

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

es Matthew & Barbara McKinney
155 Armstrong Avenue
West Union, WV 26456



9590 9402 2859 7069 5377 75

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature Agent Addressee

X *Barbara A. McKinney*

B. Received by (Printed Name) C. Date of Delivery

Barbara A. McKinney 9-21-17

D. Is delivery address different from item 1? Yes No
If YES, enter delivery address below:

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

ridge County Senior Citizens, Inc.
P.O. Box 432
West Union, WV 26456



9590 9402 2859 7069 5378 36

2. Article Number (Transfer from service label)

7017 0660 0000 2275 6799

COMPLETE THIS SECTION ON DELIVERY

A. Signature Agent Addressee

X *Marilyn Umbalage*

B. Received by (Printed Name) C. Date of Delivery

Marilyn Umbalage 9-21-17

D. Is delivery address different from item 1? Yes No
If YES, enter delivery address below:

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Edith Ann Bibbs Richards
5800 Laurent Drive, Apt. 524
Parma, OH 44129



9590 9402 2859 7069 5378 43

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature Agent Addressee

X *E. Richards*

B. Received by (Printed Name) C. Date of Delivery

Edith Richards 9-20-17

D. Is delivery address different from item 1? Yes No
If YES, enter delivery address below:

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Warren E. & Judy E. Bee
 3076 Big Isaac Road
 Salem, WV 26426



9590 9402 2859 7069 5378 29

2. Article Number (Transfer from service label)

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

SECTION ON DELIVERY

A. Signature
 X *Judy E. Bee* Agent Addressee
 B. Received by (Printed Name)
 Judy E. Bee
 C. Date of Delivery
 D. Is delivery address different from item 1? Yes No
 If YES, enter delivery address below:

SEP 21 2017

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Clinton & Nancy J. Means
 143 Armstrong Avenue
 West Union, WV 26456



9590 9402 2859 7069 5377 82

2. Article Number (Transfer from service label)

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
 X *Nancy Means* Agent Addressee
 B. Received by (Printed Name)
 NANCY MEANS
 C. Date of Delivery
 9-20-17
 D. Is delivery address different from item 1? Yes No
 If YES, enter delivery address below:

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

Domestic Return Receipt

**U.S. Postal Service™
 CERTIFIED MAIL® RECEIPT**

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee \$ 3.35

Extra Services & Fees (check box, add fees as appropriate)

- Return Receipt (hardcopy) \$ 2.95
- Return Receipt (electronic) \$
- Certified Mail Restricted Delivery \$
- Adult Signature Required \$
- Adult Signature Restricted Delivery \$

Postage \$.49

Total Postage and Fees \$ 6.59

Sent To Fredrick Gregory and Charles Michelle E. Dotson
 Street and Apt. No., or PO Box No. 5814 Church Dr.
 City, State, ZIP+4® Charleston, WV 25306 17-485

PS Form 3800, April 2015 See Reverse for Instructions

**U.S. Postal Service™
 CERTIFIED MAIL® RECEIPT**

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee \$ 3.35

Extra Services & Fees (check box, add fees as appropriate)

- Return Receipt (hardcopy) \$ 2.95
- Return Receipt (electronic) \$
- Certified Mail Restricted Delivery \$
- Adult Signature Required \$
- Adult Signature Restricted Delivery \$

Postage \$.49

Total Postage and Fees \$ 6.59

Sent To Spencer Enterprises, LLC
 Street and Apt. No., or PO Box No. P.O. Box 143
 City, State, ZIP+4® Smithsburg, WV 26436 17-485

