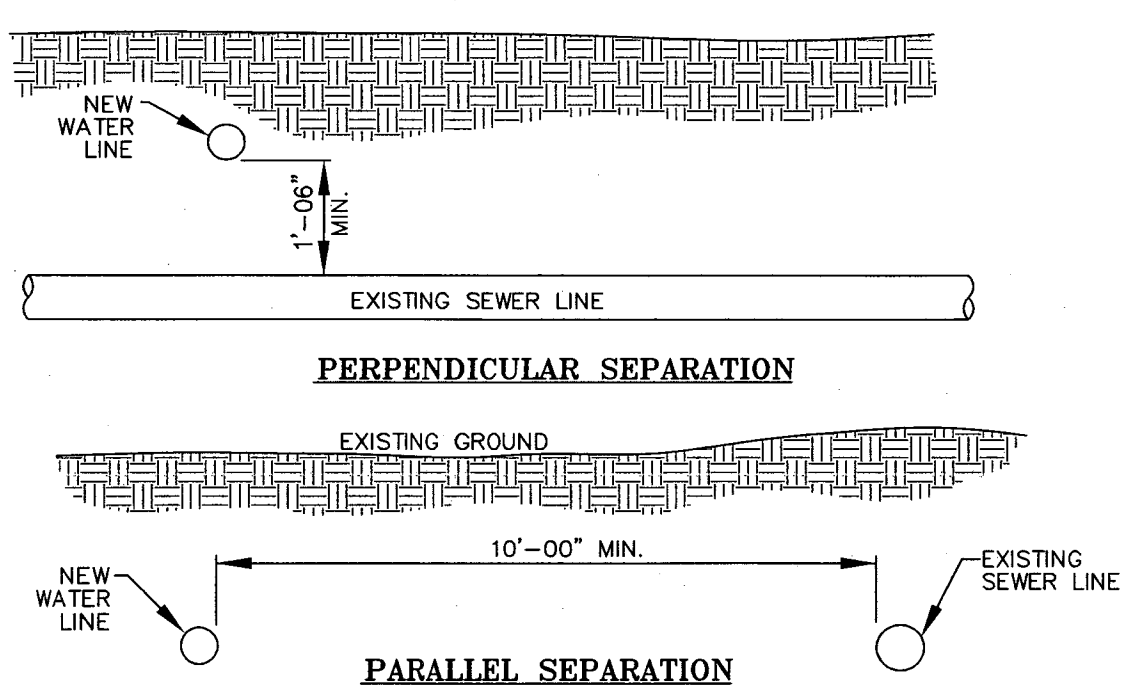


2" POST TYPE FLUSHING HYDRANT
NTS

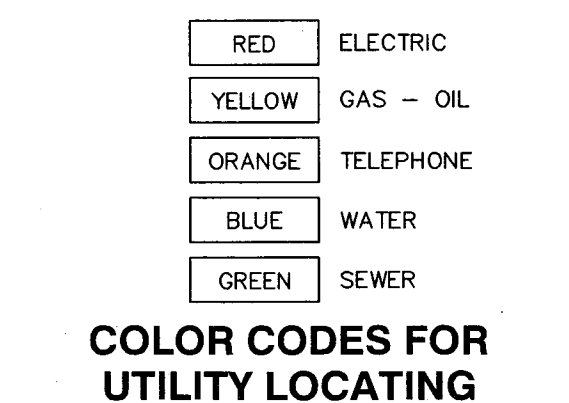
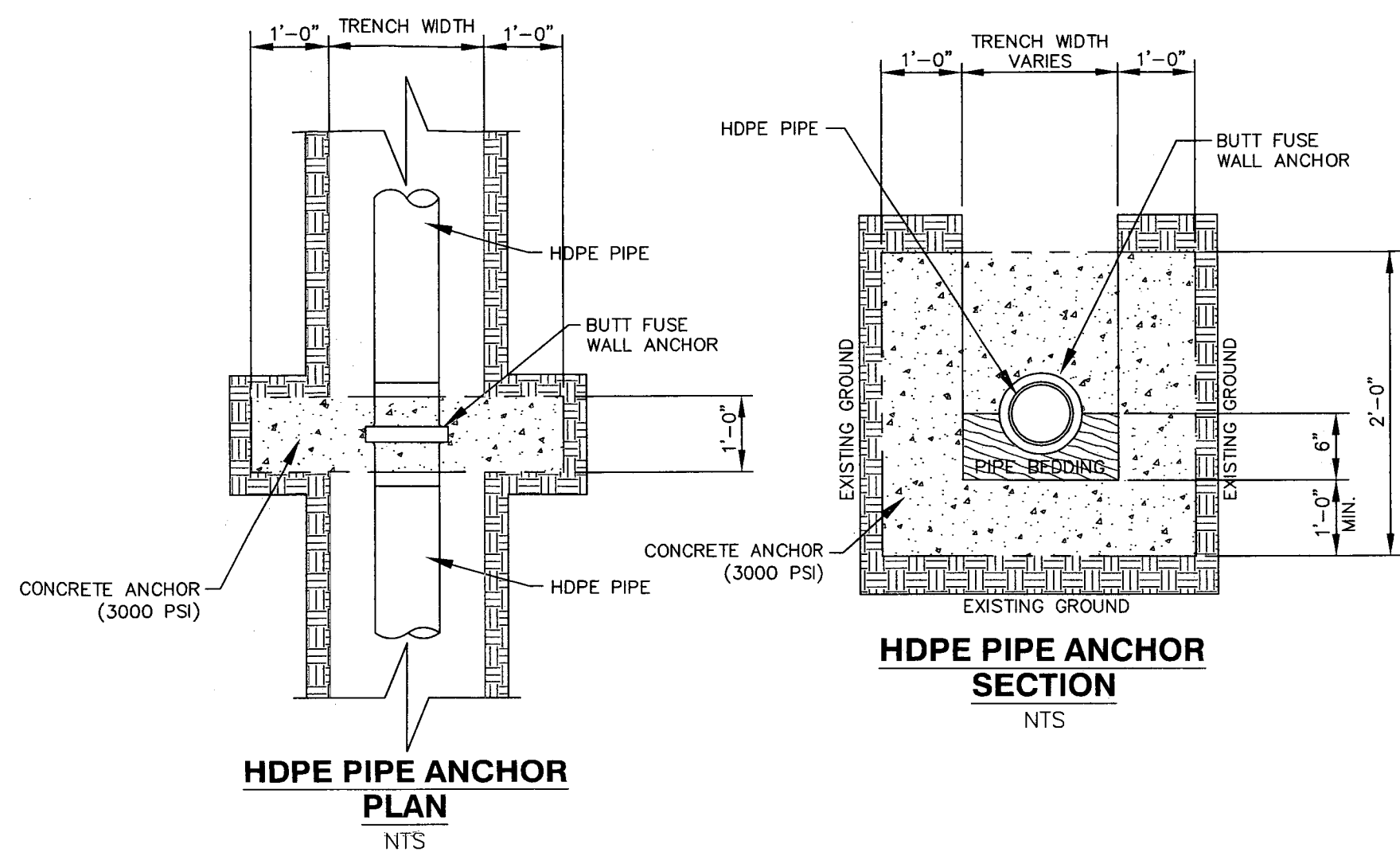


