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*)

George C. Eidel

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

MARKWEST 1042

INVOICE DATE	INVOICE NUMBER	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
09-MAR-20	03092050000	SAJV180008 FLOOD PLAN RENEWAL	500.00	0.00	500.00
COMPANY REF: Sherwood Midstream Holdings L.L.C.				**NET TOTAL**	**$500.00**

FP# 20-570

COPY COPY COPY COPY

▽ REMOVE DOCUMENT ALONG THIS PERFORATION

MARKWEST

Sherwood Midstream Holdings LLC
1515 Arapahoe Street, Tower 1, Suite 1600
Denver, CO 80202-2126
Phone: 1-800-730-8388

JP Morgan Chase Bank, N.A.
340 S Cleveland Ave
Columbus, OH 43271

44-1544/441

No. **001042**

CHECK NUMBER	DATE	PAY EXACTLY
001042	**25-MAR-20**	**$********500.00**

Pay Five Hundred Dollars And Zero Cents*****

Pay To The Order Of
Doddridge County Commission
105 Court St
Suite #3
West Union, WV 26456

AUTHORIZED SIGNATURE

DOCUMENT CONTAINS BLUE PANTOGRAPH & MICROPRINTING. BACK HAS THERMOCHROMIC INK & A WATERMARK. HOLD AT AN ANGLE TO VIEW. VOID IF NOT PRESENT.

⑈001042⑈ ⑆044115443⑆ 10007008 2⑈

COPY COPY

Sherwood Midstream Holdings LLC
1515 Arapahoe Street, Tower 1, Suite 1600
Denver, CO 80202-2126

FP# 20-570

COPY

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

FLOODPLAIN PERMIT #20-570

Sherwood Midstream 253 Armstrong Ave, West Union. Renewal of #17-485, 39.28185833, -80.72873056

TASK	COMPLETE (DATE)	NOTES
CHECK RECEIVED	4/6/2020	
US ARMY CORP. ENGINEERS (USACE)		
US FISH & WILDLIFE SERVICES (USFWS)		
WV DEPT. NATURAL RESOURCES (WVDNR)		
WV DEPT. ENVIROMENTAL PROTECTION (WVDEP)		
STATE HISTORIC & PRESERVATION OFFICE (SHPO)		
OFFICE of LAND & STREAM (OLS)		
DATE OF COMMISSION READING	4/21/2020	
DATE AVAILABLE TO BE GRANTED	5/11/2020	
PERMIT GRANTED		
COMPLETE		

Doddridge County Floodplain Permits

(Week of April 13, 2020)

Please take notice that on the **(6th)** of **(April), 2020, (Sherwood Midstream LLC.)** filed an application for a Floodplain Permit **(#20-570)** to develop land located at or about **(253 Armstrong Ave.); 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 **(May 11, 2020)** (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 a renewal of FP #17-485**

GEORGE C. EIDEL, CFM

Doddridge County Floodplain Manager

Permit# 17-485 20-570

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 R P.C
Agent for Landowner

DATE 03/31/2020

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: Environmental Manager - New Construction		
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: Environmental Manager - New Construction		
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

Project Narrative:

Describe in detail the proposed development including project name/title, type of development, estimated start and completion timeline, and its potential impact on the floodplain. Use additional copies of this page as needed.

Project Narrative:
Sherwood Midstream, LLC is proposing to continue constructing the Smithburg Natural Gas Processing
Facility on approximately 100 acres of a 244 acre MarkWest Liberty Midstream & Resources, LLC
property. The site is located off Snowbird Road (CO RT 50/16) in Doddridge County, West Virginia. Plans
for the proposed facility consist of six (6) cryogenic gas processing units, two (2) de-ethanizer units, and
supporting facilities. The facility will process natural gas and provide support for the local shale industry.
The ongoing proposed development within the FEMA designated Zone AE Floodplain involves the
installation of a 4" HDPE waterline and a potable water booster pump station with appurtenances.

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

	ACTIVITY		STRUCTURAL TYPE
[]	New Structure	[]	Residential (1 – 4 Family)
[]	Addition	[]	Residential (more than 4 Family)
[]	Alteration	[]	Non-residential (floodproofing)
[]	Relocation	[]	Combined Use (res. & com.)
[]	Demolition	[]	Replacement
[]	Manufactured/Mobil Home		

B. OTHER DEVELOPLMENT ACTIVITIES:

[] Fill [] Mining [] Drilling [] Pipelining
[] Grading
[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
[] Watercourse Alteration (including dredging and channel modification)
[] Drainage Improvements (including culvert work)
[] Road, Street, or Bridge Construction
[] Subdivision (including new expansion)
[] Individual Water or Sewer System
[X] 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? ☐ **Yes** ☐ **No**		**Is the development in the floodplain?** ☐ **Yes** ☐ **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? ☐ **Yes** ☐ **No**		**Is the development in the floodplain?** ☐ **Yes** ☐ **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:		

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: Doss Enterprises LC		
C/SC WV License Number: WV027217		
C/SC FEIN:	**C/SC DUNS:**	
Local C/SC Point of Contact (POC): Darren Hunter		
Local C/SC POC Title: Project Engineer		
C/SC Mailing Address: 7522 US Hwy 19N		
City: Jane Lew	**State:** WV	**Zip-Code:** 26378
Local C/SC Office Phone: (304) 884-2325		
Local C/SC POC Phone: (681) 495-2266		
Local C/SC POC E-Mail: darren.hunter@dossenterprises.com		

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): Richard P. Celender		
Engineer Firm Primary POC Title: Vice President		
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: (412) 429-2309		
Engineer Firm Primary POC E-Mail: rcelender@cecinc.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: 03/31/2020

Agent for Landowner

Applicant Printed Name: Richard P. Celender

File No. A-1764 Parcel ID No. 8-16-15 AND 8-16-15.2

This Indenture, made the 19th 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 1 CREEK 148 AC
Tax Map 16, Parcel 15.2
Tax Ticket Number: 27558

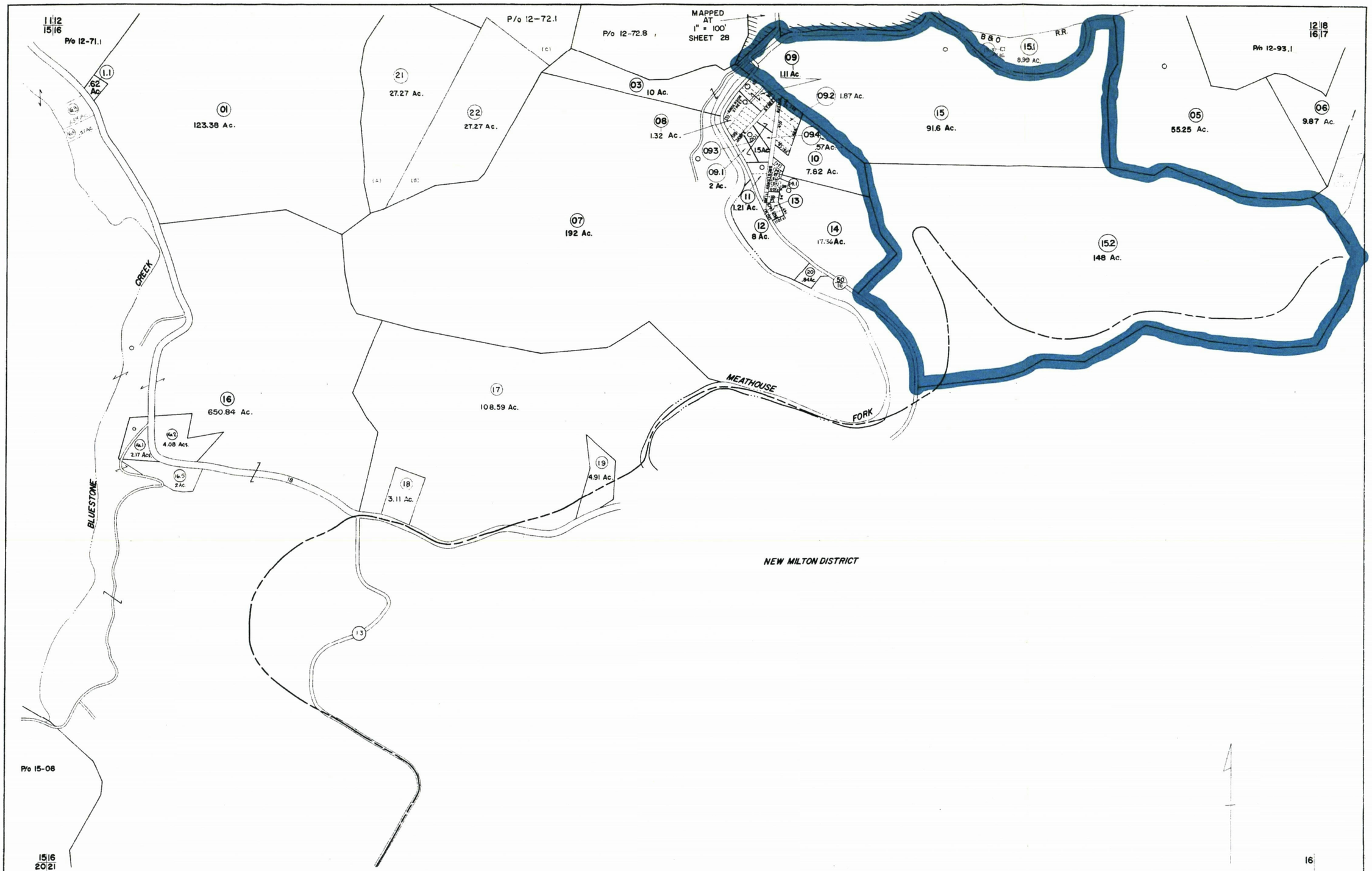
Third Tract:
MOOSE GENE P & LINDA G (SURV)
SMITHBURG 91.6 AC
Tax Map16, Parcel 15
Tax Ticket Number: 27559

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 roadway		Deed lot number - in parentheses	(15)
Corporation line		Parcel or index number - in circle	(99)
District line		Improvement	○
County line		Railroad	

Revisions

1	REVISED 3/11/64		9	Revised to 7-1-68		17	
2	1-26-72 JM		10	OGIS 1-18-91	JB	18	
3	8-30-76 BAH		11	GIS 11-93	RD	19	
4	12/17/79	AB	12	SLS INC. 3/13/00	JAW	20	
5	4-1-80	MCS	13	ESI 3/29/01	REK	21	
6	REVISED 7-81 T. Groves		14	2/27/04	SBH	22	
7	2-26-99	TRL	15			23	

STATE OF WEST VIRGINIA
DODDRIDGE COUNTY

Office of Assessor

WEST UNION DISTRICT
SHEET 16

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

LEGEND

- 820 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- APPROXIMATE STREAM CENTERLINE
- 20+55.25 — HEC-RAS CROSS SECTION
- (A) — SECTION END LABEL
- PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
- FEMA ZONE AE FLOODPLAIN
- EXISTING EPHEMERAL STREAM
- EXISTING INTERMITTANT STREAM
- EXISTING PERENNIAL STREAM
- EXISTING WETLAND

REFERENCE

1. 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.
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 LOCATION FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

SCALE IN FEET
0 100 200

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
DWG SCALE:	1"=100'	CHECKED BY:	ARG
PROJECT NO:	130-359.0209		
APPROVED BY:	*HAND SIGNATURE ON FILE		*RPC

DRAWING NO.:
SP01

P:\2013\130-359\-CADD\Dwg\TASK 0209\130359.0209-CV01-SP01.dwg

NORTH

EXISTING LEGAL RIGHT OF WAY

MEATHOUSE FORK

POTABLE WATER BOOSTER PUMP STATION

CO ROUTE 50/16

CO ROUTE 50/19

POST-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

STATE ROUTE 50

FEMA ZONE AE FLOODPLAIN

MIDDLE ISLAND CREEK

4" HDPE WATER LINE

PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

CO ROUTE 50/30

CO ROUTE 50/22

POST-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

FEMA ZONE AE FLOODPLAIN

BUCKEYE CREEK

LEGEND

- 820 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- APPROXIMATE STREAM CENTERLINE
- 20+55.25 — HEC-RAS CROSS SECTION
- SECTION END LABEL
- PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
- POST-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
- 820 — PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- FEMA ZONE AE FLOODPLAIN
- EXISTING EPHEMERAL STREAM
- EXISTING INTERMITTANT STREAM
- EXISTING PERENNIAL STREAM
- EXISTING WETLAND

REFERENCE

1. 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.
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4. FLOODPLAIN LOCATION FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

SCALE IN FEET
0 100 200

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

POST-DEVELOPMENT
100-YEAR FLOODPLAIN MAP

DATE:	9/8/17
DRAWN BY:	MEC/ARC
DWG SCALE:	1"=100'
CHECKED BY:	ARG
PROJECT NO:	130-359.0209
APPROVED:	*RPC

DRAWING NO.:
SP02

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, Pennsylvania 15205
(412) 429-2324 Toll Free (800) 365-2324
Fax (412) 429-2114

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

LETTER OF TRANSMITTAL

DATE:	**4/2/20**	JOB NO.:	**130-359**
ATTENTION:	**George Eidel**		
RE:	**Smithburg Natural Gas Processing**		
	Facility - Floodplain Permit Renewal		

WE ARE SENDING YOU									
	X	ATTACHED		SEPARATE COVER	VIA	**FedEx - Priority**	THE FOLLOWING ITEMS:		
		SHOP DWGS		PRINTS		PLANS		SAMPLES		SPECIFICATIONS
		COPY OF LETTER				CHANGE ORDER			

COPIES	DATE	NUMBER	DESCRIPTION
2	3/31/20		Floodplain Development Permit Application
1	3/31/20		Application Fee
2	7/15/13		Deed
2	9/8/17		Tax Parcel map
2	9/8/17		Flooplain Site Plan

WE ARE SENDING YOU						
	X	FOR APPROVAL		APPROVAL 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

George,

Attached is the flooplain permit renewal application for the Smithburg Natural Gas Processing Facility. Please review and let me know if you need any additional information.

Thank you,

COPY TO: _____

SIGNED: _____

Timothy G. Johnston

WV Flood Map

This map is not the official regulatory FIRM or DFIRM. Its purpose is to assist with determining potential flood risk for the selected location.

HIGH RISK	
	Regulatory Floodway
Zone AE	1-Percent-Annual-Chance Flood Hazard Area **With Base Flood Elevation** (BFE)
Zone A	1-Percent-Annual-Chance Flood Hazard Area **Without BFE** (may have Advisory Flood Heights)
Advisory	1-Percent-Annual-Chance Future Conditions (High Risk Advisory Flood Zones)

Download the Full Legend for all flood tool symbols
https://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf

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. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. WV Flood Tool (*https://www.MapWV.gov/flood*) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

Flood Info Location — *Map created on 4/6/2020*

User Notes

Flood Hazard Area	Location is **WITHIN** the FEMA 100-year floodplain.
Flood Zone	AE
Stream	Meathouse Fork
Watershed (HUC8)	Little Musringum-Middle Island (5030201)
Flood Height	Refer to FIS report for BFE
Water Depth	About 9.0 ft (Source: HAZUS)
Elevation	About 793 ft (Source: SAMS 2003)
Community & ID	Doddridge County (ID: 540024)
FEMA Map & Date	54017C0140C; Effective Date: 10/4/2011
Location (lat, long)	(39.283172, -80.733393)
Parcel ID	09-08-0016-0015-0000
E-911 Address	multiple addresses

Gmail **George Eidel <doddridgecountyfpm@gmail.com>**

Smithburg Processing Facility

2 messages

George Eidel <doddridgecountyfpm@gmail.com> Mon, Apr 6, 2020 at 3:27 PM
To: Richard Lowry <RALowry@marathonpetroleum.com>

Rick,

Got the floodplain permit application for renewal of the Smithburg Processing Facility. Thanks for sending it over. I need a couple of things, can you send me a map or layout of where the new waterline and equipment will be. Will it affect the floodplain, if not, a no rise certificate will work. If there is substantial equipment that may cause a rise an H&H may be needed. Also can you give me an estimate of cost showing where you arrived at the $500.00 fee. Thanks again and stay safe!!

--

George C. Eidel, CFM, OEM Director/Floodplain Manager

Doddridge County Office of Emergency Management
101 Church Street Suite 102
West Union, WV 26456-2095
Work Phone:1-304-873-1343
Mobile Phone: 1-304-281-7407
Fax: 1-304-873-1840
doddridgecountyfpm@gmail.com
--

Lowry, Richard A. <RALowry@marathonpetroleum.com> Mon, Apr 6, 2020 at 4:29 PM
To: George Eidel <doddridgecountyfpm@gmail.com>

Thanks George.

I hope you are doing well. I have CEC collecting the requested information. I will pass that along as soon as I get it.

Thanks again

Rick

[Quoted text hidden]

April 24, 2020

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 #19-548
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 (#19-548) 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 expires on May 27, 2020. 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:

- Hydrologic and Hydraulic Analysis of Middle Island Creek, Meathouse Fork, and Buckeye Creek – Smithburg Natural Gas Processing Facility

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 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.

Also included for your review, please find the quote associated with the proposed water booster station. This quotation was used to determine the floodplain permit renewal 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 $500.00 fee was submitted with the previously submitted application.

New Industrial Structures or Additions and/or Substantial Improvement to Existing Industrial Structures, changes in Land Use and Land Altering Activities for Industrial purposes

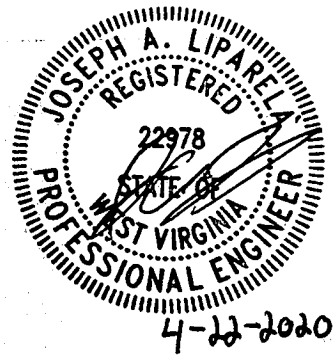
(industrial structures includes oil and/or natural gas wells, roads, bridges, tank pads, and Buildings used or associated with oil and natural gas purposes)
(the total costs of which do not exceed $100,000.00).....**$500.00**

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

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Joseph A. Liparela, P.E.
Project Manager



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

Enclosures

130-359-NRL Floodplain Permit-4.22.20

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, Pennsylvania 15205
(412) 429-2324 Toll Free (800) 365-2324
Fax (412) 429-2114

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

LETTER OF TRANSMITTAL

DATE:	**5/1/2020**	JOB NO.:	**130-359**
ATTENTION:	**George Eidel**		
RE:	**Commercial/Industrial Floodplain**		
	Development Permit Renewal #19-548,		
	Smithburg Natural Gas		
	Processing Facility		

WE ARE SENDING YOU	X	ATTACHED		SEPARATE COVER	VIA	**FedEx**			THE FOLLOWING ITEMS:
		SHOP DWGS		PRINTS	X	PLANS		SAMPLES	X SPECIFICATIONS
		COPY OF LETTER				CHANGE ORDER			

COPIES	DATE	NUMBER	DESCRIPTION
1	5/1/2020		"No-Rise" Letter
1	5/1/2020		Smithburg Natural Gas Processing Facility Water Line and Booster Plans
1	5/1/2020		Hydrologic and Hydraulic Analysis of Middle Island Creek, Meathouse Fork, and Buckeye Creek - Smithburg Natural Gas Processing Facility
1	5/1/2020		Water Booster Pump Station Quotation
1	5/27/2019		Current Floodplain Development Permit

WE ARE SENDING YOU	x	FOR APPROVAL		APPROVAL 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 EXECUTION.		
		FOR BIDS DUE:				PRINTS RETURNED AFTER LOAN TO US

REMARKS

Enclosed are the Response to Comments documents for Doddridge County Floodplain Permit Renewal (#19-548) of the Smithburg Natural Gas Processing Facility.

Please let me know if you have any questions.

Thank you,

COPY TO: File

SIGNED: Timothy G. Johnston

Gmail George Eidel <doddridgecountyfpm@gmail.com>

RE: [EXTERNAL] Smithburg Processing Facility-Floodplain Permit Renewal

Johnston, Tim <tjohnston@cecinc.com> Thu, Apr 30, 2020 at 3:04 PM
To: George Eidel <doddridgecountyfpm@gmail.com>
Cc: "Celender, Rick" <rcelender@cecinc.com>, "Weis, Kristen" <kweis@cecinc.com>, "Lowry, Richard A." <RALowry@marathonpetroleum.com>

Good Afternoon George,

Our Smithburg Processing Facility "No Rise Letter", plans showing the proposed waterline and booster station (including details of the booster station), the original H&H Analysis, and documentation explaining how the permit fee was determined are available for download at the location linked below.

http://downloads.cecinc.com/130-359-Smithburg/20200430%20Doddridge%20FP%20Permit/

Please let us know if you have any questions.

Thank you,

Tim

Timothy G. Johnston, P.E.* / Project Manager

Civil & Environmental Consultants, Inc.

333 Baldwin Road · Pittsburgh, PA 15205-1751

Toll-Free: (800) 365-2324 · Direct: (412) 489-0203 · Fax: (412) 429-2114

Mobile: (724) 875-6718 · http://www.cecinc.com

Senior Leadership · Integrated Services · Personal Business Relationships

**Registered Professional in Pennsylvania*

From: George Eidel <doddridgecountyfpm@gmail.com>
Sent: Friday, April 10, 2020 3:20 PM
To: Celender, Rick <rcelender@cecinc.com>
Subject: Re: [EXTERNAL] Smithburg Processing Facility-Floodplain Permit Renewal

Rick,

[Quoted text hidden]
[Quoted text hidden]

April 24, 2020

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 #19-548
Smithburg Processing Facility, Doddridge County, West Virginia
CEC Project 130-359

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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 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.

Also included for your review, please find the quote associated with the proposed water booster station. This quotation was used to determine the floodplain permit renewal 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 $500.00 fee was submitted with the previously submitted application.

New Industrial Structures or Additions and/or Substantial Improvement to Existing Industrial Structures, changes in Land Use and Land Altering Activities for Industrial purposes

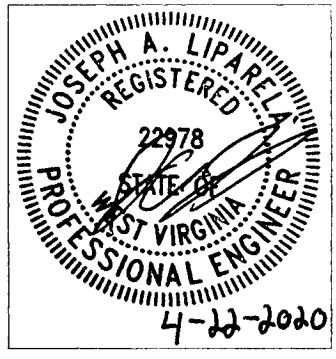
(industrial structures includes oil and/or natural gas wells, roads, bridges, tank pads, and Buildings used or associated with oil and natural gas purposes)
(the total costs of which do not exceed $100,000.00).....**$500.00**

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

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Joseph A. Liparela, P.E.
Project Manager



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

Enclosures

130-359-NRL Floodplain Permit-4.22.20

TROMBOLD EQUIPMENT CO., INC.
www.tepco-trombold.com

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

QUOTATION NO. 008234 **DATE:** 9/4/19

TO: ATTN: MATT FLUHARTY
CEC

PREPARED BY: Rob Trombold

PROJECT: Mark West Pump Station
LOCATION: Smithburg, WV

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.

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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

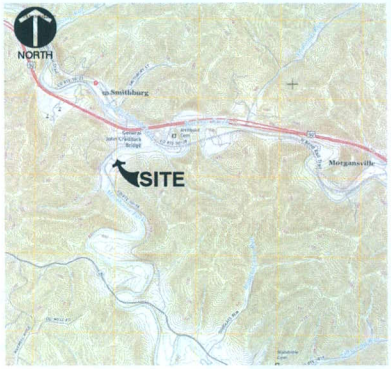
SMITHBURG NATURAL GAS PROCESSING FACILITY
WATER LINE AND BOOSTER STATION

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.

SCALE IN FEET
0 2000 4000

SITE MAP
SCALE: 1" = 2000'

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

PROJECT GENERAL NOTES

1. 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.
2. 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 PROVIDE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
3. 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.
4. ALL WORK PERFORMED BY THE CONTRACTOR SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
5. 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.
6. 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
1. 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.
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.

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

CALL BEFORE YOU DIG
MUWV
1-800-245-4848

REVISION RECORD

NO.	DATE	DESCRIPTION

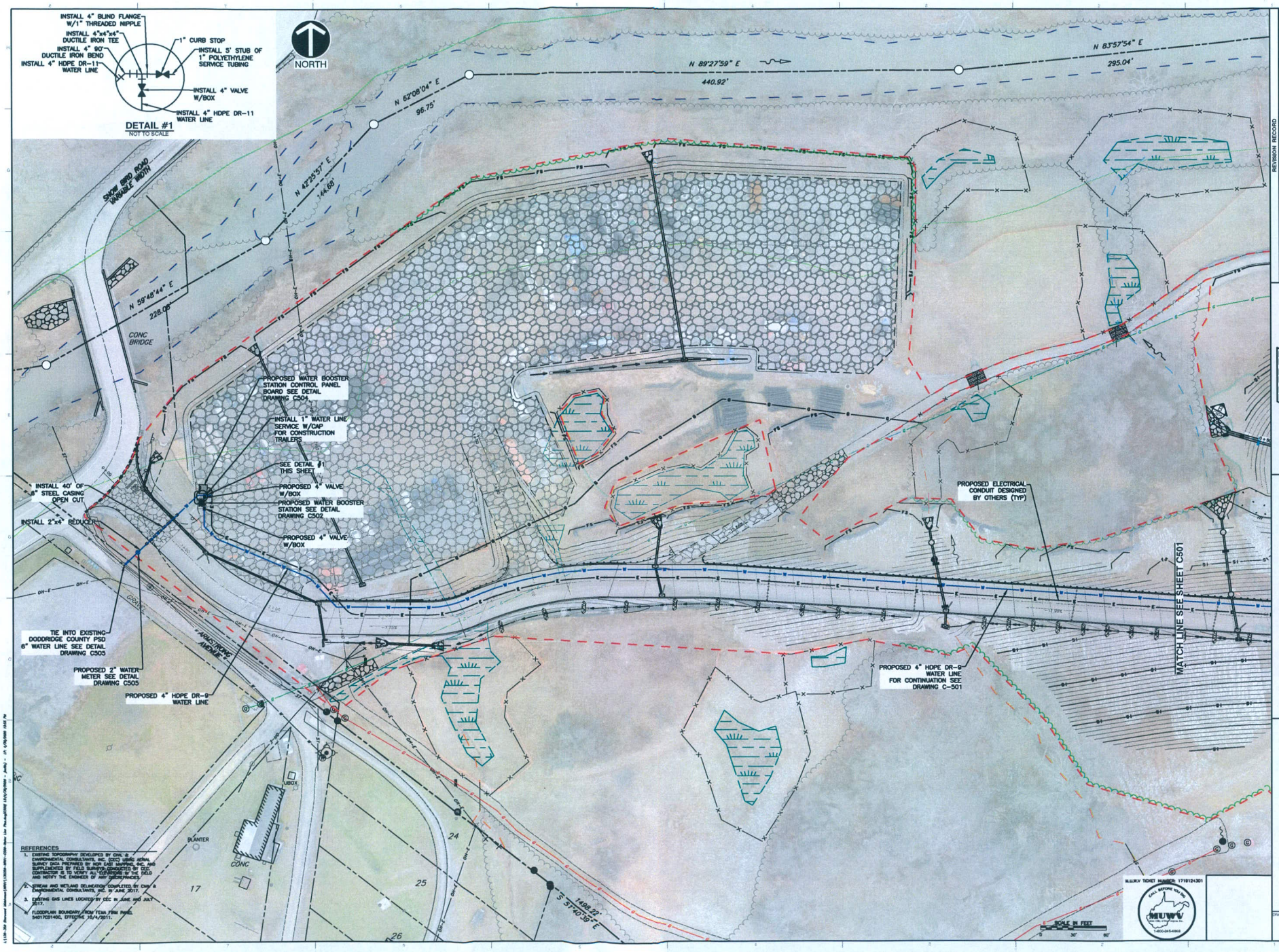
Civil & Environmental Consultants, Inc.
99 Cambridge Place - - Bridgeport, WV 26330
PH: 304.933.3119 - 855.488.8539 - Fax: 304.933.3327
www.cecinc.com

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

COVER

DATE: June 25, 2019 | DRAWN BY: JBH
PROJECT NO: 130-359 | CHECKED BY: MWF
APPROVED BY: * HARD COPIES ON FILE | MWF

DRAWING NO.
C000



REVISION RECORD

NO	DATE	DESCRIPTION

CEC
Civil & Environmental Consultants, Inc.
99 Cambridge Place • Bridgeport, WV 26330
PH: 304.933.3119 • 855.488.8059 • 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	JBH
DRAWN BY:		MWF
SCALE:	AS SHOWN	MWF
CHECKED BY:		MWF
APPROVED BY:		MWF

DRAWING NO.
C500

PCL XL Error

Subsystem:	I/O
Error:	InputReadError
Operator:	EndPage
Position:	542093

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: #19-548

Date Approved: May 27, 2019 **Expires: May 27, 2020**

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

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

Project Address: Snowbird Road/Armstrong Avenue West Union

Firm: 54017C0140C **Lat/Long: 39.283720N, -80.732358W**

Purpose of Development: Renewal of Permit #17-485/Natural Gas Processing Plant

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

George C Eidel

Date: May 27, 2019

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

TROMBOLD EQUIPMENT CO., INC.
www.tepco-trombold.com

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

QUOTATION NO. 008234 **DATE:** 9/4/19

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

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.
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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.

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END OF QUOTATION

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

Civil & Environmental Consultants, Inc.

333 Baldwin Road | Pittsburgh, PA 15205 | p: 412-429-2324 f: 412-429-2114 | www.cecinc.com

TABLE OF CONTENTS

APPENDICES

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 Piggin 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 approximately1,930 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

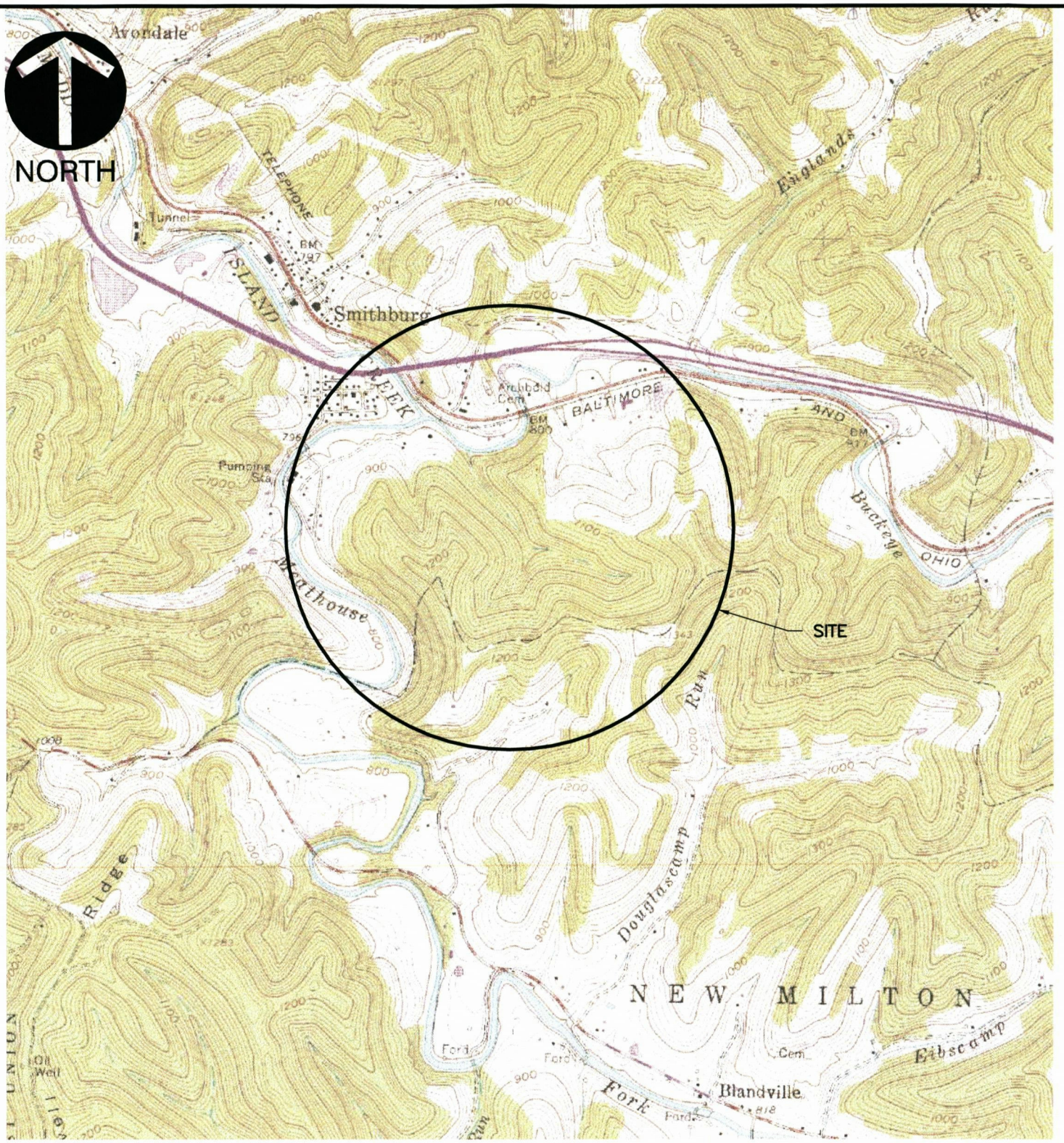
CEC developed the following conclusions based on the H&H analysis results:

- 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



REFERENCE

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

SCALE IN FEET

0 2000 4000

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

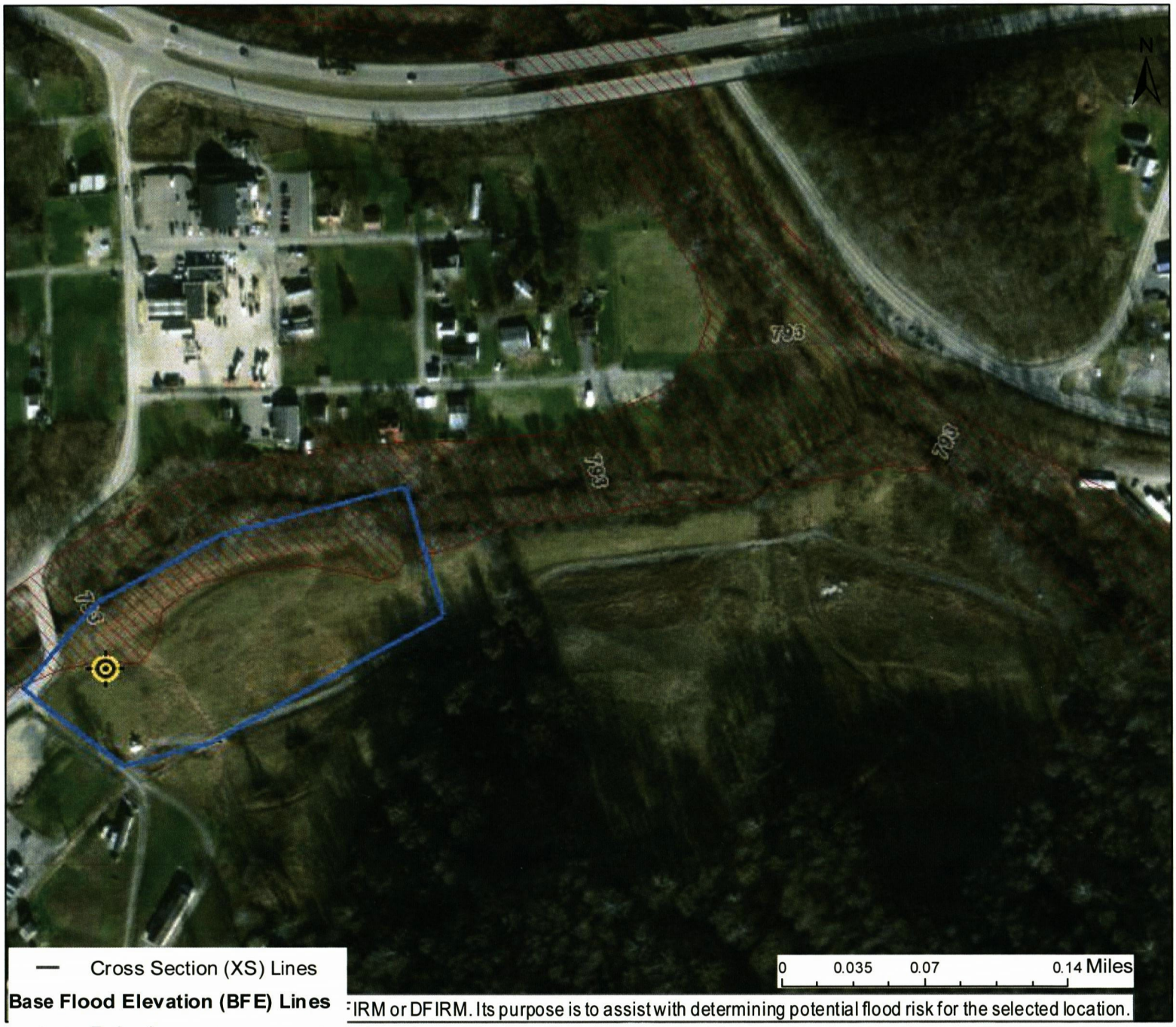
SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA

SITE LOCATION MAP

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

P:\2013\130-359\-CADD\Dwg\TASK 0209\130359.0209-CV01-FIG 1.dwg[LAYOUT1] LS:(01/09/2017 - btomiczek) - LP: 9/1/2017 4:35 PM

WV Flood Map



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

— 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

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 (503
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.

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

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

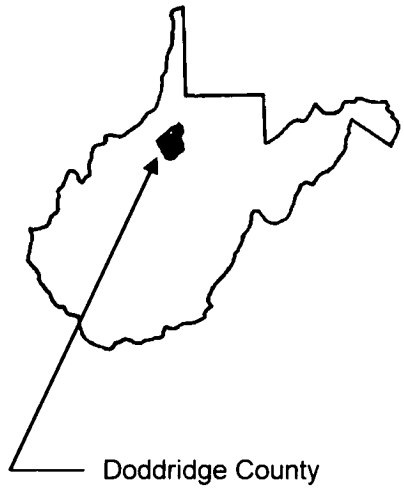
APPENDIX B

FEMA FLOOD INSURANCE STUDY AND FIRM

FLOOD INSURANCE STUDY

DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
WEST UNION, TOWN OF	540025
DODDRIDGE COUNTY (UNINCORPORATED AREAS)	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

Stream	Limits of Detailed Study
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

Stream	Limits of Detailed Study
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

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ. MILES)	PEAK DISCHARGE (CFS) 1-PERCENT-ANNUAL- CHANCE
MIDDLE ISLAND CREEK		
Upstream of Doddridge-Tyler County boundary	134.78	15,200
Approximately 0.1 mile downstream of confluence of Piggin 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

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ. MILES)	PEAK DISCHARGE (CFS) 1-PERCENT-ANNUAL- CHANCE
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

USGS 7.5-Minute Quadrangle Name	Corner	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Conversion from NGVD29 to NAVD88 (foot)
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".

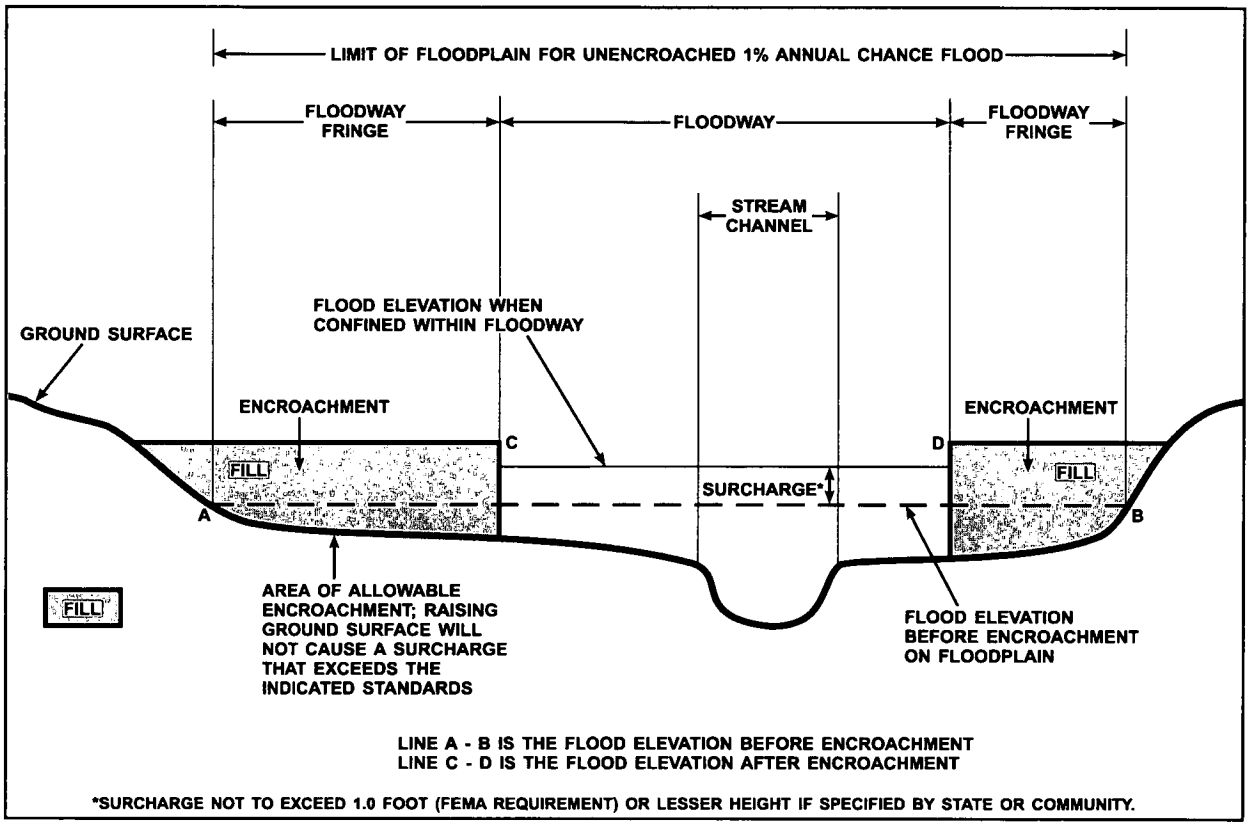

Figure 1 - Floodway Schematic

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

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

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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3. U. S. Department of the Interior, Water-Resources Investigation 87-4111, Techniques for Estimating Flood-Depth Frequency Relations for Streams in West Virginia, by Jeffrey B. Wiley, 1987.

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5. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984.

6. U. S. Army Corps of Engineers, Huntingdon District, Special Flood Hazard Information Report, Middle Island Creek and Tributaries, Doddridge County, West Virginia, October 1978.

7. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Big Isaac, West Virginia, 1964, Photorevised 1976; Center Point, West Virginia, 1961, Photorevised 1976; New Milton, West Virginia, 1965, Photorevised, 1976; Smithburg, West Virginia, 1961, Photorevised 1976; West Union, West Virginia, 1961, Photorevised 1976.

8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of West Union, Doddridge County, West Virginia, April 2, 1976.

9. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Doddridge County, West Virginia, Washington, D.C., June 3, 1977.

10. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Tyler County, West Virginia, Washington, D. C., November 4, 1988.

11. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Harrison County, West Virginia, Washington, D. C., July 4, 1988.

12. Federal Emergency Management Agency, Flood Insurance Study, Lewis County and Incorporated Areas, West Virginia, Washington, D.C., July 1, 1987.

13. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Ritchie County, West Virginia, Washington, D.C., December 11, 1981.

14. Federal Emergency Management Agency, Flood Insurance Study, Gilmer County and Incorporated Areas, West Virginia (Unpublished).