PS Form 3800, April 2015 See Reverse for Instructions

0598 2017 0660 0000 2275 6850

489 5275 684 2017 0660 0000 0990 2707

7017 0660 0000 2275 6836

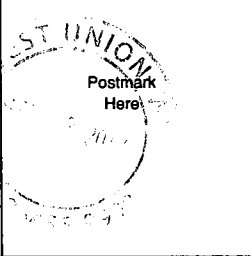
U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)
 Return Receipt (hardcopy) \$ 2.75
 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
 Adult Signature Required \$
 Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To
Lawrence Gaskins
Street and Apt. No., or PO Box No.
3582 Smithton Rd.
City, State, ZIP+4®
West Union, WV 26456 17-485
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6812

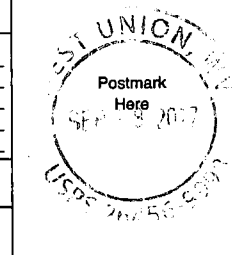
U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)
 Return Receipt (hardcopy) \$ 2.75
 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
 Adult Signature Required \$
 Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To
Craig & Cassandra D. Ewing do Sandy Ewing
Street and Apt. No., or PO Box No.
45 Holly St.
City, State, ZIP+4®
West Union, WV 26456 17-485
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6799

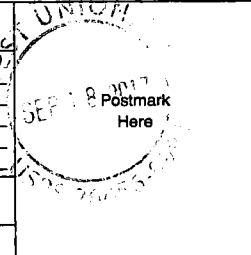
U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)
 Return Receipt (hardcopy) \$ 2.75
 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
 Adult Signature Required \$
 Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To
Doddridge Co. Senior Citizens, Inc.
Street and Apt. No., or PO Box No.
P.O. Box 432
City, State, ZIP+4®
West Union, WV 26456 17-485
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6829

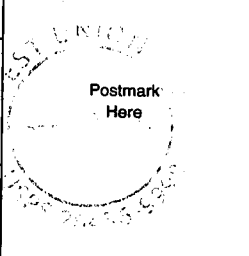
U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)
 Return Receipt (hardcopy) \$ 2.75
 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
 Adult Signature Required \$
 Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To
Virginia L. Nicholson
Street and Apt. No., or PO Box No.
155 Armstrong Ave.
City, State, ZIP+4®
West Union, WV 26456 17-485
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6805

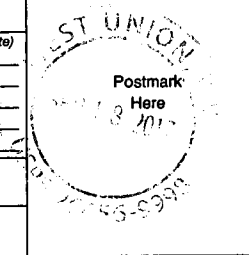
U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)
 Return Receipt (hardcopy) \$ 2.75
 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
 Adult Signature Required \$
 Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To
Edith Ann Bibbs Richards
Street and Apt. No., or PO Box No.
5800 Laurent Dr., Apt. 524
City, State, ZIP+4®
Parma, OH 44129 17-485
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6782

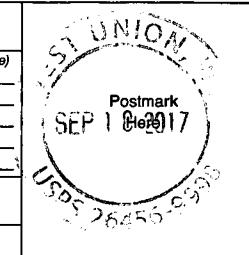
U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)
 Return Receipt (hardcopy) \$ 2.75
 Return Receipt (electronic) \$
 Certified Mail Restricted Delivery \$
 Adult Signature Required \$
 Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To
Warren E. & Judy E. Bee
Street and Apt. No., or PO Box No.
3076 Big Isaac Rd.
City, State, ZIP+4®
Salem, WV 26426 17-485
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6713

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee
\$ **3.35**

Extra Services & Fees (check box, add fee as appropriate)

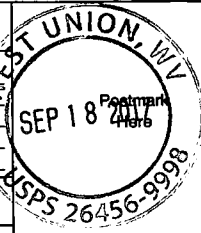
Return Receipt (hardcopy) \$ **2.75**

Return Receipt (electronic) \$ _____

Certified Mail Restricted Delivery \$ _____

Adult Signature Required \$ _____

Adult Signature Restricted Delivery \$ _____



Postage
\$ **.49**

Total Postage and Fees
\$ **6.59**

Sent To **Elwood P. Elizabeth Rill**
Street and Apt. No., or PO Box No.
4619 Glenville Rd.
City, State, ZIP+4®
Glen Rock, PA 17327 17-485