METER SETTING (SAME SIDE OF PAVED ROAD)
NTS

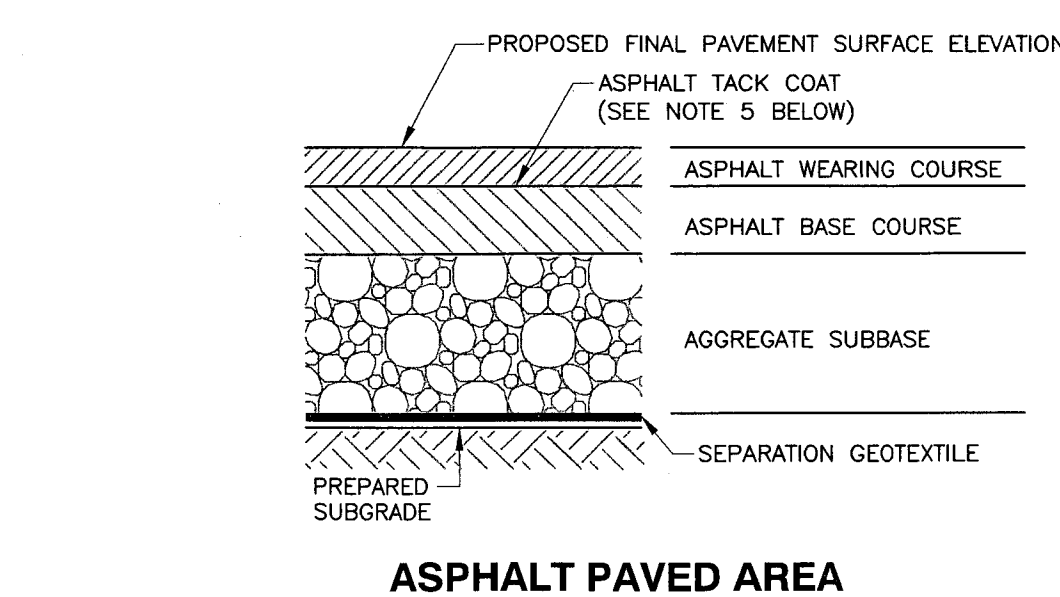
THRUST BLOCKING DETAILS
NTS



DETAIL SHOWING SEPARATION OF SEWER AND WATER LINES
NTS



COLOR CODES FOR UTILITY LOCATING
MAGNETIC WARNING TAPE
NTS

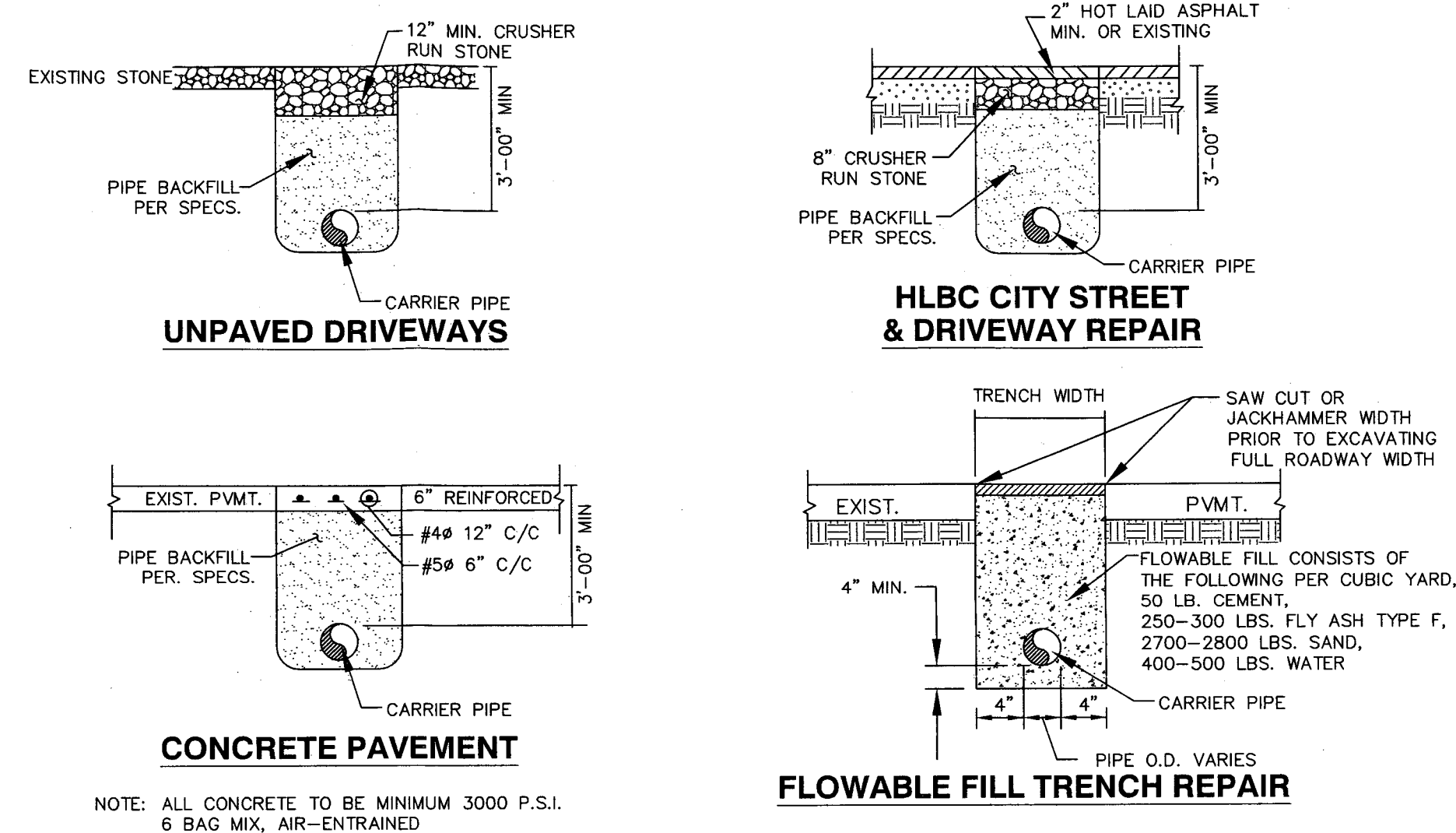


ASPHALT PAVED AREA

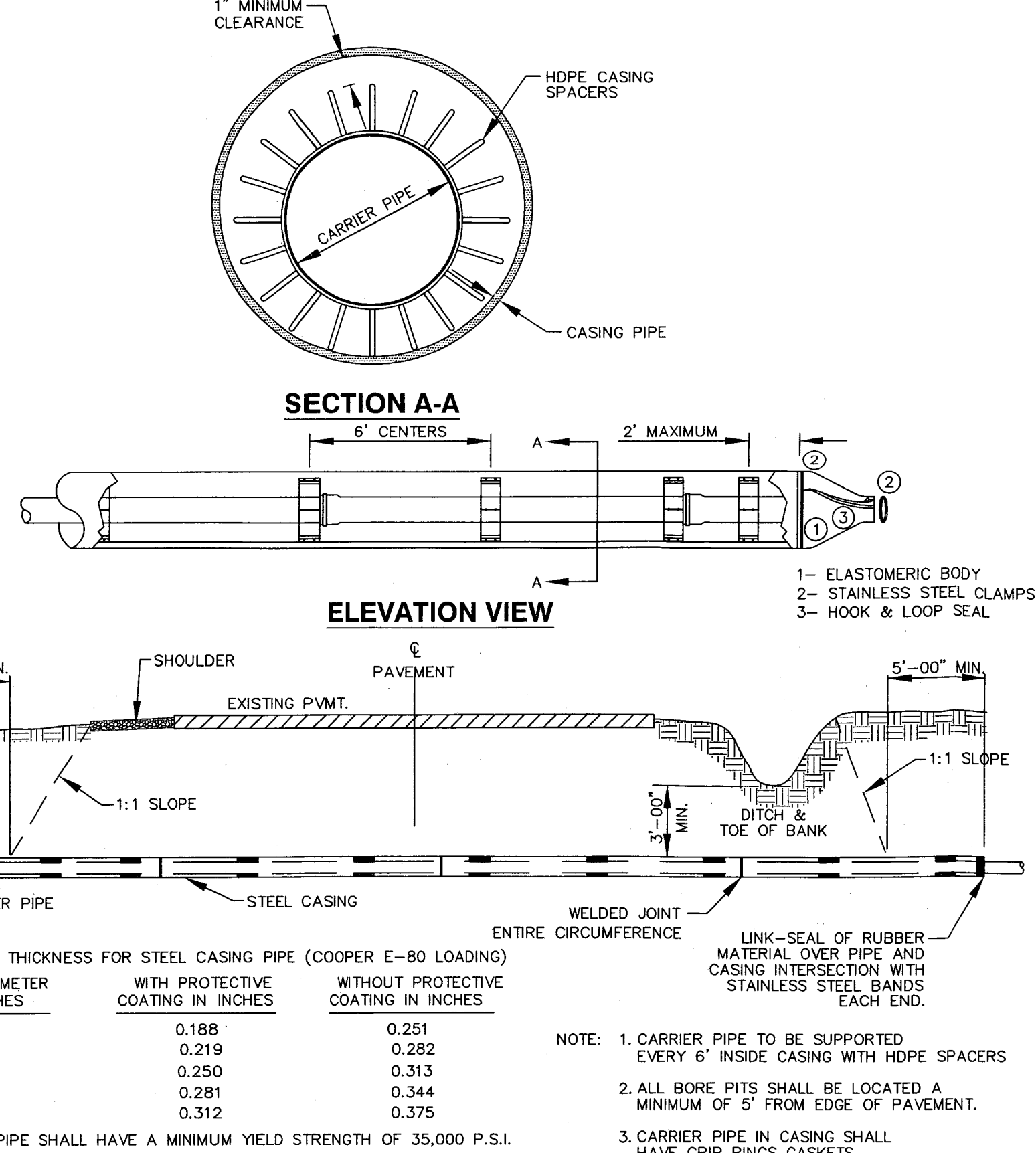
ITEM	MATERIAL	SPECIFICATION	COMPACTED THICKNESS (IN.)
ASPHALT WEARING COURSE	SUPERPAVE 9.5 MM MIX PG 64-22 ASPHALT BINDER	WDOH DIVISION 400 (STANDARD SPECIFICATIONS ROADS AND BRIDGES)	2"
ASPHALT BASE COURSE	SUPERPAVE 25 MM MIX PG 64-22 ASPHALT BINDER	WDOH DIVISION 400 (STANDARD SPECIFICATIONS ROADS AND BRIDGES)	4"
AGGREGATE SUBBASE	AASHTO #57 STONE	AASHTO M43-05 (STANDARD SPECIFICATION OF AGGREGATE FOR ROAD AND BRIDGE CONSTRUCTION)	8"
SEPARATION GEOTEXTILE	NON-WOVEN GEOTEXTILE	WDOH DIVISION 715.11.8	NOT APPLICABLE