FLOOD PROFILES

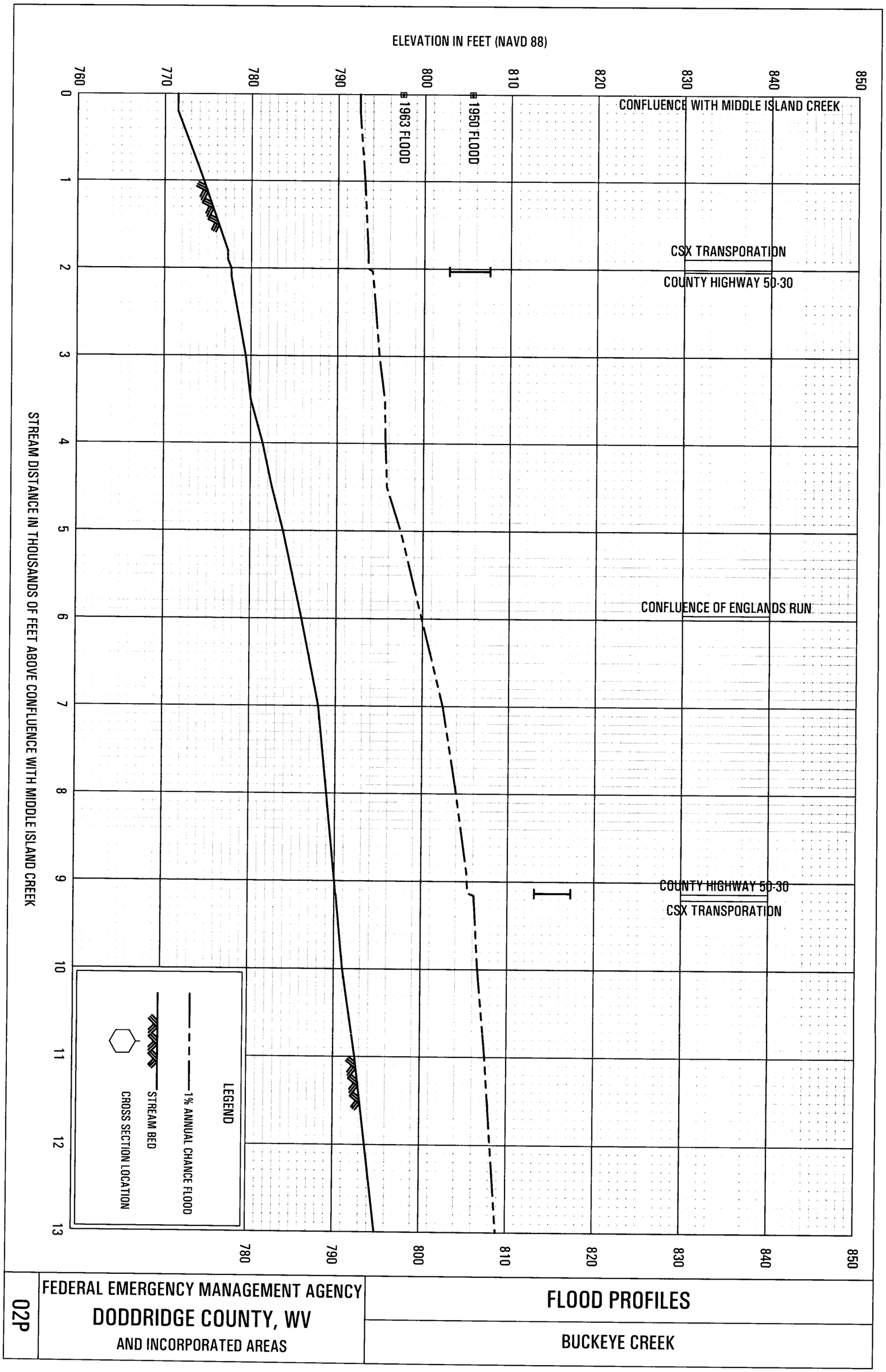
BIG ISAAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

01P



02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

BUCKEYE CREEK

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

03P

ELEVATION IN FEET (NAVD 88)

900
890
880
870
860
850
840
830
820
810

26 27 28 29 30 31 32 33 34 35 36 37 38 39

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH MIDDLE ISLAND CREEK

CONFLUENCE OF LONG RUN

LIMIT OF DETAILED STUDY
COUNTY HIGHWAY 15

LEGEND

1% ANNUAL CHANCE FLOOD

STREAM BED

CROSS SECTION LOCATION

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

04P

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

05P

ELEVATION IN FEET (NAVD 88)

925
920
915
910
905
900
895
890
885
880

CONFLUENCE OF INDIAN FORK

COUNTY HIGHWAY 46-2

CONFLUENCE OF ELDERCAMP RUN

CONFLUENCE OF WOLFPEN RUN

COUNTY HIGHWAY 48

61.5 62.0 62.5 63.0 63.5 64.0 64.5 65.0 65.5 66.0 66.5 67.0 67.5 68.0

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH MIDDLE ISLAND CREEK

LEGEND

1% ANNUAL CHANCE FLOOD

STREAM BED

CROSS SECTION LOCATION

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

06P

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

07P

FLOOD PROFILES

GREENBRIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

08P

940
935
930
925
920
915
910
905
900
895

ELEVATION IN FEET (NAVD 88)

LIMIT OF DETAILED STUDY

LEGEND

1% ANNUAL CHANCE FLOOD

STREAM BED

CROSS SECTION LOCATION

5.5 6 6.5 7 7.5 8 8.5 9 9.5 10 10.5 11 11.5 12

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH BUCKEYE CREEK

FLOOD PROFILES

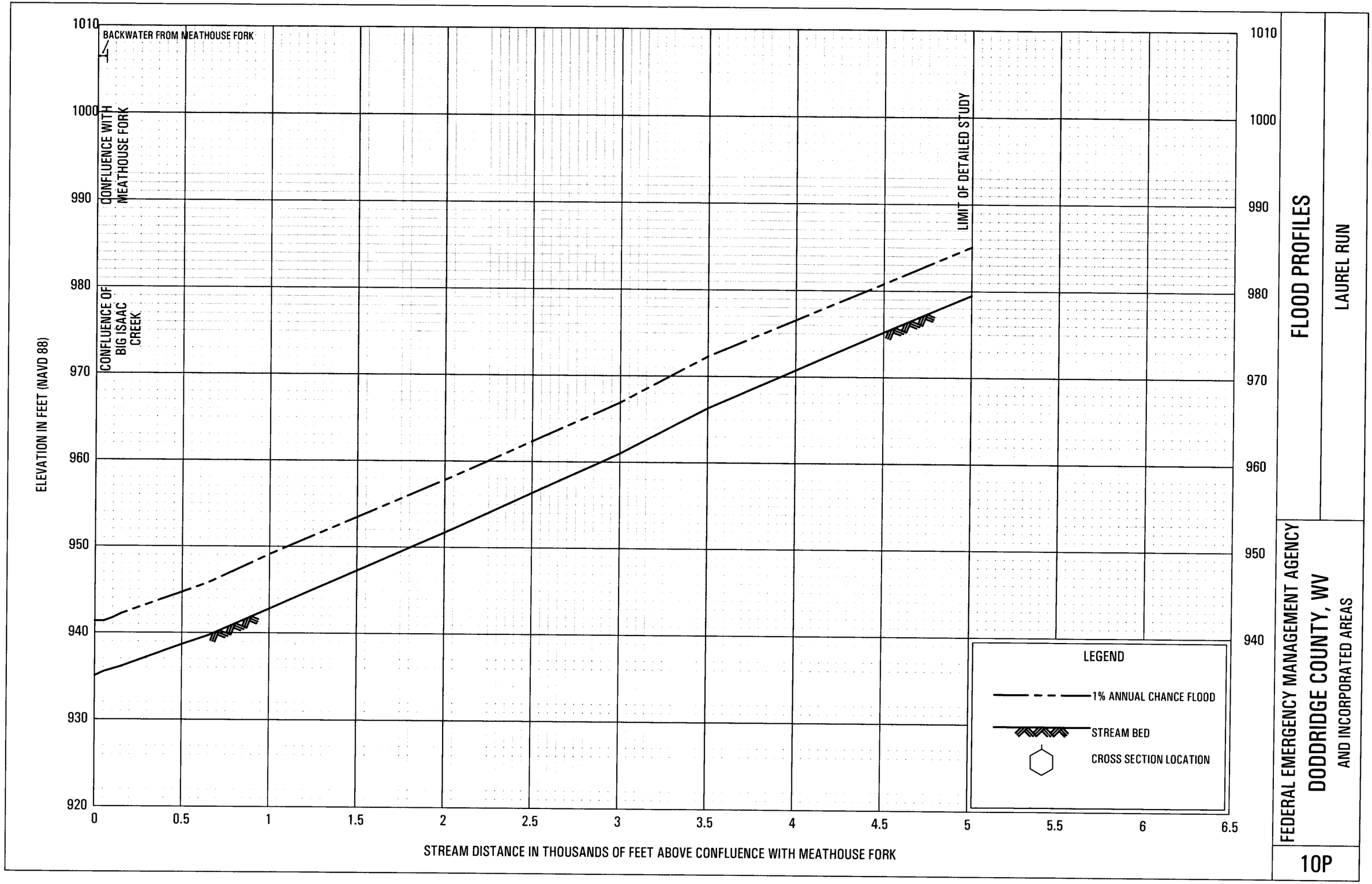
GREENBRIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

09P



FLOOD PROFILES

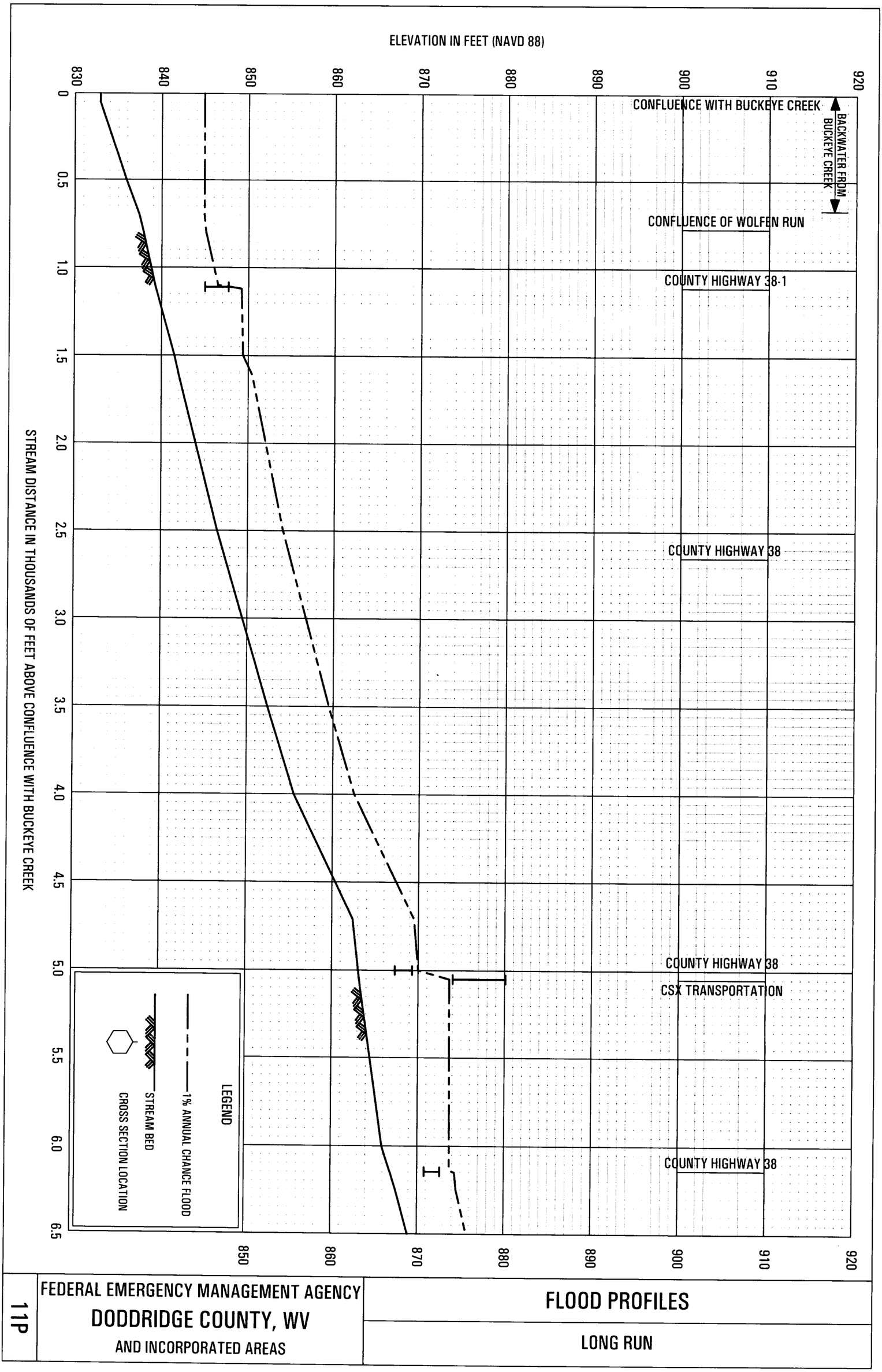
LAUREL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

10P



11P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

LONG RUN

950
940
930
920
910
900
890
880
870
860

ELEVATION IN FEET (NAVD 88)

6.5 7.0 7.5 8.0 8.5 9.0 9.5 10 10.5 11 11.5 12 12.5 13

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH BUCKEYE CREEK

LIMIT OF DETAILED STUDY

LEGEND

1% ANNUAL CHANCE FLOOD

STREAM BED

CROSS SECTION LOCATION

FLOOD PROFILES

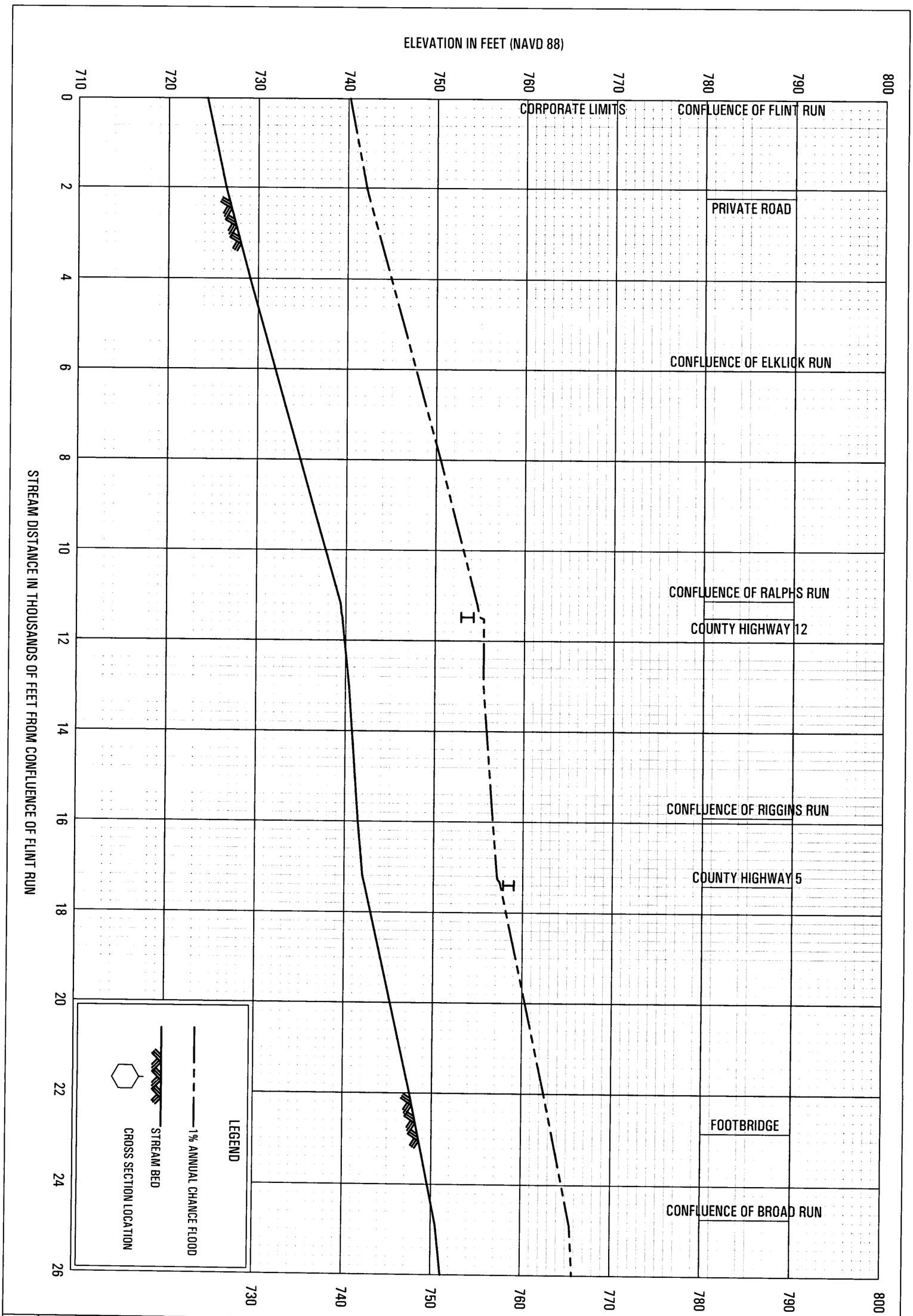
LONG RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

12P



FEDERAL EMERGENCY MANAGEMENT AGENCY

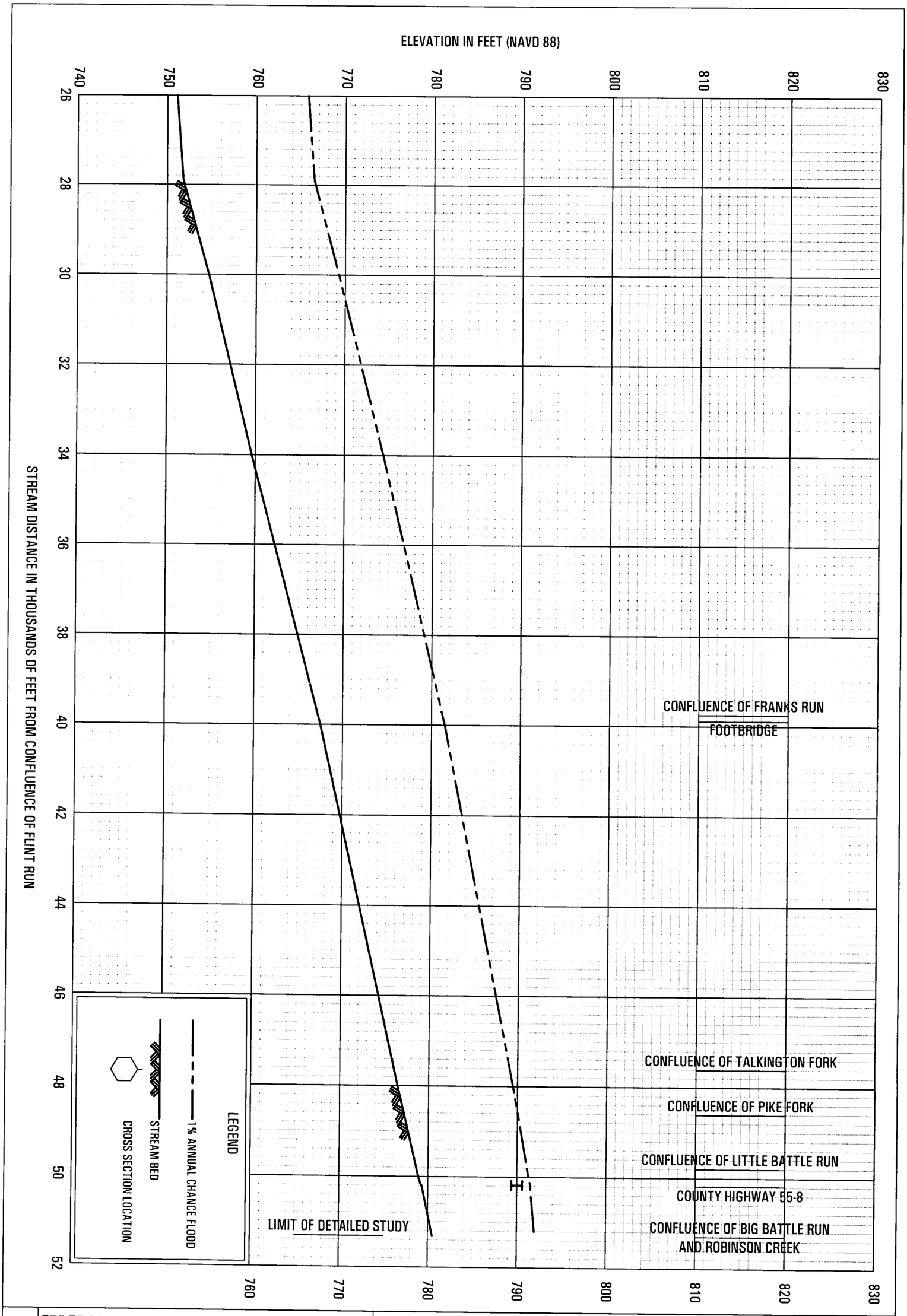
DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

MCELROY CREEK

13P



14P

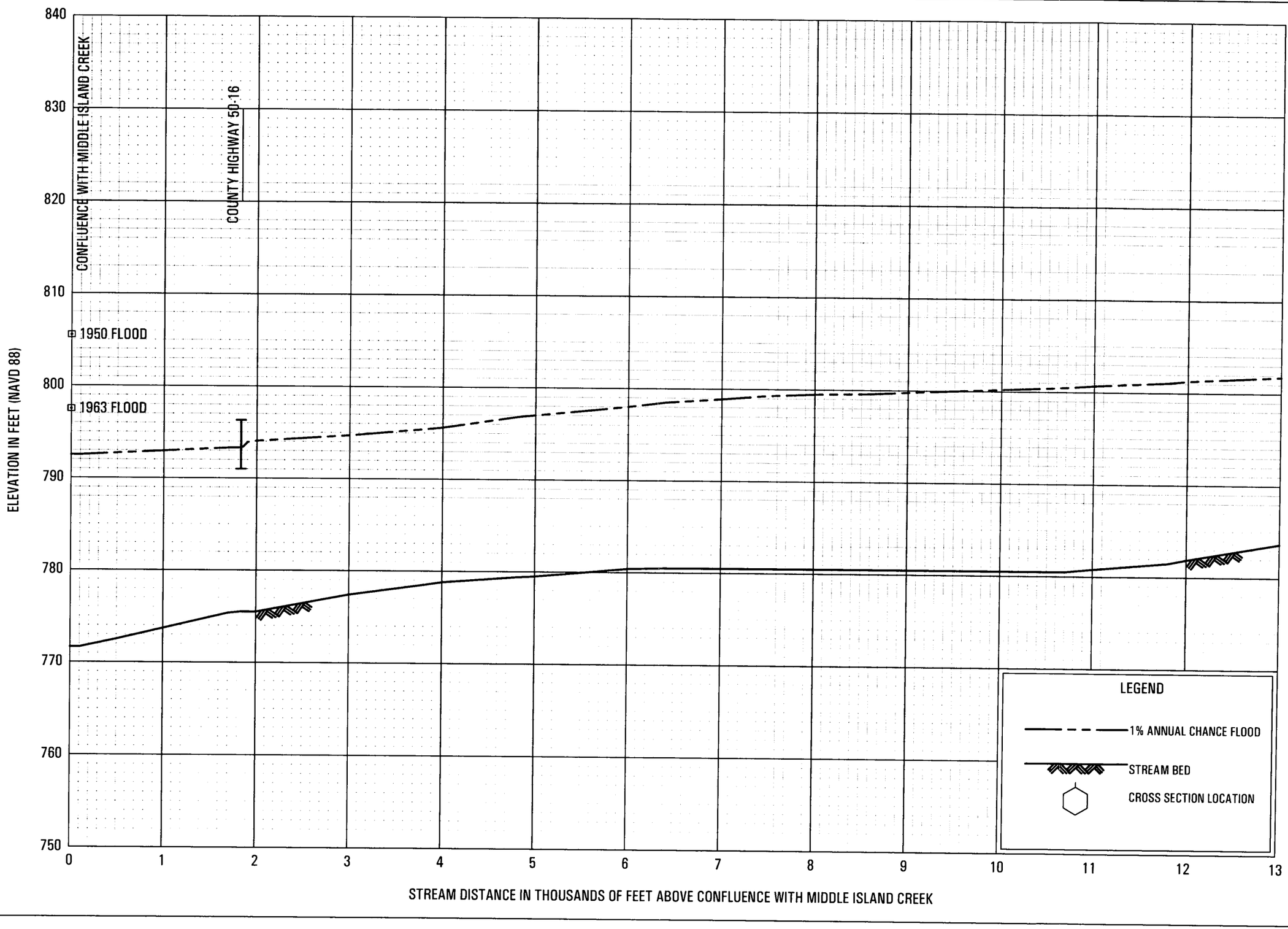
FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

MCELROY CREEK



FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

15P

FLOOD PROFILES

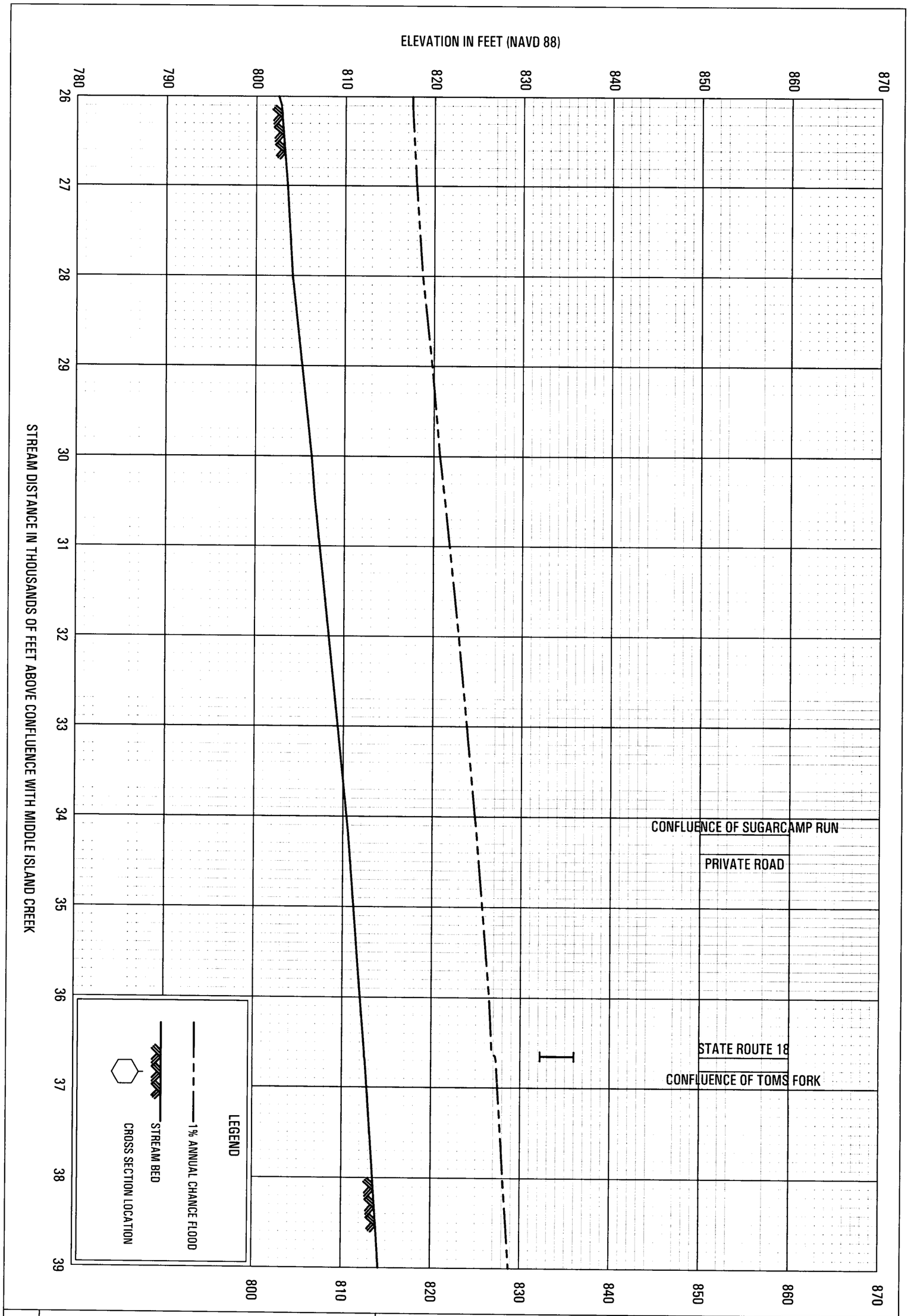
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

16P



17P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

MEATHOUSE FORK

FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

18P

FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

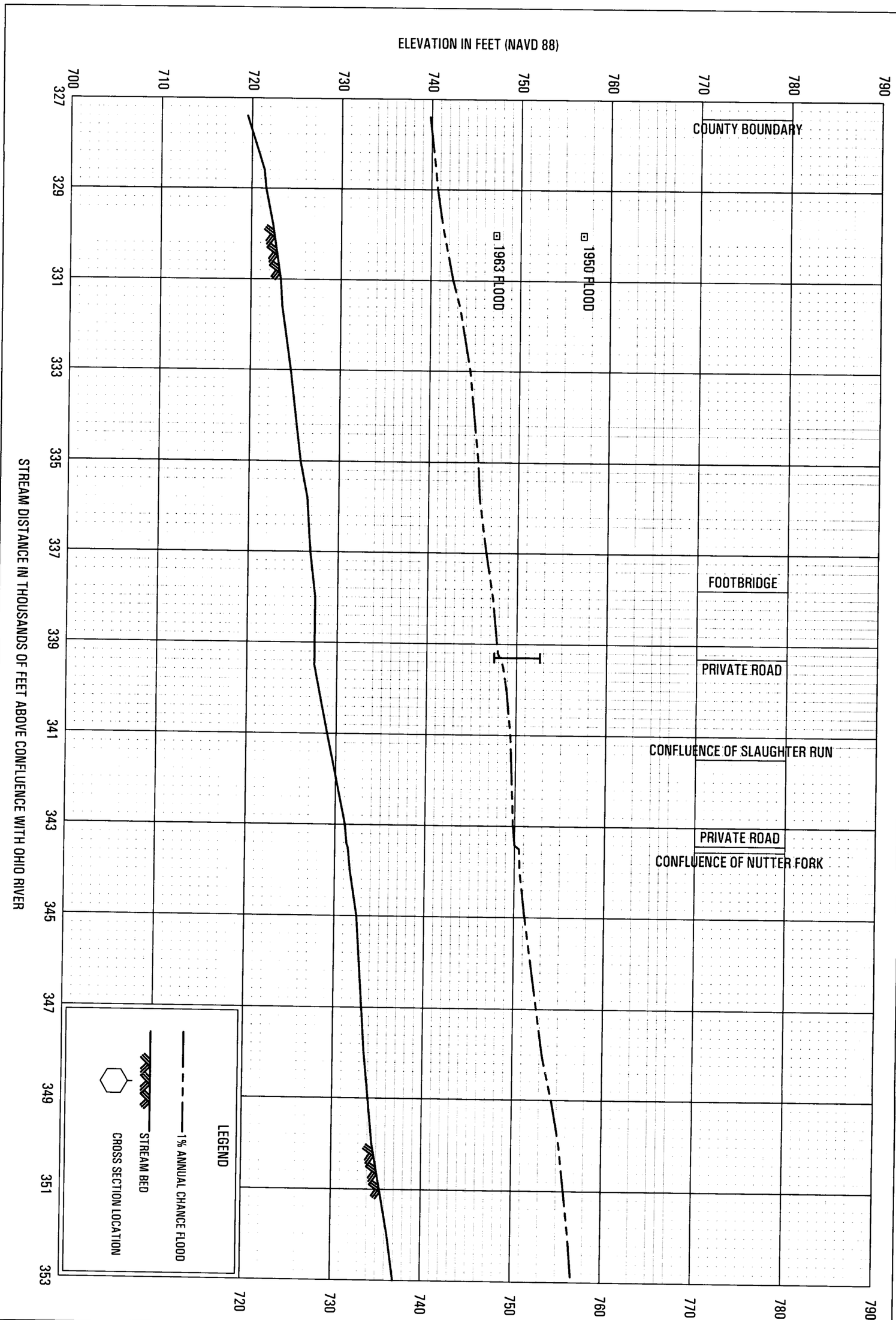
FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



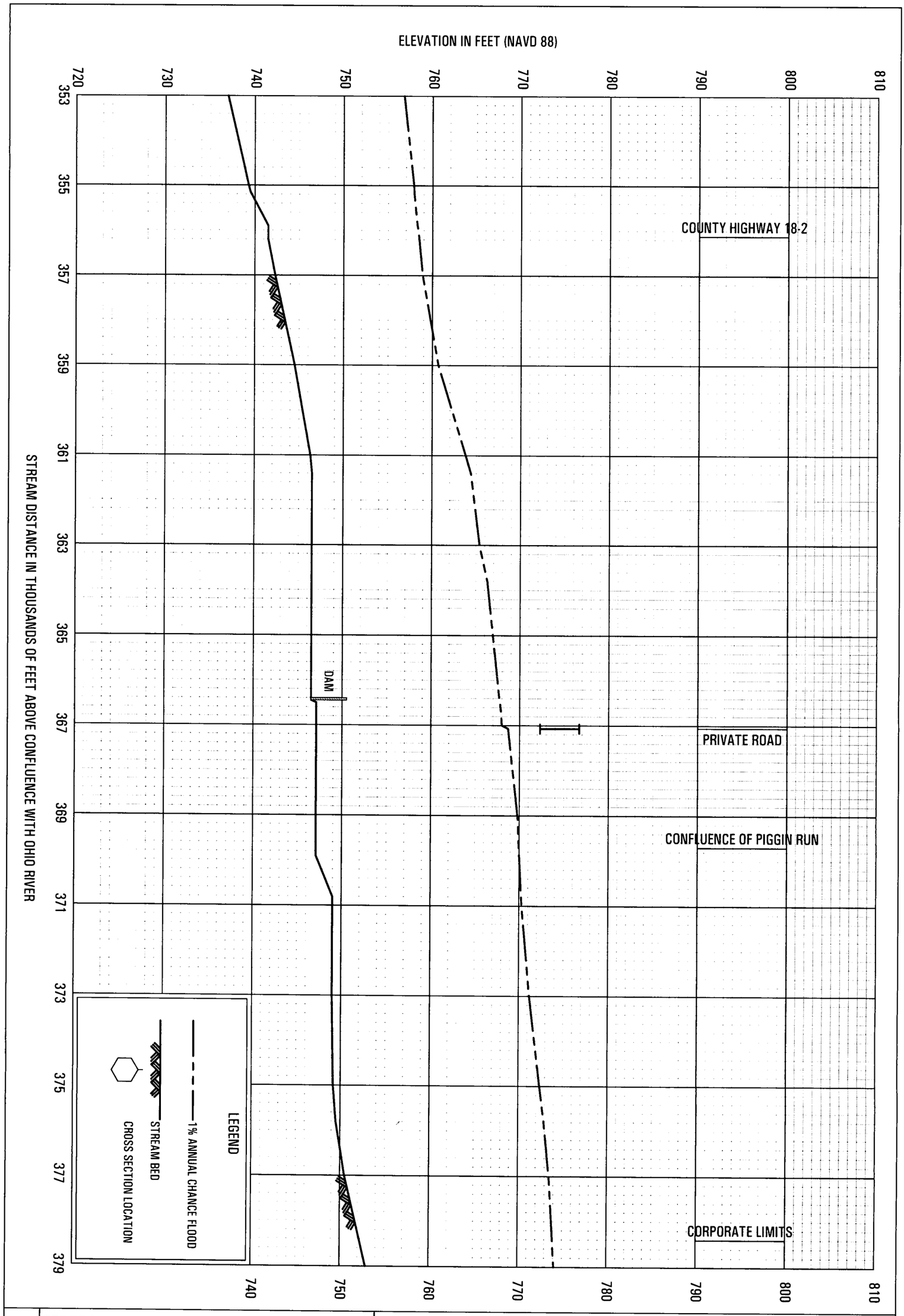
FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

MIDDLE ISLAND CREEK



22P

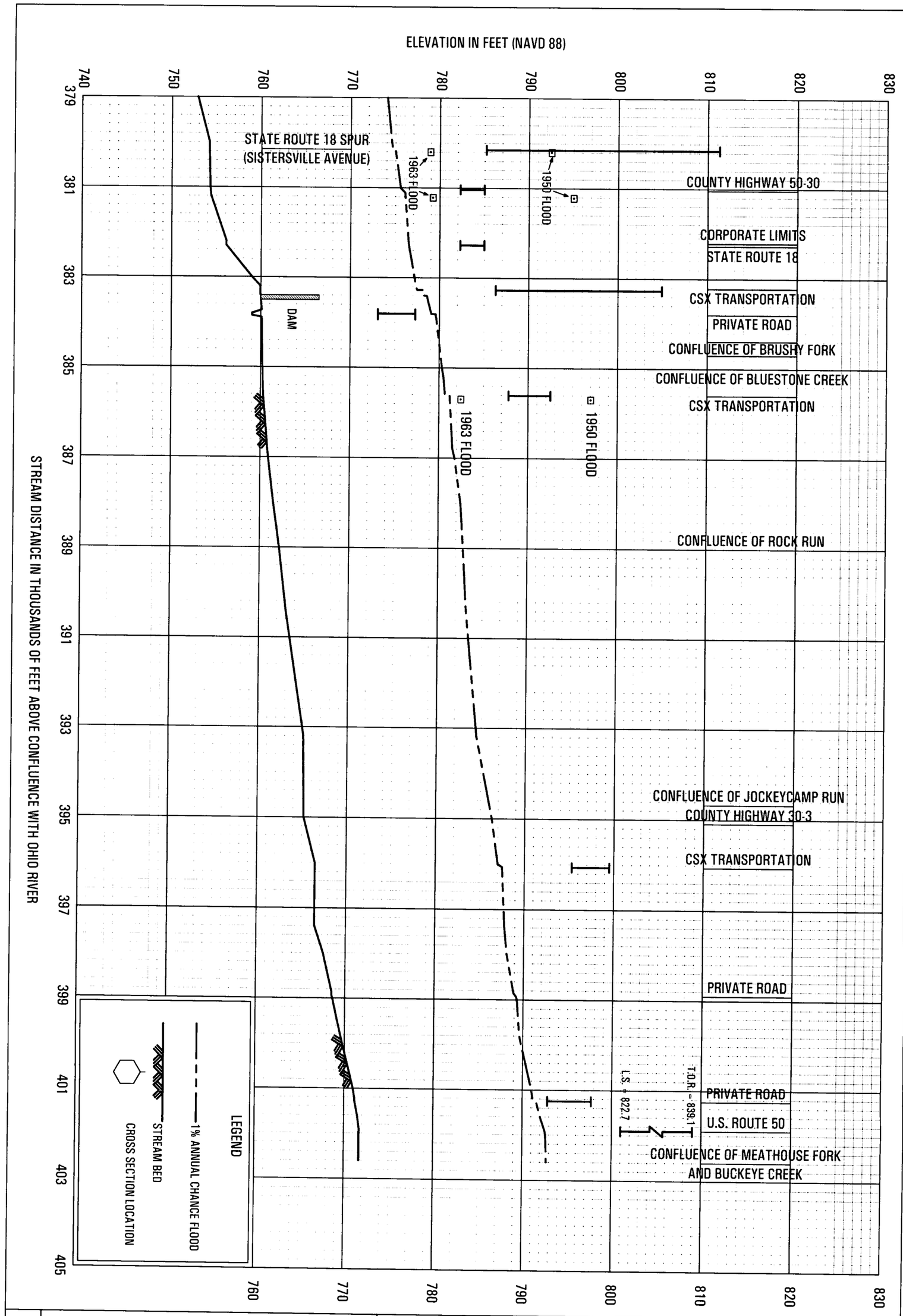
FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

MIDDLE ISLAND CREEK



23P

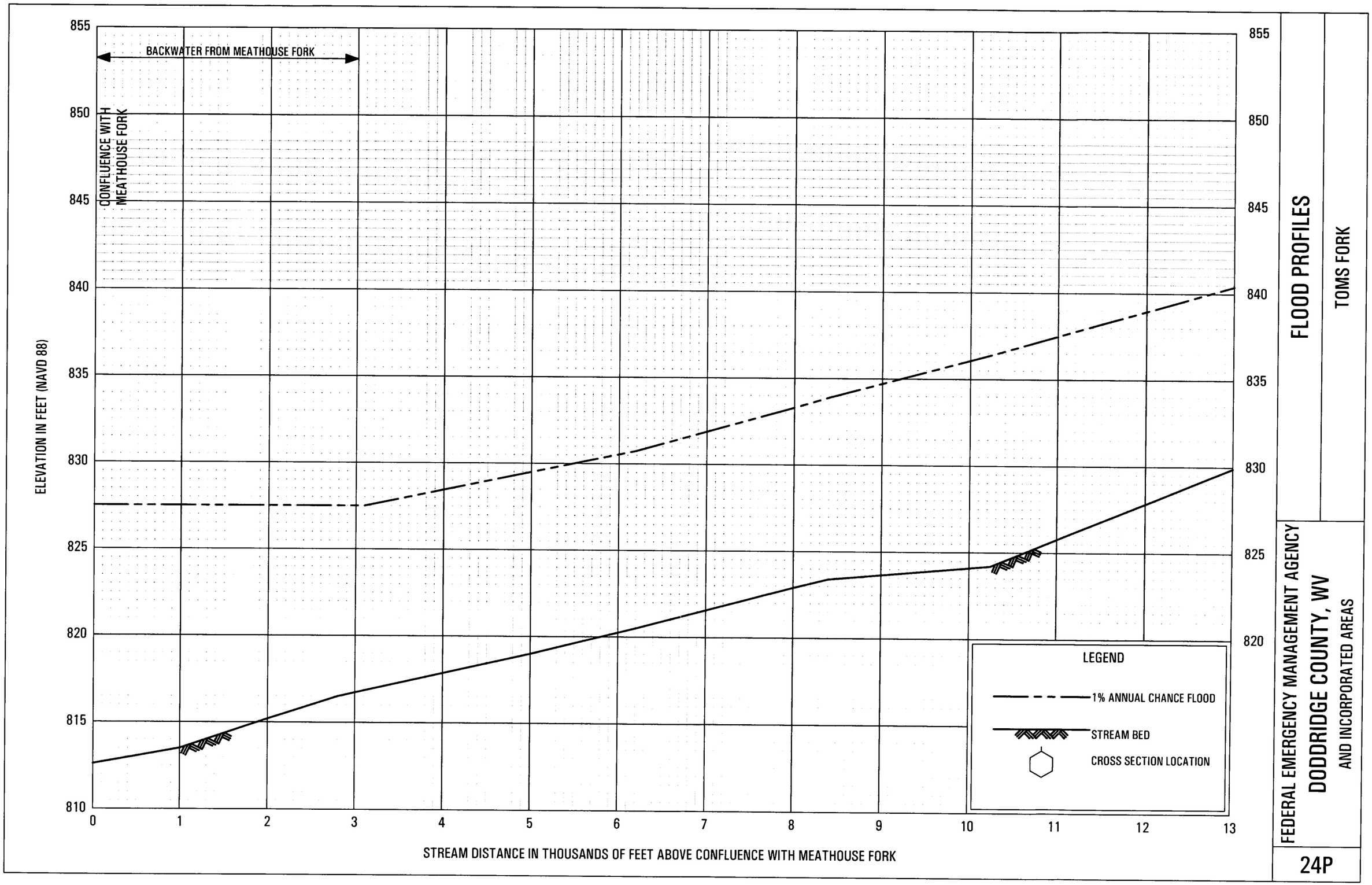
FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

FLOOD PROFILES

MIDDLE ISLAND CREEK



FLOOD PROFILES

TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

24P

FLOOD PROFILES

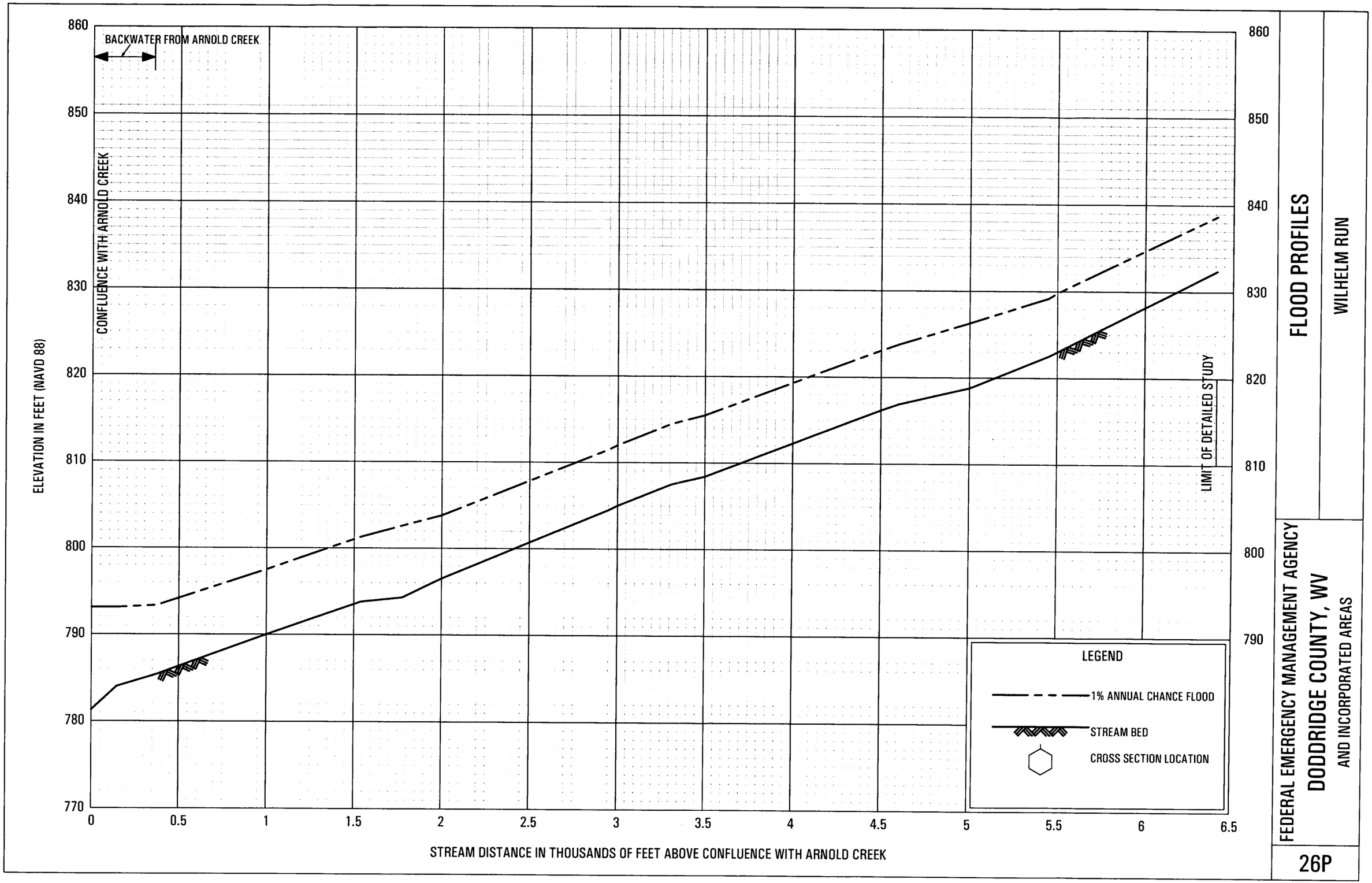
TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