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6720

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee
\$ **3.35**

Extra Services & Fees (check box, add fee as appropriate)

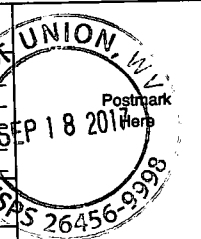
Return Receipt (hardcopy) \$ **2.75**

Return Receipt (electronic) \$ _____

Certified Mail Restricted Delivery \$ _____

Adult Signature Required \$ _____

Adult Signature Restricted Delivery \$ _____



Postage
\$ **.49**

Total Postage and Fees
\$ **6.59**

Sent To **Thomas E. Anna S. Daak**
Street and Apt. No., or PO Box No.
213 Armstrong Ave.
City, State, ZIP+4®
West Union, WV 26456 17-485

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6751

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee
\$ **3.35**

Extra Services & Fees (check box, add fee as appropriate)

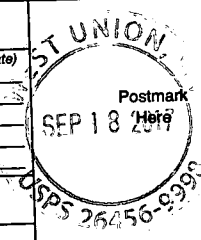
Return Receipt (hardcopy) \$ **2.75**

Return Receipt (electronic) \$ _____

Certified Mail Restricted Delivery \$ _____

Adult Signature Required \$ _____

Adult Signature Restricted Delivery \$ _____



Postage
\$ **.49**

Total Postage and Fees
\$ **6.59**

Sent To **Darlene K. McKinney**
Street and Apt. No., or PO Box No.
140 Armstrong Ave.
City, State, ZIP+4®
West Union, WV 26456 17-485

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6775

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee
\$ **3.35**

Extra Services & Fees (check box, add fee as appropriate)

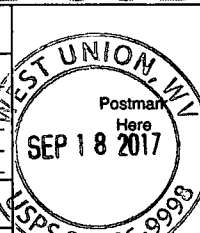
Return Receipt (hardcopy) \$ **2.75**

Return Receipt (electronic) \$ _____

Certified Mail Restricted Delivery \$ _____

Adult Signature Required \$ _____

Adult Signature Restricted Delivery \$ _____



Postage
\$ **.49**

Total Postage and Fees
\$ **6.59**

Sent To **Marie E. Gassaway**
Street and Apt. No., or PO Box No.
618 Fairview Ave.
City, State, ZIP+4®
Labanon, TN 37087 17-485

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6768

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee
\$ **3.35**

Extra Services & Fees (check box, add fee as appropriate)

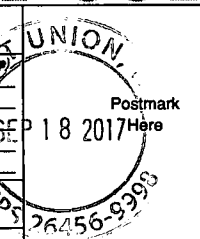
Return Receipt (hardcopy) \$ **2.75**

Return Receipt (electronic) \$ _____

Certified Mail Restricted Delivery \$ _____

Adult Signature Required \$ _____

Adult Signature Restricted Delivery \$ _____



Postage
\$ **.49**

Total Postage and Fees
\$ **6.59**

Sent To **Doddridge Co. COOP marketing**
Street and Apt. No., or PO Box No.
Rt. 1, Box 105
City, State, ZIP+4®
Newport, WV 26411 17-485

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 0660 0000 2275 6744

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

Domestic Mail Only

For delivery information, visit our website at www.usps.com

OFFICIAL USE

Certified Mail Fee
\$ **3.35**

Extra Services & Fees (check box, add fee as appropriate)

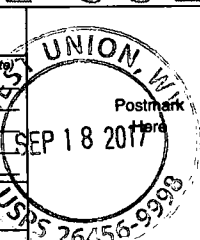
Return Receipt (hardcopy) \$ **2.75**

Return Receipt (electronic) \$ _____

Certified Mail Restricted Delivery \$ _____

Adult Signature Required \$ _____

Adult Signature Restricted Delivery \$ _____



Postage
\$ **.49**

Total Postage and Fees
\$ **6.59**

Sent To **Clinton & Nancy J. Means**
Street and Apt. No., or PO Box No.
143 Armstrong Ave.
City, State, ZIP+4®
West Union, WV 26456 17-485