- ASPHALT PAVEMENT SECTION DEPTH TABLE**
- NOTES:
- PRIOR TO PLACEMENT OF AGGREGATE SUBBASE, THE PAVEMENT SUBGRADE SHALL BE PREPARED AS FOLLOWS:
 - PAVEMENT SUBGRADE SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AND WITHIN ± 3% OF ITS OPTIMUM MOISTURE CONTENT, AS DETERMINED BY ASTM D1557 (MODIFIED PROCTOR). TESTING DEPTH FOR THIS REQUIREMENT IS 10". ANY SOFT AREAS, AS DELINEATED BY A PROFFROLL, PERFORMED WITH A FULLY-LOADED OFF ROAD OR TRAILER DUMP TRUCK, SHALL BE OVEREXCAVATED TO A FIRM AND COMPETENT MATERIAL AND BACKFILLED. PROFFROLL SHOULD ONLY BE EVALUATED IMMEDIATELY PRIOR TO AGGREGATE SUBBASE PLACEMENT.
 - THE SUBGRADE SHALL BE GRADED AND SHAPED AS REQUIRED TO CONSTRUCT THE AGGREGATE BASE COURSE IN CONFORMANCE WITH THE GRADES, LINES AND THICKNESSES SHOWN ON THE DRAWINGS.
 - MANHOLE TOPS TO BE FLUSH WITH FINAL PAVEMENT SURFACE.
 - PLACE AGGREGATE SUBBASE AND COMPACT EACH LIFT TO VISUAL NON-MOVEMENT UNDER THE WEIGHT OF THE COMPACTION EQUIPMENT.
 - THE ASPHALT COURSES SHALL BE COMPACTED TO 92% TO 95% OF THE THEORETICAL MAXIMUM DENSITY.
 - IF ASPHALT BASE COURSE IS TO REMAIN EXPOSED FOR MORE THAN 48 HOURS, PLACE ASPHALT TACK COAT COMPLETELY OVER BASE COURSE WITHIN 48 HOURS OF WEARING COURSE INSTALLATION.
 - DO NOT PLACE PAVEMENT WHERE CARBONACEOUS MATERIAL, FAT CLAY, ELASTIC SILT, OR COAL IS WITHIN 5 FEET OF FINISHED SUBGRADE.