25P



FLOOD PROFILES

WILHELM RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

26P

APPENDIX C

EXISTING CONDITIONS HYDRAULIC CALCULATIONS, CROSS SECTIONS, AND FLOODPLAIN MAPS

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
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: 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,

"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

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 River	Reach	Tributary River	Reach	Length	Angle
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	846.87	15.06003	840	26.38	831.64	29.82001	829.18
36.76001	824.62	58.93002	810	60.84003	808.74	70.34003	798.98	72.48001	796.79
83.61002	785.43	87.56003	784	98.61002	780	99.06003	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	.068	3.61002	.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

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

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	824.77	4.490021	824.11	12.17999	820	19.98001	815.81
28.42001	811.45	39.99002	800	41.89999	798.11	45	795.11	51.72	788.61
63.06	780	65.27002	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						

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	800	3.66	796.96	4.70999	796.82	11.66998	796	16.73999	795.35
17.16	795.19	18.51999	794	18.85999	793.64	19.69	793.23	23.63998	791.24
25.47998	790	27.78	788.44	29	787.53	33.13	786.94	35.07999	786.65
35.82999	786.37	36.72	786	40.89999	784.34	3.51999	784	45.31	783.79
45.88	783.72	46.95999	783.47	48.44998	783.07	49.31	783.65	53.35001	786
55.60999	787.28	64.60999	788.45	68.51999	789.09	72.25	789	73.57999	788.96
83.10999	788.94	88.16	785.39	5.28998	780	97.95999	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	.06	83.10999	.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
```

0	814	.75	813.88	3.369995	813.27	10.8	811.97	11.77	811.83
20.69	810.23	21.19	810	21.46001	809.87	25.63	807.65	25.84001	807.53
27.89	806.39	33.73001	803.49	35.93001	800	38.39	793.64	40.75	789.42
42.39	787.84	7.34001	784.23	48.59001	783.14	50.79001	781.66	52.59001	780
53.39	779.25	59.23001	778	60.77	777.57	62.84001	777.07	81.01001	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	.06	47.34001	.055	120.66	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.34001	120.66	105.28	100	89.4	.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	804.3	099976	803.94	3.830002	803.31	0.32001	802	15.84	800.96
22.32001	798.82	2.57001	798.72	24.46001	798.17	24.86	798	26.23	797.37
31.89999	794	32.08	793.89	36.09	790.35	36.31	790	37.82001	787.6
40.53999	786	42.38	784.94	44.13	783.68	44.95	782.86	48.39	779.96
50.00999	778.85	1.42999	778	53.03999	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

```
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     79469.60999  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
```

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

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
```

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	796.58	5.559998	794.65	12.73999	790.51	23.31	786.06
24.66	785.49	26.78	784.54	41.26001	780.36	42	780.22	44.48001	778.93
49.19	776.44	56.5	775.66	70	774.64	83.5	775.79	84.52002	776.5
85.54001	777.08	85.56	777.09	87.38	777.59	1.73999	779.91	94.45999	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	8042.89	0015	803.86	2.970001	803.86	3.470001	803.78	20.45999	802.63
24.59	802.35	27.85001	802.07	29.41	801.98	40.73001	801.17	43.97	800.85
45.42001	799.91	50.54999	796.69	52.26001	796.13	53.10001	795.84	53.79999	795.6
54.01001	795.53	55.17999	794.58	55.44	792.47	55.67001	792.49	55.67999	791.97
56.26001	791.81	63.87	789.67	3.04001	786.48	76.23999	784.04	76.32001	783.99
76.45001	783.97	6.58002	783.82	76.64001	783.78	84.86002	779.01	88.81	776.73
88.94	776.64	89.08002	776.55	89.11002	776.53	89.35001	776.38	89.37	776.36

89.48999	776.28	89.62	776.28	9.85001	776.19	0.08002	776.19	90.31	776.18
90.54999	776.18	90.79001	776.17	91.04001	776.17	91.29001	776.16	91.51001	776.16
91.73001	776.15	91.95001	776.15	92.17001	776.14	92.35001	776.14	92.53	776.13
92.81	776.13	93.09	776.12	93.34	776.12	93.59	776.11	93.82001	776.11
94.04999	776.1	94.37	776.09	94.70001	776.09	95.04999	776.08	95.32001	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	.06	73.04001	.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

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	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	796.6952.26001		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

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	.067	3.04001	.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	803.97	1.600006	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	803.51	9.899994	803.451	0.92001	803.391	1.89999	803.33	12.84	803.28
13.75	803.22	14.60999	803.18	15.44	803.131	6.26001	803.081	6.98001	803.04

17.39999	803.03	20.42001	802.92	22.04999	802.86	23.07001	802.82	23.76001	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	802.55	30.35001	802.55	31.29999	802.48	31.95001	802.4
32.51001	802.37	32.57001	802.37	33.79999	802.22	34.89999	802.09	35.63	802.01
38.48999	801.22	38.60999	801.14	38.69	801.11	38.72	801.1	40.22	789.71
42.13	789.75	42.17001	789.75	42.67999	789.71	43.17001	789.67	44.14999	789.59
46.5	789.34	8.20001	788.55	48.59	789.2	48.62	789.18	48.63	789.18
48.63	789.17	48.64001	789.17	48.64999	789.16	48.66	789.16	48.66	789.15
48.67001	789.15	48.67001	789.14	48.67999	789.14	48.69	789.13	49.13	788.8
62.85001	778.06	63.09	777.88	65.32999	776.22	65.35001	776.22	67.12	776.21
78.07999	775.87	78.79001	775.84	79.48999	775.82	80.19	775.79	80.89001	775.77
81.59	775.74	91.54001	775.31	94.44	775.18	98.98001	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.

```
        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
```

38.48999	801.22	38.60999	801.14	38.69	801.11	38.72	801.1	40.22	789.71
42.13	789.75	42.17001	789.75	42.67999	789.71	43.17001	789.67	44.14999	789.59
46.5	789.34	8.20001	788.55	48.59	789.2	48.62	789.18	48.63	789.18
48.63	789.17	48.64001	789.17	48.64999	789.16	48.66	789.16	48.66	789.15
48.67001	789.15	48.67001	789.14	48.67999	789.14	48.69	789.13	49.13	788.8
62.85001	778.06	63.09	777.88	65.32999	776.22	65.35001	776.22	67.12	776.21
78.07999	775.87	78.79001	775.84	79.48999	775.82	80.19	775.79	80.89001	775.77
81.59	775.74	91.54001	775.31	94.44	775.18	98.98001	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	803.16	4.140015	802.15	8.550018	800.31	3.08002	798.62	17.98001	797.14
19.21002	796.64	19.36002	796.49	19.5	796	20.69	791.62	3.90002	790
37.05002	783.41	39.06	782.45	39.39001	782.27	42.10001	780	46.37003	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	.06	23.90002	.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	80	85.079987	804.64	7.209991	803.11	14.16	798.19	20.94998	793.56
25.60999	791.58	34.97	787.9	38.03	786.69	44.60999	785.52	50.72	783.77
60.81998	778	63.35999	776.43	79	776	101.5	774.74	123	776

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

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	.065	5.08997	.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	832.09	3.289978	830.95	7.090027	829.87	7.76001	829.65	8.140015	829.49
23.52002	823.82	8.32001	821.68	31.98999	820.27	32.21002	82	055.23001	792.59
57.41	790	58.97	788.14	62.32001	784.16	64.01001	783.42	68.16	781.41
72.64999	779.36	73.48999	778.88	78.14001	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	.066	2.32001	.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	828.92	1.41998	3	828.77	5.63000	5	828.44	14.56	825.79
16.07999	825.39	18.41	825.07	24	824.39	24.69	824	26.03998	823.23
33.13	819.31	45.31998	797.87	49.19998	790.01	49.57999	789.25	50.51999	788.52
52.70999	786.84	60.04999	781.06	66.31998	777.56	8.31998	776.42	68.32999	776.41
95.38998	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	.065	2.70999	.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	822.59	15.26999	8	2218.17001	821.43	23.58002	820.13
27.11002	819.25	28.92999	818	37.97	811.45	44.09	8	0849.60001	800.33

57.31	791.64	58.61002	790.17	59.82001	789.21	71.61002	780.36	76.23999	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	Sta	n Val
0	.067	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	817.8	1.610016	817.55	9.650024	812.37	23.37003	803.59
29.31003	800	37.20001	795.33	43.26001	791.98	47.15002	790	47.19	789.98
58.22	783.56	60.72	781.86	64.96002	778	66.69	776.43	90.71002	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	97.56	.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

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	804	3.440002	803.38	10.92001	801.08	13.01999	800.51	4.70999	800
19.72	798.47	31.20001	796.67	34.29999	796.17	43.22	794.92	44.98001	794.65
46.51001	794.49	50.06	794	54.45001	793.39	67.51001	791.91	71.29001	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	802	2.019989	801.64	4.5	800.68	6.47998	800	10.04001	798.71
12.51999	798.1	13.28	798	14.19	797.87	22.69998	796.83	30.51999	796.15
32.53	796	38.92999	795.55	47.92999	794.75	58.19998	794.38	61.88998	794.21
65.97	794	75.97	793.46	77.35999	793.4	82.37	792.96	83.22	792.87
84.14999	792.82	89.73999	792.59	95.44	792.12	97.60999	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	169.67	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

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	794	12.09998	793.58	14.39999	793.58	28.31	793.59	34.34998	793.54
45.21997	793.66	48.68997	793.62	52.28	793.59	57.31998	793.49	80.82999	792.91
84.51999	792.83	85.26999	792.85	85.54999	792.86	85.92999	792.87	87.87	792.6
91.21997	792.19	94.51999	79	296.20999	791.84	97.97998	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
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	795.2910.45996		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	803.72563.5699		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

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		

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

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

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	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)		(ft)	
(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	

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

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

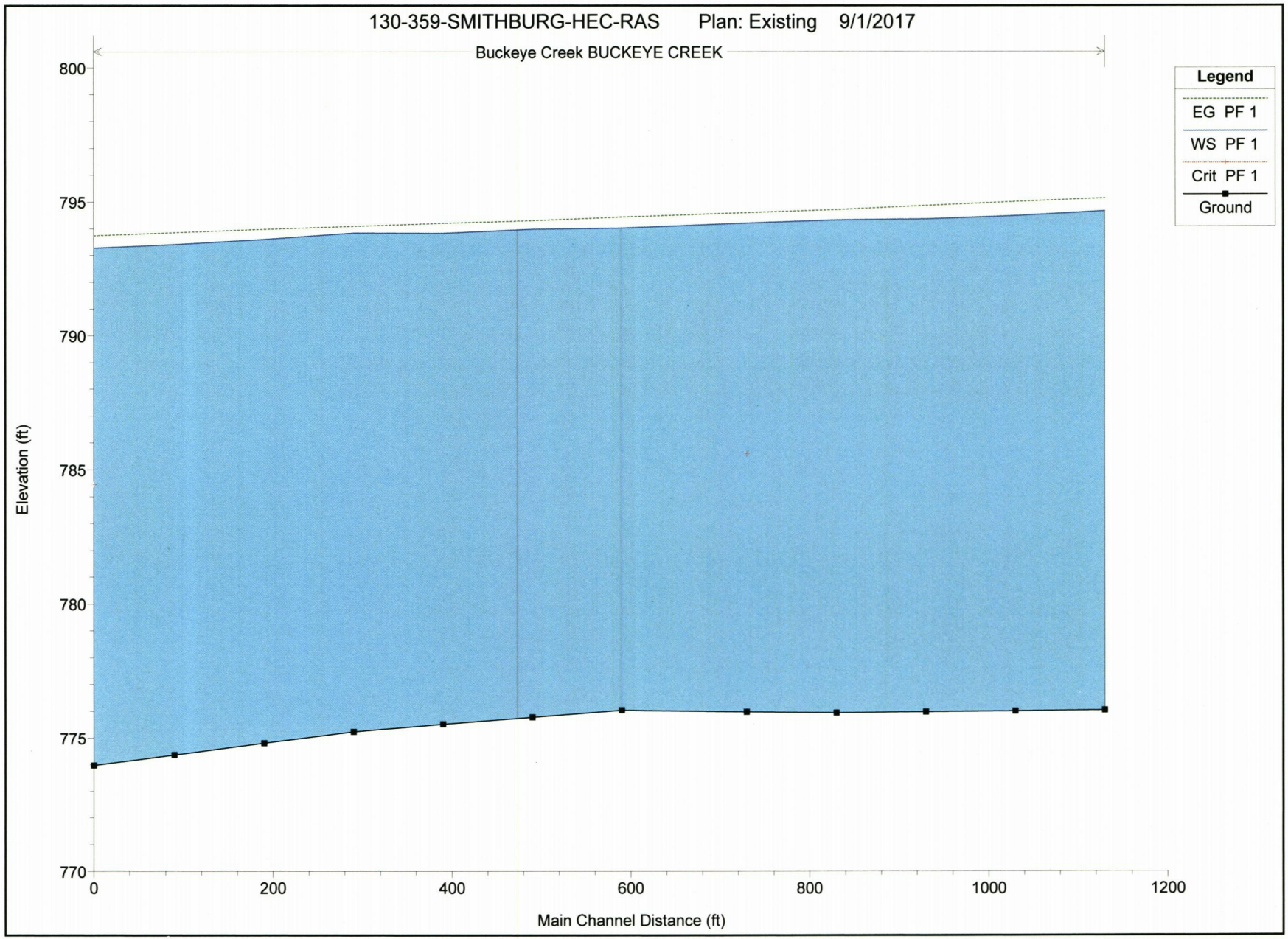
0.26

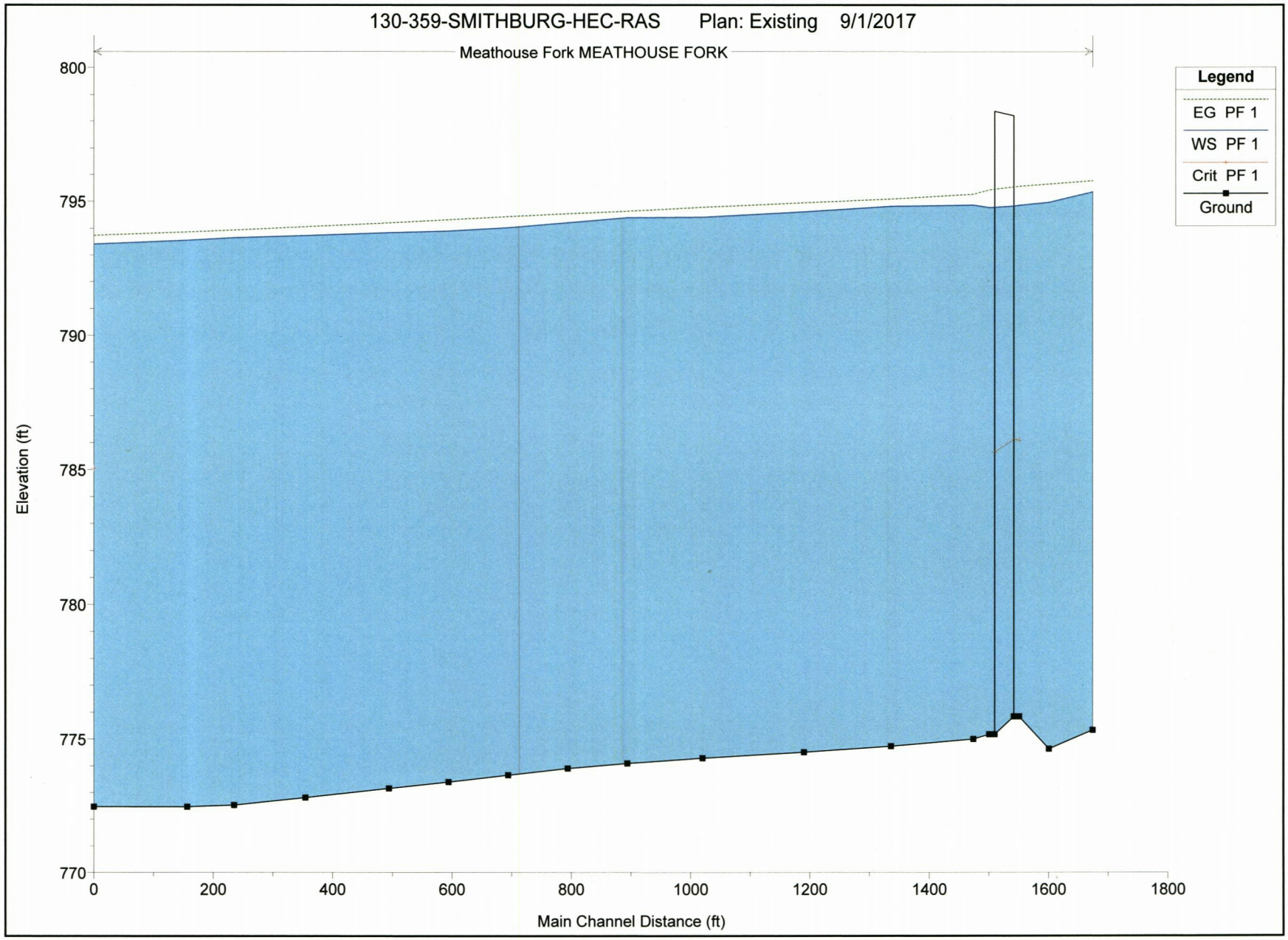
Profile Output Table - Standard Table 2

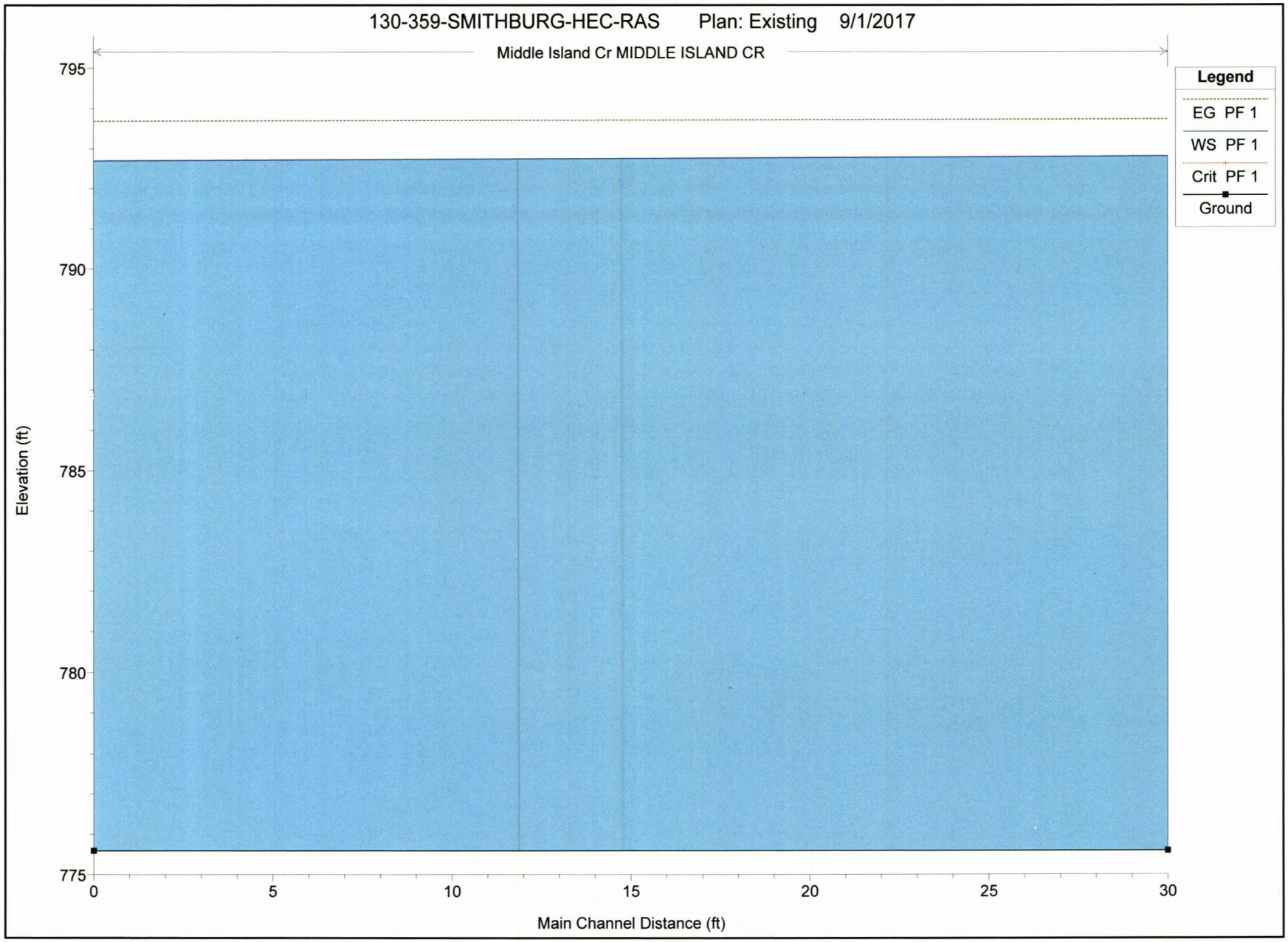
River	Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
				(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	793.73	792.82	0.91	0.04	0.01	3041.65	13703.07	205.28	351.29
Middle Island Cr	MIDDLE ISLAND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

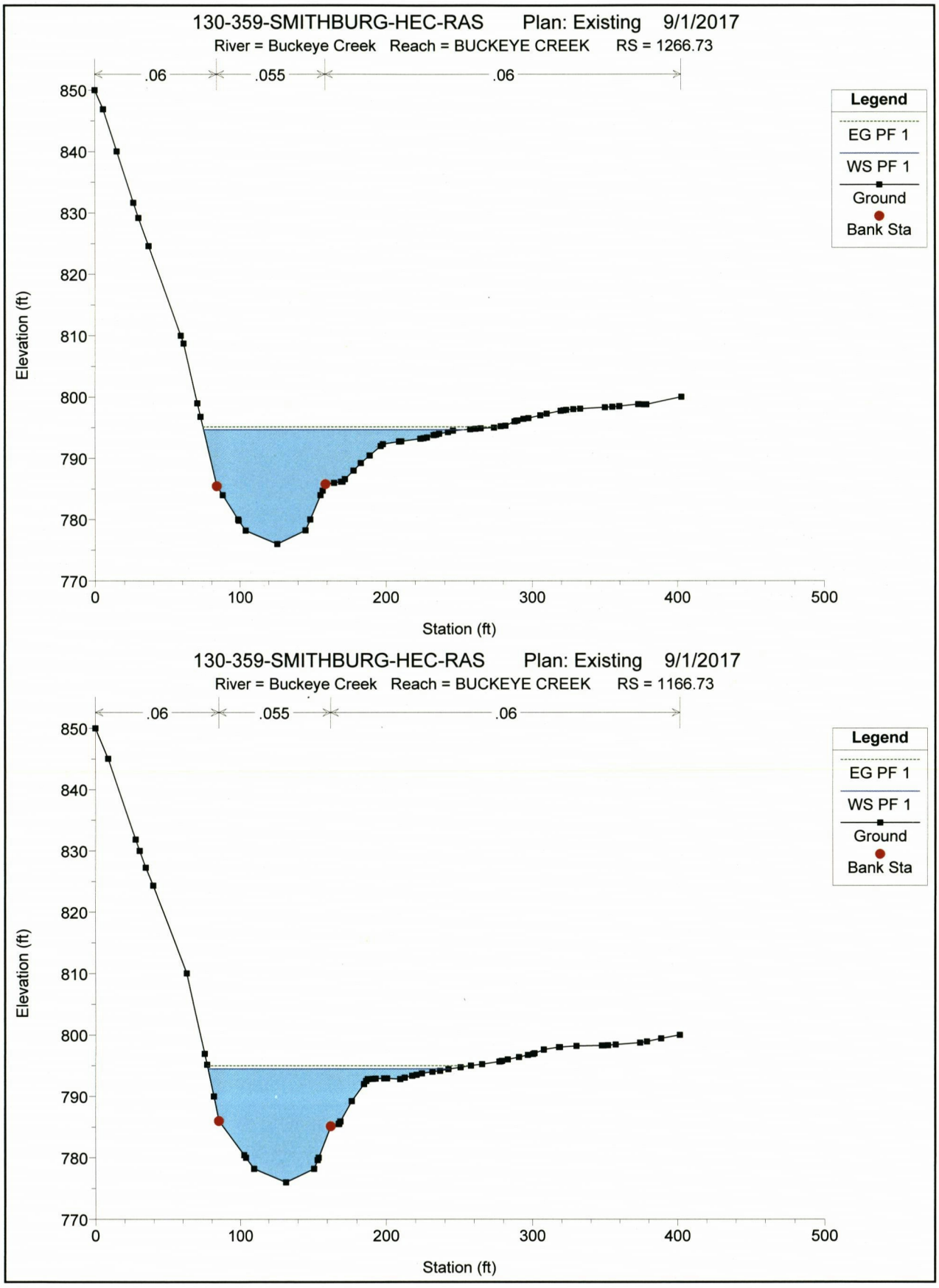
```
  Meathouse Fork     MEATHOUSE FORK     1152.99        PF 1          794.63
794.39        0.24          0.08          0.01     33.94     6479.57   3086.50
371.65
  Meathouse Fork     MEATHOUSE FORK     1052.99        PF 1          794.54
794.21        0.33          0.10          0.01    295.67     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
```

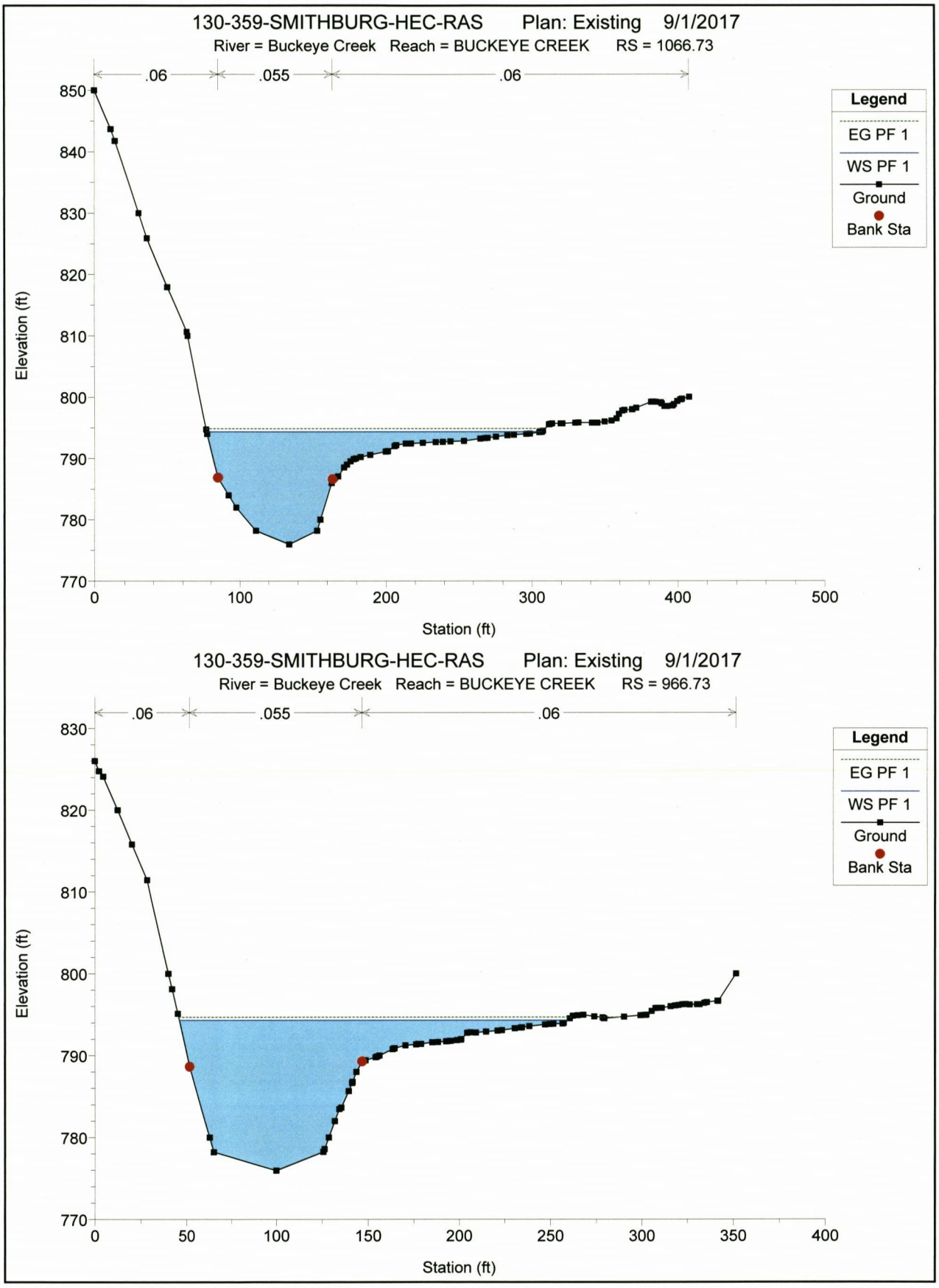
Buckeye Creek	BUCKEYE CREEK	526.73		PF 1	794.20			
793.82	0.37	0.08	0.04	160.62	5632.16	1557.22		
150.19								
Buckeye Creek	BUCKEYE CREEK	426.73		PF 1	794.08			
793.83	0.25	0.10	0.01	461.91	5254.74	1633.35		
209.01								
Buckeye Creek	BUCKEYE CREEK	326.73		PF 1	793.97			
793.59	0.38	0.12	0.01	771.94	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								

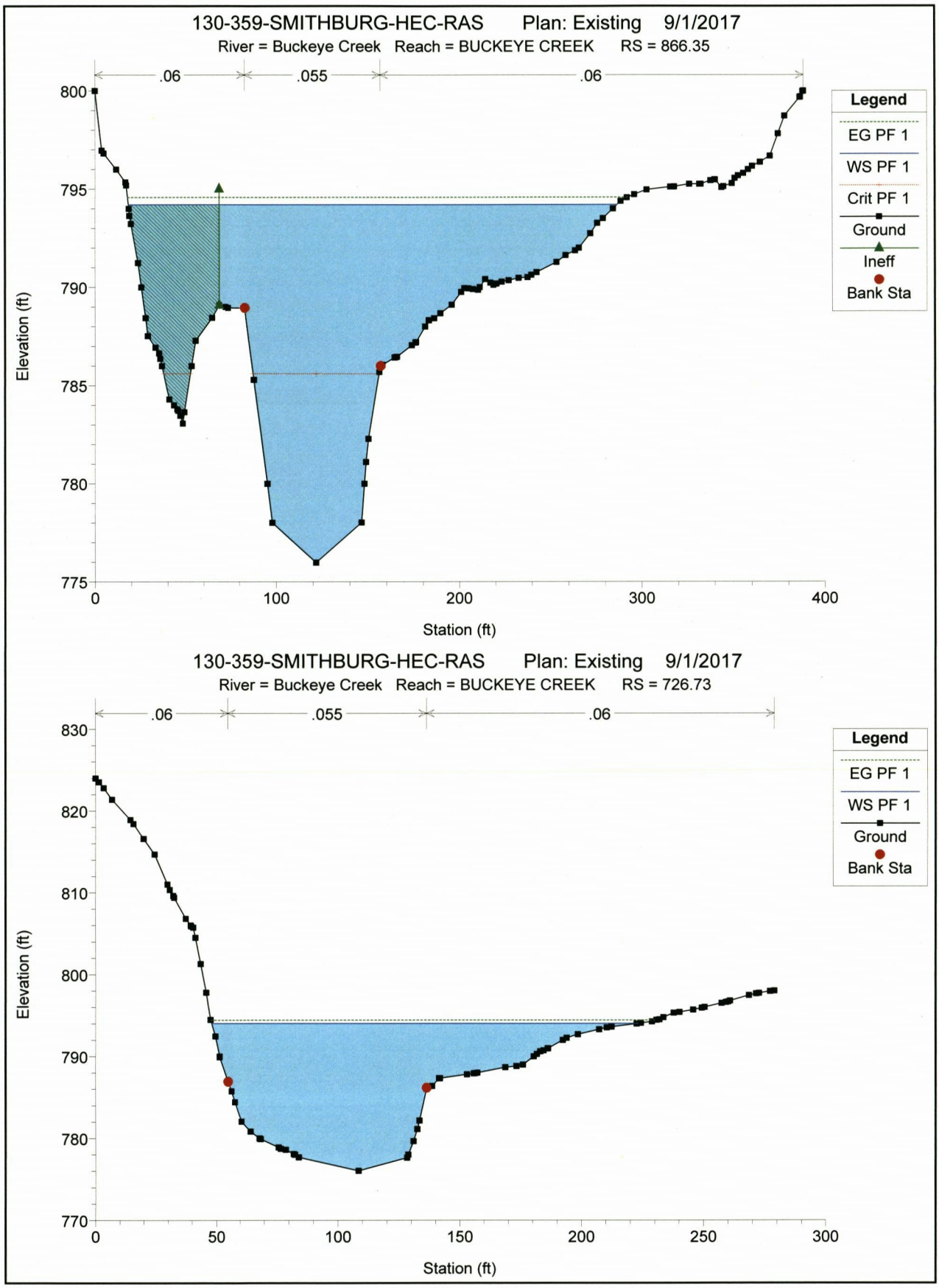

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
Buckeye Creek BUCKEYE CREEK
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
800
795
790
785
780
775
770
0
200
400
600
800
1000
1200
Main Channel Distance (ft)

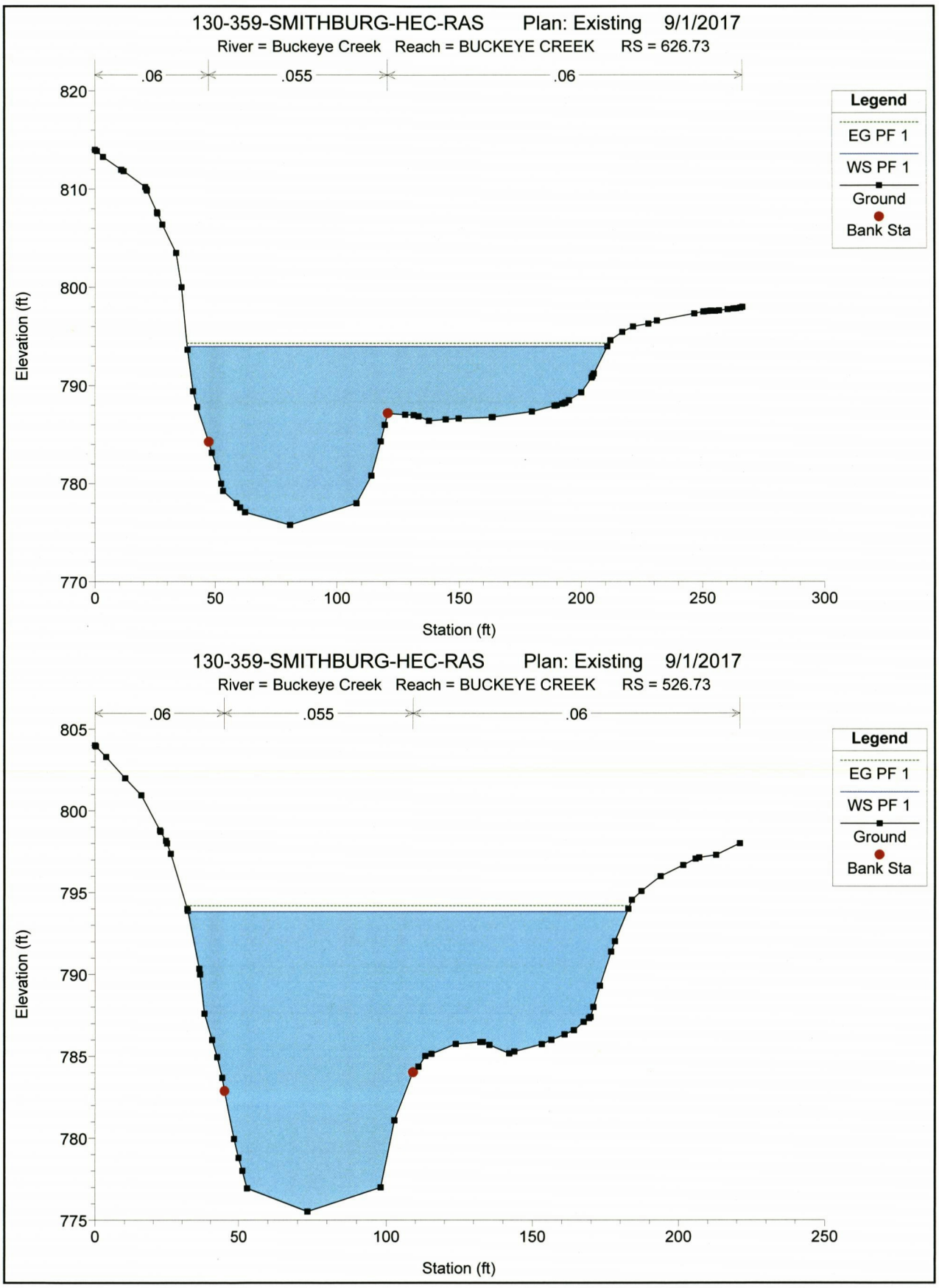

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
Meathouse Fork MEATHOUSE FORK
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
800
795
790
785
780
775
770
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)

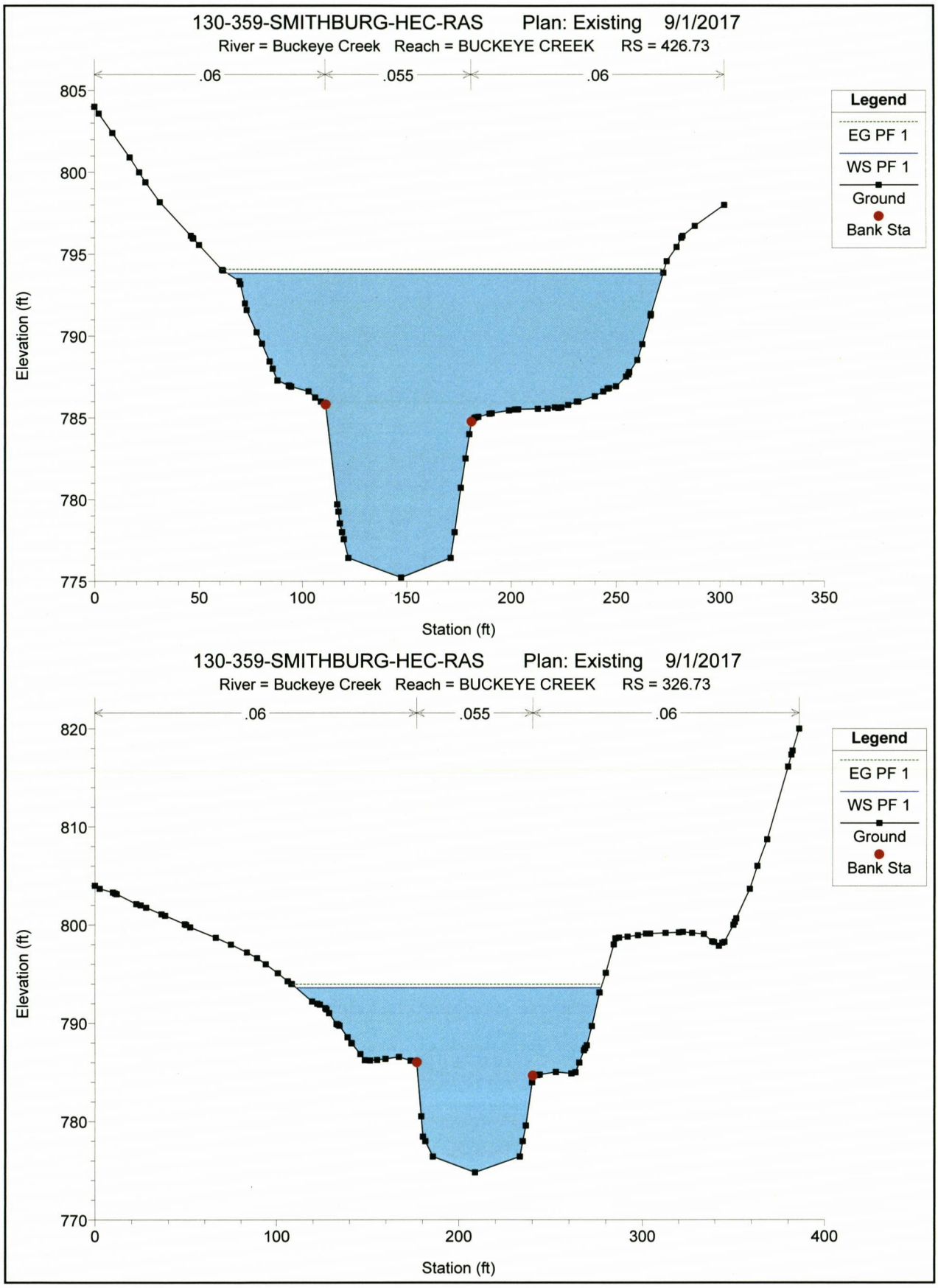

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
Middle Island Cr MIDDLE ISLAND CR
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
795
790
785
780
775
0
5
10
15
20
25
30
Main Channel Distance (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1266.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1166.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1066.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 966.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
820
810
800
790
780
770
0
50
100
150
200
250
300
350
400
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 866.35
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
800
795
790
785
780
775
0
100
200
300
400
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 726.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
820
810
800
790
780
770
0
50
100
150
200
250
300
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 626.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
50
100
150
200
250
300
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 526.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
0
50
100
150
200
250
Station (ft)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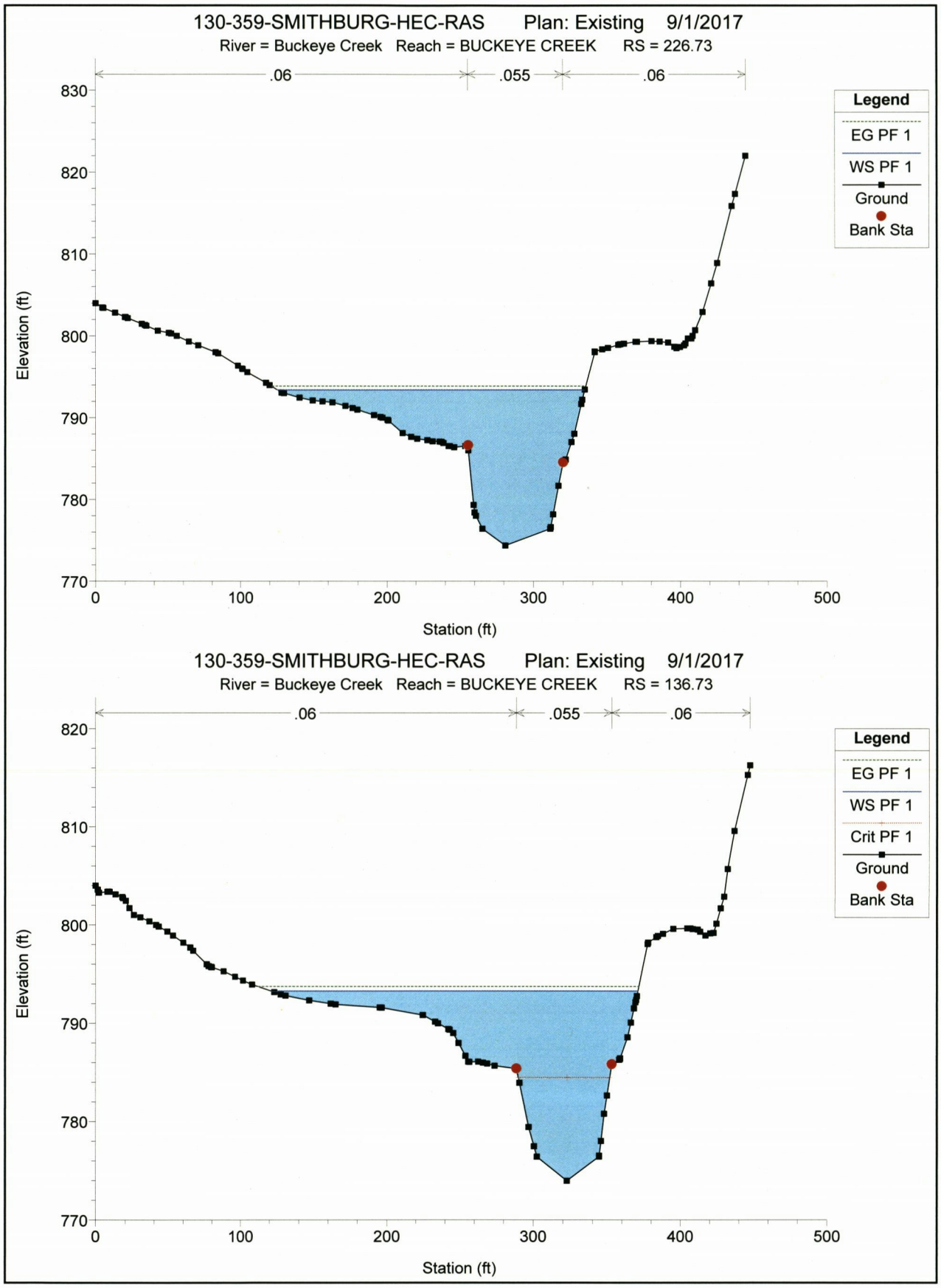
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 426.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
0
50
100
150
200
250
300
350
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 326.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
100
200
300
400
Station (ft)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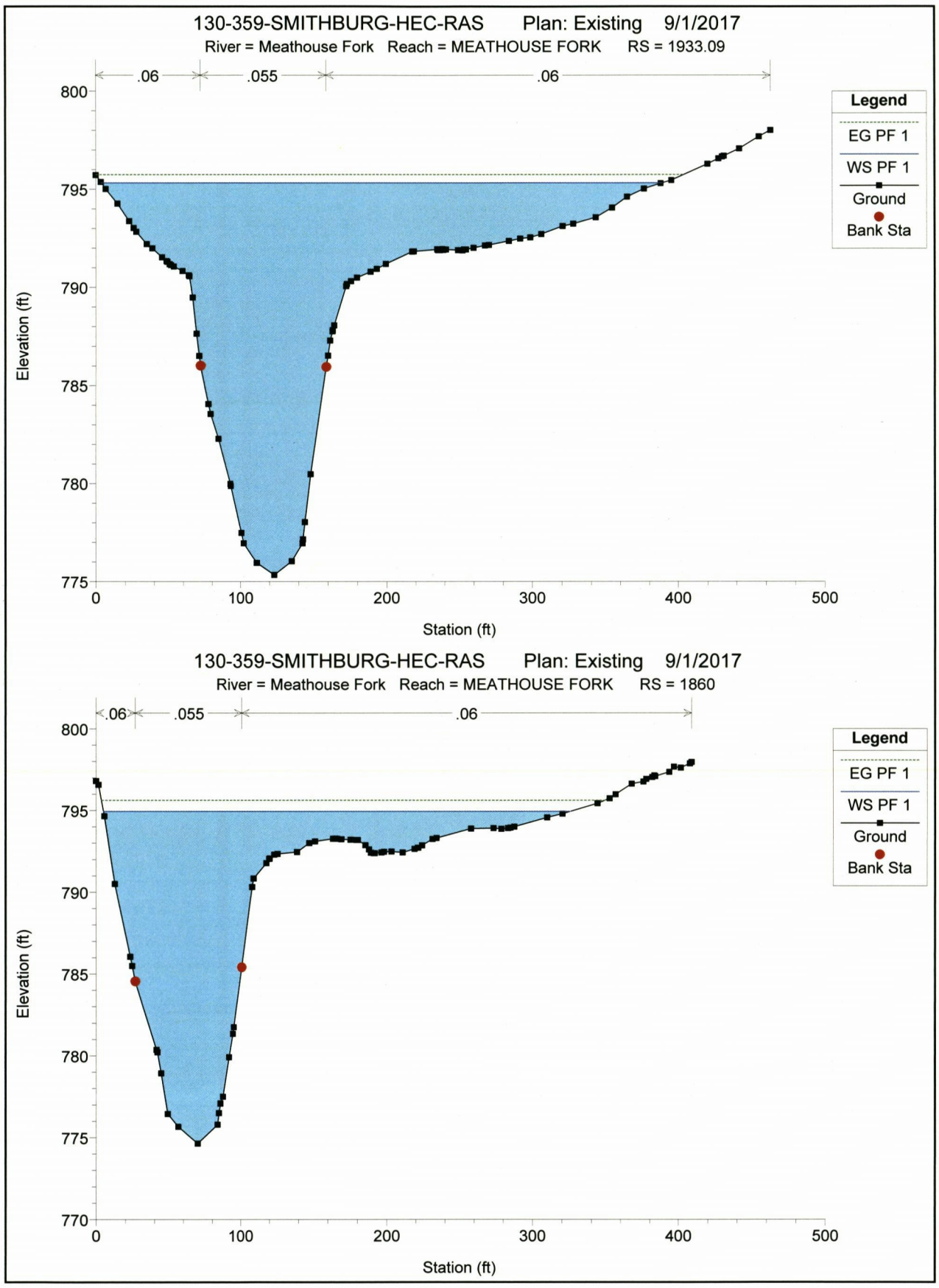
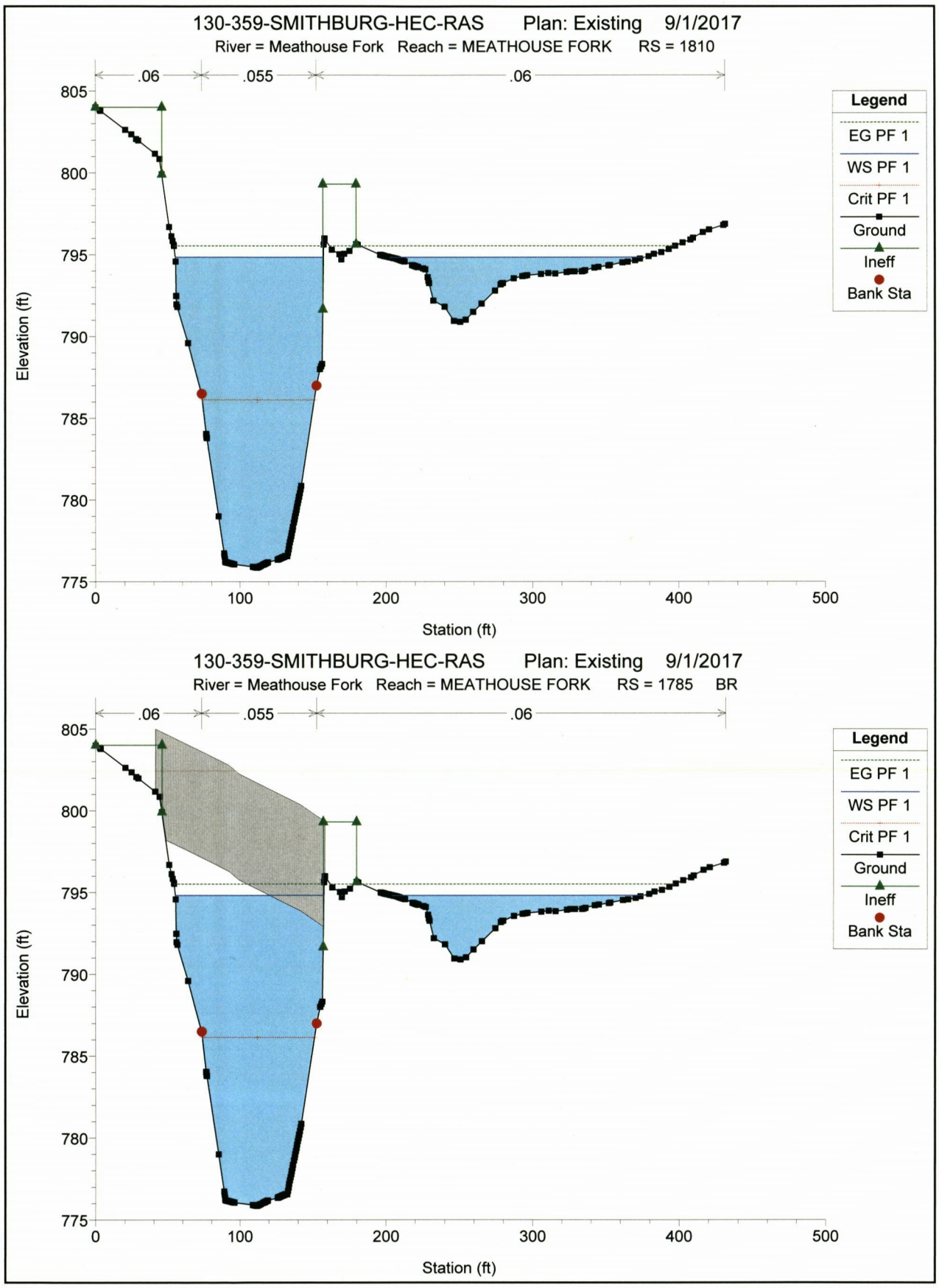
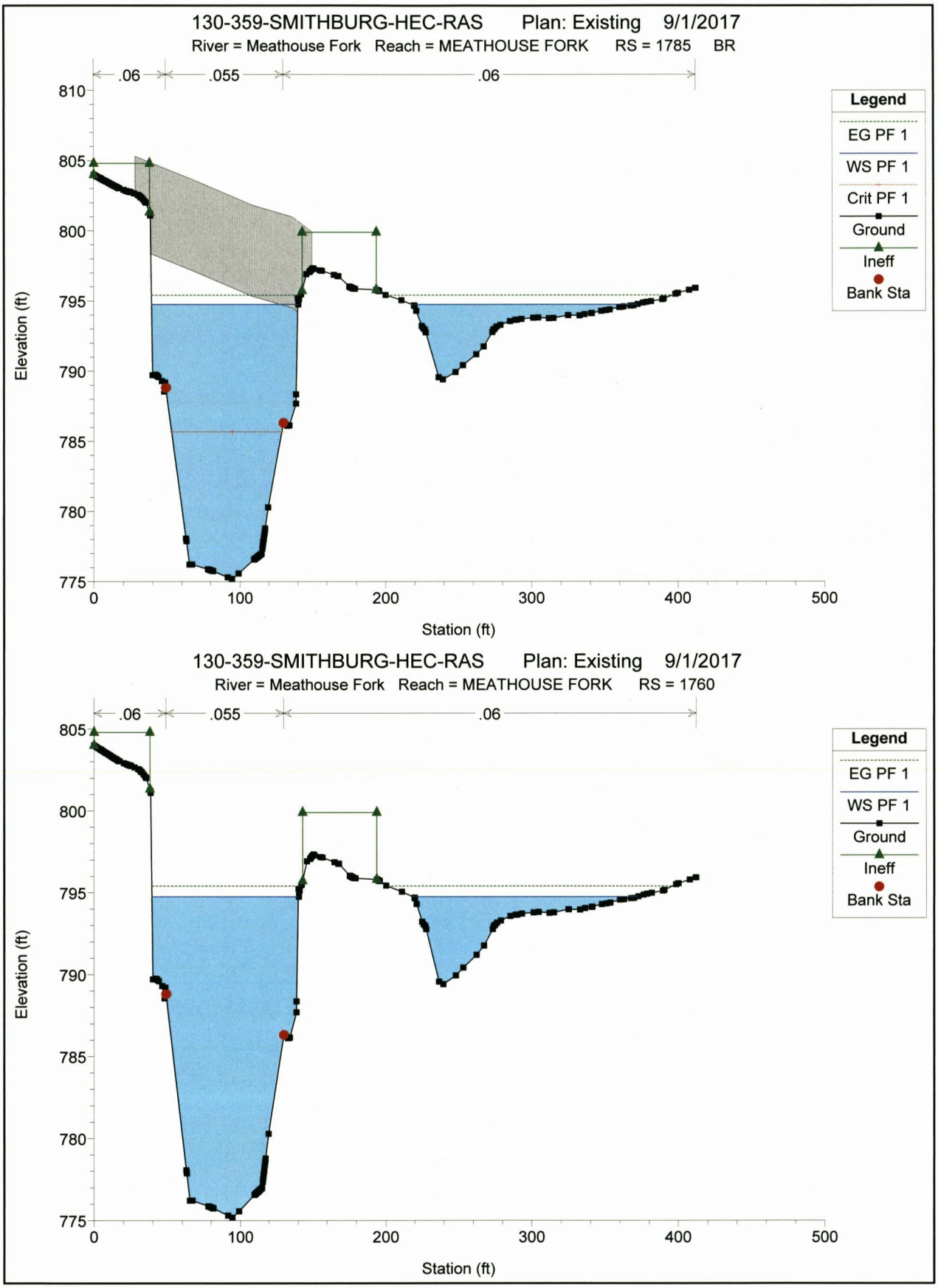
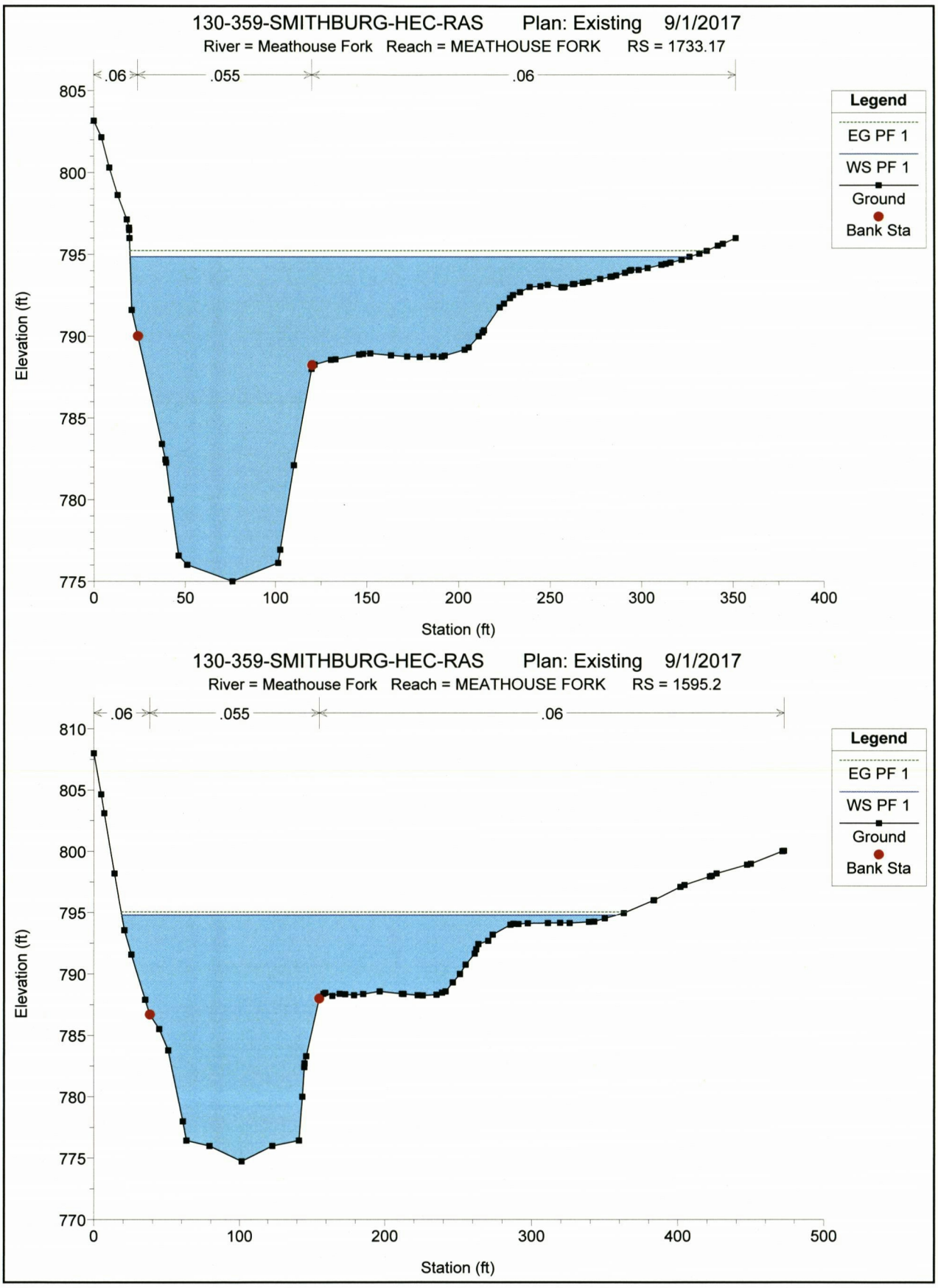
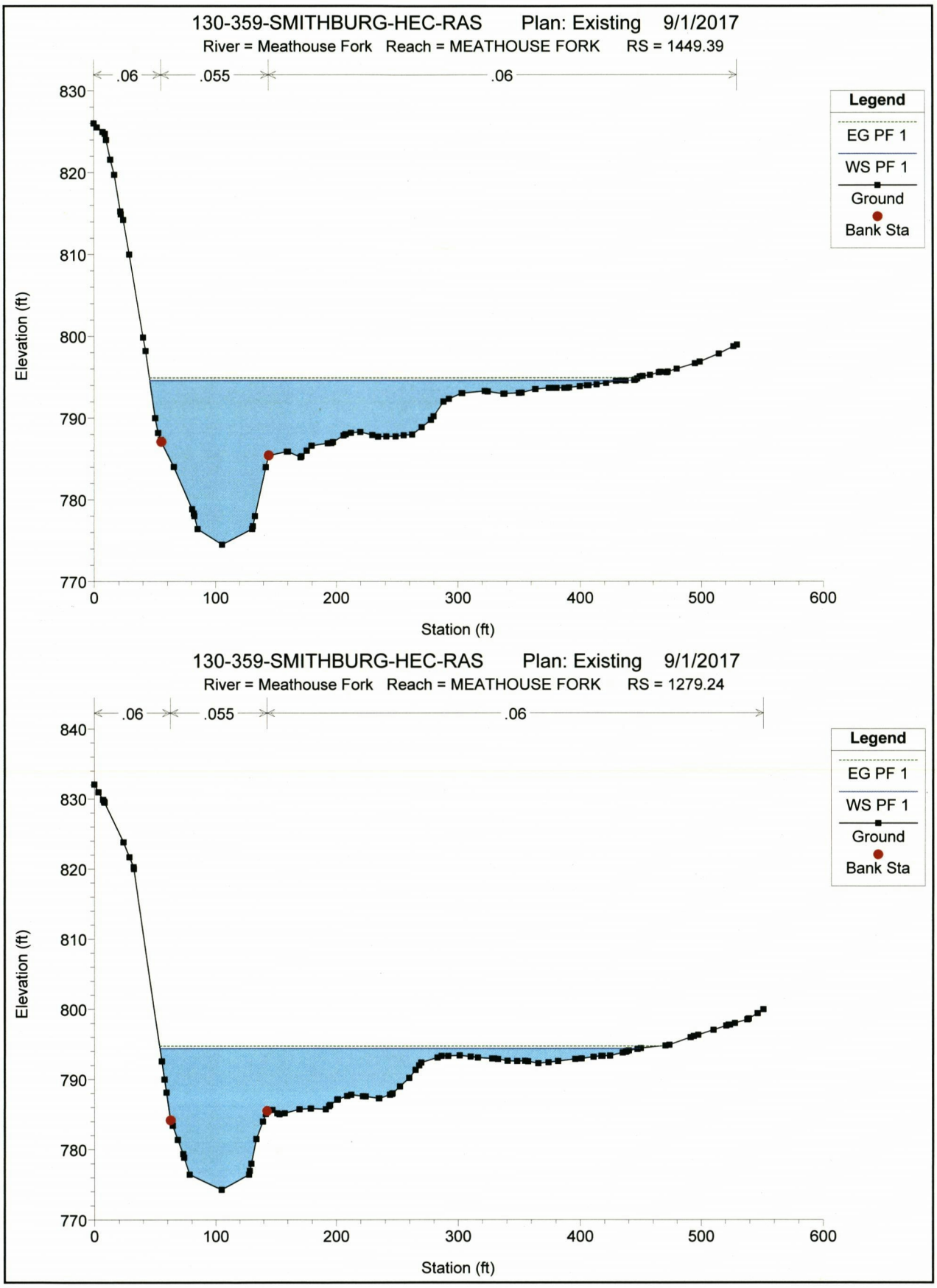
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 226.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 136.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

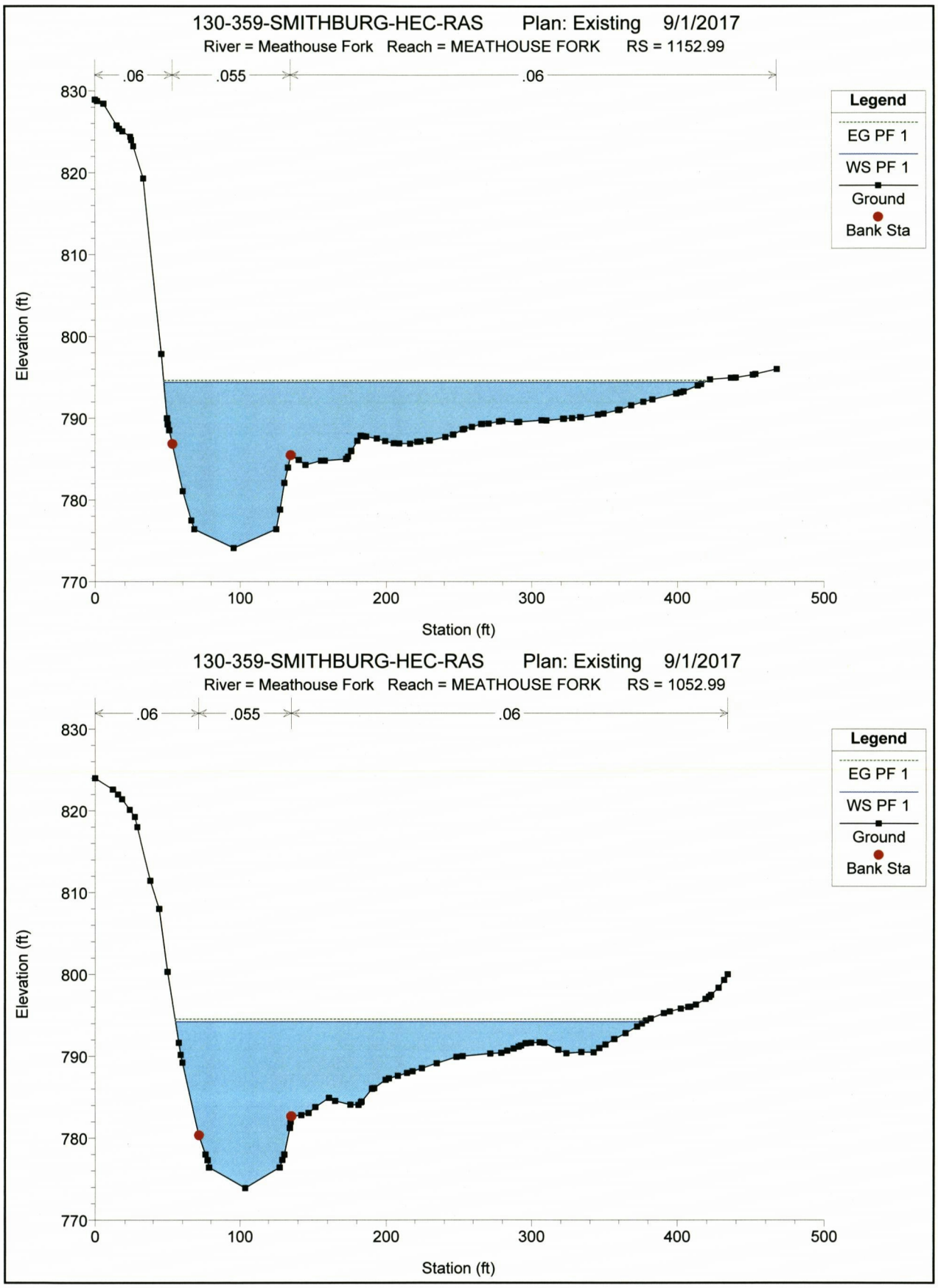

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1933.09
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1860
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

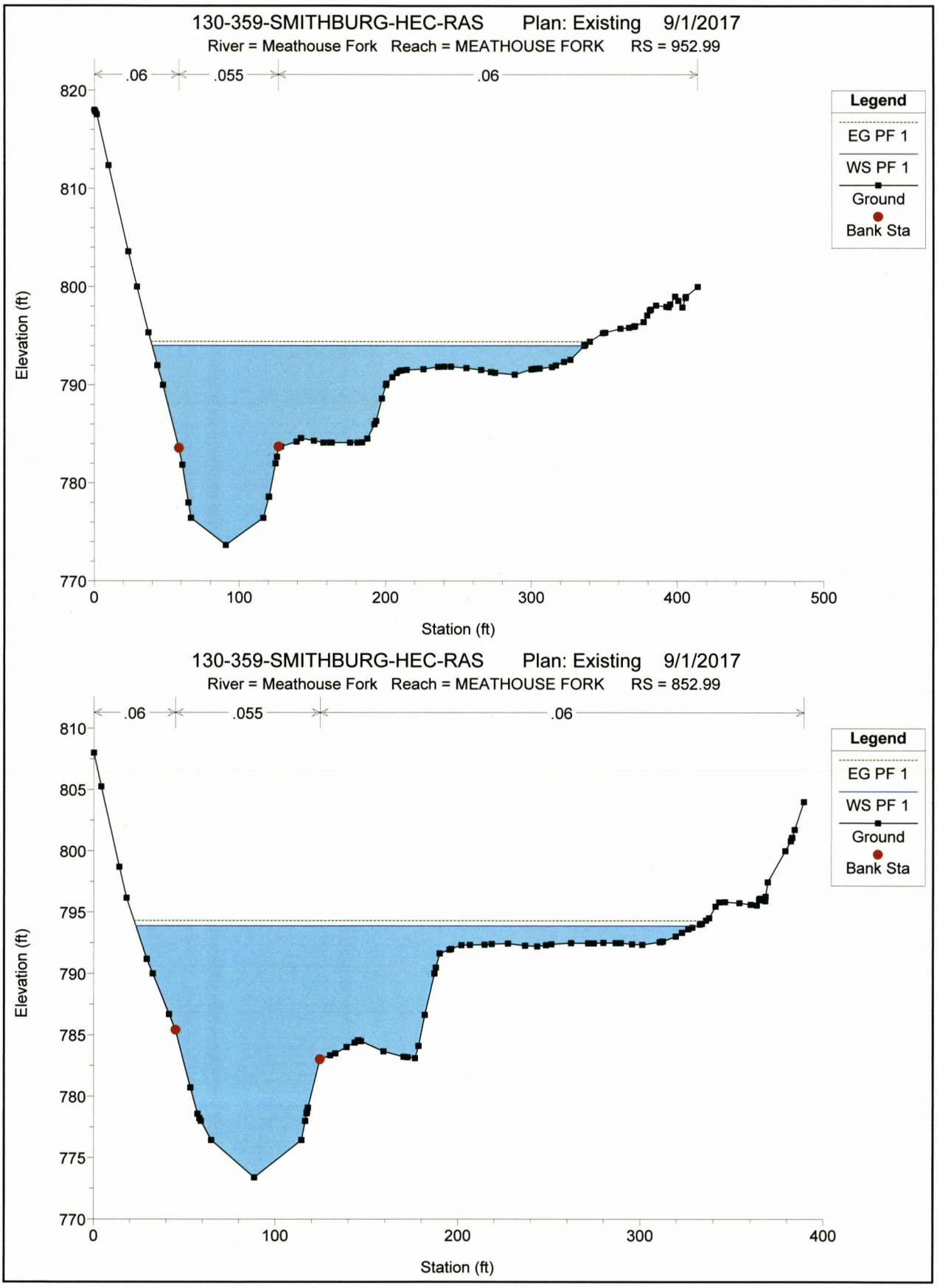

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1810
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
0
100
200
300
400
500
Station (ft)

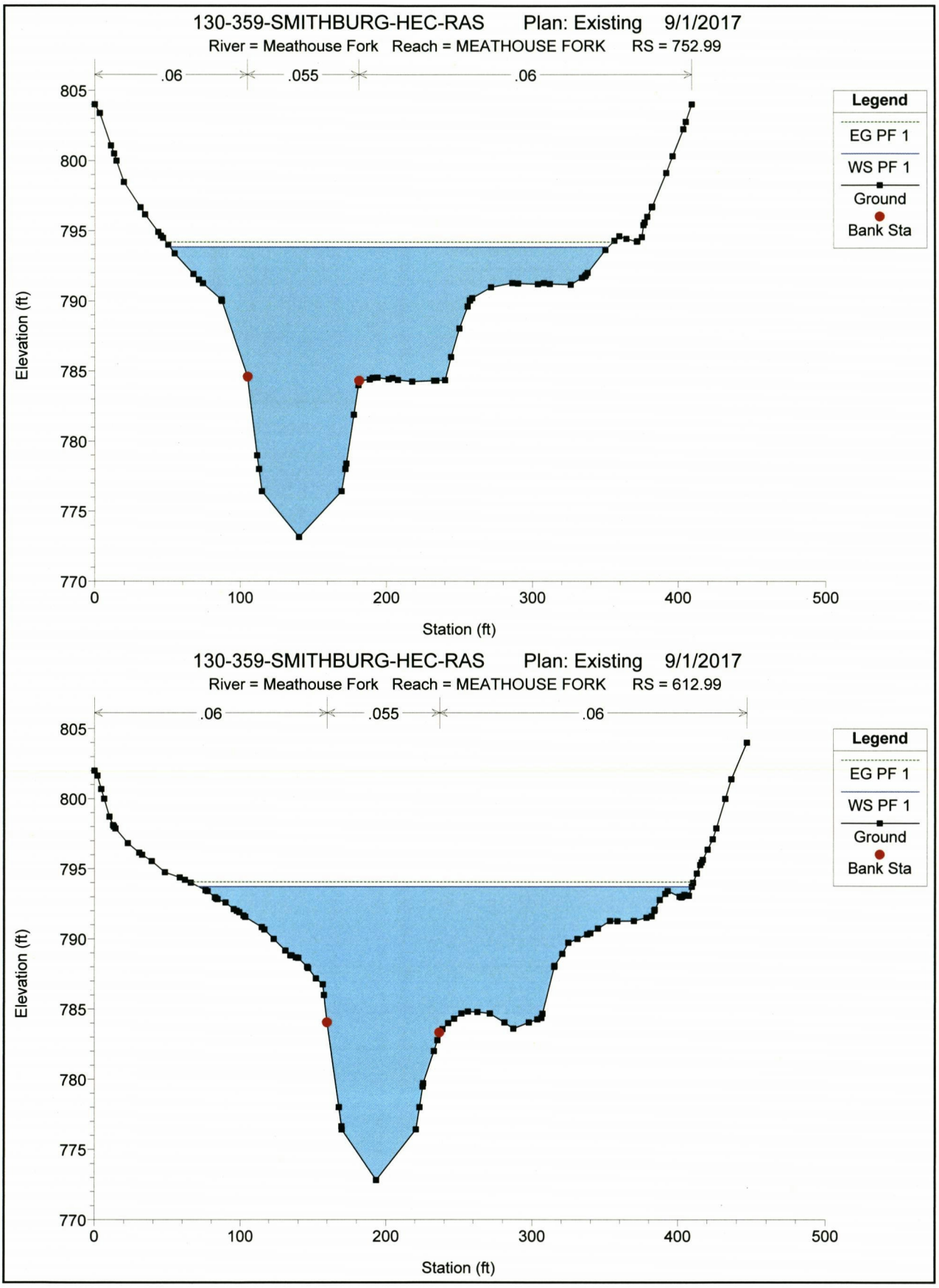

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1760
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

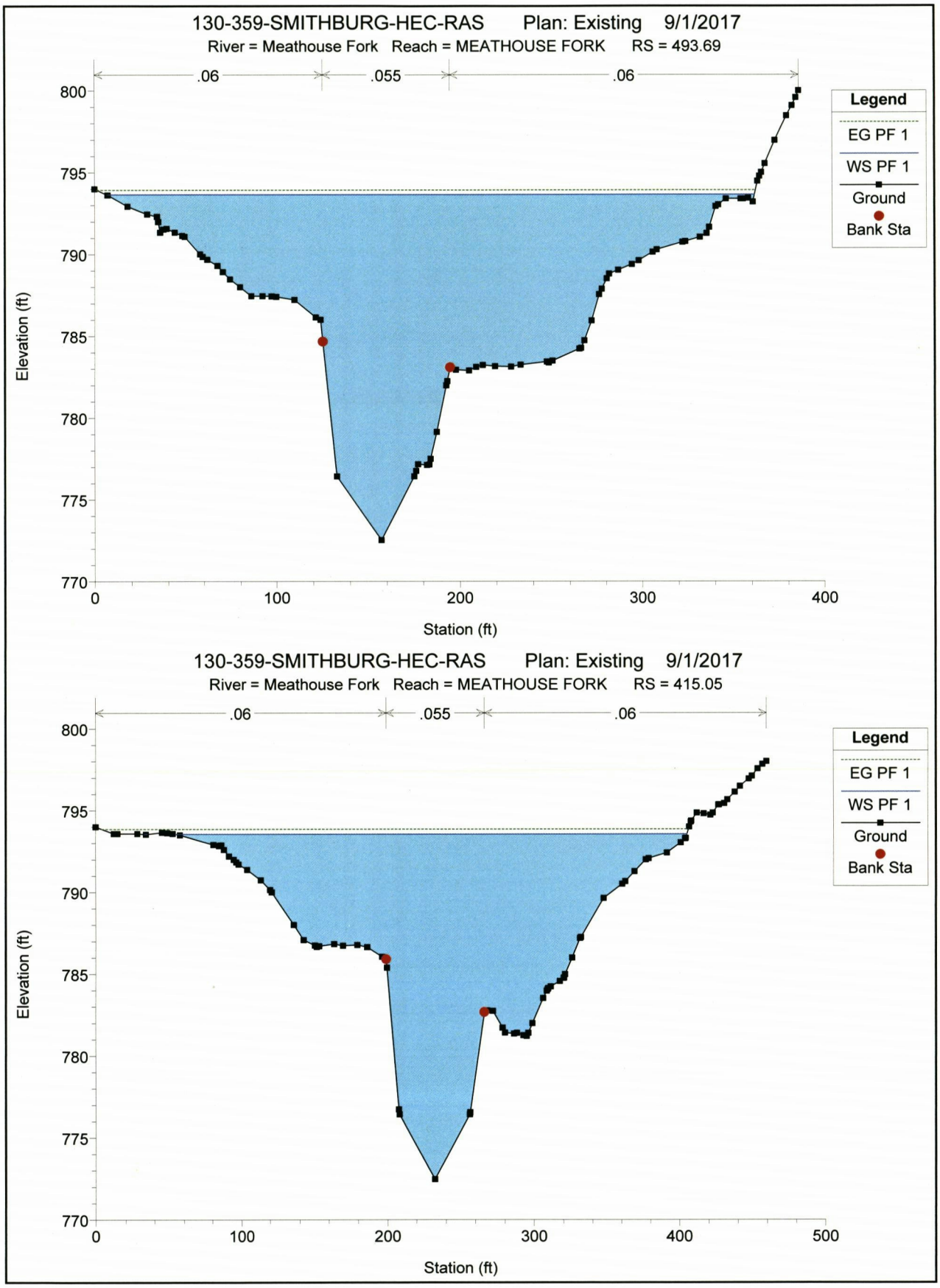

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1733.17
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1595.2
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

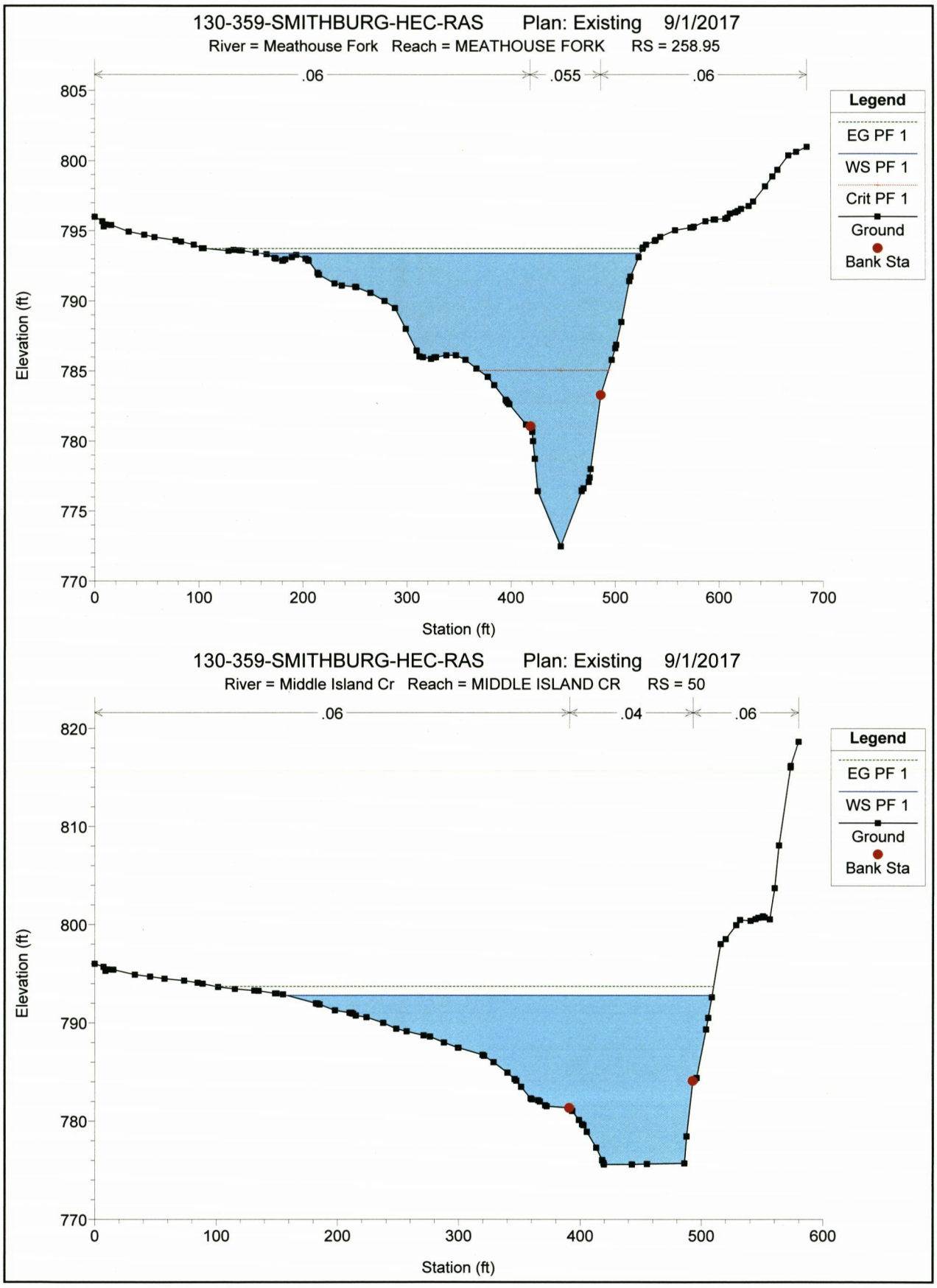

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1449.39
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1279.24
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

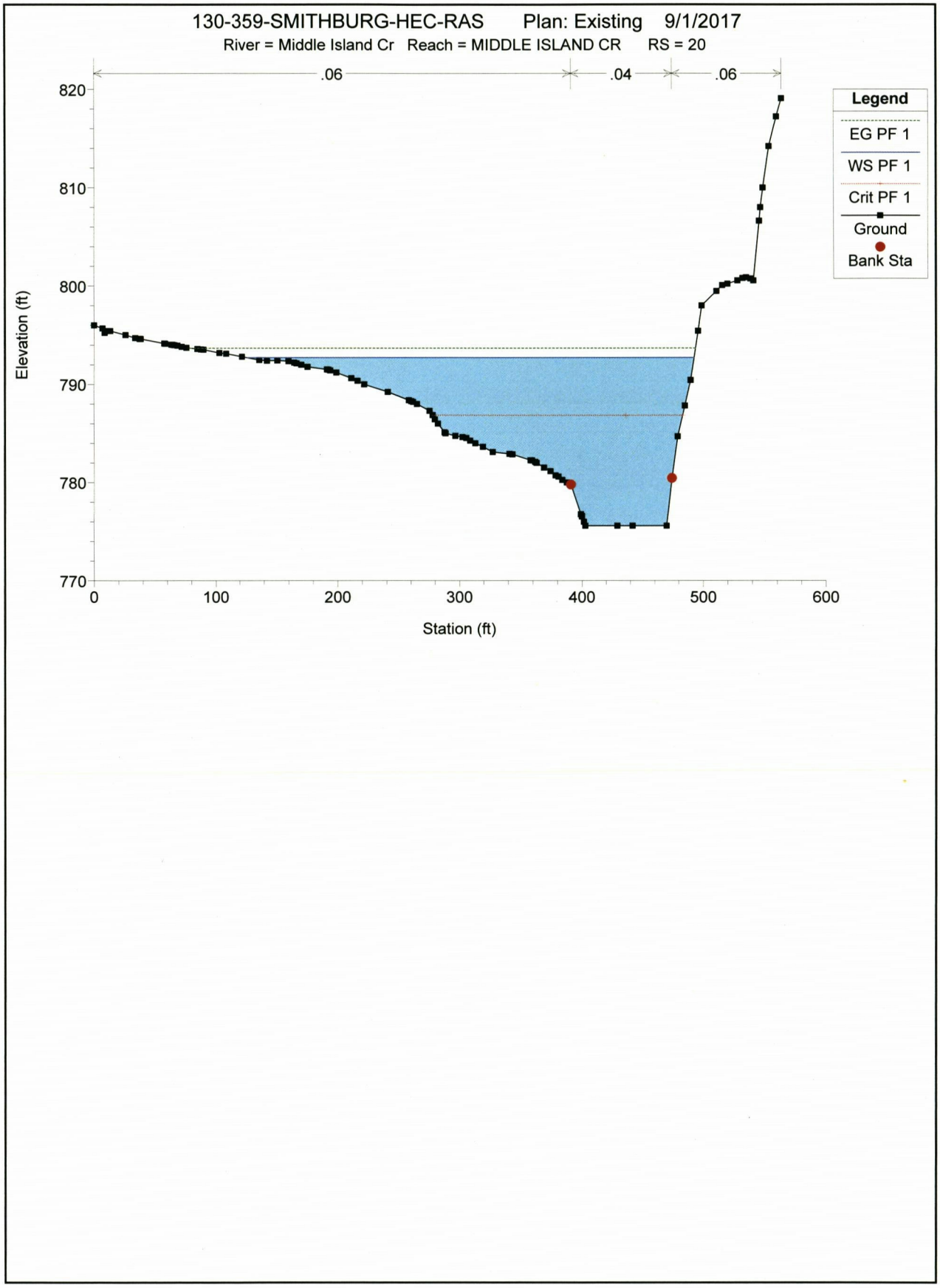

130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1152.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1052.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 952.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 852.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
810
805
800
795
790
785
780
775
770
0
100
200
300
400
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 752.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 612.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
770
0
100
200
300
400
500
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 493.69
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
800
795
790
785
780
775
770
0
100
200
300
400
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 415.05
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
800
795
790
785
780
775
770
0
100
200
300
400
500
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 258.95
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
770
0
100
200
300
400
500
600
700
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 50
.06
.04
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
100
200
300
400
500
600
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 20
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
100
200
300
400
500
600
Station (ft)

NORTH

EXISTING LEGAL RIGHT OF WAY

MEATHOUSE FORK

CO ROUTE 50/19

CO ROUTE 50/16

STATE ROUTE 50

FEMA ZONE AE FLOODPLAIN

MIDDLE ISLAND CREEK

CO ROUTE 50/30

CO ROUTE 50/22

PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

FEMA ZONE AE FLOODPLAIN

BUCKEYE CREEK

LEGEND

- 820 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- APPROXIMATE STREAM CENTERLINE
- 20+55.25 — HEC-RAS CROSS SECTION
- A — SECTION END LABEL
- PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
- FEMA ZONE AE FLOODPLAIN
- EXISTING EPHEMERAL STREAM
- EXISTING INTERMITTANT STREAM
- EXISTING PERENNIAL STREAM
- EXISTING WETLAND

REFERENCE

1. 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.
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 LOCATION FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

SCALE IN FEET
0 100 200

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
DWG SCALE:	1"=100'
CHECKED BY:	ARG
PROJECT NO:	130-359.0209
APPROVED BY:	*HAND SIGNATURE ON FILE *RPC

DRAWING NO.:

SP01

APPENDIX D

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS, CROSS SECTIONS, AND FLOODPLAIN MAPS

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
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: 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,

"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

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
Middle Island Cr	MIDDLE ISLAND CR	PF 1	

Downstream
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 River	Reach	Tributary River	Reach	Length	Angle
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	846.87	15.06003	840	26.38	831.64	29.82001	829.18
36.76001	824.62	58.93002	810	60.84003	808.74	70.34003	798.98	72.48001	796.79
83.61002	785.43	87.56003	784	98.61002	780	99.06003	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	.068	83.61002	.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

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

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	824.77	4.490021	824.11	12.17999	82	019.98001	815.81
28.42001	811.45	39.99002	80	041.89999	798.11	45	795.11	51.72	788.61
63.06	780	65.27002	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						

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	800	3.66	796.96	4.70999	796.82	11.66998	796	16.73999	795.35
17.16	795.19	18.51999	794	18.85999	793.64	19.69	793.23	23.63998	791.24
25.47998	790	27.78	788.44	29	787.53	33.13	786.94	35.07999	786.65
35.82999	786.37	36.72	786	40.89999	784.34	3.51999	784	45.31	783.79
45.88	783.72	46.95999	783.47	48.44998	783.07	49.31	783.65	53.35001	786
55.60999	787.28	64.60999	788.45	68.51999	789.09	72.25	789	73.57999	788.96
83.10999	788.94	88.16	785.39	5.28998	780	97.95999	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	.06	83.10999	.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
```

0	814	.75	813.88	3.369995	813.27	10.8	811.97	11.77	811.83
20.69	810.23	21.19	810	21.46001	809.87	25.63	807.65	25.84001	807.53
27.89	806.39	33.73001	803.49	35.93001	800	38.39	793.64	40.75	789.42
42.39	787.84	7.34001	784.23	48.59001	783.14	50.79001	781.66	52.59001	780
53.39	779.25	59.23001	778	60.77	777.57	62.84001	777.07	81.01001	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	.06	47.34001	.055	120.66	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.34001	120.66	105.28	100	89.4	.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	804.3	099976	803.94	3.830002	803.31	0.32001	802	15.84	800.96
22.32001	798.82	2.57001	798.72	24.46001	798.17	24.86	798	26.23	797.37
31.89999	794	32.08	793.89	36.09	790.35	36.31	790	37.82001	787.6
40.53999	786	42.38	784.94	44.13	783.68	44.95	782.86	48.39	779.96
50.00999	778.85	1.42999	778	53.03999	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

```
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     79469.60999  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
```

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

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

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	.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	795.72	3.369995	795.37	6.710022	795.02	14.92001	794.27	22.80002	793.38
25.94	793.03	27.70001	792.83	34.94	792.21	38.68002	791.99	45.42001	791.54
48.44	791.34	49.05002	791.35	0.65002	791.19	51.5	791.14	53.47	791.07
59.62	790.83	63.99002	790.62	64.41	790.57	66.70001	789.49	69.29001	787.65
71.22	786.51	72.01001	786.01	77.38	784.05	78.74002	783.55	84.25	782.28
92.69	779.98	93.08002	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

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	796.78	2.700012	796.64	3.76001	796.56	5.279999	795.66	7.360016	794.7
11.56	793.47	21.41	789.21	23.31	788.39	32.29001	784.51	37.78	782.14
39.89001	781.38	43.59	781.13	43.73001	781.12	46.48001	778.85	49.19	776.44
56.5	775.66	70	774.64	83.5	775.79	84.52002	776.5	86.94	776.54
90.67001	776.59	94.84	779.47	95.11002	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	804	2.890015	803.86	2.970001	803.86	3.470001	803.78	20.45999	802.63

24.59	802.35	27.85001	802.07	29.41	801.98	40.73001	801.17	43.97	800.85
45.42001	799.91	50.54999	796.69	51.22	796.47	52.26001	796.13	53.79999	795.6
54.01001	795.53	55.17999	794.58	55.44	792.47	55.67001	792.49	55.67999	791.97
56.26001	791.81	63.87	789.6	73.03	786.48	76.23999	784.04	76.32001	783.99
76.45001	783.97	6.58002	783.82	76.64001	783.78	84.86002	779.01	88.81	776.73
88.94	776.64	89.08002	776.55	89.11002	776.53	89.35001	776.38	89.37	776.36
89.48999	776.28	89.62	776.2	89.85001	776.19	90.08002	776.19	90.31	776.18
90.54999	776.18	90.79001	776.17	91.04001	776.17	91.29001	776.16	91.51001	776.16
91.73001	776.15	91.95001	776.15	92.17001	776.14	92.35001	776.14	92.53	776.13
92.81	776.13	93.09	776.12	93.34	776.12	93.59	776.11	93.82001	776.11
94.04999	776.1	94.37	776.09	94.70001	776.09	95.04999	776.08	95.32001	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
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	

89.48999	776.28	89.62	776.28	89.85001	776.19	90.08002	776.19	90.31	776.18
90.54999	776.18	90.79001	776.17	91.04001	776.17	91.29001	776.16	91.51001	776.16
91.73001	776.15	91.95001	776.15	92.17001	776.14	92.35001	776.14	92.53	776.13
92.81	776.13	93.09	776.12	93.34	776.12	93.59	776.11	93.82001	776.11
94.04999	776.1	94.37	776.09	94.70001	776.09	95.04999	776.08	95.32001	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

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

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

```
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
```

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.