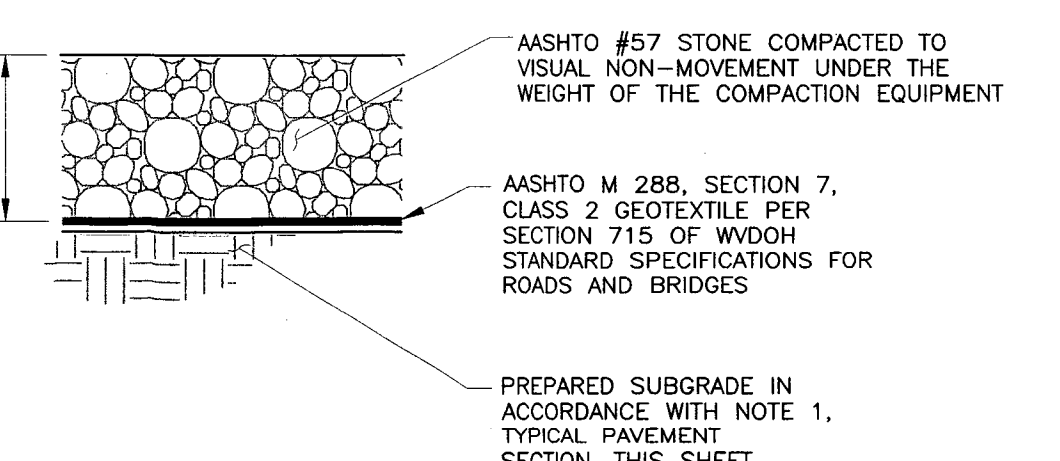
TYPICAL PAVEMENT SECTION
NTS



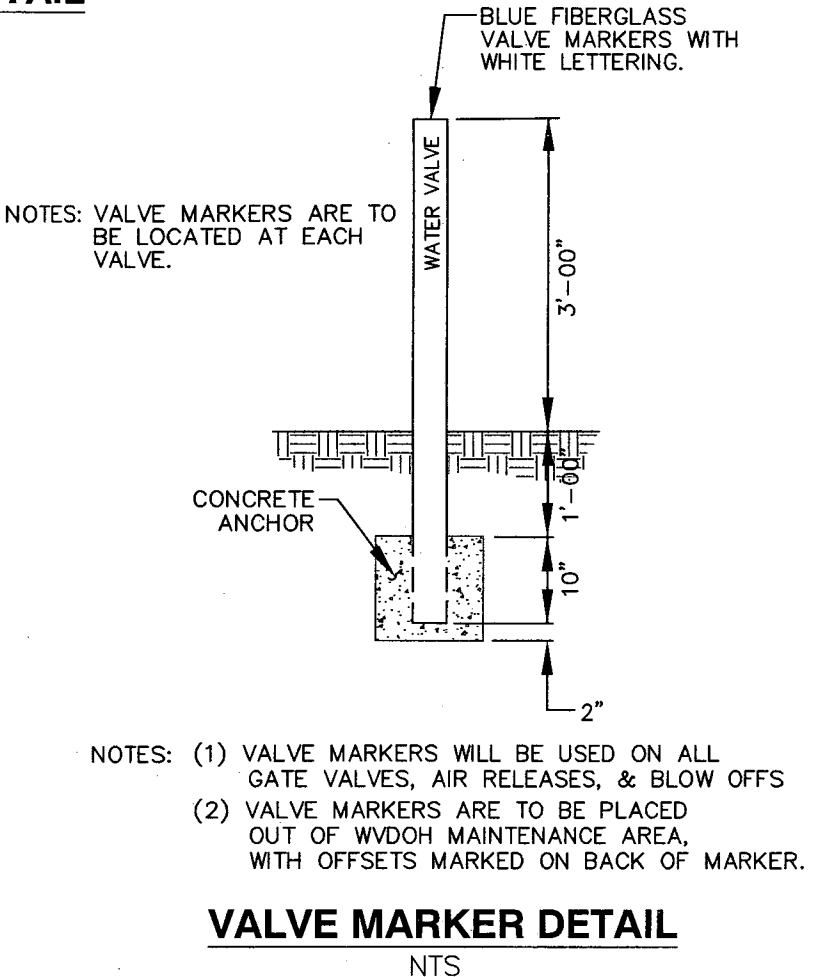
TYPICAL ROAD REPAIR DETAILS NOT WITHIN W.V.D.O.H. R.O.W.'S
NTS



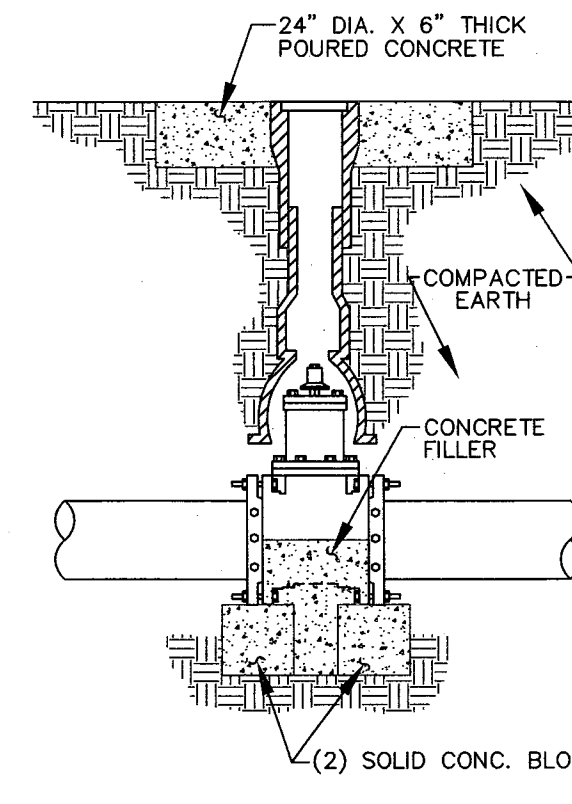
TYPICAL CASING DETAIL FOR ROAD CROSSING (OPEN CUT OR BORED & JACKED)
NTS



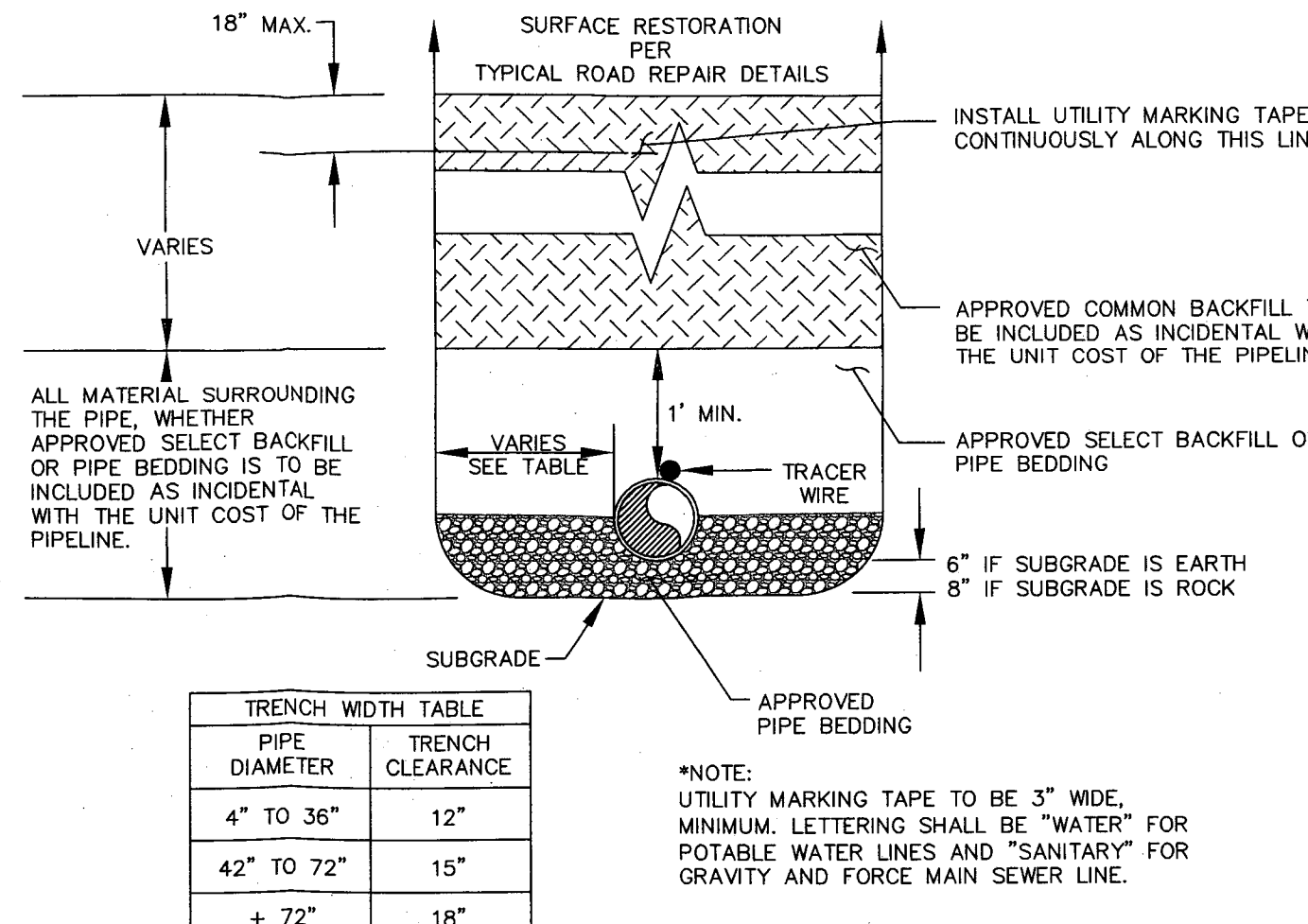
GRAVEL PAD DETAIL
NTS



VALVE MARKER DETAIL
NTS



GATE VALVE SUPPORT OUTSIDE OF WVDH R.O.W.
NTS



TRENCH WIDTH TABLE

PIPE DIAMETER	TRENCH CLEARANCE
4" TO 36"	12"
42" TO 72"	15"
+ 72"	18"

STANDARD BEDDING AND TRENCH DETAIL
NTS

Civil & Environmental Consultants, Inc.
99 Cambridge Place - Bridgeport, WY 26330
PH: 304.933.3119 - 855.488.9539 - FAX: 304.933.3277
www.cedinc.com

**SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS
PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA**

DETAILS
DATE: June 26, 2010
DRAWN BY: J.B.H.
CHECKED BY: M.W.F.
AS SHOWN
PROJECT NO.: 100-559
APPROVED BY: M.W.F.