```
        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
```

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	798.1920.95999	793.56			
25.60999	791.5838.03998	786.69	44.62	785.52	50.72	783.7760.81998	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	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	824.7510.08997	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			

55.08997	787.09	435	5.09998	787.09	65.17999	784.02	80.47998	778.85	81.87997	778.31
82.52997	778	85	5.08997	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	.066	5.17999	.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

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	832.09	3.300018	830.95	7.089996	829.87	7.77002	829.65	8.140015	829.49
23.52002	823.82	8.32001	821.68	31.99002	820.27	32.22	820	55.23001	792.59
57.41	790	62.33002	784.16	64.02002	783.42	68.17001	781.41	72.66	779.36
73.49002	778.88	78.14001	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	.066	2.33002	.055	142.98	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
62.33002	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	828.92	1.410004	828.77	5.619995	828.44	14.56	825.79	16.07999	825.39
18.41	825.07	24	824.39	24.67999	824	26.03	823.23	33.12	819.31
45.31	797.87	49.19	790.01	49.57001	789.25	52.70001	786.84	60.04999	781.06
66.31	777.5	68.31	776.42	68.32999	776.41	95.38998	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

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	.06	52.70001	.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	824	11.89001	822.59	15.27002	822	18.17001	821.43	23.59	820.13
27.11002	819.25	28.92999	818	37.97	811.45	44.09	808	49.60001	800.33
58.61002	790.17	59.82001	789.21	71.61002	780.36	76.24002	778	77.60001	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	.06	71.61002	.055	135.45	.04

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

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	817.55	9.650024	812.37	23.37003	803.59
29.31003	800	37.20001	795.33	43.26001	791.98	47.15002	790	47.19	789.98
58.22	783.56	60.72	781.86	64.96002	778	66.69	776.43	90.71002	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	808	4.070007	805.25	14.06	798.69	18.20001	796.16	29.19	791.2

29.23999	791.18	32.45999	79	41.45999	786.68	45.07999	785.42	53.44	780.71
57.29001	778.57	58.42001	778.21	59.14999	778	64.70999	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	.06	45.07999	.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	804	3.440002	803.38	10.92001	801.08	13.01999	800.5	14.70999	800
19.72	798.47	31.20001	796.67	34.29999	796.17	43.22	794.92	44.98001	794.65
46.51001	794.49	50.06	794	54.45001	793.39	67.51001	791.91	71.29001	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= 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	7946.95	0012	793.63	17.76001	792.93	28.91	792.46	34.10001	792.31
34.70001	79235.73999		791.34	37.51001	791.53	39.17001	791.57	43.59	791.34
47.76001	791.14	49.20999	791.09	57.92999	790.02	59.42999	789.86	61.89001	789.68
67.39999	789.3	70.23999	788.93	74.17001	788.48	79.73001	78886.14001		787.46
92.42999	787.46	97.44	787.44	99.92001	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		793.58	14.39999	793.58	28.31	793.59	34.34998	793.54
45.21997	793.66	48.68997	793.62	52.28	793.59	57.31998	793.49	80.82999	792.91

84.51999	792.83	85.26999	792.85	85.54999	792.86	85.92999	792.87	87.87	792.6
91.21997	792.19	94.51999	792	96.20999	791.84	97.97998	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	79	67.33001	795.6	88.78997	795.3	10.40997	795.44	15.79999	795.4
32.40997	794.94	47.33002	794.71	57.20996	794.55	77.35999	794.33	82.77002	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
0	7967.190002	795.69	8.72998	795.29	10.45996	795.44	15.32996	795.41	
32.88	794.91	45.39996	794.75	57.45996	794.57	3.61996	794.31	84.77997	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	803.725	63.5699	808.08
572.9	816.03	572.93	816.06	572.95	816.075	73.2599	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
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	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

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	Vel Chnl	Flow Area	Top Width	Froude # Chl
(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(cfs) (ft)	
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		
795.17		795.61	0.001171	5.75	2268.15	376.99	
0.25							
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	9600.00	774.64		
794.98		795.51	0.001365	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	0.001277	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	0.001280	5.93	1747.54	276.54	

	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	

	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) (cfs) (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      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
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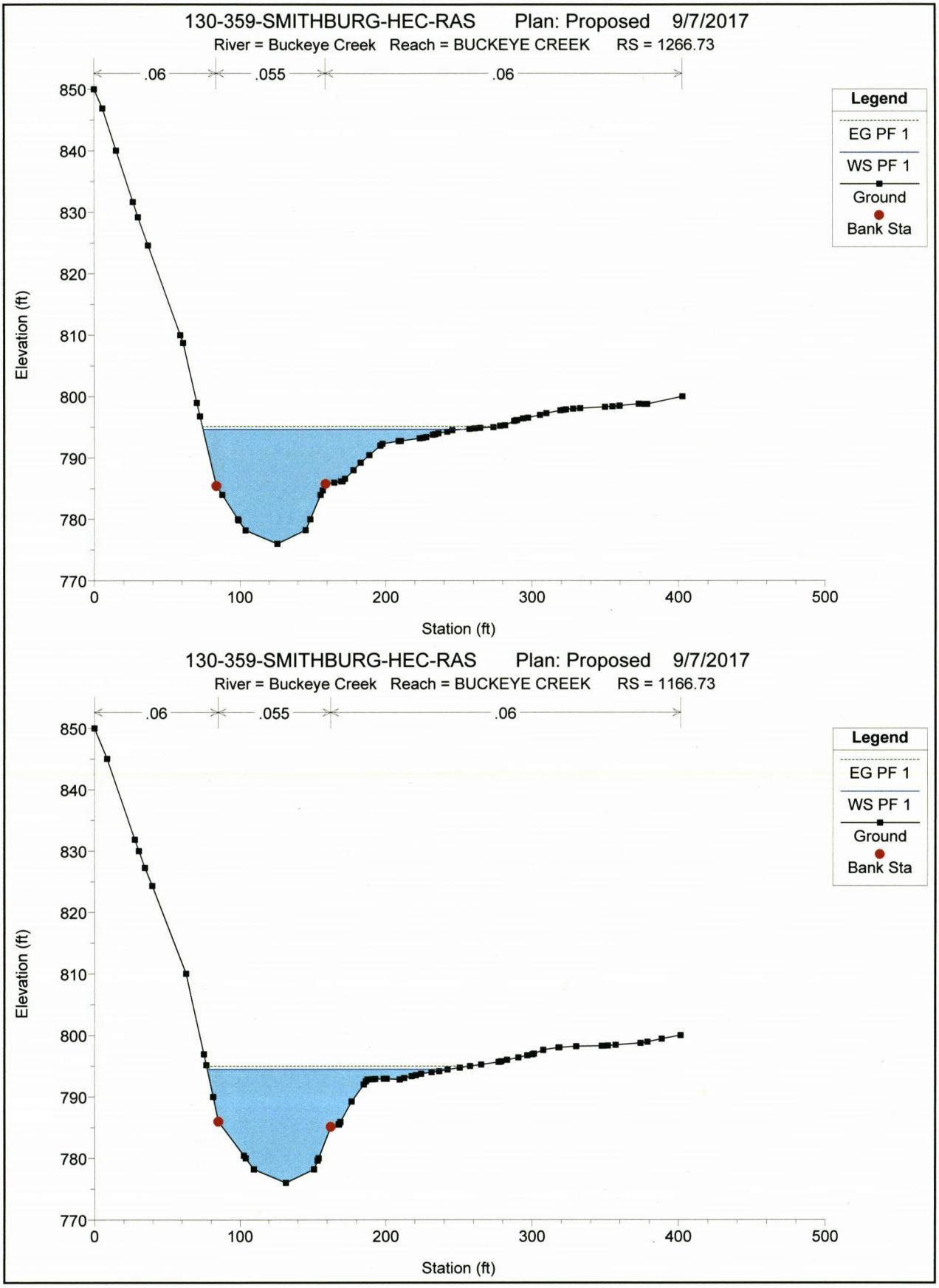
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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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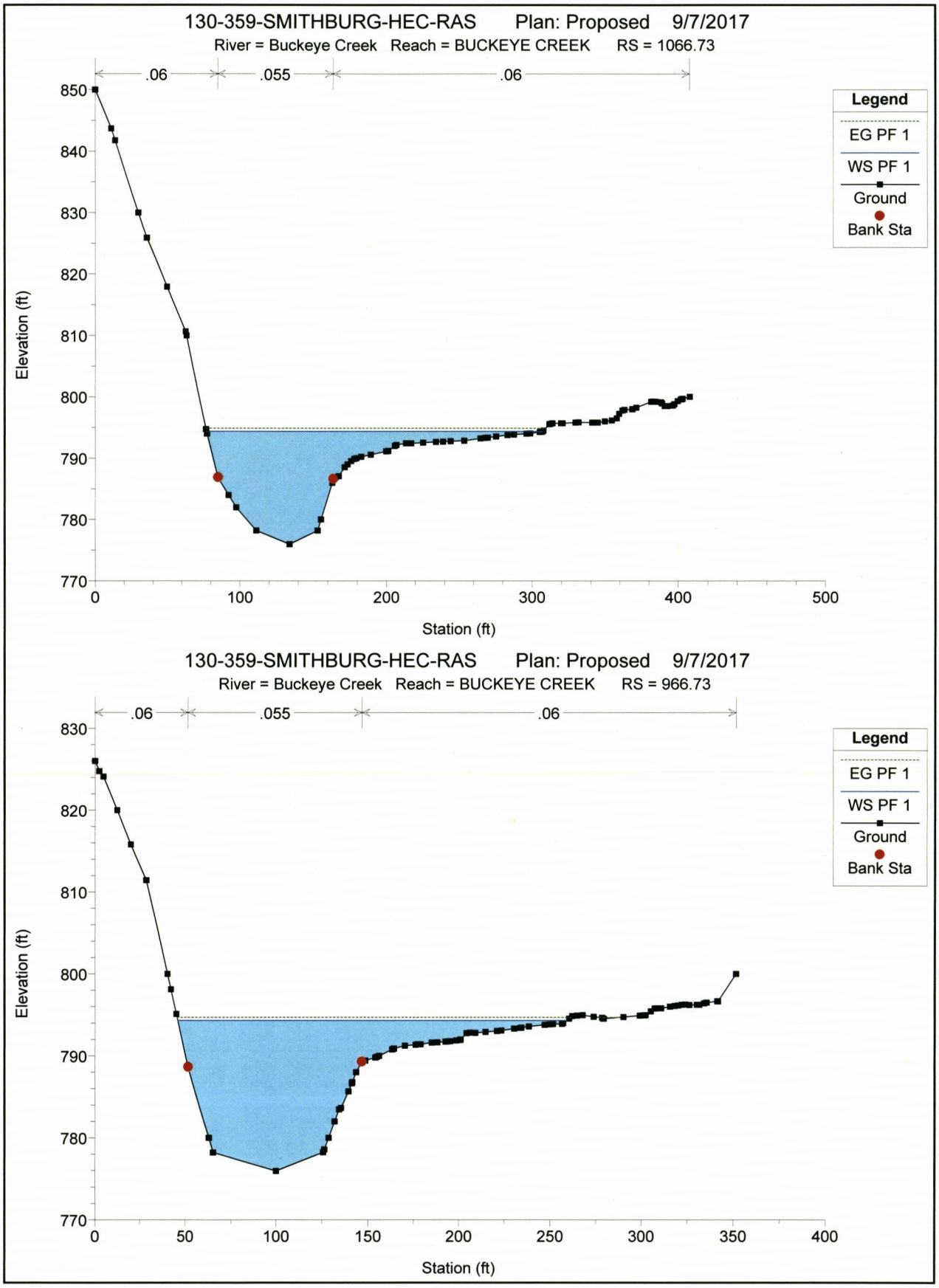
840
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)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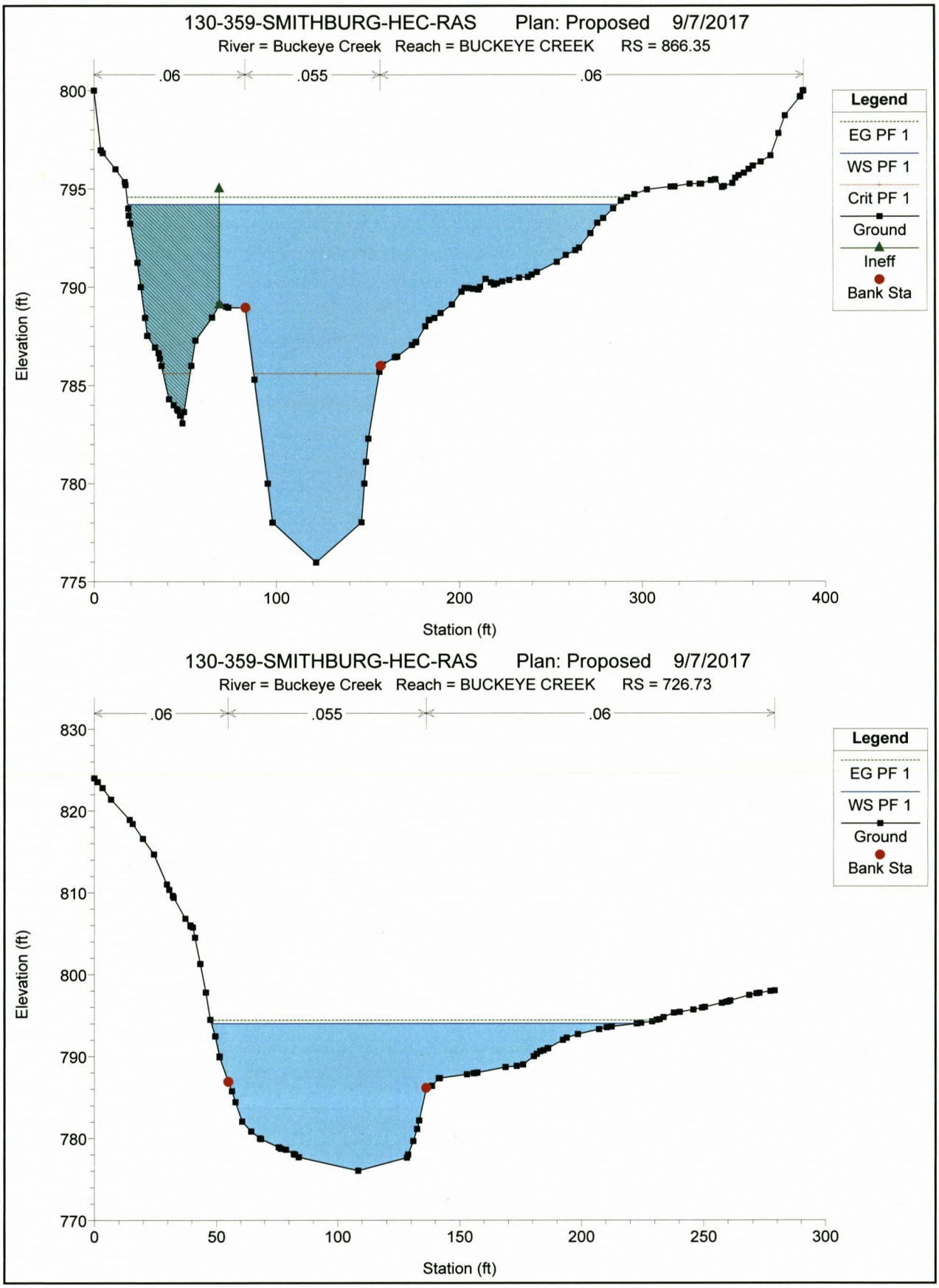
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
850
840
830
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 966.73
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
830
820
810
800
790
780
770
0
50
100
150
200
250
300
350
400
Station (ft)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.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
800
795
790
785
780
775
0
100
200
300
400
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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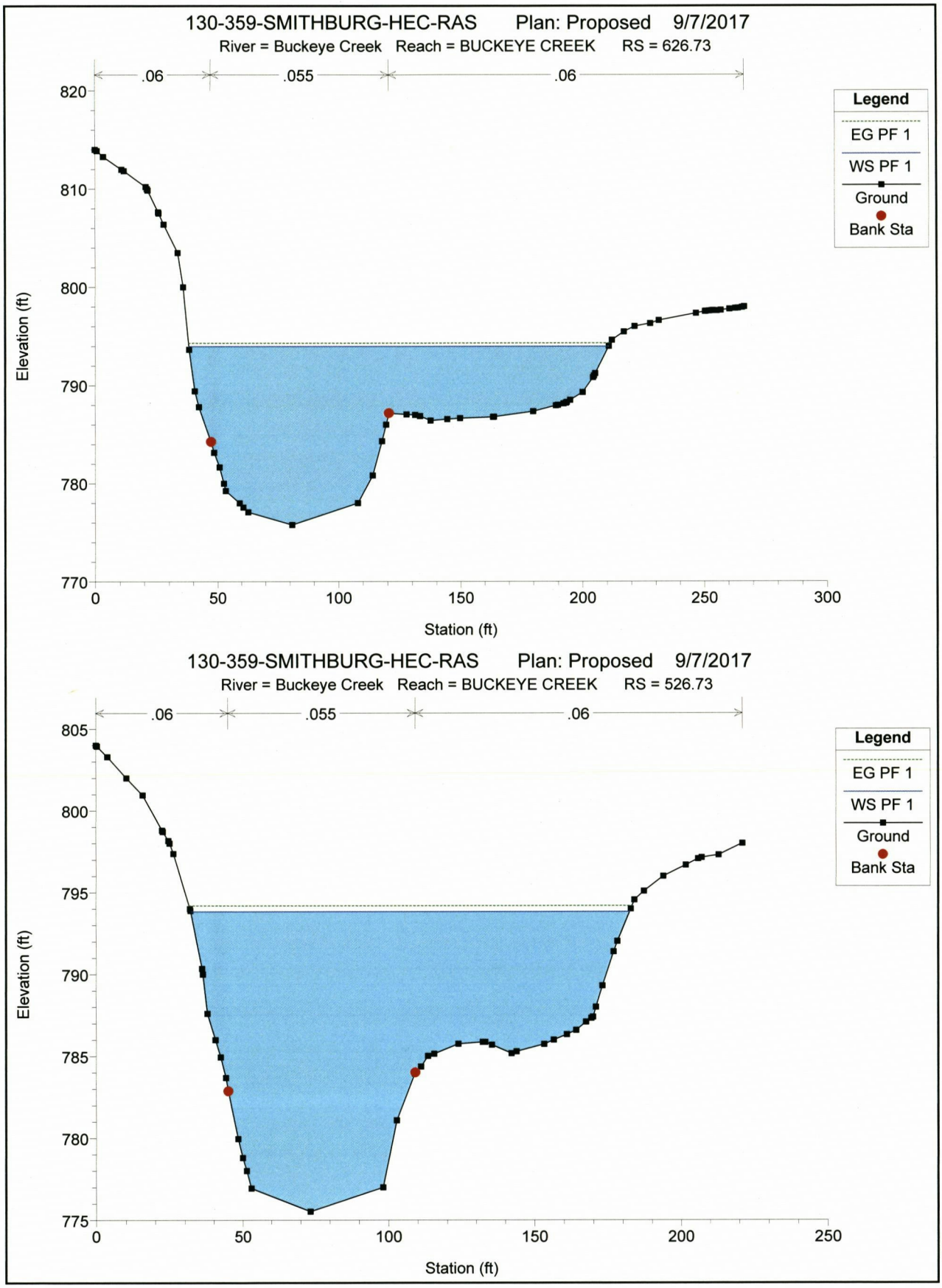
820
810
800
790
780
770
0
50
100
150
200
250
300
Station (ft)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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
50
100
150
200
250
300
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 526.73
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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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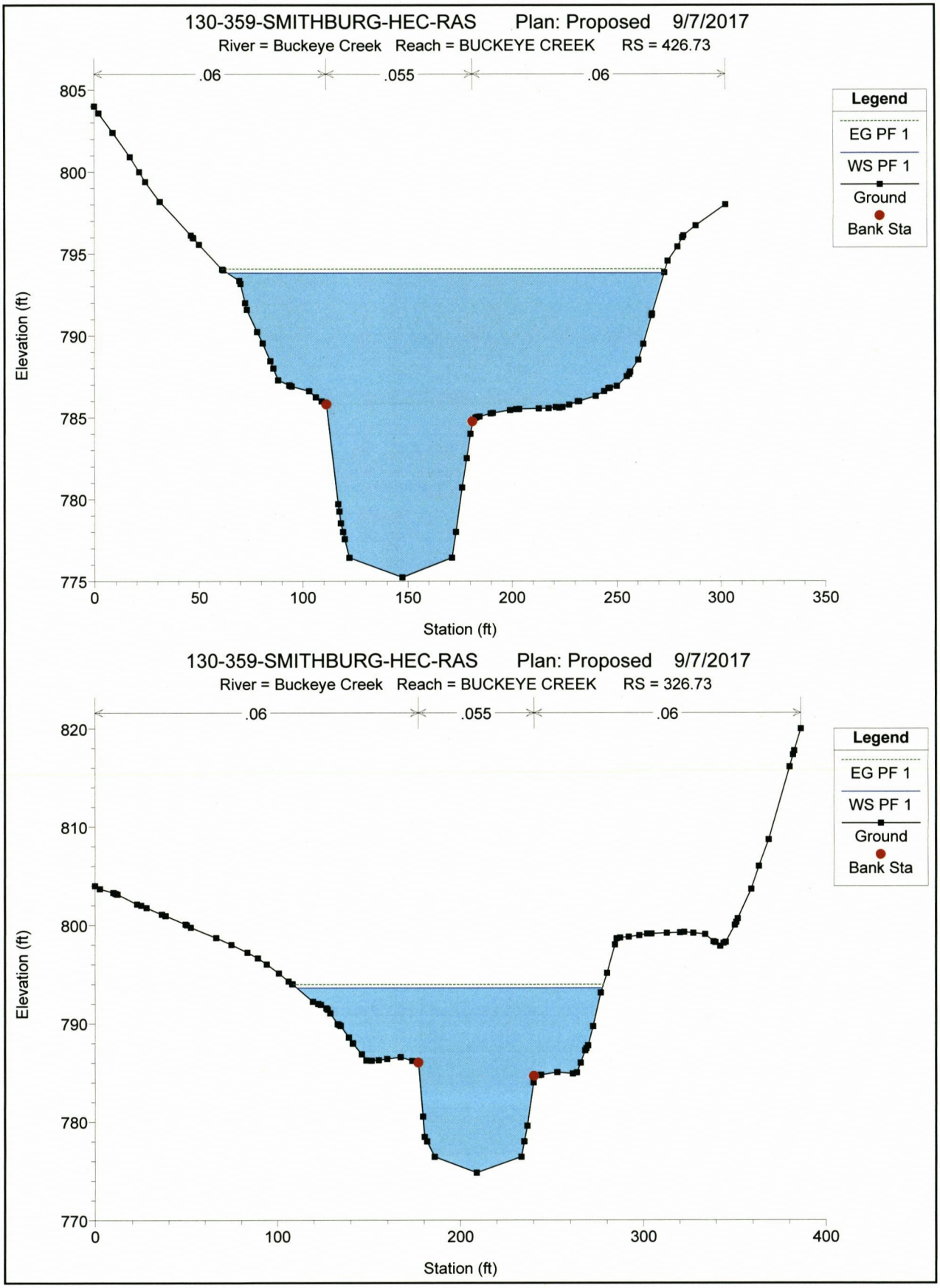
790
785
780
775
0
50
100
150
200
250
Station (ft)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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
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800
795
790
785
780
775
0
50
100
150
200
250
300
350
Station (ft)
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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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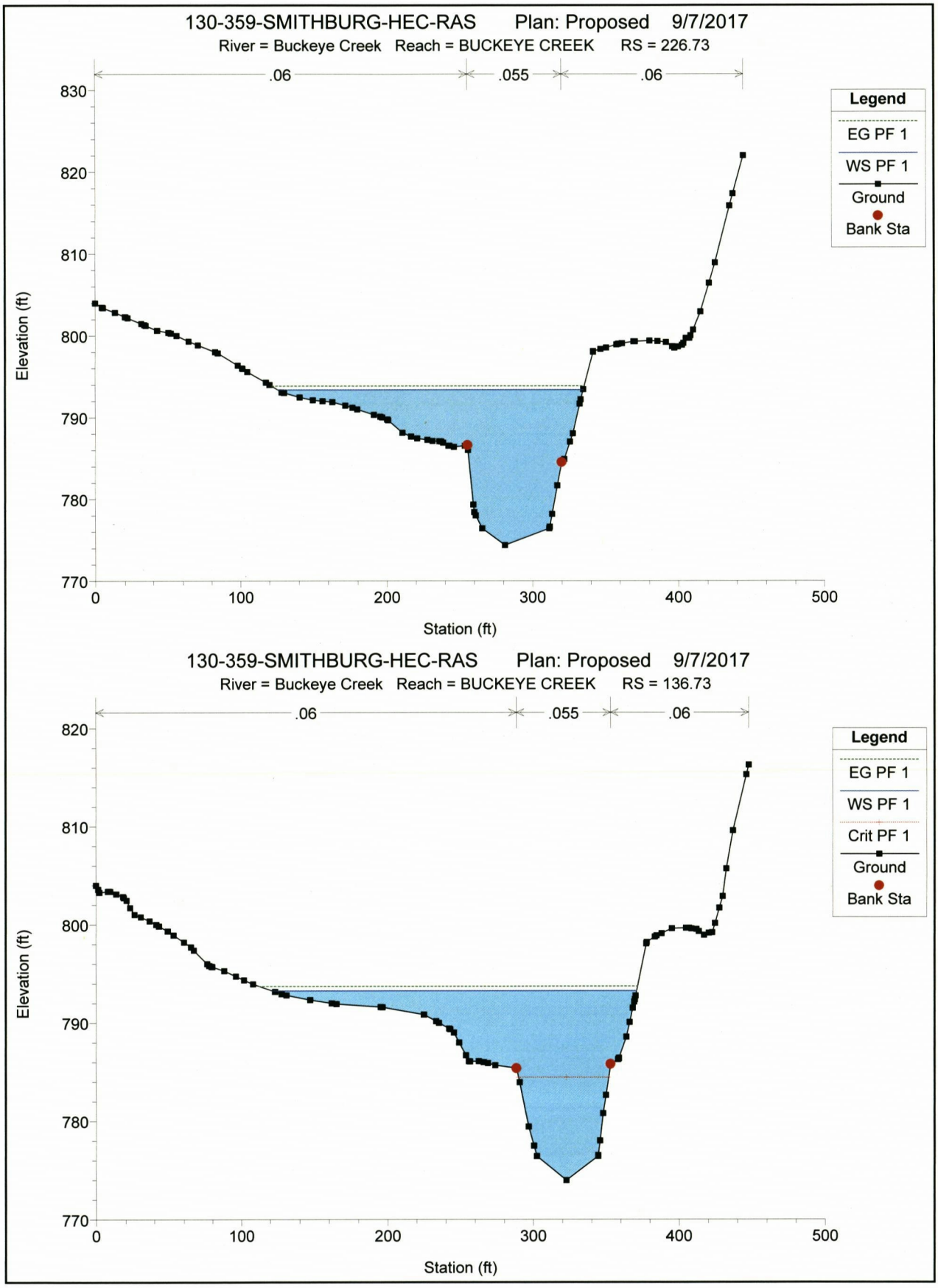
810
800
790
780
770
0
100
200
300
400
Station (ft)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Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 136.73
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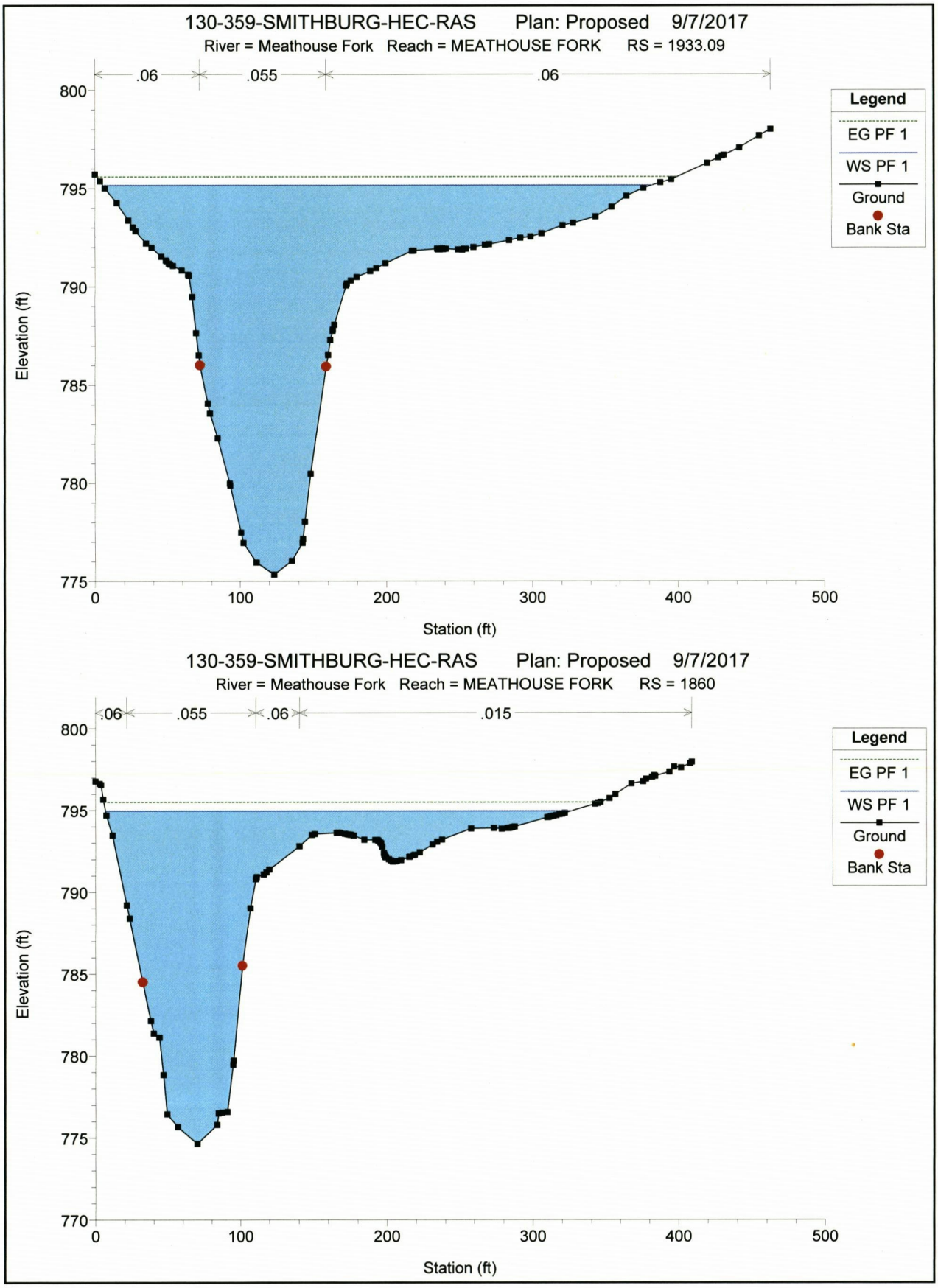
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1860
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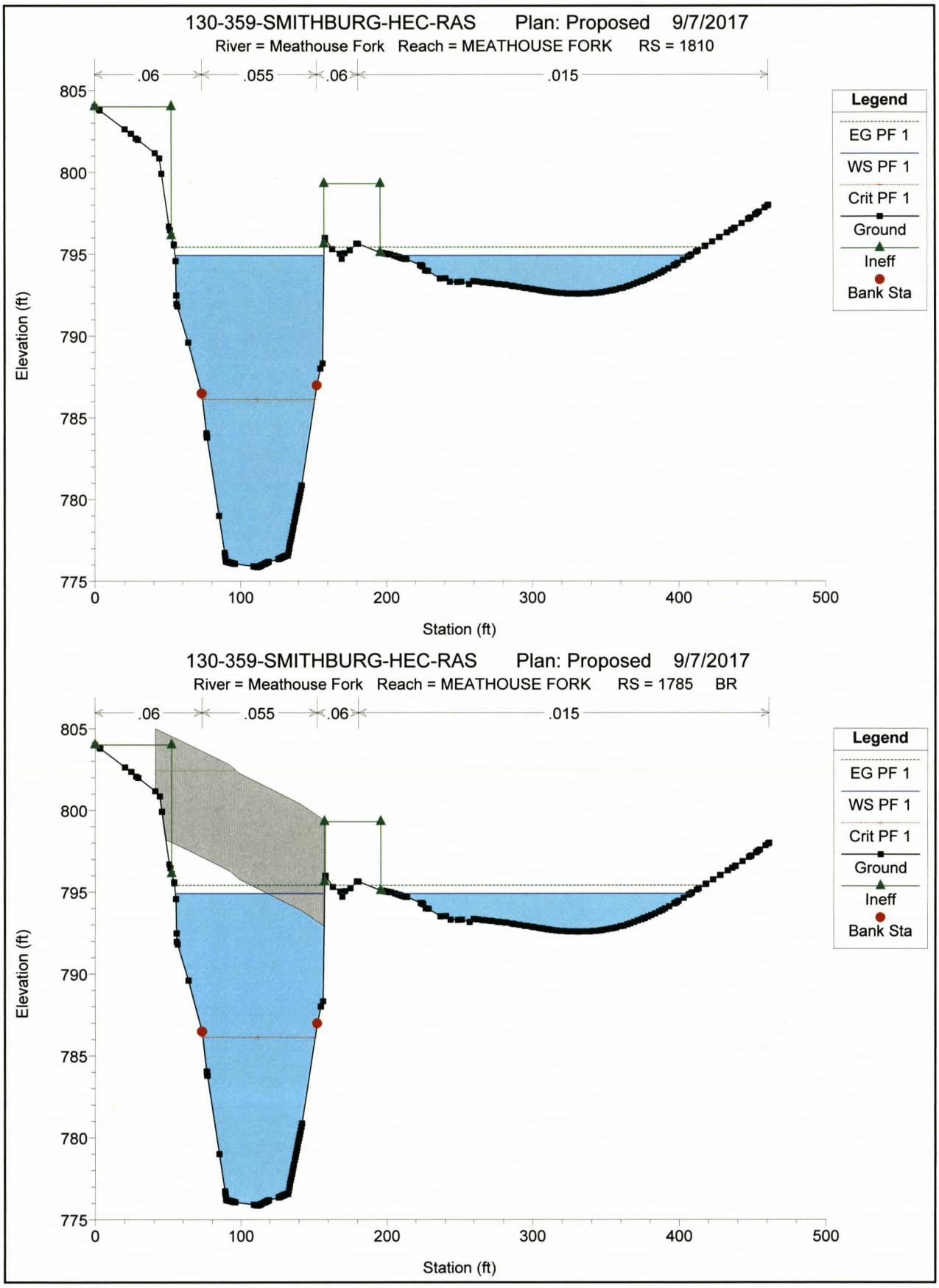
.06
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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.055
.06
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR
.06
.055
.06
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
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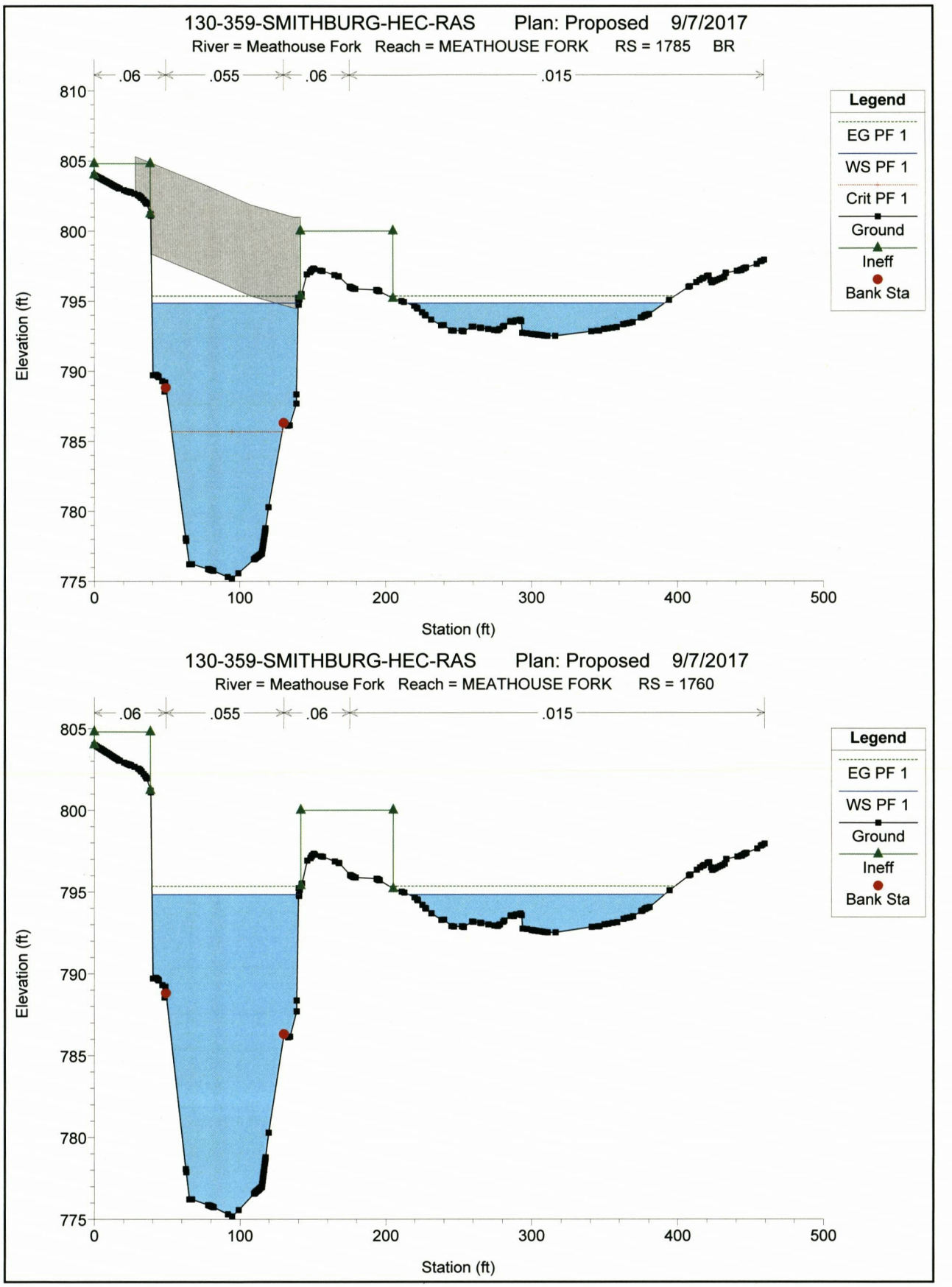
800
795
790
785
780
775
0
100
200
300
400
500
Station (ft)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River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1785 BR
.06
.055
.06
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1760
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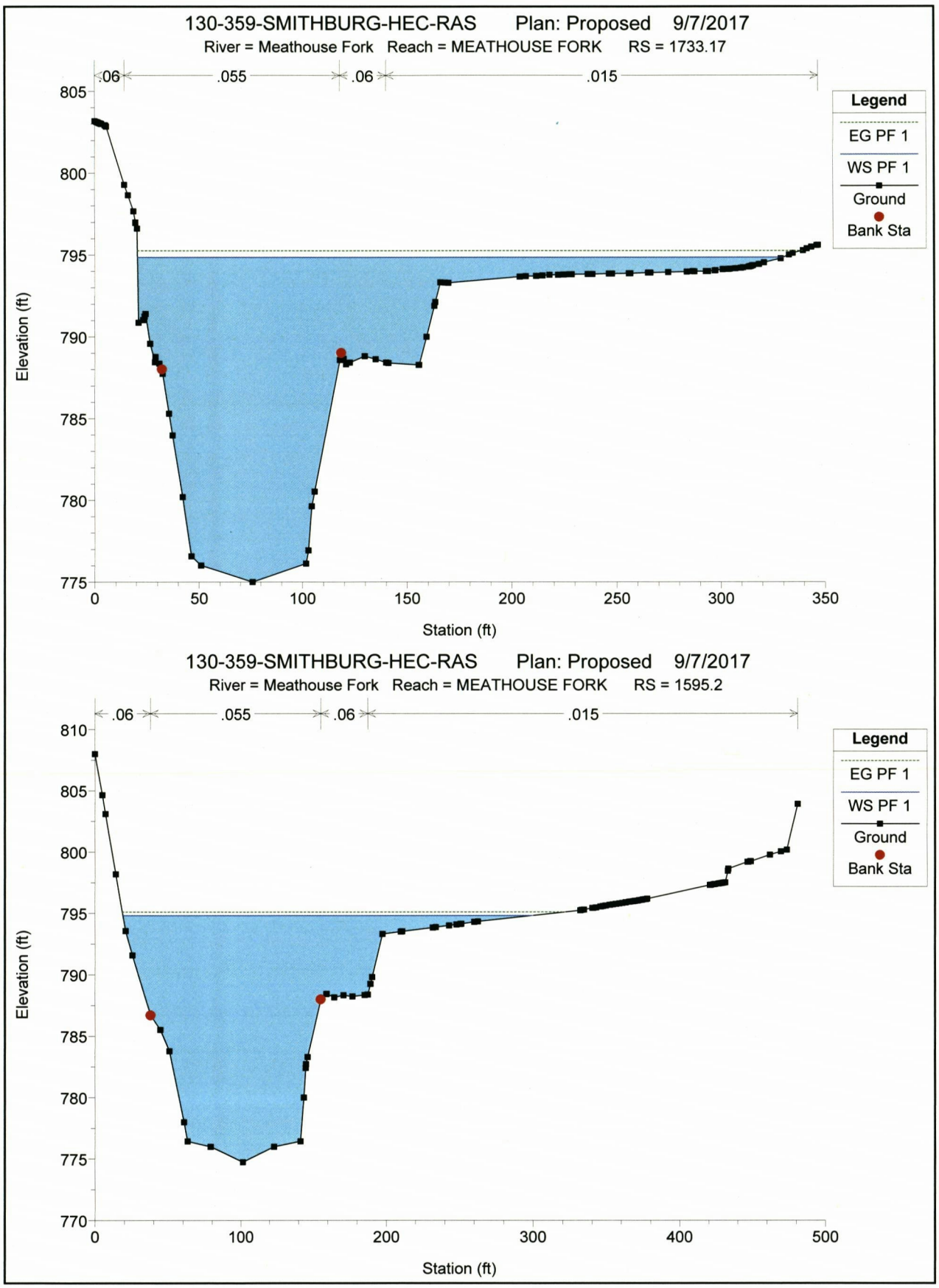
.06
.015
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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.06
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1595.2
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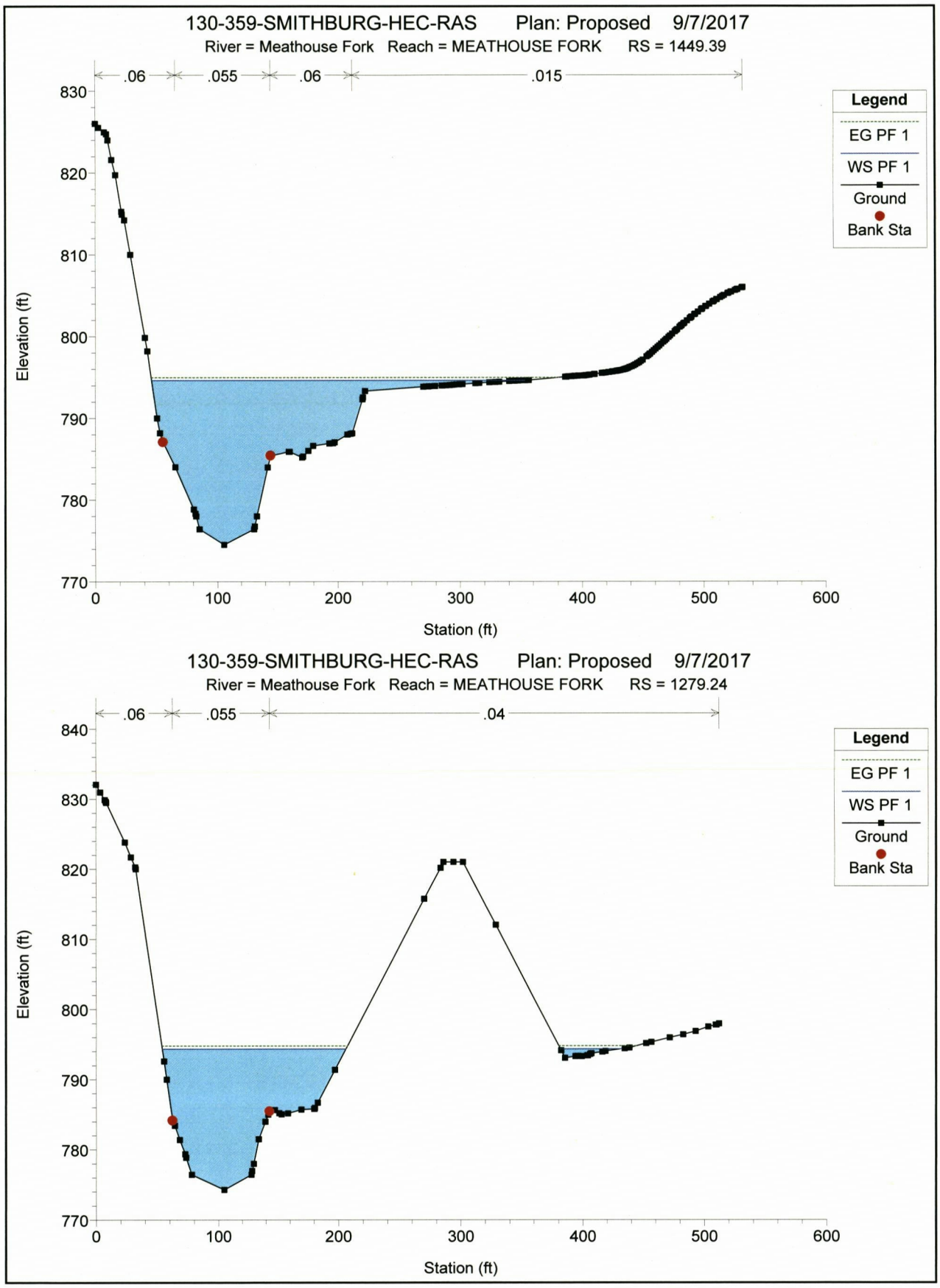
.06
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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.055
.06
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1279.24
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.055
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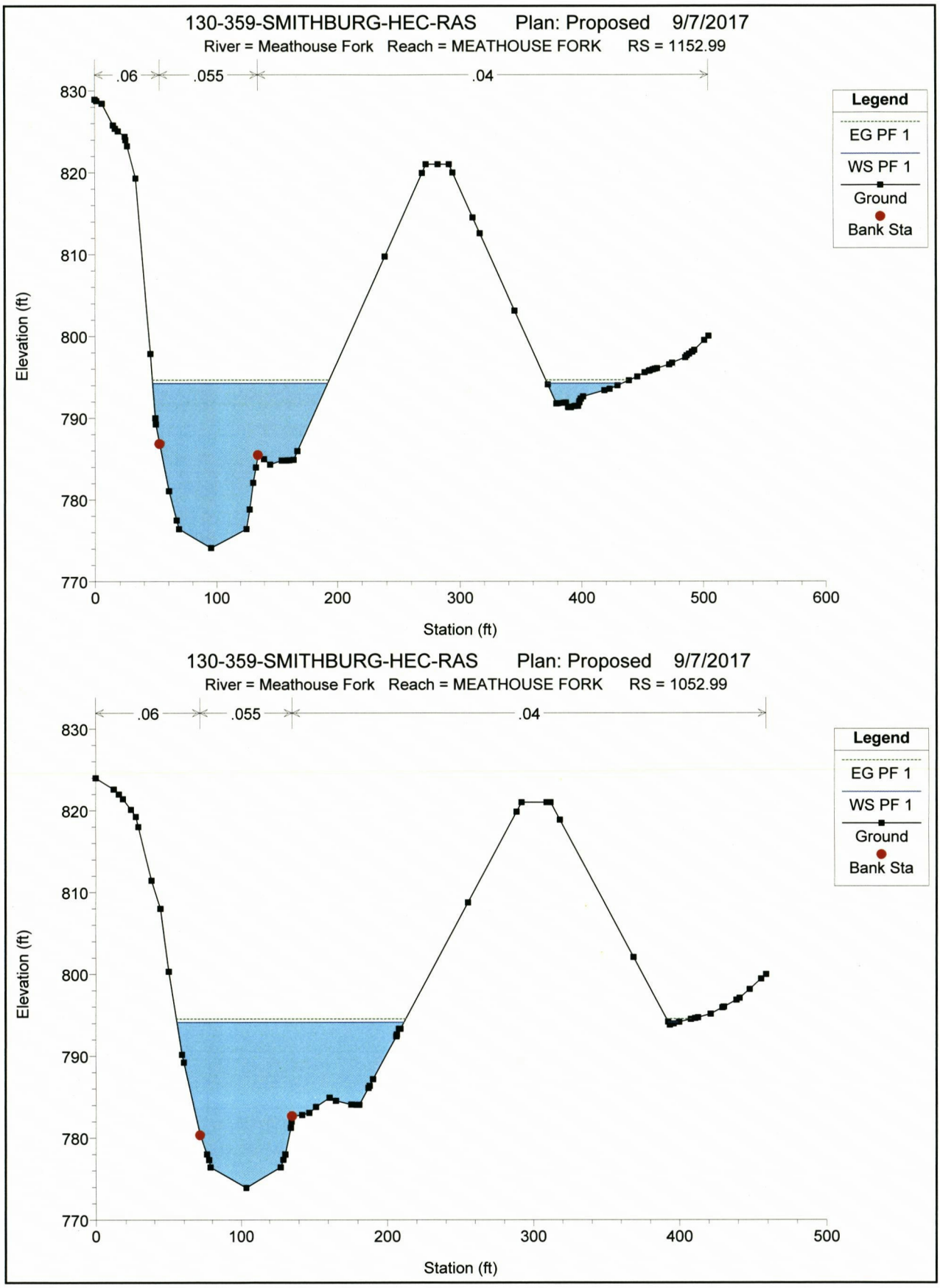
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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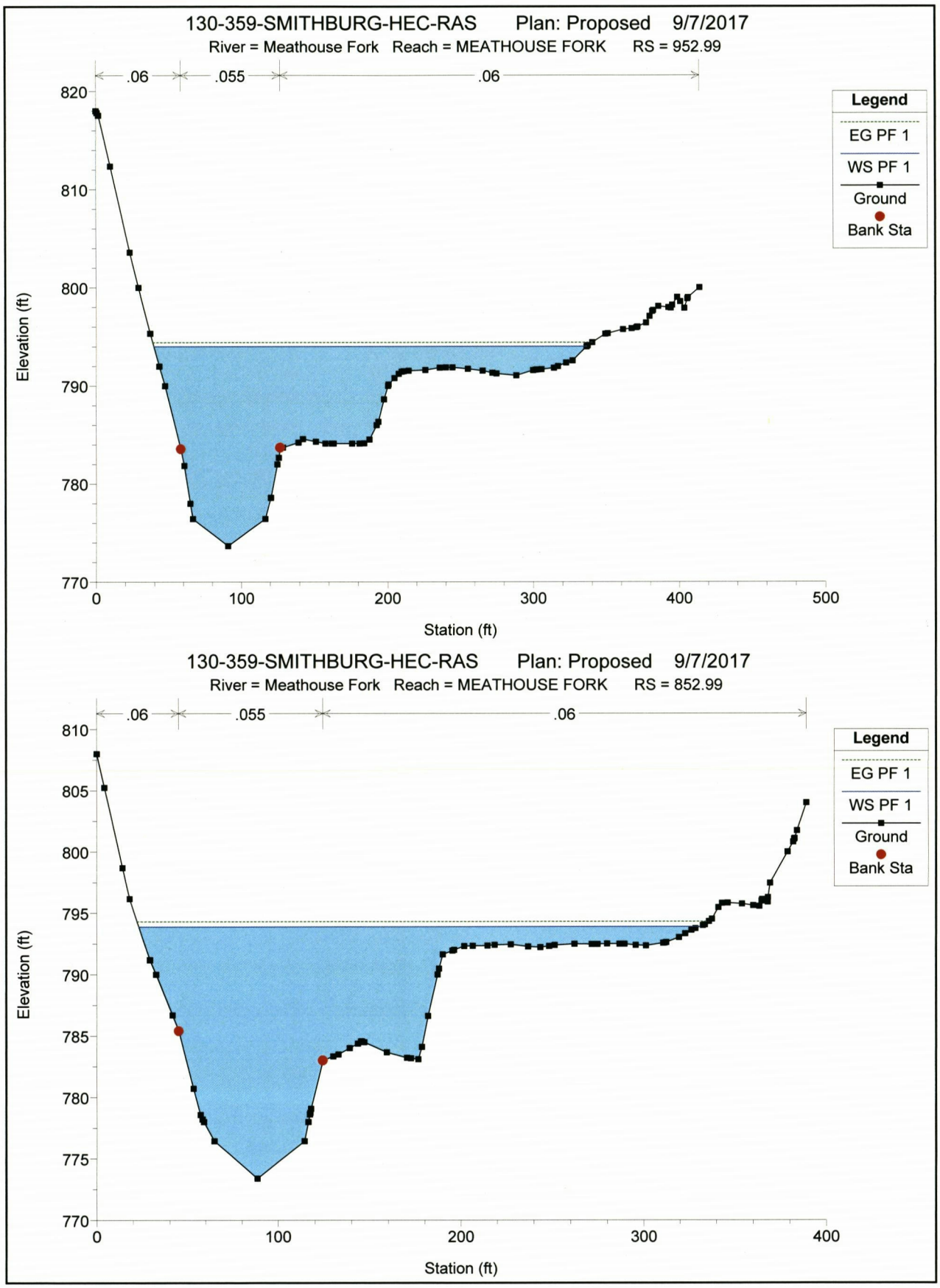
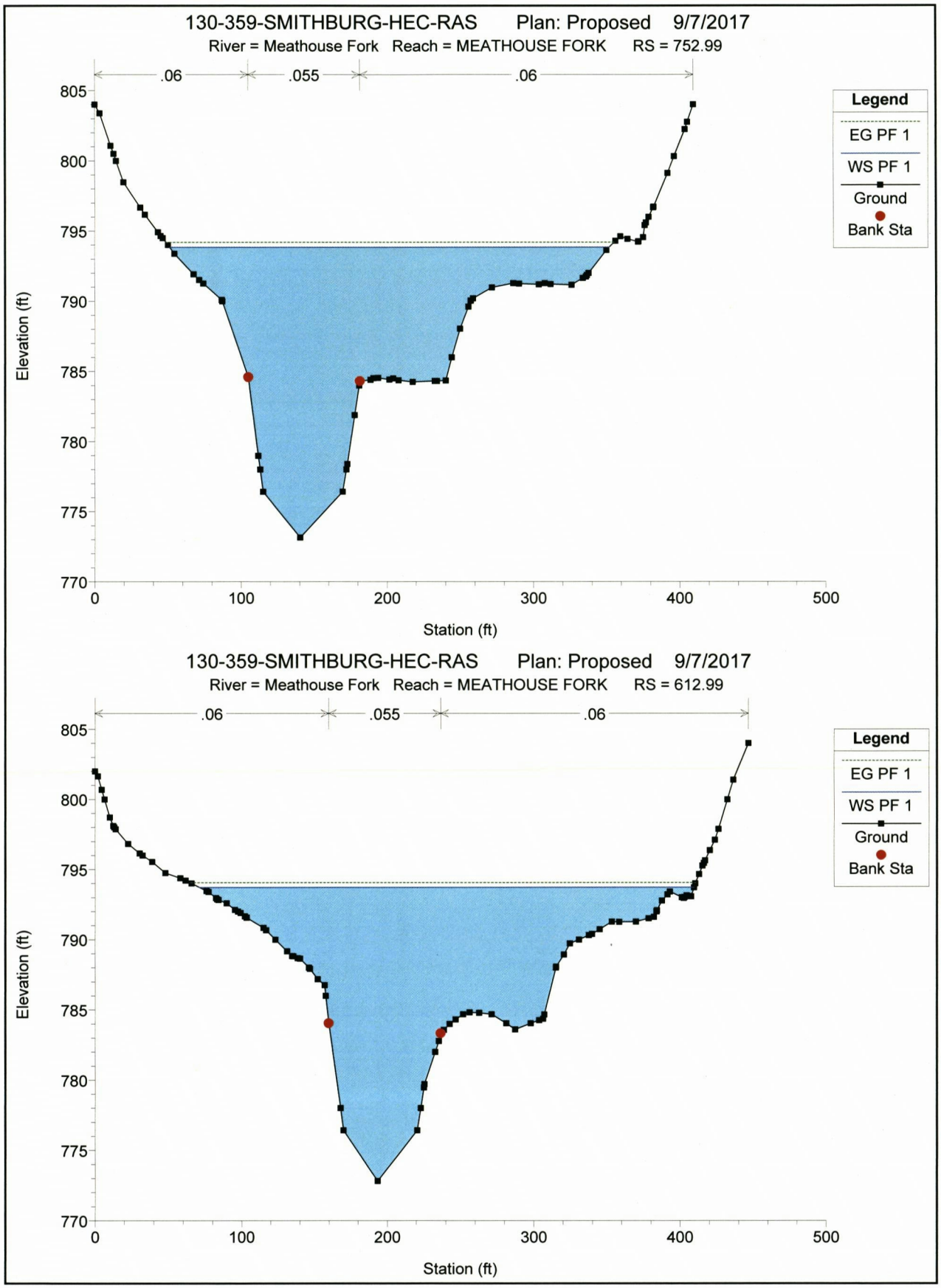
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1052.99
.06
.055
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 952.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
820
810
800
790
780
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 852.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
810
805
800
795
790
785
780
775
770
0
100
200
300
400
Station (ft)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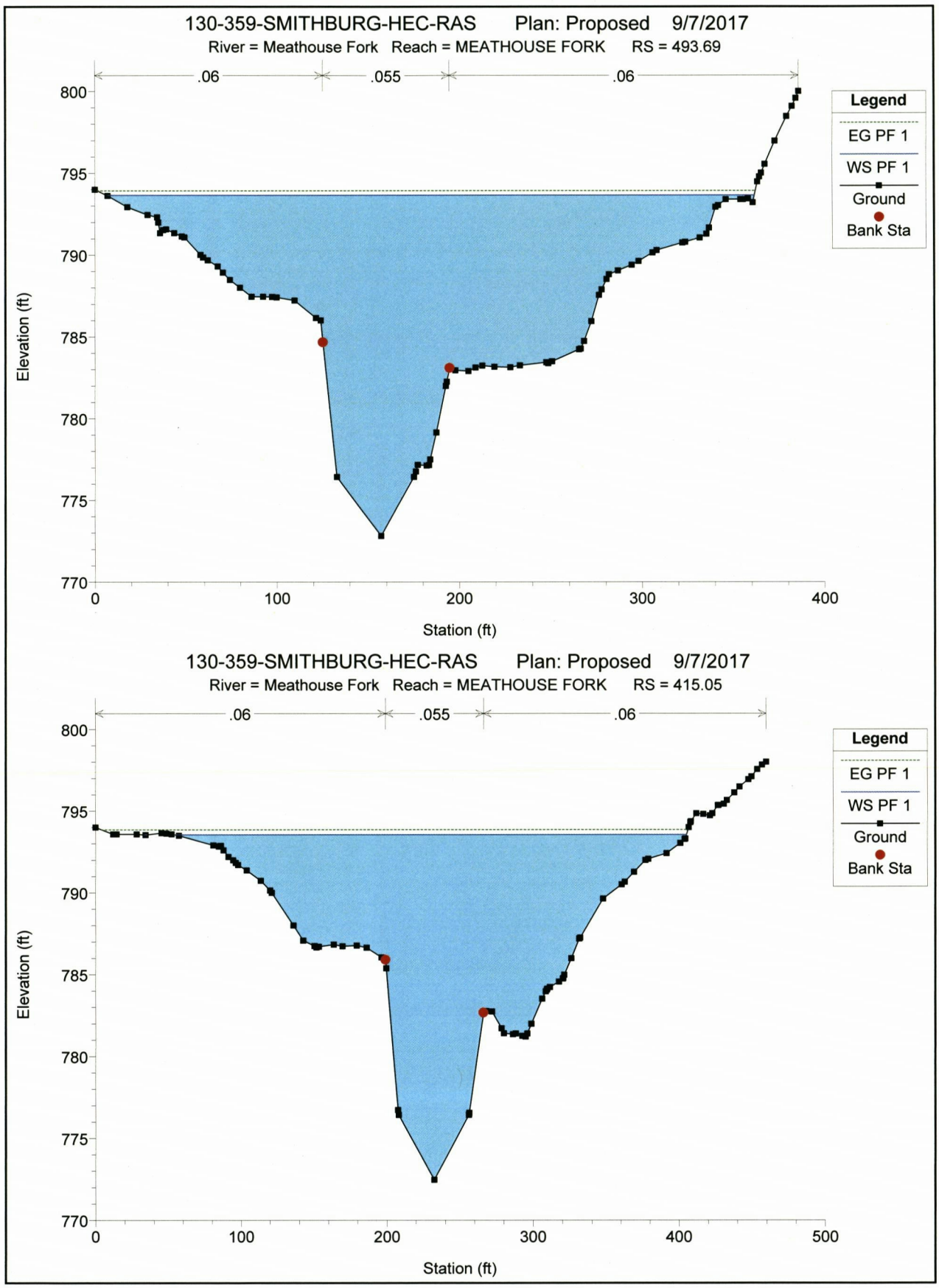
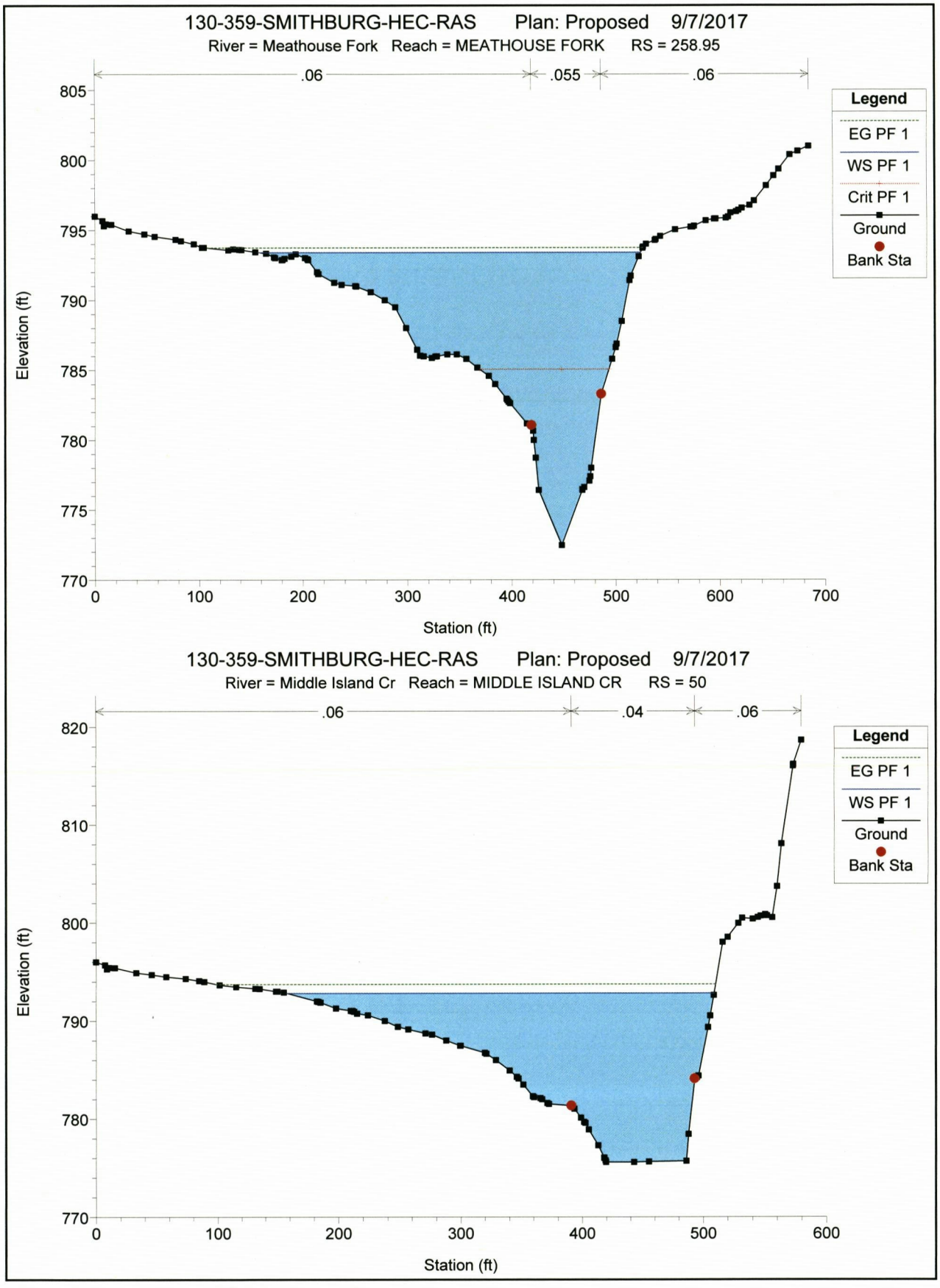
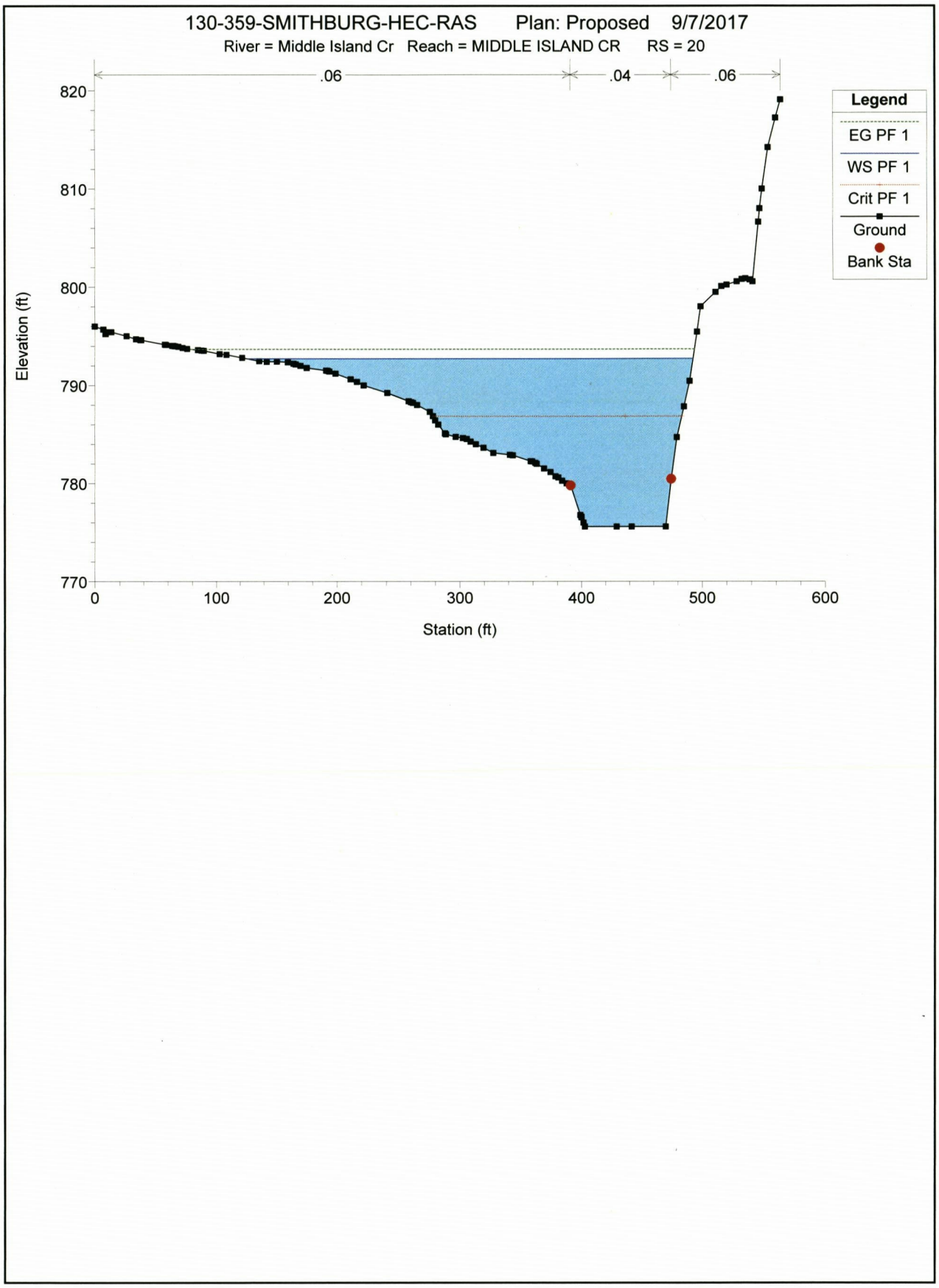
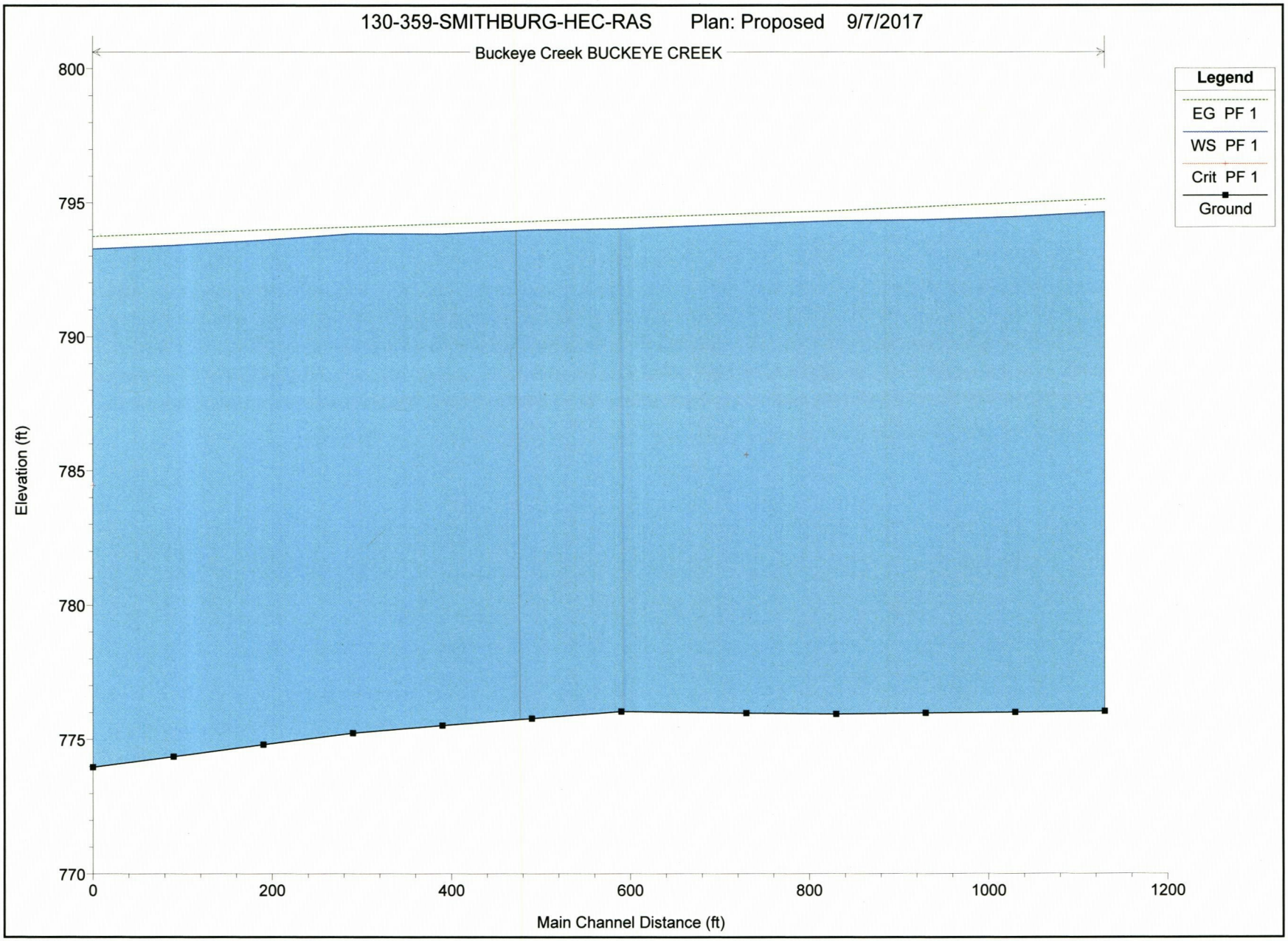
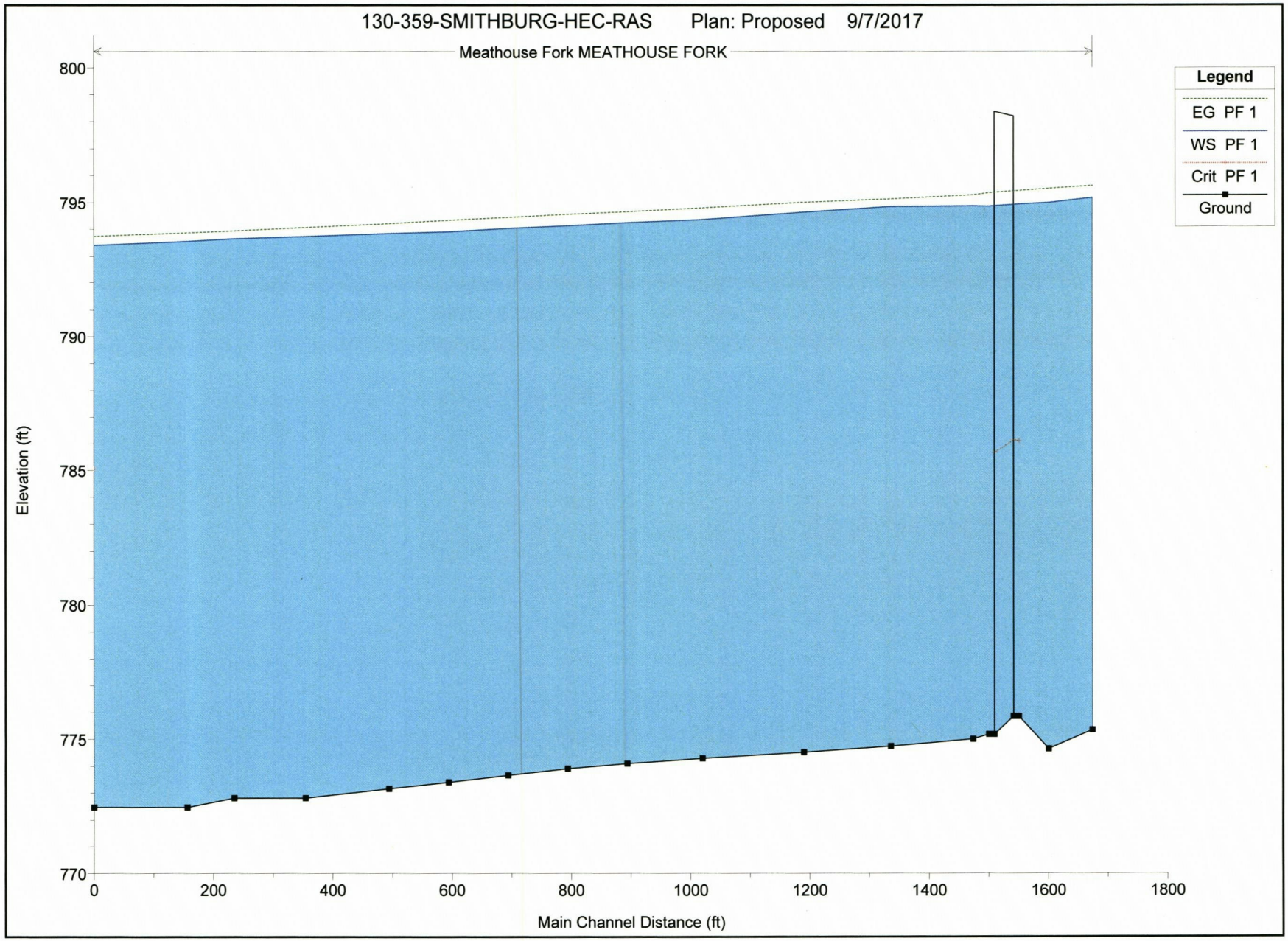
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 752.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
770
0
100
200
300
400
500
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 612.99
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
805
800
795
790
785
780
775
770
0
100
200
300
400
500
Station (ft)

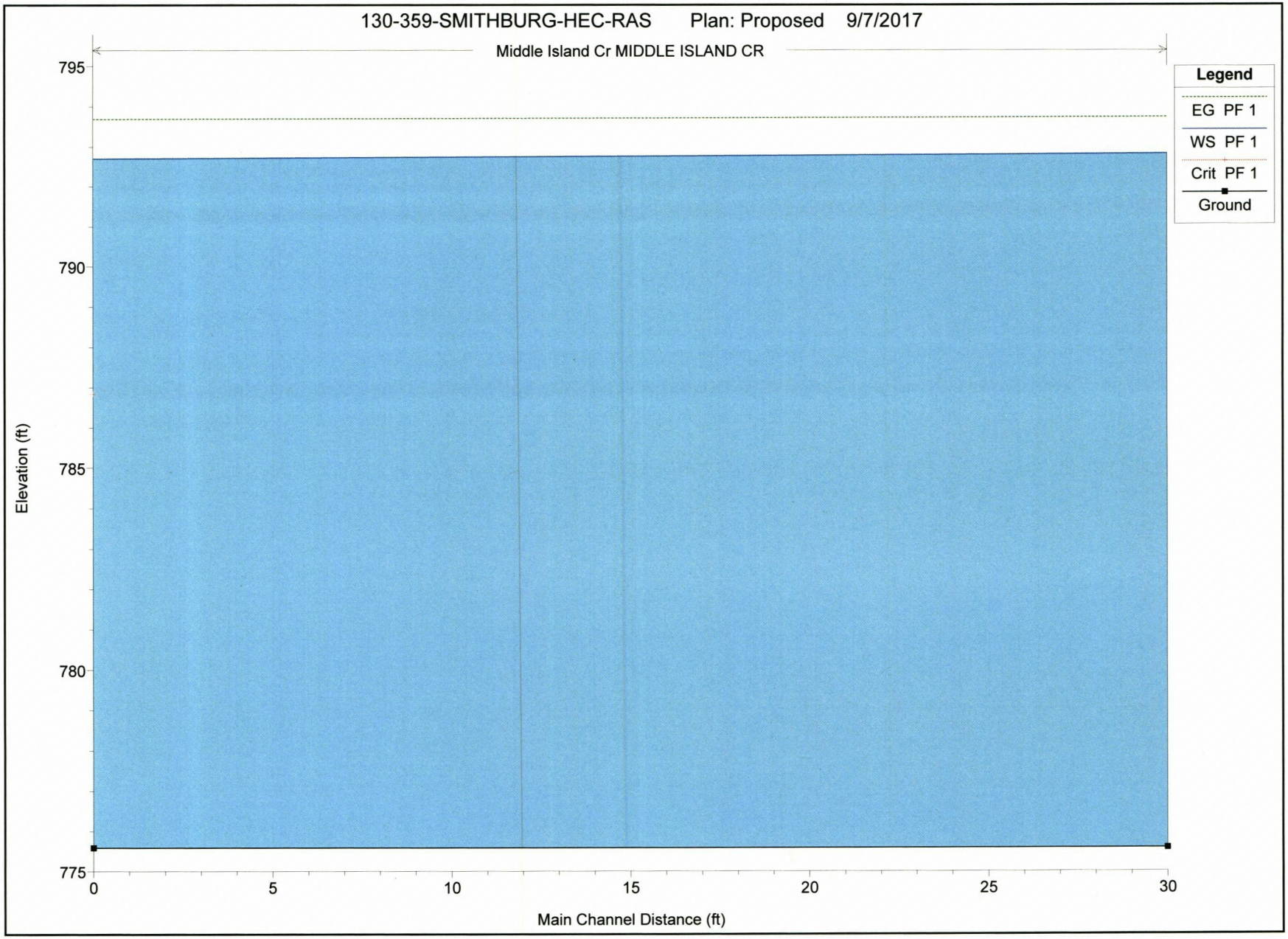

130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 493.69
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
800
795
790
785
780
775
770
0
100
200
300
400
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 415.05
.06
.055
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
800
795
790
785
780
775
770
0
100
200
300
400
500
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 258.95
.06
.055
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 50
.06
.04
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 20
.06
.04
.06
820
810
800
790
780
770
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
Buckeye Creek BUCKEYE CREEK
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
800
795
790
785
780
775
770
0
200
400
600
800
1000
1200
Main Channel Distance (ft)


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
Meathouse Fork MEATHOUSE FORK
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
800
795
790
785
780
775
770
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
Middle Island Cr MIDDLE ISLAND CR
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
795
790
785
780
775
0
5
10
15
20
25
30
Main Channel Distance (ft)

NORTH

EXISTING LEGAL RIGHT OF WAY

MEATHOUSE FORK

CO ROUTE 50/16

CO ROUTE 50/19

STATE ROUTE 50

POST-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS

FEMA ZONE AE FLOODPLAIN

MIDDLE ISLAND CREEK