HAND SIGNATURE ON FILE

DRAWING NO. **C505**





MARS LOCATION:
310 CLAY AVENUE (SHIPPING)
PO BOX 897 (MAILING)
MARS, PA 16046
PHONE: 724-625-4260
FAX: 724-625-4227

BRIDGEPORT LOCATION:
5793 W VETERANS MEMORIAL HWY
SUITE 102
BRIDGEPORT, WV 26330
PHONE: 304-842-8611
FAX: 304-842-8684

ATTN: MATT FLUHARTY
TO: CEC
PROJECT: Mark West Pump Station
LOCATION: Smithburg, WV

QUOTATION NO. 008234

DATE: 9/4/19

PREPARED BY: Rob Trombold

DUE DATE:

These printed conditions apply unless otherwise stated in typewritten portion.

1. All prices subject to revision after 30 days.
2. **TERMS:** Net 30 from date of shipment.
3. **CONDITIONS:** General conditions on the reverse side of this quotation apply to this quotation and any orders resulting from this quotation.
4. **PRICES:** All prices are your net cost F.O.B. factory with freight allowed to "LOCATION" shown above.
5. **TAXES:** Any and all taxes must be added to the quoted price.
6. **SCHEDULES:** All schedules are approximate. Drawings: From date of order. Shipments: From date of receipt at the factory of approved drawing and release for fabrication.
7. **ACCESSORIES:** No accessory equipment included unless stated in quotation.

ITEM 1: FACTORY PACKAGED WATER BOOSTER PUMP STATION

One USEMCO water booster pumping station with the following equipment factory installed on a welded steel base and enclosed in a hinged fiberglass enclosure: Two Grundfos model CR5-14 pumps connected to 5 HP, 3500 RPM motors driven by variable frequency drives rated for 35 GPM at 285' TDH; piping and valves to include 2" station inlet, 2" magnetic flow meter, 2" pump inlet isolation wafer butterfly valves, 2" strainers, 2" pump discharge isolation wafer butterfly valves and wafer silent check valves, 2" station discharge outlet; NEMA 1 fiberglass control panel for 480 volt 3 phase 3 wire incoming service with USEMCO H2Pro PLC constant pressure variable speed type control.