CO ROUTE 50/30

CO ROUTE 50/22

BUCKEYE CREEK

LEGEND

- 820 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- APPROXIMATE STREAM CENTERLINE
- 20+55.25 — HEC-RAS CROSS SECTION
- A — SECTION END LABEL
- PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
- POST-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
- 820 — PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- FEMA ZONE AE FLOODPLAIN
- EXISTING EPHEMERAL STREAM
- EXISTING INTERMITTANT STREAM
- EXISTING PERENNIAL STREAM
- EXISTING WETLAND

REFERENCE

1. 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.
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 LOCATION FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

SCALE IN FEET
0 100 200

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

POST-DEVELOPMENT 100-YEAR FLOODPLAIN MAP

DATE:	9/8/17	DRAWN BY:	MEC/ARC
DWG SCALE:	1"=100'	CHECKED BY:	ARG
PROJECT NO:			130-359.0209
APPROVED:	*HAND SIGNATURE ON FILE		*RPC

DRAWING NO.:

SP02

P:\2017\130-359\130359.0209\CAD\[dwg]\130359.0209-CP01-SP02 LS(9.8.2017 - accidental) - LF, 9/8/2017 2:59 PM

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

HEC-RAS Plan: proposed Profile: PF 1

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)	(ft)	(cfs)	(cfs)	(cfs)	(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	100.38	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
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.

SCALE IN FEET
0 2000 4000

SITE MAP
SCALE: 1" = 2000'

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

PROJECT GENERAL NOTES

1. 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.
2. 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.
3. 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.
4. ALL WORK PERFORMED BY THE CONTRACTOR SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
5. 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.
6. 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

1. 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.
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.

L:\130-359 Sherwood Midstream\WR01\130359-WR01-C000-COVER.dwg{C000} LS:(6/26/2019

M.U.W.V TICKET NUMBER: 1719124301

MUWV 1-800-245-4848

REVISION RECORD

NO	DATE	DESCRIPTION

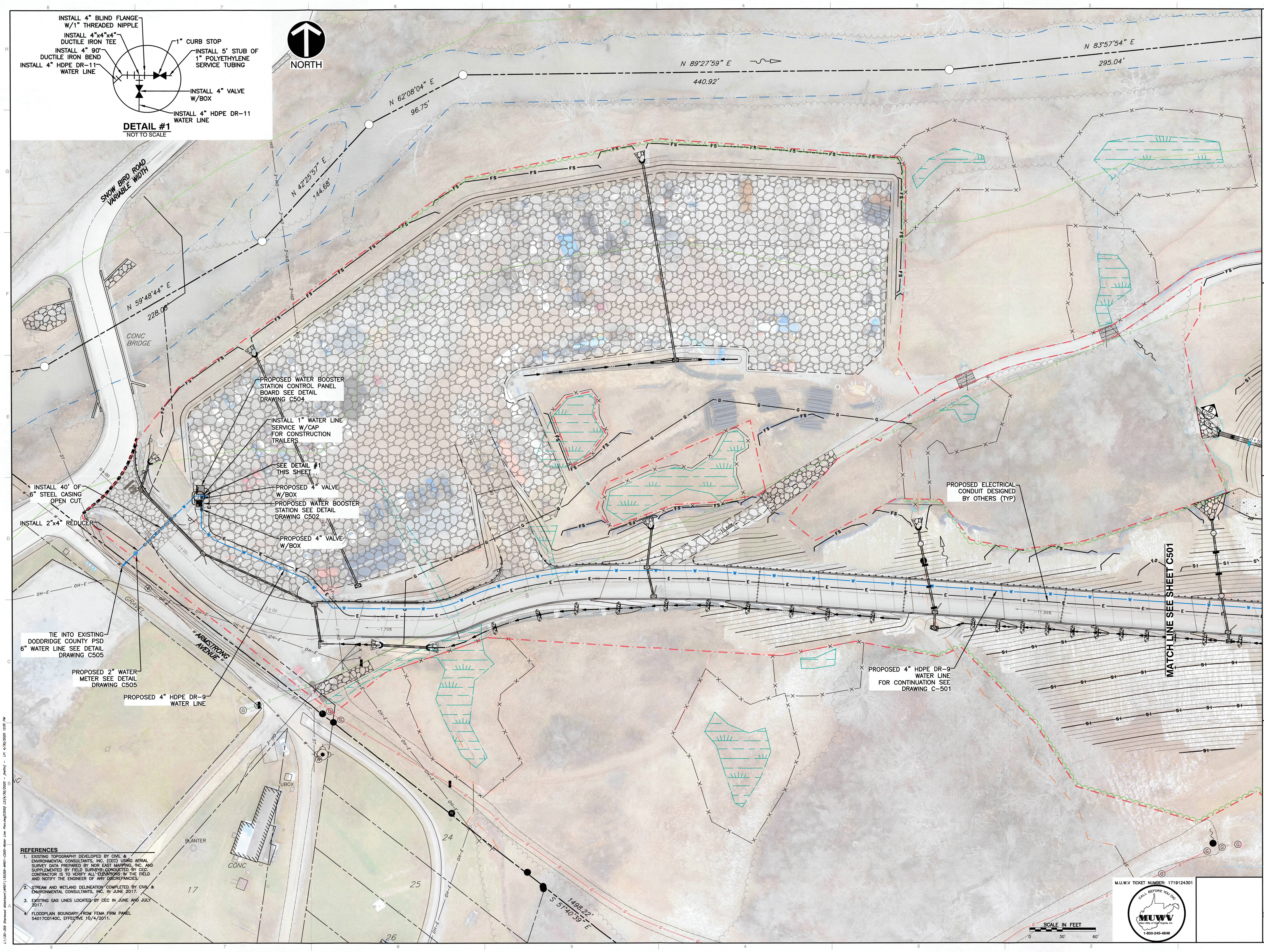
Civil & Environmental Consultants, Inc.
99 Cambridge Place · Bridgeport, WV 26330
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com

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

COVER

DATE:	June 26, 2019	DRAWN BY:	JBH
DWG SCALE:		CHECKED BY:	MWF
PROJECT NO:			130-359
APPROVED BY:	* HAND SIGNATURE ON FILE		MWF

DRAWING NO.: **C000**



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L:\130-359 Sherwood Midstream\WR01\130359-WR01-C500-Water Line Plan.dwg{C500}

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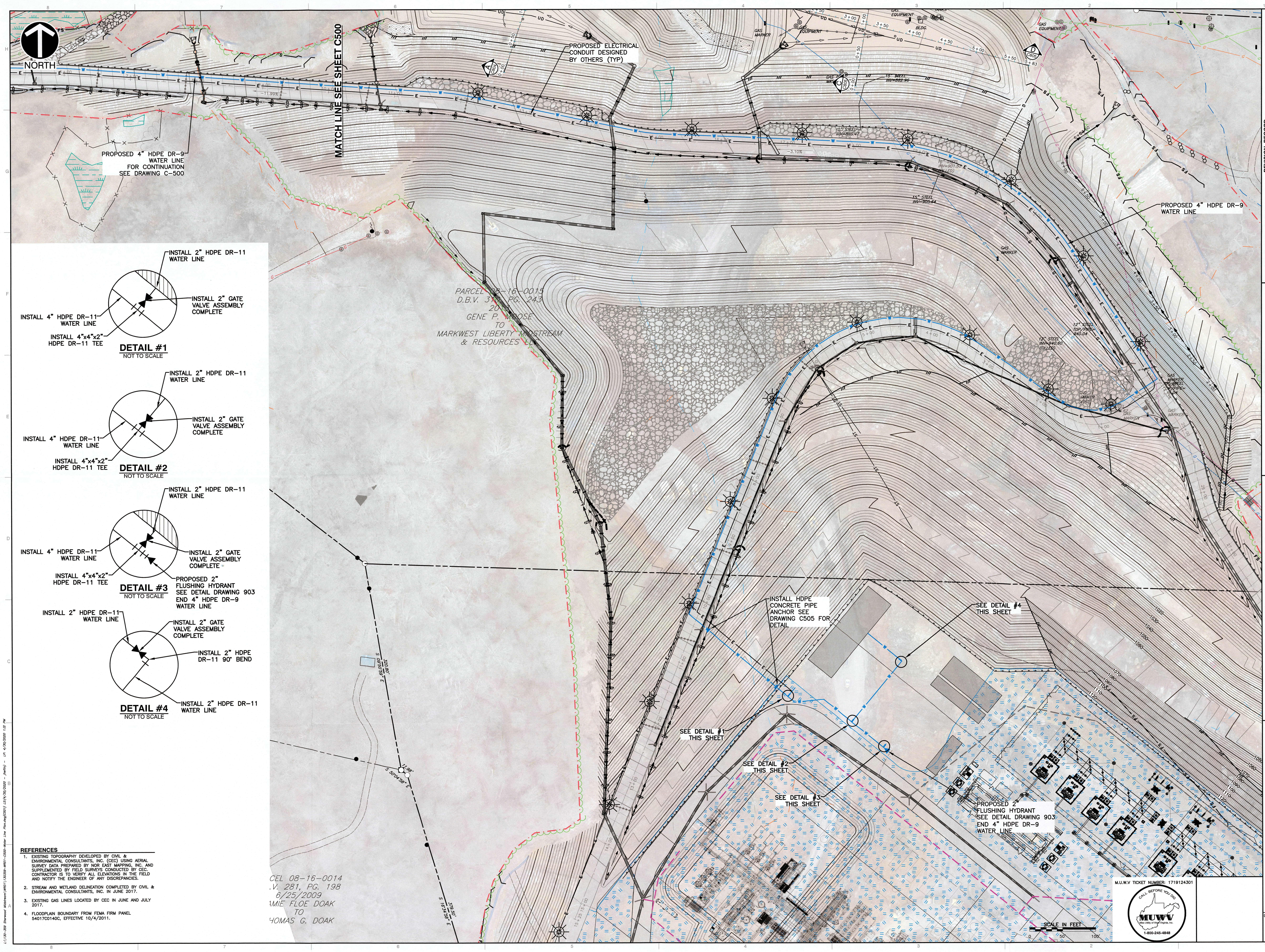
SHERWOOD MIDSTREAM LLC
SMITHBURG NATURAL GAS PROCESSING FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA

WATER LINE SITE PLAN

DATE:	April 30, 2020	DRAWN BY:	JBH
DWG SCALE:	AS SHOWN	CHECKED BY:	MWF
PROJECT NO:	130-359		
APPROVED BY:	* HAND SIGNATURE ON FILE		MWF

DRAWING NO.: **C500**



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L:\130-359 Sherwood Midstream\WR01\130359-WR01-C500-Water Line Plan.dwg{C501}

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

WATER LINE OVERALL SITE PLAN

DATE:	April 30, 2020	DRAWN BY:	JBH
DWG SCALE:	AS SHOWN	CHECKED BY:	MWF
PROJECT NO:	130-359		MWF
APPROVED BY:	* HAND SIGNATURE ON FILE		

DRAWING NO.: **C501**

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"	17.1
3 1/2"	22.4
4"	28.3
5"	43.1
6"	60.8
8"	103.0
10"	160.0
12"	225.0

Based on side thrust per 100 lb./in^2 pressure per degree of deflection.

NOTE: Multiply side thrust pounds by degree of deflection times pounds of pressure divided by 100 to obtain total side thrust in pounds.

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

Pipe Size	Dead End or Tee	90° Elbow	45° Elbow	22 1/2° Elbow
1.5"	2.94	4.16	2.25	1.15
2"	4.56	6.45	3.50	1.78
2.5"	6.65	9.40	5.10	2.60
3"	9.80	13.9	7.51	3.82
3.5"	12.8	18.1	9.81	4.99
4"	16.2	23.0	12.4	6.31
5"	24.7	35.0	18.9	9.63
6"	34.8	49.2	26.7	13.6
8"	59.0	83.5	45.2	23.0
10"	91.5	130.0	70.0	35.8
12"	129.0	180.0	98.5	50.3

Based on pounds thrust per PSI working pressure.

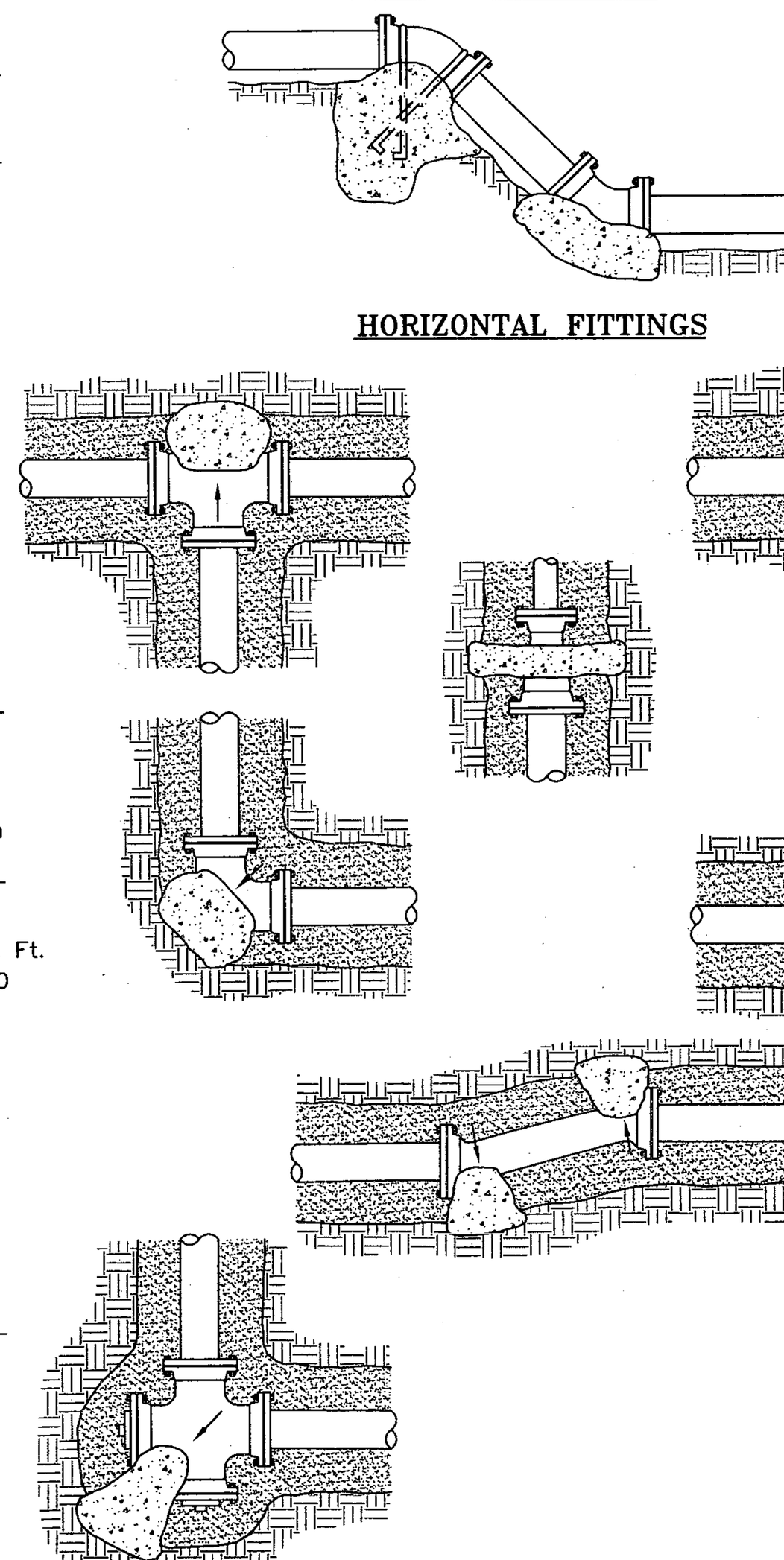
STEP 2. Determine the bearing strength of the soil from the table below:

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

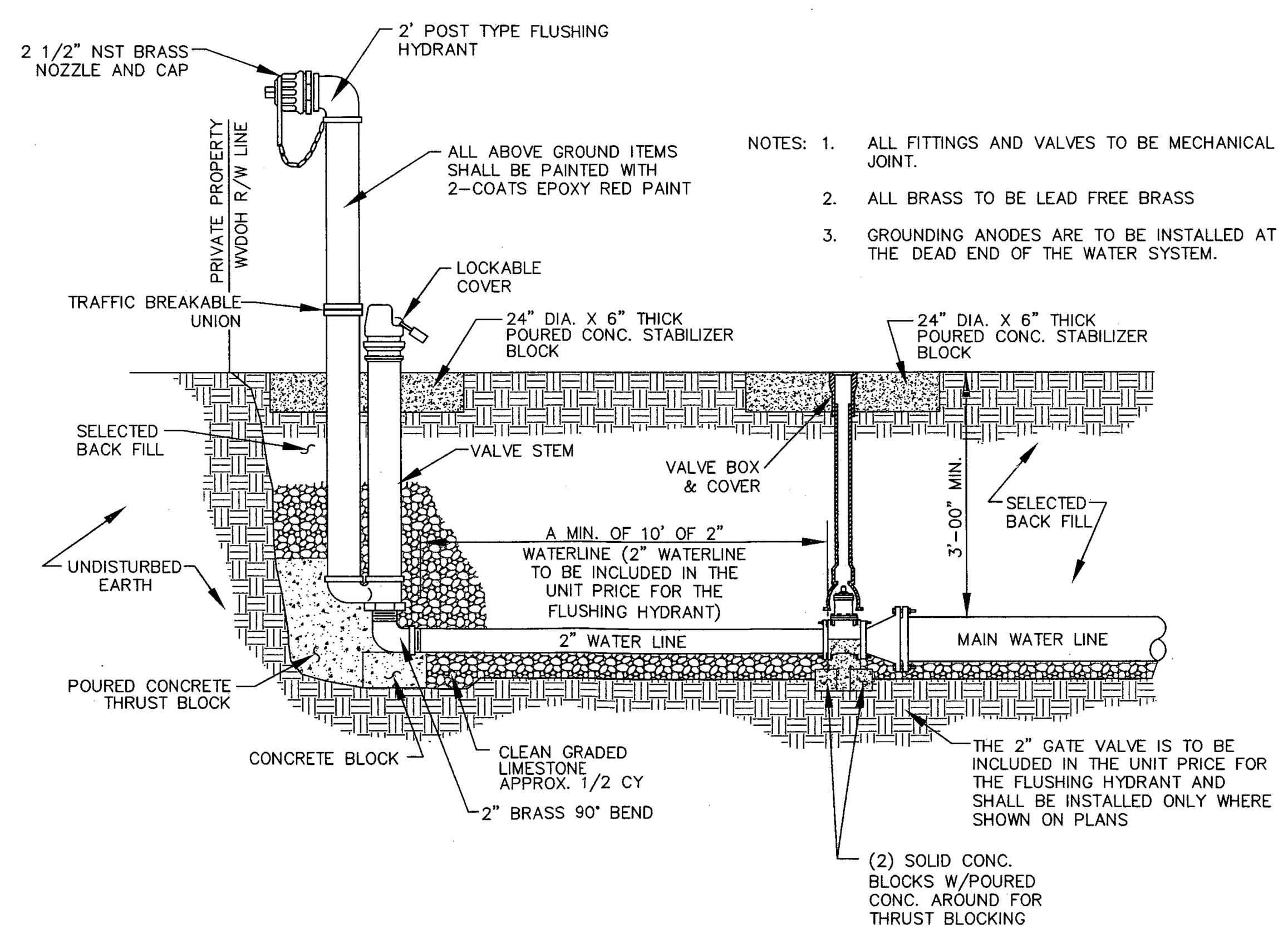
STEP 3. Divide the total thrust obtained in Step 1 by the bearing strength of the soil; this gives the square feet of area needed.

NOTE: ALL CONCRETE THRUST BLOCKING TO MEET 3000 PSI CRUSH TEST.

NOTE: ALL FITTINGS TO BE WRAPPED WITH 4 MIL PLASTIC WRAP PRIOR TO PLACING CONCRETE THRUST BLOCKING.

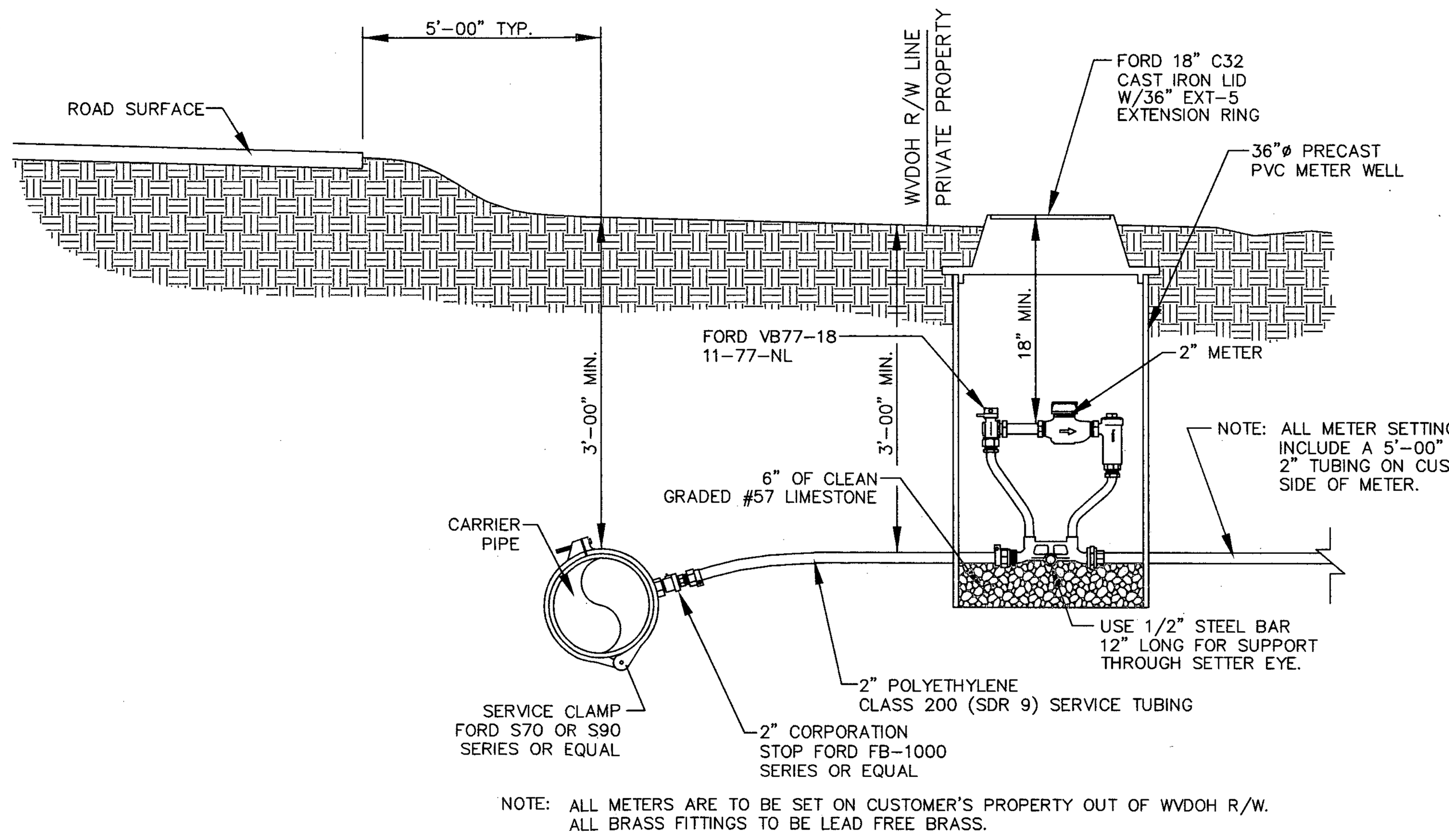


THRUST BLOCKING DETAILS
NTS



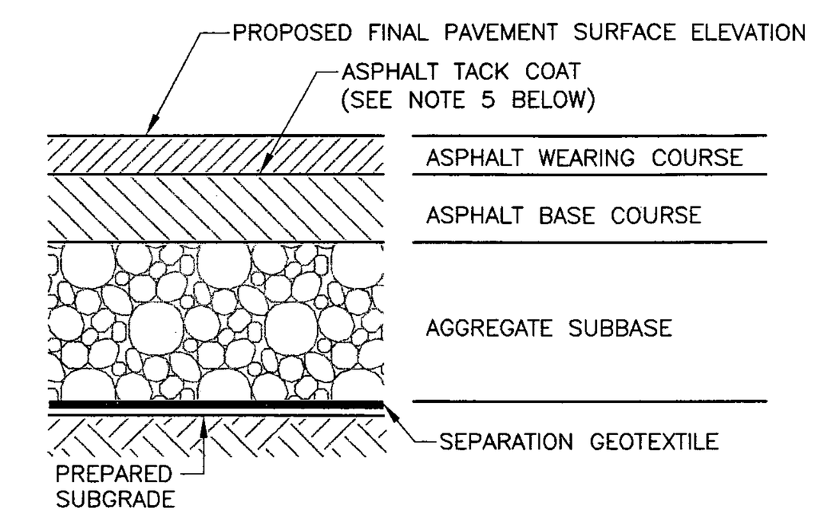
NOTES:
1. ALL FITTINGS AND VALVES TO BE MECHANICAL JOINT.
2. ALL BRASS TO BE LEAD FREE BRASS
3. GROUNDING ANODES ARE TO BE INSTALLED AT THE DEAD END OF THE WATER SYSTEM.

2" POST TYPE FLUSHING HYDRANT
NTS



NOTE: ALL METERS ARE TO BE SET ON CUSTOMER'S PROPERTY OUT OF WVDOH R/W. ALL BRASS FITTINGS TO BE LEAD FREE BRASS.

METER SETTING (SAME SIDE OF PAVED ROAD)
NTS



ASPHALT PAVED AREA

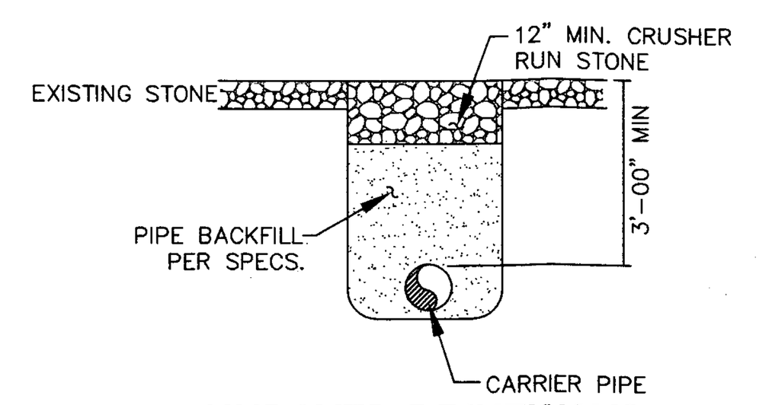
ITEM	MATERIAL	SPECIFICATION	COMPACTED THICKNESS (IN.)
ASPHALT WEARING COURSE	SUPERPAVE 9.5 MM MIX PG 64-22 ASPHALT BINDER	WVDOH DIVISION 400 (STANDARD SPECIFICATIONS ROADS AND BRIDGES)	2"
ASPHALT BASE COURSE	SUPERPAVE 25 MM MIX PG 64-22 ASPHALT BINDER	WVDOH DIVISION 400 (STANDARD SPECIFICATIONS ROADS 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 GEOTEXILTE	WVDOH DIVISION 715.11.8	NOT APPLICABLE

ASPHALT PAVEMENT SECTION DEPTH TABLE

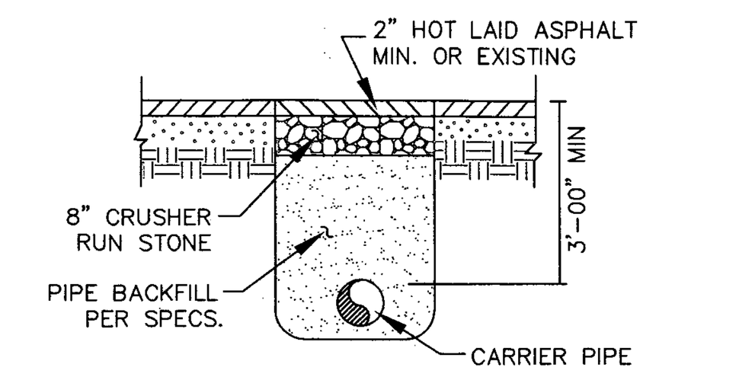
NOTES:

1. PRIOR TO PLACEMENT OF AGGREGATE SUBBASE, THE PAVEMENT SUBGRADE SHALL BE PREPARED AS FOLLOWS:
   A. 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 PROOFROLL PERFORMED WITH A FULLY-LOADED OFF ROAD OR TRI-AXLE DUMP TRUCK, SHALL BE OVEREXCAVATED TO A FIRM AND COMPETENT MATERIAL AND BACKFILLED. PROOFROLL SHOULD ONLY BE EVALUATED IMMEDIATELY PRIOR TO AGGREGATE SUBBASE PLACEMENT.
   B. 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.
2. MANHOLE TOPS TO BE FLUSH WITH FINAL PAVEMENT SURFACE.
3. PLACE AGGREGATE SUBBASE AND COMPACT EACH LIFT TO VISUAL NON-MOVEMENT UNDER THE WEIGHT OF THE COMPACTION EQUIMENT.
4. THE ASPHALT COURSES SHALL BE COMPACTED TO 92% TO 95% OF THE THEORETICAL MAXIMUM DENSITY.
5. 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.
6. DO NOT PLACE PAVEMENT WHERE CARBONACEOUS MATERIAL, FAT CLAY, ELASTIC SILT, OR COAL IS WITHIN 5 FEET OF FINISHED SUBGRADE.

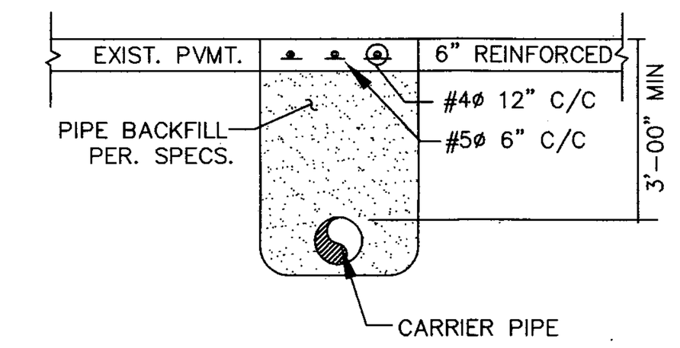
TYPICAL PAVEMENT SECTION
NTS



UNPAVED DRIVEWAYS

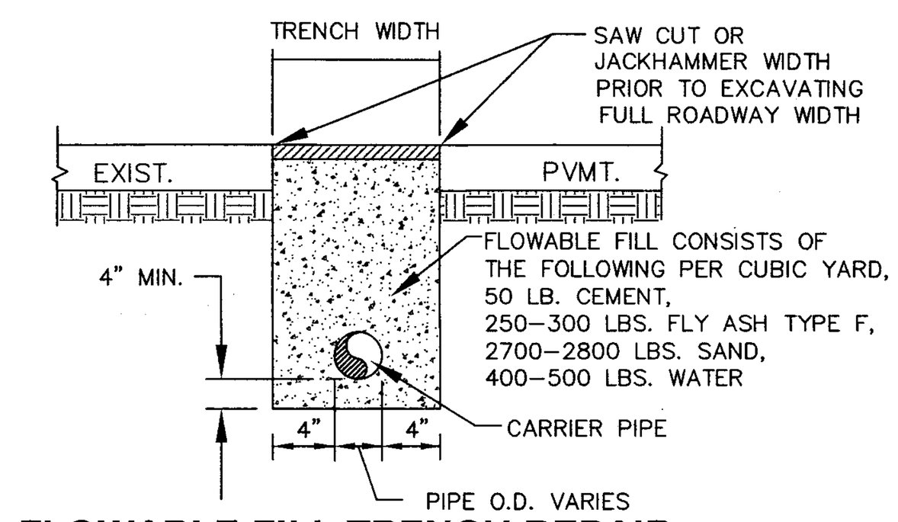


HLBC CITY STREET & DRIVEWAY REPAIR



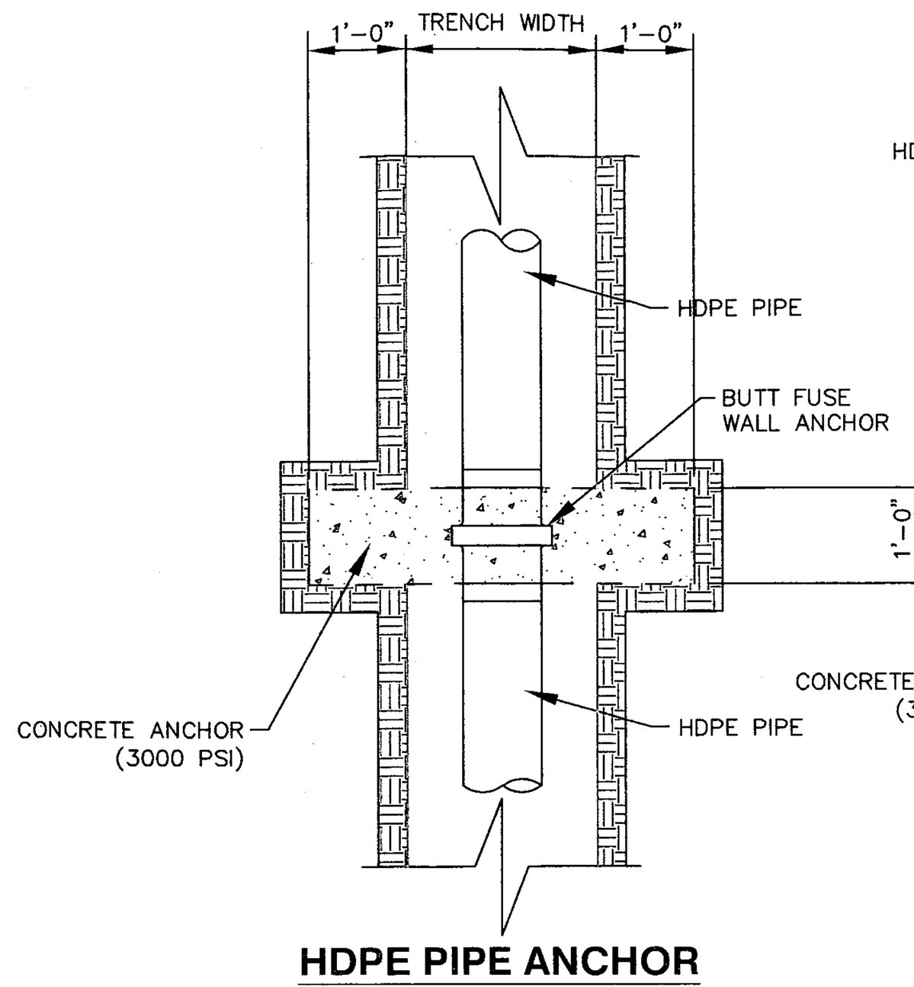
CONCRETE PAVEMENT

NOTE: ALL CONCRETE TO BE MINIMUM 3000 P.S.I. 6 BAG MIX, AIR-ENTRAINED

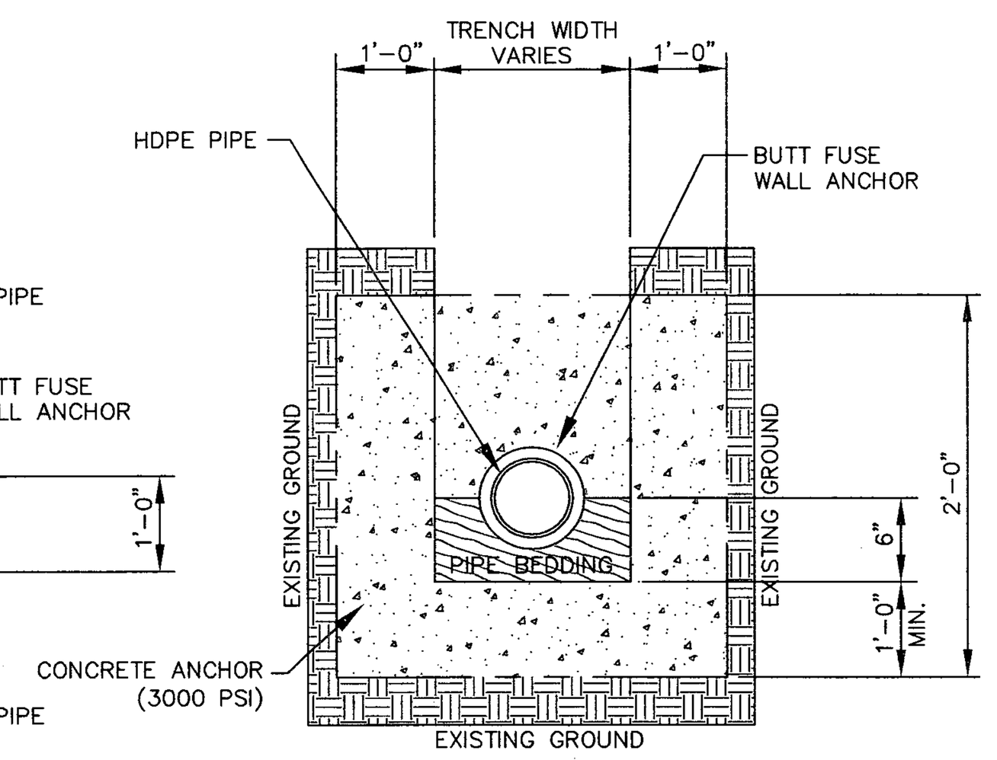


FLOWABLE FILL TRENCH REPAIR

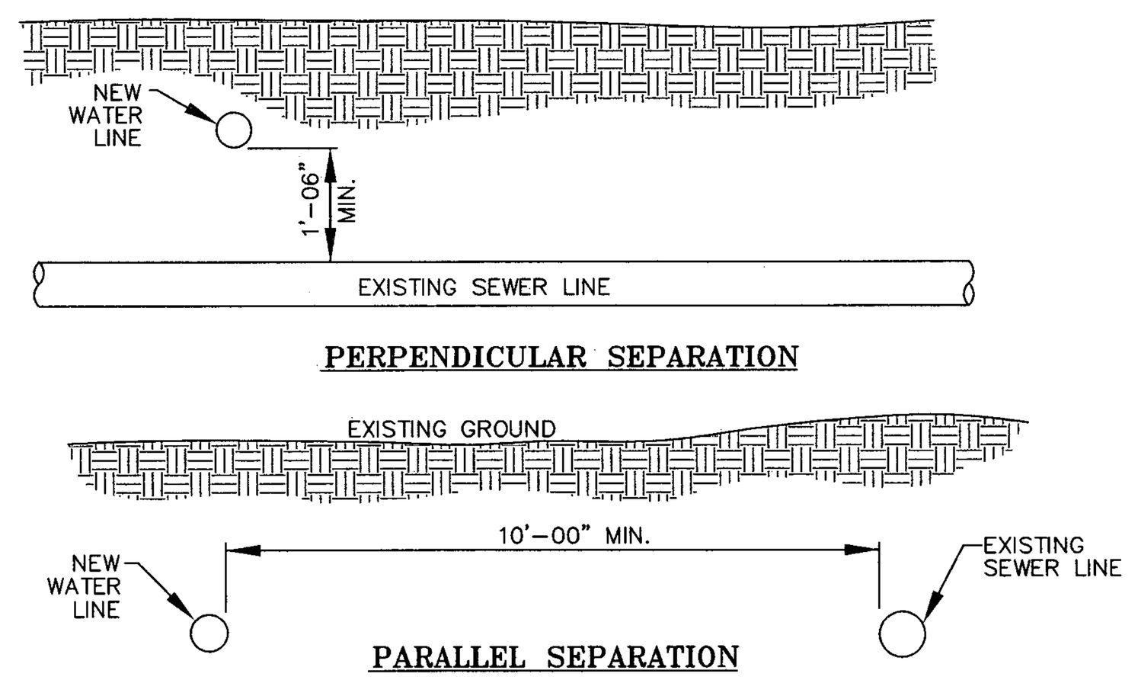
TYPICAL ROAD REPAIR DETAILS NOT WITHIN WV.D.O.H. R.O.W.'S
NTS



HDPE PIPE ANCHOR PLAN
NTS



HDPE PIPE ANCHOR SECTION
NTS

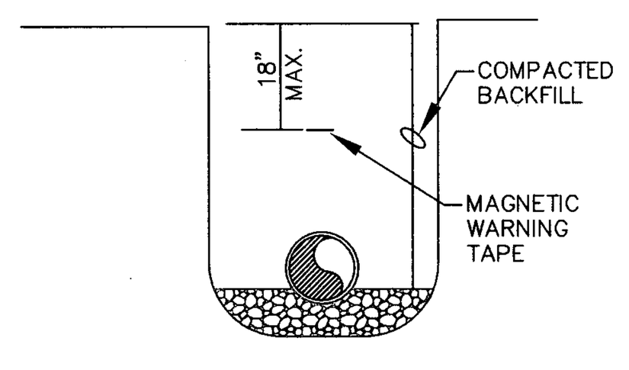


DETAIL SHOWING SEPARATION OF SEWER AND WATER LINES
NTS

RED	ELECTRIC
YELLOW	GAS - OIL
ORANGE	TELEPHONE
BLUE	WATER
GREEN	SEWER

COLOR CODES FOR UTILITY LOCATING

MAGNETIC WARNING TAPE
NTS



MAGNETIC WARNING TAPE
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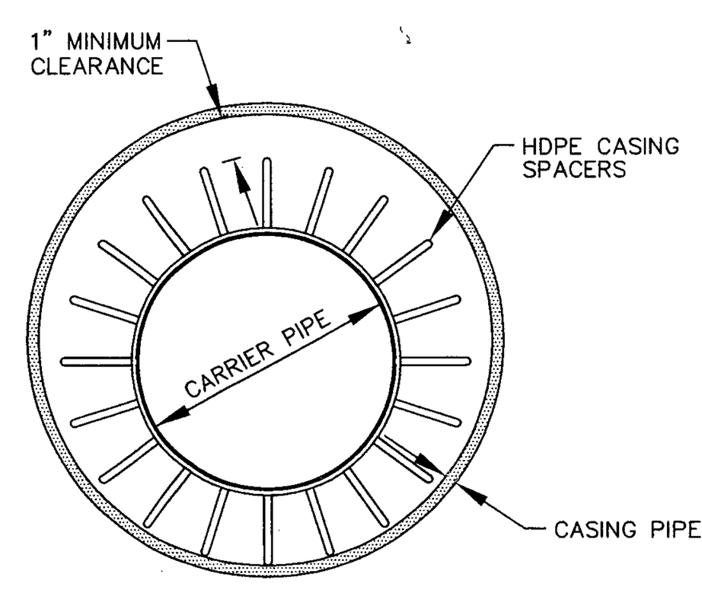
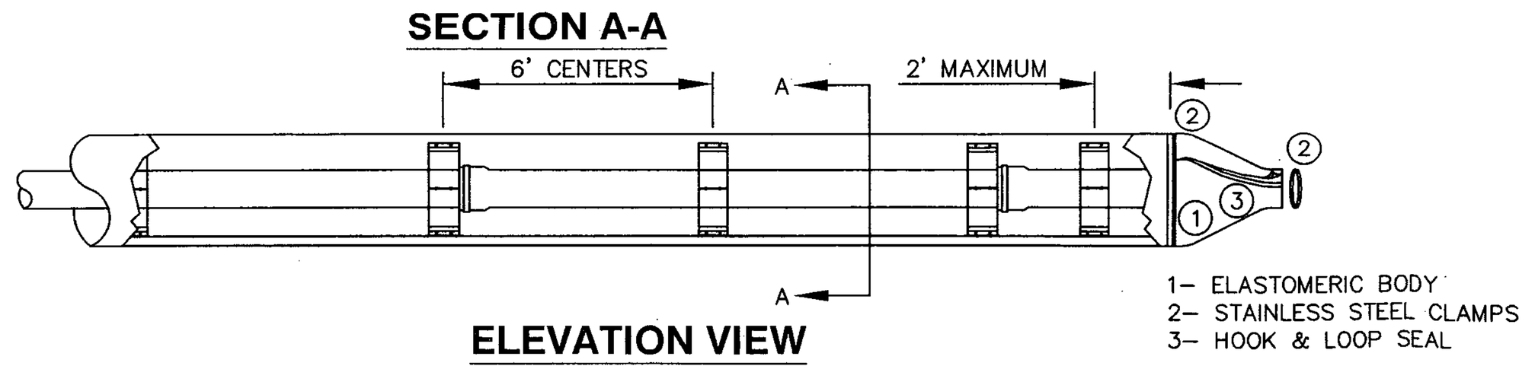
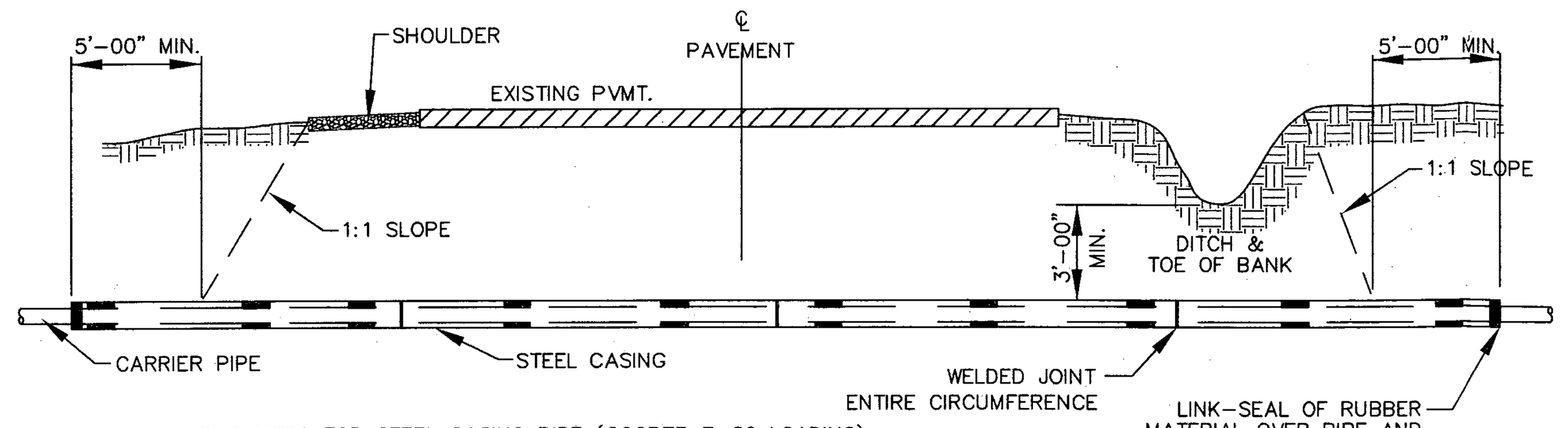


SECTION A-A



ELEVATION VIEW



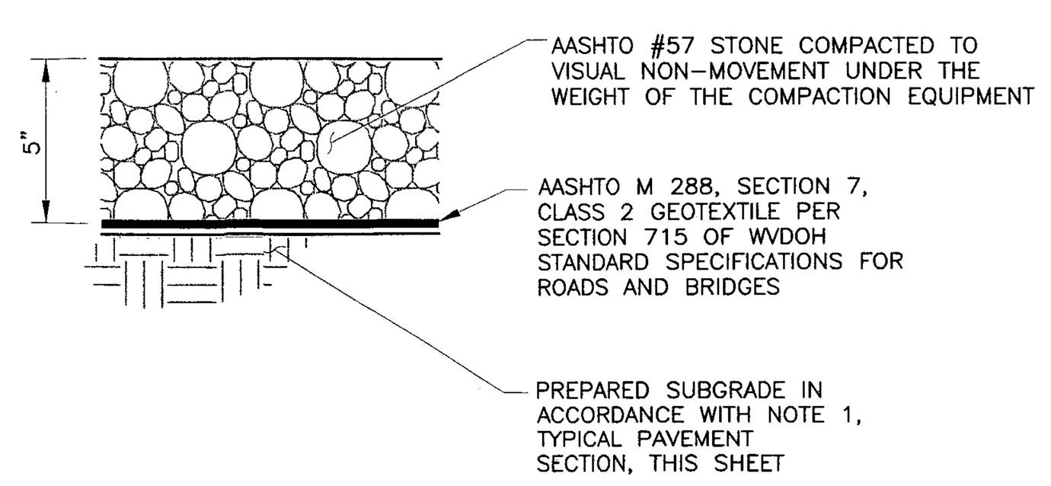
MINIMUM WALL THICKNESS FOR STEEL CASING PIPE (COOPER E-80 LOADING)

NOMINAL DIAMETER IN INCHES	WITH PROTECTIVE COATING IN INCHES	WITHOUT PROTECTIVE COATING IN INCHES
Under 14	0.188	0.251
14 & 16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
30	0.312	0.375

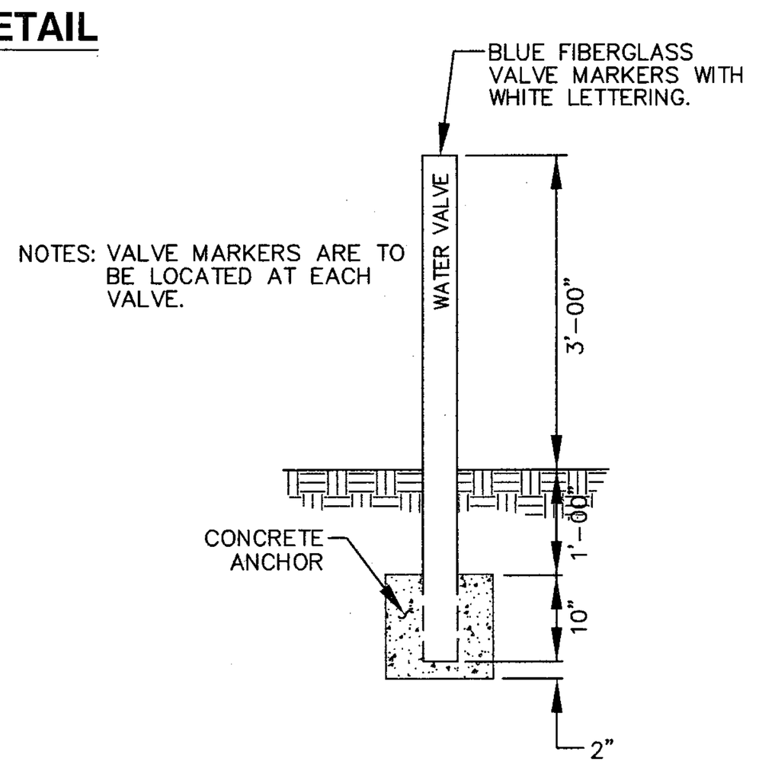
STEEL CASING PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35,000 P.S.I.

NOTE:
1. CARRIER PIPE TO BE SUPPORTED EVERY 6' INSIDE CASING WITH HDPE SPACERS
2. ALL BORE PITS SHALL BE LOCATED A MINIMUM OF 5' FROM EDGE OF PAVEMENT.
3. CARRIER PIPE IN CASING SHALL HAVE GRIP RINGS GASKETS.

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



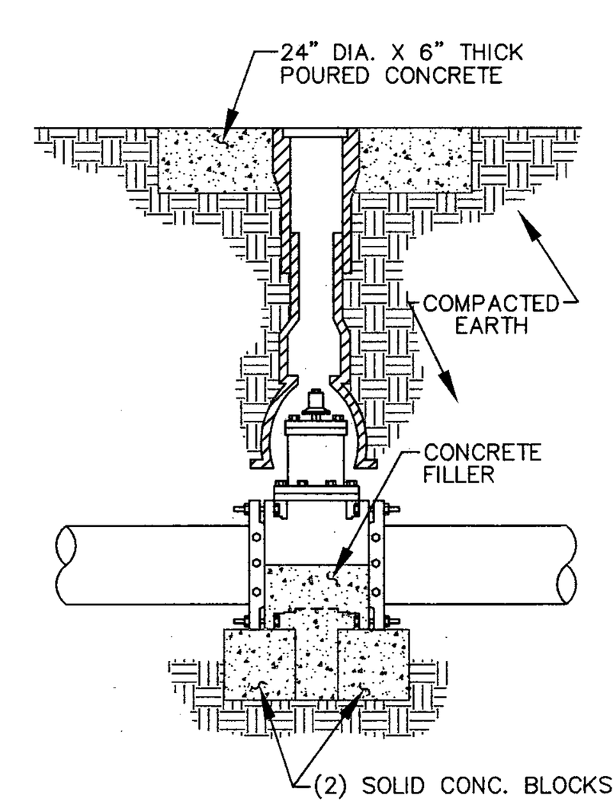
GRAVEL PAD DETAIL
NTS



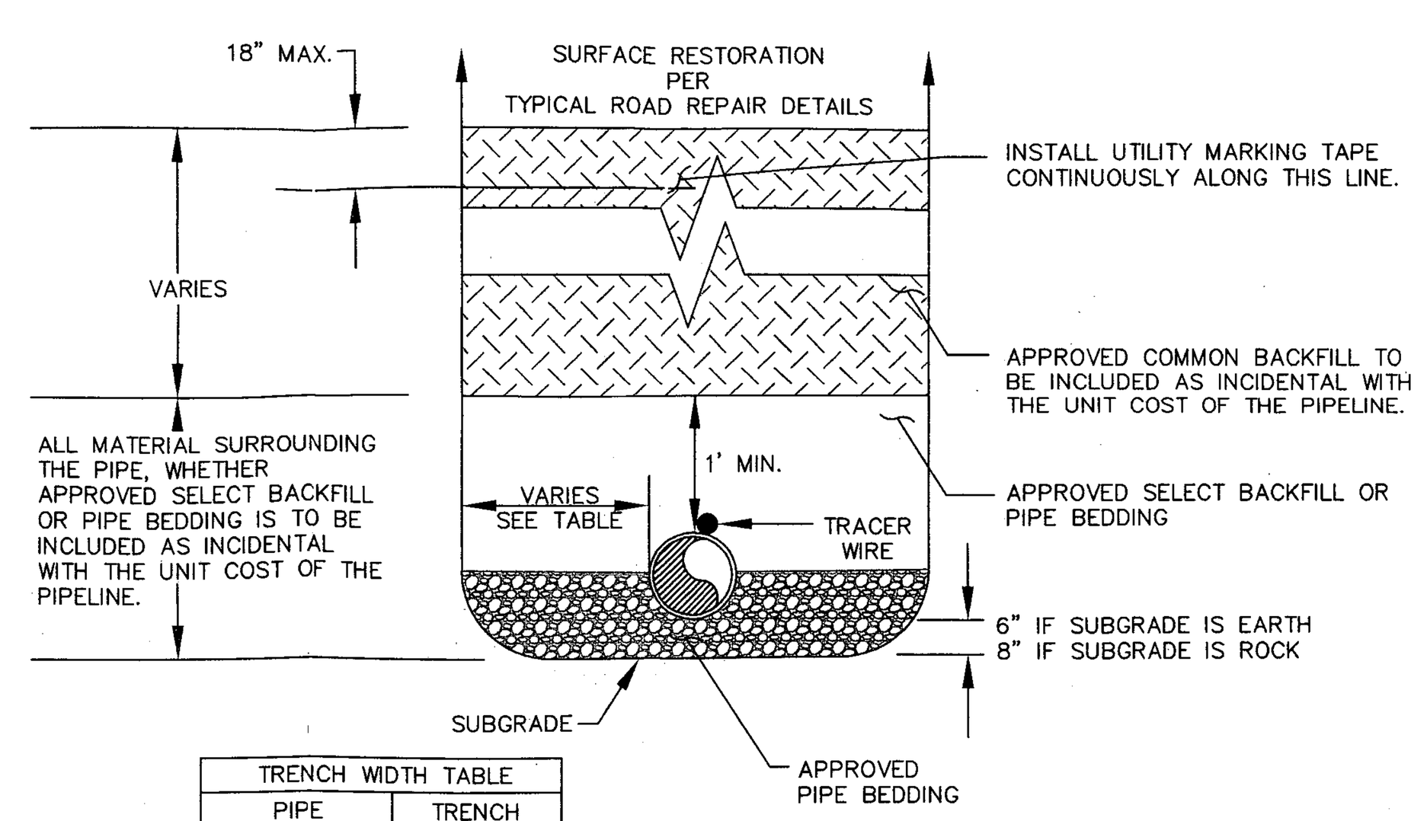
NOTES: VALVE MARKERS ARE TO BE LOCATED AT EACH VALVE.

NOTES: (1) VALVE MARKERS WILL BE USED ON ALL GATE VALVES, AIR RELEASES, & BLOW OFFS
(2) VALVE MARKERS ARE TO BE PLACED OUT OF WVDOH MAINTENANCE AREA, WITH OFFSETS MARKED ON BACK OF MARKER.

VALVE MARKER DETAIL
NTS



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



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

*NOTE: UTILITY MARKING TAPE TO BE 3" WIDE, MINIMUM. LETTERING SHALL BE "WATER" FOR POTABLE WATER LINES AND "SANITARY" FOR GRAVITY AND FORCE MAIN SEWER LINE.

STANDARD BEDDING AND TRENCH DETAIL
NTS

M.U.W.V TICKET NUMBER: 1719124301

REVISION RECORD

NO	DATE	DESCRIPTION

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

DETAILS

DATE:	June 26, 2019	DRAWN BY:	JBH
DWG SCALE:	AS SHOWN	CHECKED BY:	MWF
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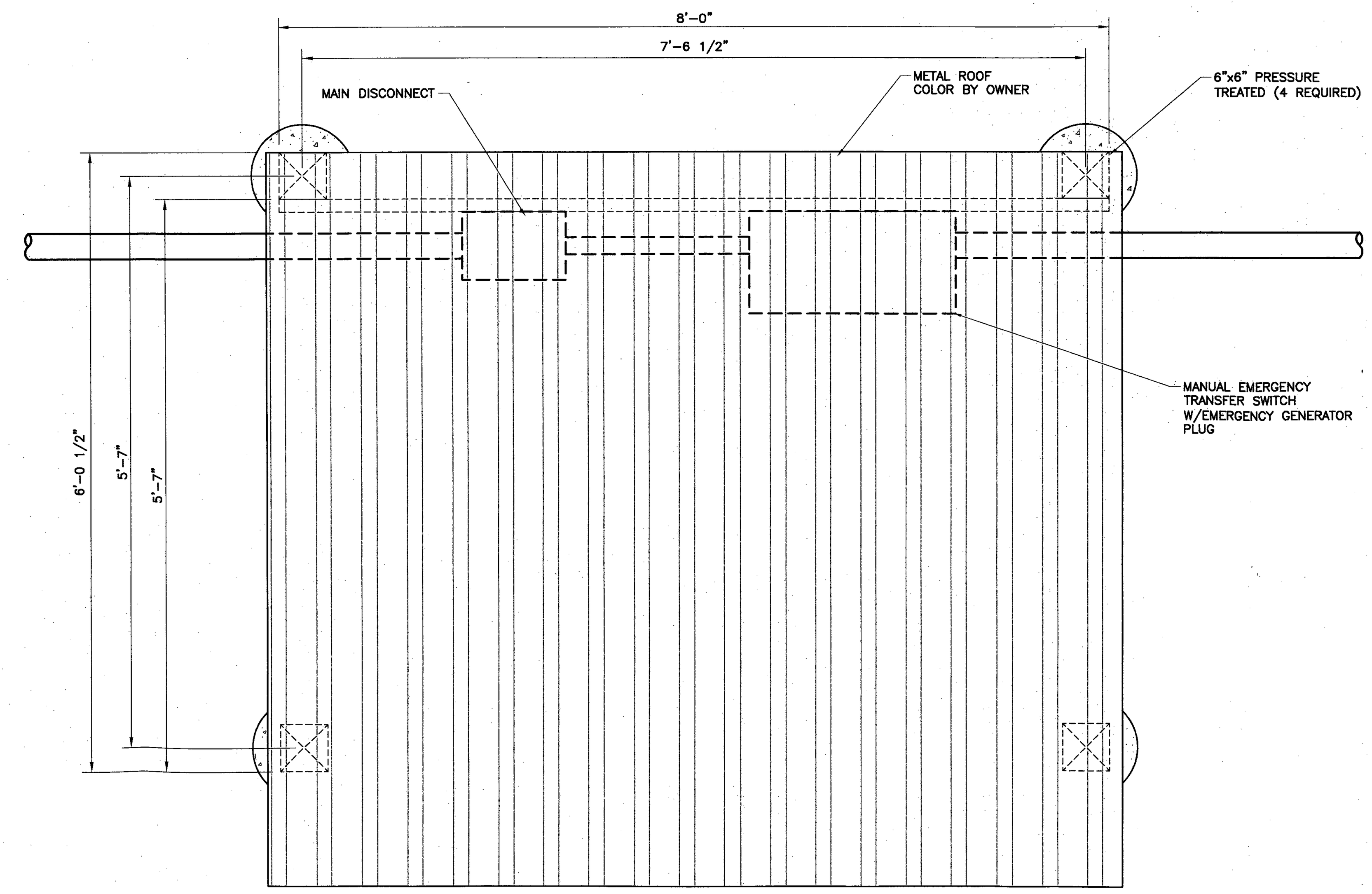
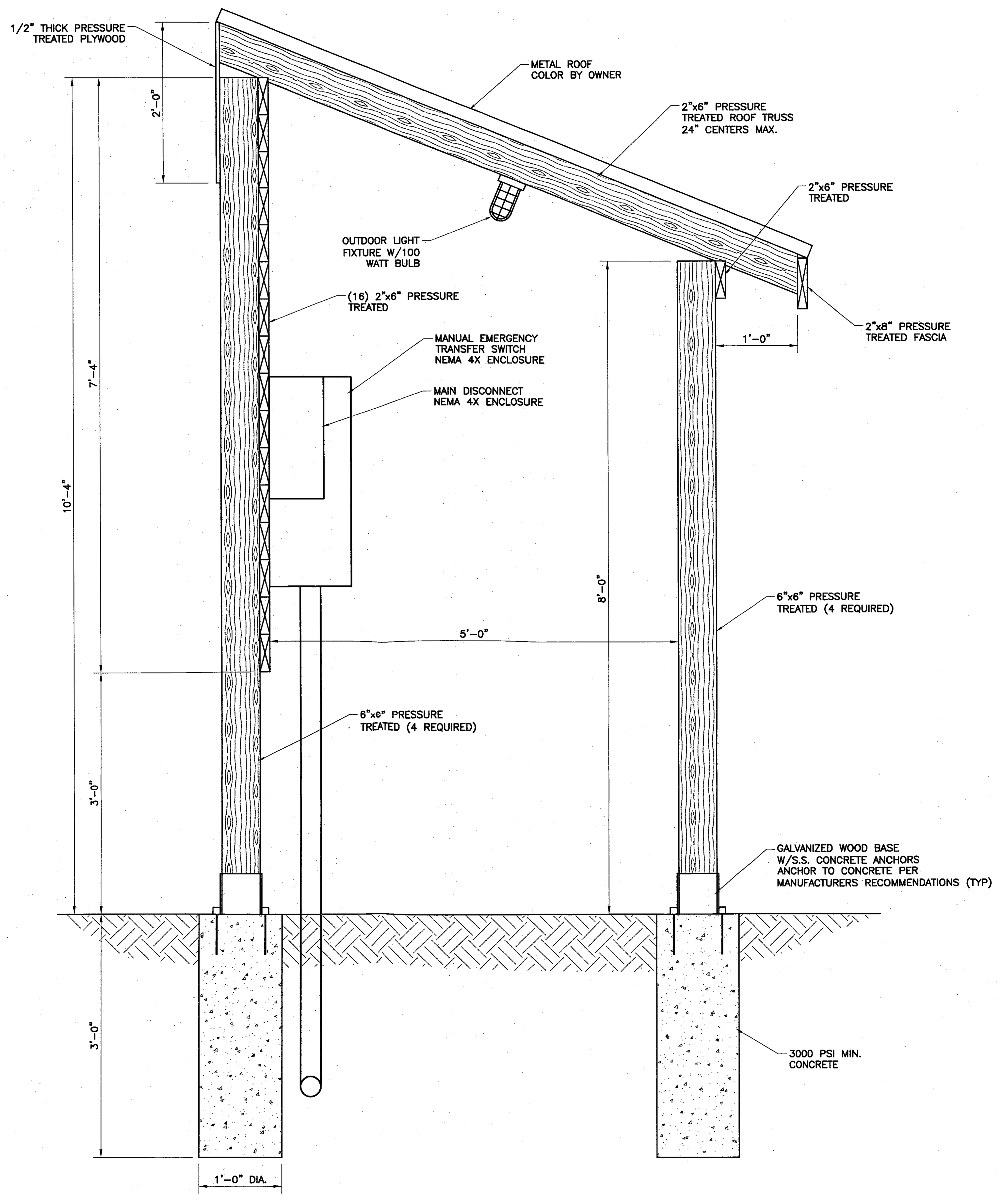
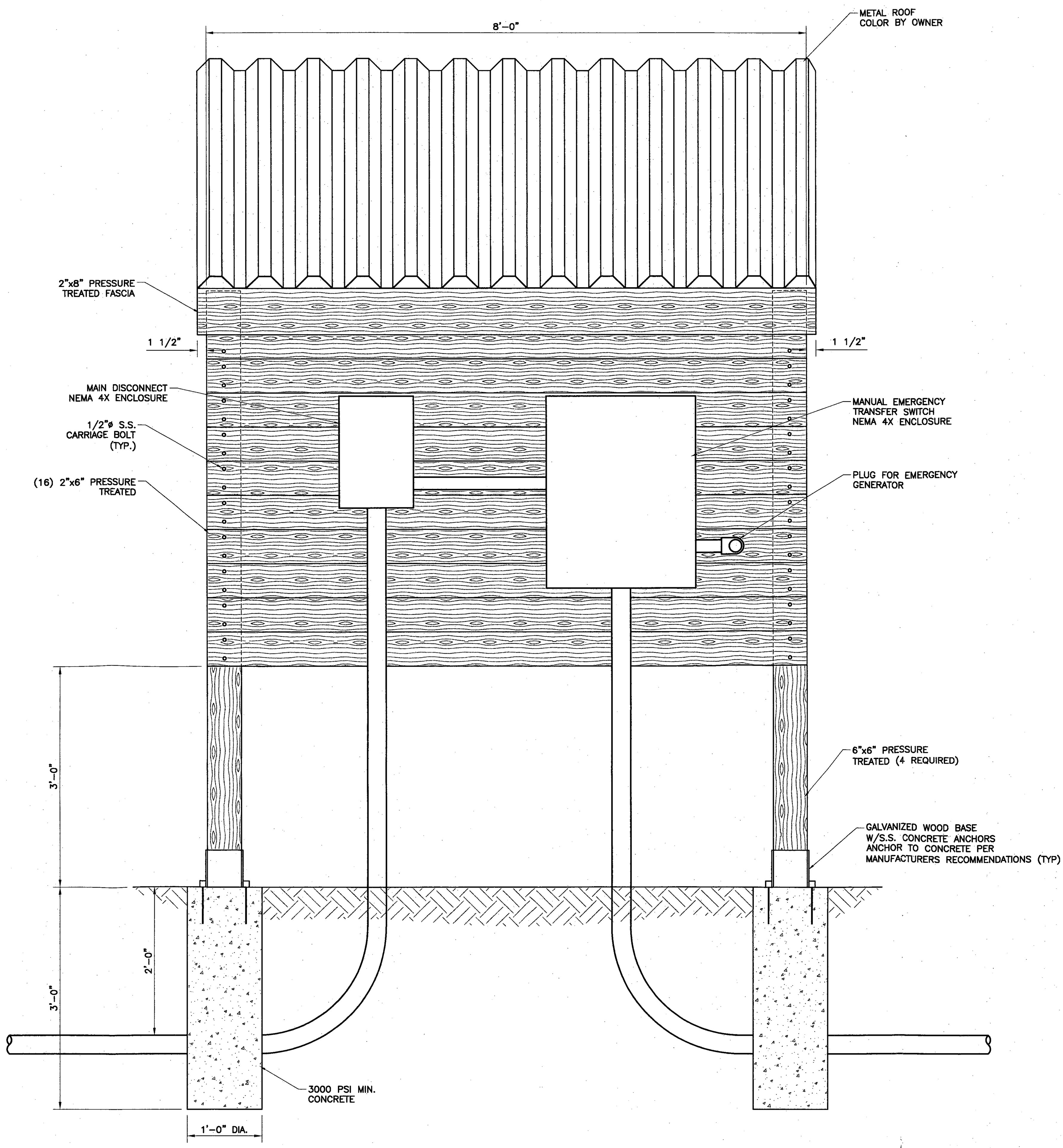
DRAWING NO.: C505

L:\130-359 Sherwood Midstream\WR01\130359-WR01-C900-Details.dwg{C505} LS:(6/26/2019 ...







WATER BOOSTER STATION
ELECTRICAL PANEL BOARD DETAIL
SCALE: 1" = 1 FOOT

M.U.W.V TICKET NUMBER: 1719124301

MUWV 1-800-245-4848

REVISION RECORD

NO	DATE	DESCRIPTION

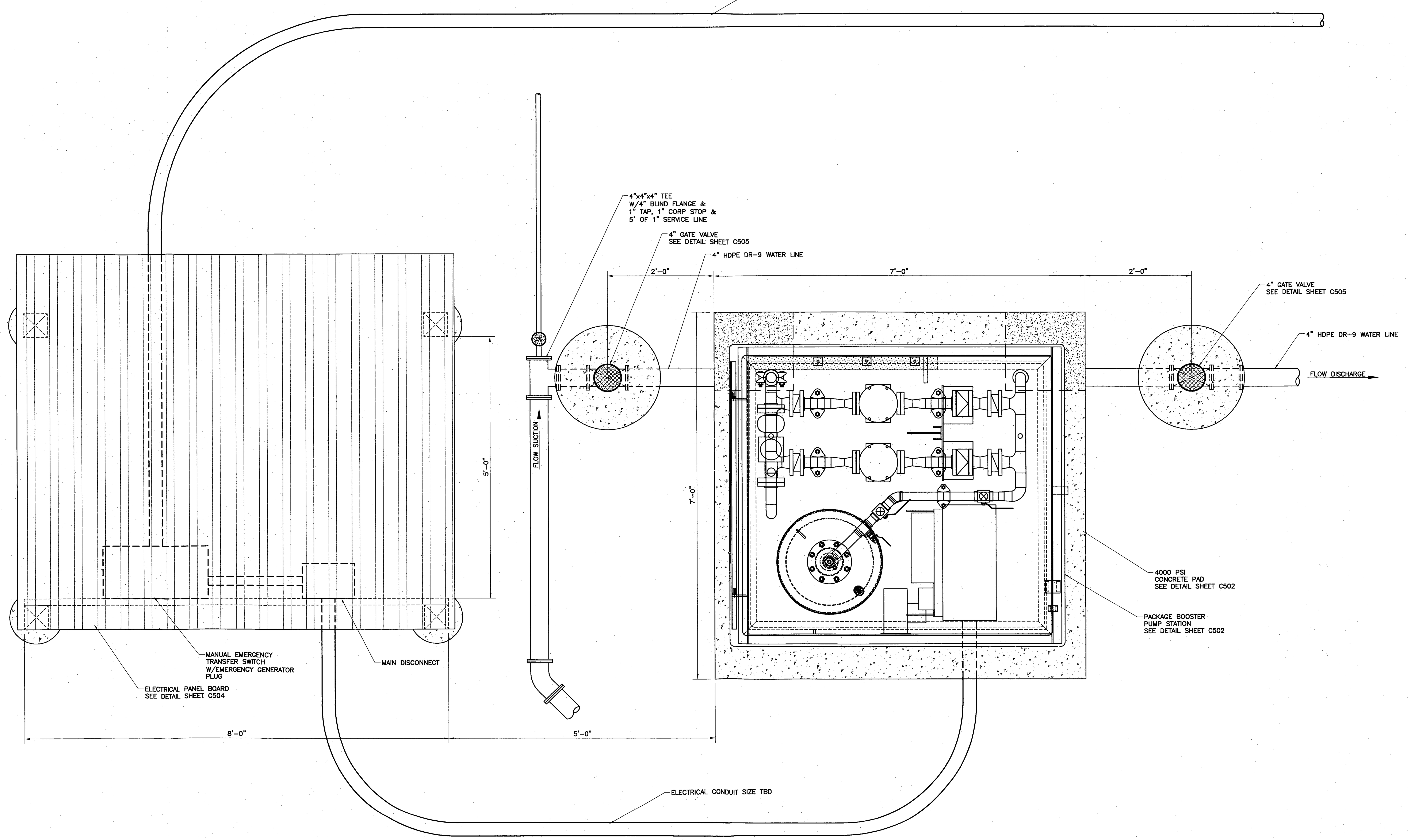
Civil & Environmental Consultants, Inc.
99 Cambridge Place · Bridgeport, WV 26330
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com

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

DETAILS

DATE:	June 26, 2019	DRAWN BY:	JBH
DWG SCALE:	AS SHOWN	CHECKED BY:	MWF
PROJECT NO:	130-359		
APPROVED BY:	* HAND SIGNATURE ON FILE		MWF

DRAWING NO.:
C504



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

M.U.W.V TICKET NUMBER: 1719124301

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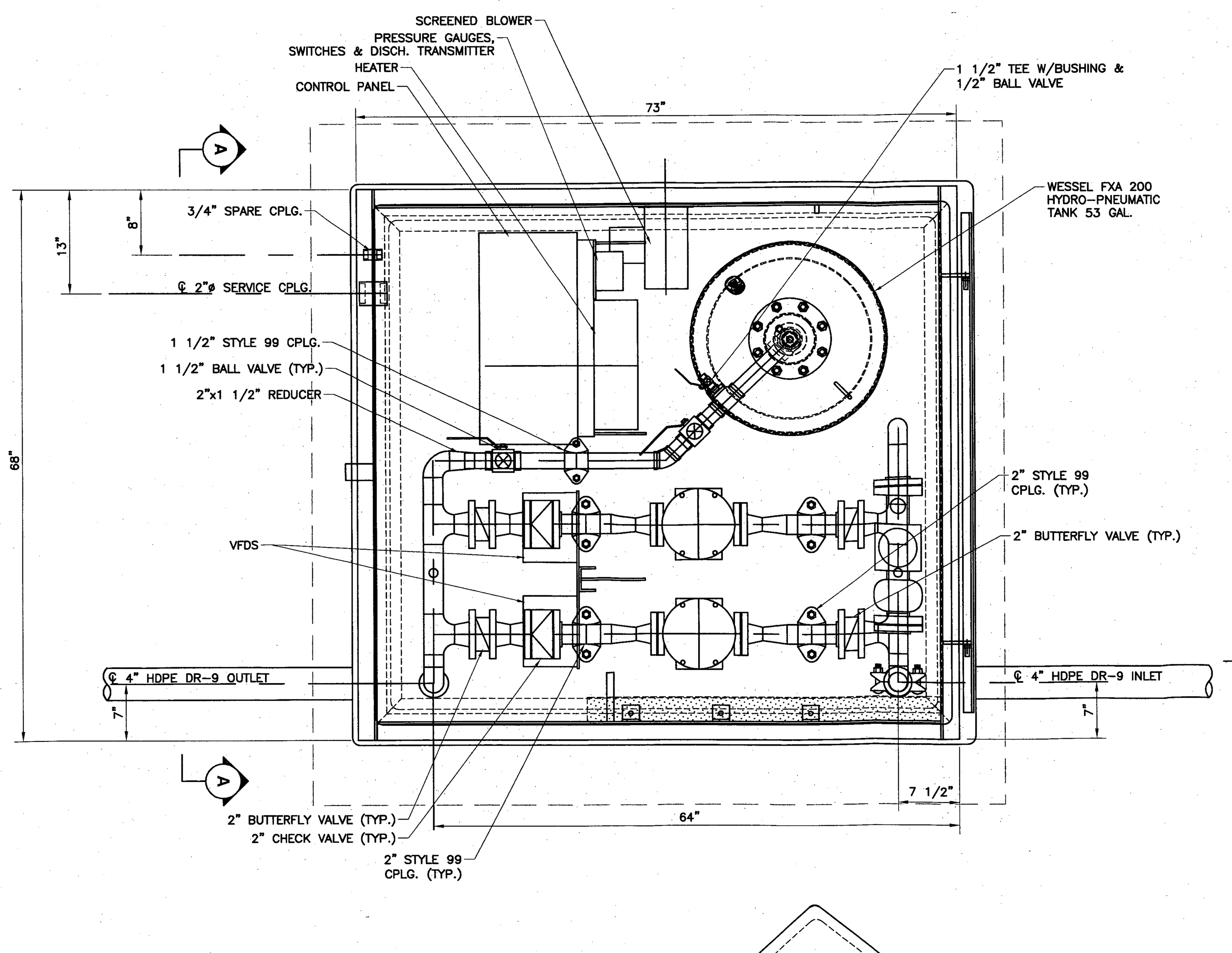
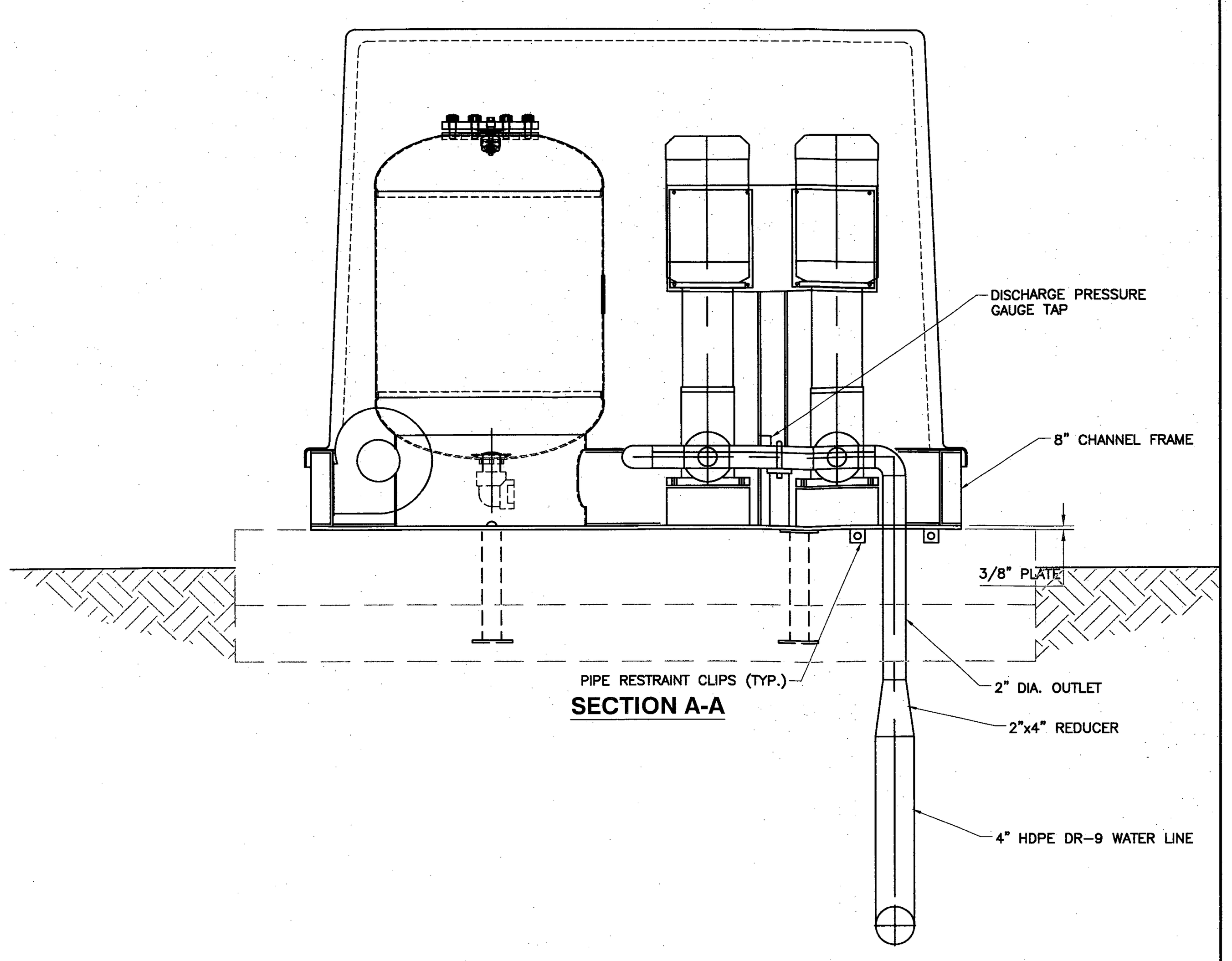
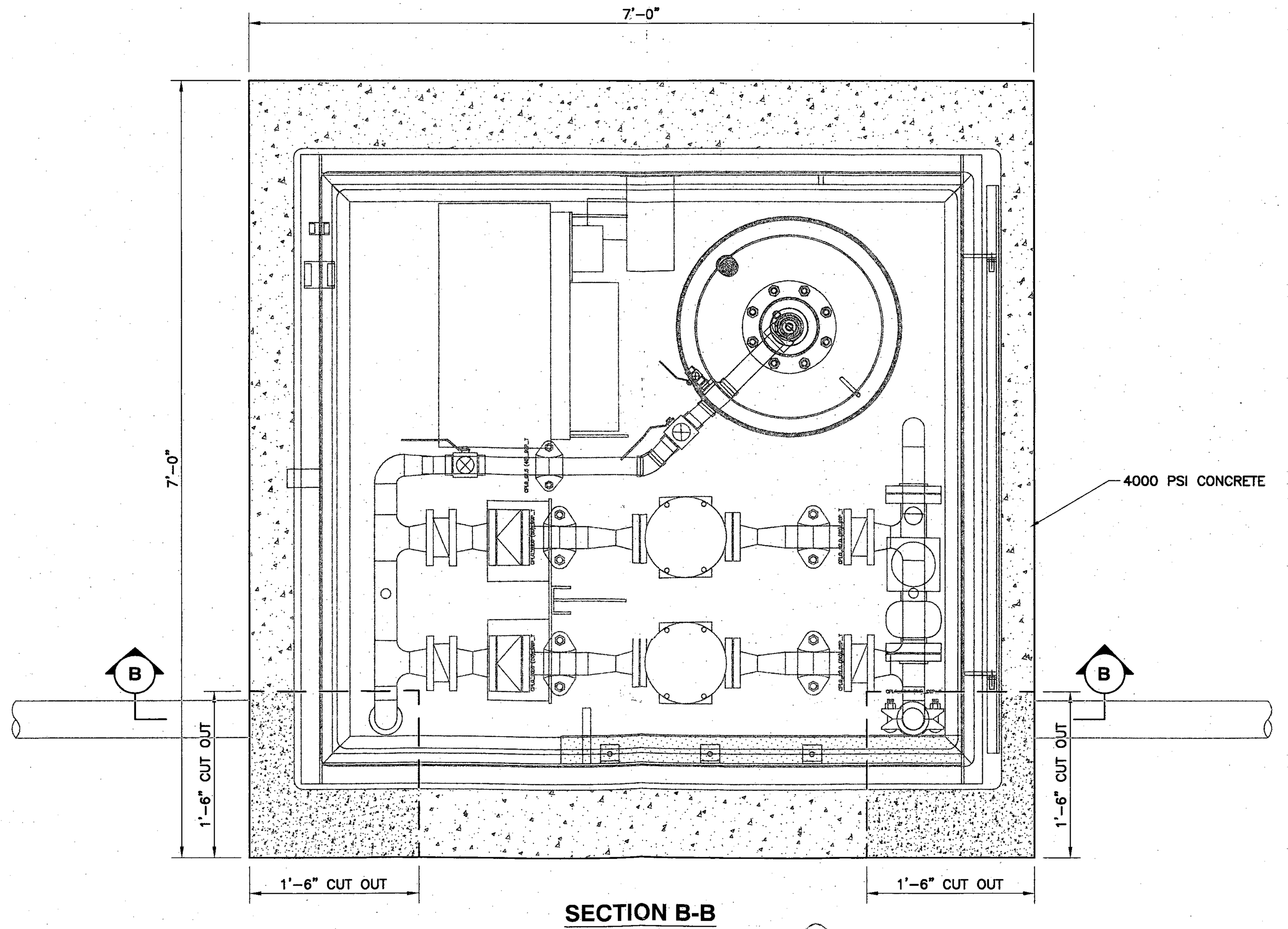
C503



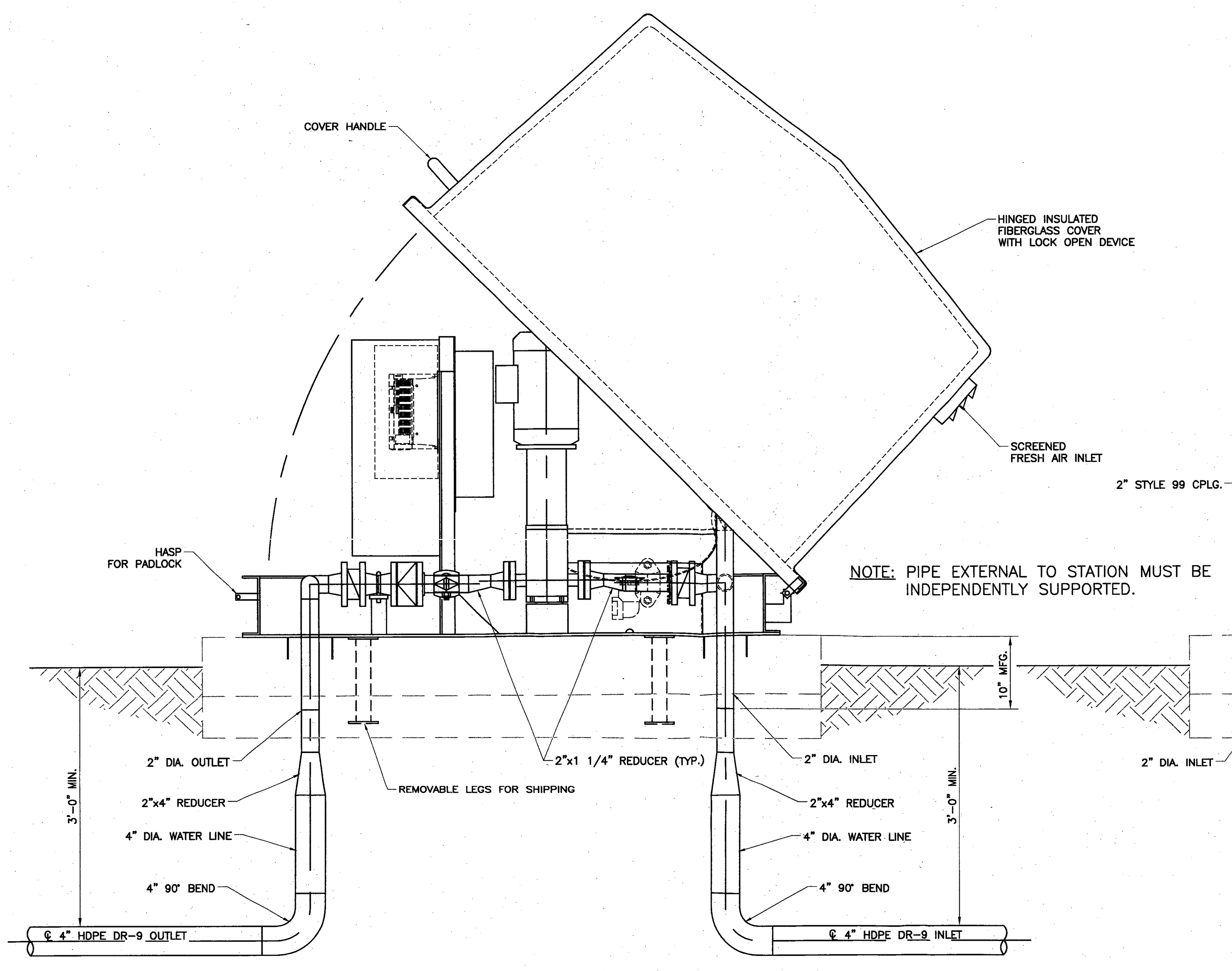
PUMP STATION CHARACTERISTICS
FLOW RATE: 35 GPM
TOTAL DYNAMIC HEAD: 285 FT.
SUCTION PRESSURE: 98 PSI
DISCHARGE PRESSURE: 221 PSI



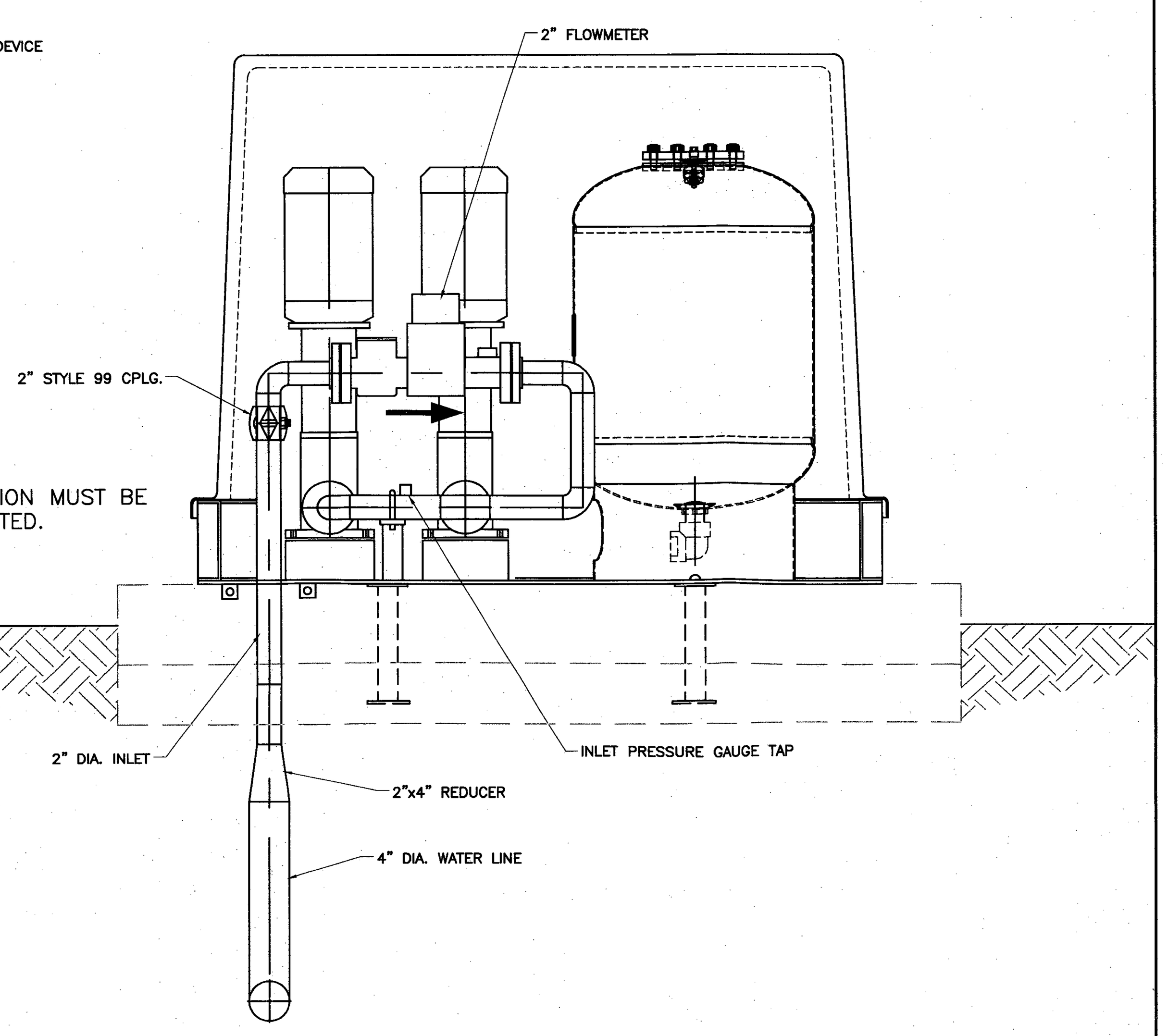
SECTION A-A



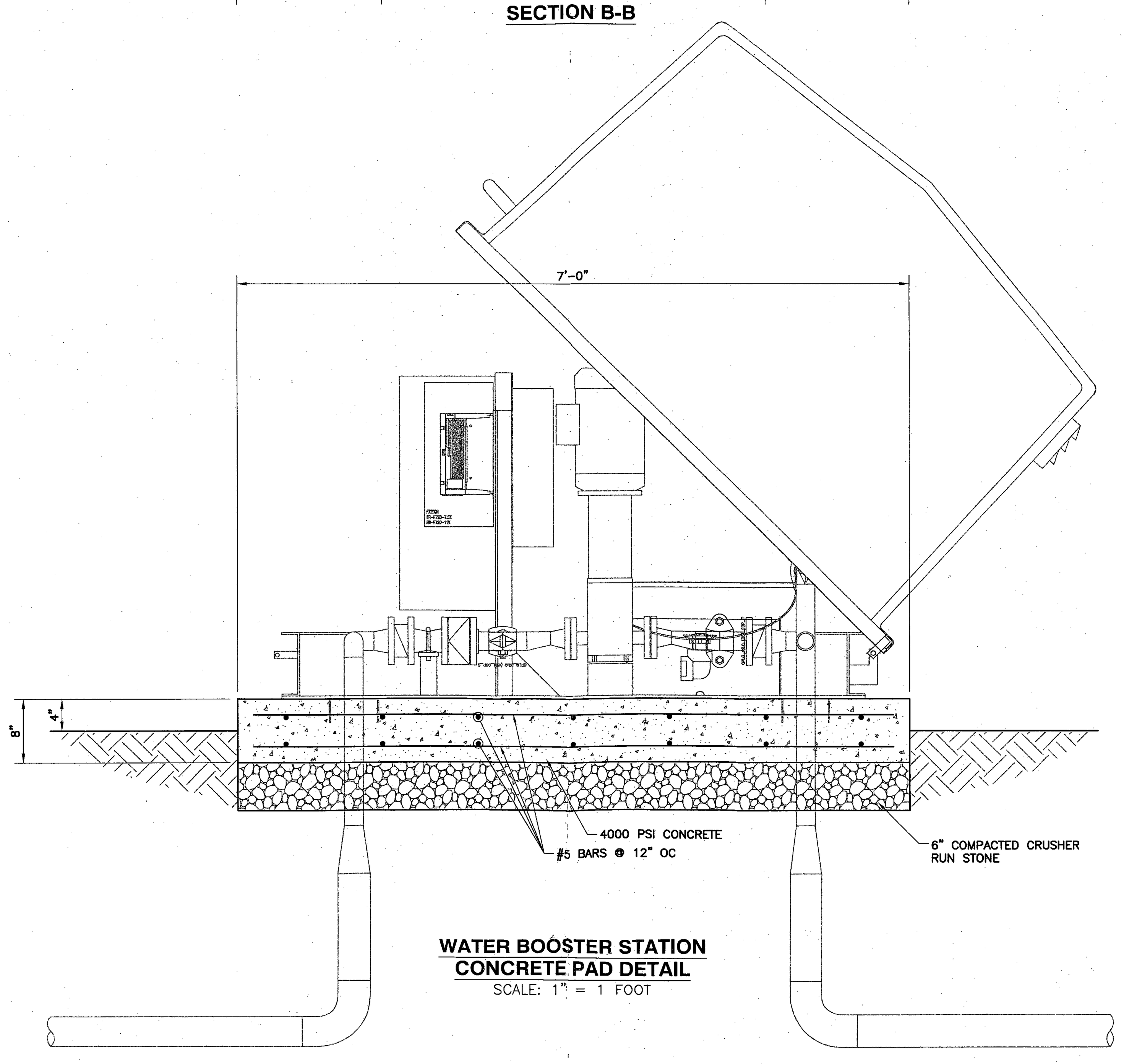
SECTION B-B



NOTE: PIPE EXTERNAL TO STATION MUST BE INDEPENDENTLY SUPPORTED.



WATER BOOSTER STATION DETAIL
SCALE: 1" = 1 FOOT



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

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

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