Station to be shipped via LTL.
Station piping to be welded stainless steel.
Two pressure gauges provided.
Two pressure transmitters provided.
Wessels FXA-HP 200, 53 gallon, 250 psi hydro tank provided.
Low suction pressure switch and logic provided.

Pump station pricing and delivery per this proposal will not meet the American Iron and Steel Requirements of the Consolidated Appropriations Act of 2014.

Price: \$ 54,911.00 F.O.B. factory. This price does not include any taxes which may apply. Any applicable taxes are the sole responsibility of the buyer. Freight charges allowed to the job site or rail siding of USEMCO's selection. Unloading and special transportation expenses related to job site conditions are not included.

Installation of shipped loose items is the responsibility of the buyer. This may include but not limited to vent pipes, hatches, magnesium anodes and pumps.

Prices quoted and contained herein are firm provided quotation is accepted within 30 days from date of bid and if approved submittals are received within 60 days after mailed from USEMCO for approval.

Four (4) Operational and Maintenance manuals will be supplied at time of start up. Additional copies may be purchased for \$50.00 each.

Terms: Net thirty (30) days from the date of invoice, or at start up, whichever occurs first, if credit is approved, otherwise due in full upon delivery. These terms are independent of and are not contingent upon the manner in which the purchaser may receive payment from others. The sale of the equipment described above is made solely and expressly subject to the terms and conditions on the face and reverse side hereof.

Shipment is estimated 8-10 weeks after receipt in USEMCO's office of complete approved submittal data.

One day of factory trained service representative time for start up purposes is included in the price. If additional days are required, USEMCO will furnish a factory trained service representative for \$1,500.00 per day, plus travel time and expenses.

END OF QUOTATION

INVOICE

The Herald Record LLC
177 MAIN STREET
WEST UNION, WV 26456
United States

Phone: 304-873-1600
Fax: 304-666-1017
Mobile: 304-266-2247
TheHeraldRecord.com

Doddridge County OFFICE OF EMERGENCY MANAGEMENT
101 Church Street
West Union, West Virginia 26456
United States

Invoice Number: 3331
Invoice Date: June 16, 2021
Payment Due: June 16, 2021
Amount Due (USD): \$99.62

Items	Quantity	Price	Amount
Class II Legal Ad -- Floodplain Permit # 21-596 Run Date: 6/9/21 & 6/16/21	1	\$49.81	\$49.81
II Legal Ad - Floodplain Permit # 596 ⌘ Run dates: 6/9/21 & 6/16/21	1	\$49.81	\$49.81
		Total:	\$99.62
		Amount Due (USD) :	\$99.62



STATE of WEST VIRGINIA;
COUNTY OF DODDRIDGE, TO WIT:

I, Tamela B. Beamer, Editor of THE HERALD RECORD, a certified weekly newspaper published regularly in Doddridge County, West Virginia, DO Hereby Certify Upon Oath that the accompanying Legal Notice entitled:

Doddridge County Floodplain Permits
(Week of June 14, 2021)

Please take notice that on the (7th) of (June), 2021, (Sherwood Minstream LLC) filed an application for a Floodplain Permit (#21-596 to develop land located at or about (253 Armstrong Ave, West Union); Coordinates : 39.28185833, -80.7283056. The Application is on file with the Floodplain Manager of the County and may be inspected or copied during regular business hours in accordance to WV Code Chapter 29B Freedom of Information, Article 1 Public Records and county policy and procedures. Any interested persons who desire to comment shall present the same in writing by (July 5, 2021) (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Floodplain Manager of the County at 105 Court Street, Suite #3, West Union, WV 26456. This project is for the renewal of permit #20-570 Smithburg Processing Plant

George C. Eidel, CFM
Doddridge County Floodplain Manager

6/9x2XB

Floodplain Permit Application
Sherwood Midstream
Permit # 21-596

was published in said paper for 2 successive weeks beginning with the issue of 6/9, 2021 and ending with the issue of 6/16, 2021 that contains 252 word space at .115 cents per word and amounts to the sum of \$ 28.08 FOR THE FIRST PUBLICATION.

SECOND PUBLICATION IS 75% OF THE FIRST PUBLICATION and each other publication thereafter \$ \$21.73 for the TOTAL OF: \$ 49.81.

Editor,

Tamela B. Beamer

SWORN TO AND SUBSCRIBED BEFORE ME THIS THE 16 day of June, 2021.

NOTARY PUBLIC

Jennifer D. Leggett