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Darlene K. McKinney
140 Armstrong Avenue
West Union, WV 26456



9590 9402 2859 7069 5377 99

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *Darlene K. McKinney* Agent Addressee

B. Received by (Printed Name)

C. Date of Delivery

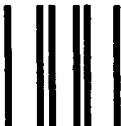
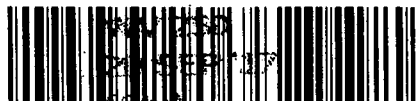
Darlene McKinney *9-20-17*

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING#



First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

9590 9402 2859 7069 5377 99

**United States
Postal Service**

• Sender: Please print your name, address, and ZIP+4® in this box•

**Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456**

17-485

201205



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

raig D. & Cassandra D. Ewing
c/o Sandy Ewing
45 Holly Street
West Union, WV 26456



9590 9402 2859 7069 5378 50

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *Cassandra Ewing*

- Agent
 Addressee

B. Received by (Printed Name)

C. Date of Delivery

9-20-17

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING #

CHARLESTON



First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

9590 9402 2859 7069 5378 50

United States
Postal Service

• Sender: Please print your name, address, and ZIP+4® in this box•

Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456

17-485



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Lawrence Gaskins
3582 Smithton Road
West Union, WV 26456



9590 9402 2859 7069 5378 74

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

 Agent
 Addressee

B. Received by (Printed Name)

L. GASKINS

C. Date of Delivery

9-20-17

 D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING #



First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

9590 9402 2859 7069 5378 74

**United States
Postal Service**

• Sender: Please print your name, address, and ZIP+4® in this box•

Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456

17-485

5-201205



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Thomas E. & Anna S. Doak
213 Armstrong Avenue
West Union, WV 26456



9590 9402 2859 7069 5377 68

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *Anna S. Doak* Agent Addressee

B. Received by (Printed Name)

Anna S. Doak

C. Date of Delivery

9-20-17

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING #



First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

9590 9402 2859 7069 5377 68

**United States
Postal Service**

• Sender: Please print your name, address, and ZIP+4® in this box•

**Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456**

17-485



SENDER: COMPLETE THIS SECTION

Complete items 1, 2, and 3.

Print your name and address on the reverse
so that we can return the card to you.

- Attach this card to the back of the mailpiece,
or the front if space permits.

1. Article Addressed to:

Marie E. Gassaway
618 Fairview Avenue
Lebanon, TN 37087



9590 9402 2859 7069 5378 12

Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

Marie Gassaway Agent
 Addressee

B. Received by (Printed Name)

Marie Gassaway

C. Date of Delivery

9-21-17

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING



First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

9590 9402 2859 7069 5378 12

**United States
Postal Service**

• Sender: Please print your name, address, and ZIP+4® in this box•

**Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456**

17-485



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: _____

Spencer Enterprises, LLC
P.O. Box 143
Smithburg, WV 26436



9590 9402 2859 7069 5378 81

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *Ron Spencer*

-
- Agent
-
-
- Addressee

B. Received by (Printed Name)

C. Date of Delivery

9-19-17

- D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING#



9590 9402 2859 7069 5378 81



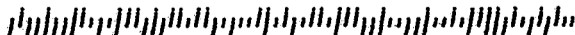
First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

**United States
Postal Service**

• Sender: Please print your name, address, and ZIP+4® in this box®

**Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456**

17-485



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:



Elwood P. & Elizabeth Rill
4619 Glenville Road
Glen Rock, PA 17327



9590 9402 2859 7069 5377 51

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature



Agent
 Addressee

B. Received by (Printed Name)

S. ELIZABETH RILL

C. Date of Delivery

4-21-17

 D. Is delivery address different from item 1? Yes
 if YES, enter delivery address below: No

3. Service Type

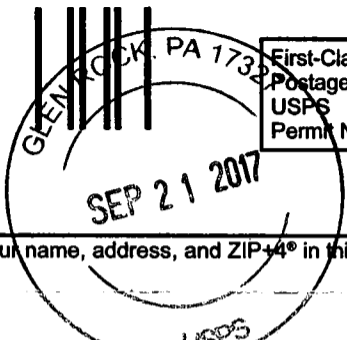
- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING#



9590 9402 2859 7069 5377 51

**United States
Postal Service**

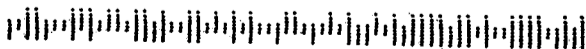


First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

• Sender: Please print your name, address, and ZIP+4® in this box•

**Doddridge County OEM/CFM
George Eidel
105 Court Street, Suite 3
West Union, WV 26456**

17-4851



7017 0660 0000 2275 6737

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

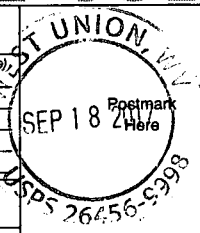
For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
\$ 3.35

Extra Services & Fees (check box, add fee as appropriate)

- Return Receipt (hardcopy) \$ 2.45
- Return Receipt (electronic) \$
- Certified Mail Restricted Delivery \$
- Adult Signature Required \$
- Adult Signature Restricted Delivery \$



Postage
\$.49

Total Postage and Fees
\$ 6.59

Sent To James Matthew & Barbara McKinney

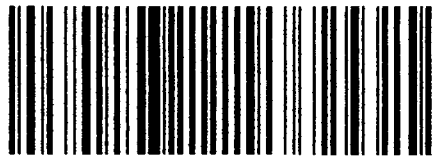
Street and Apt. No., or PO Box No.
155 Armstrong Ave.

City, State, ZIP+4®
West Union, WV 26456 17-485

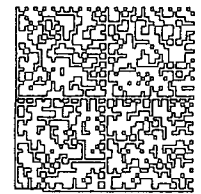
PS Form 3800, April 2010 PSN 7530-02-000-9047 See Reverse for Instructions

CERTIFIED MAIL®

Floodplain Manager
Doddridge County Office of Emergency Management
105 Court Street, Suite 3
West Union, WV 26456



7017 0660 0000 2275 6850



HASLER

\$006.59⁰⁰

09/18/2017 ZIP 26456
012E14643162

US POSTAGE

Fredrick Gregory and Charles S. & Michelle E. Dotson
5814 Church Drive
Charleston, WV 25306

NIXIE 250 FE 1 0009/22/17

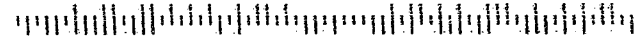
RETURN TO SENDER
ATTEMPTED - NOT KNOWN
UNABLE TO FORWARD

ANK

BC: 26456201205

*2271-00378-18-44

25306885642 0063



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Fredrick Gregory and Charles S. & Michelle E. Dotson
5814 Church Drive
Charleston, WV 25306



9590 9402 2859 7069 5378 98

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

Agent

Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)

- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Doddridge County Office of
Emergency Management/Floodplain Management
105 Court Street, Suite 3
304-873-1343
doddridgecountyfpm@gmail.com



Dear Sir or Ma'am,

September 18, 2017

You are receiving this letter because you have been identified as a land surface and/or mineral rights owner for property or adjacent property related to the proposed development/project identified by the following page.

No action is required of you. This letter is simply to inform you of the proposed development.

If you would like to comment on this proposed project, or would like additional information, you may contact the Doddridge County Floodplain Manager at the above address.

Respectfully yours,

A handwritten signature in black ink, appearing to read "George Eidel". The signature is fluid and cursive.

George Eidel, CFM, OEM Director/Floodplain Manager



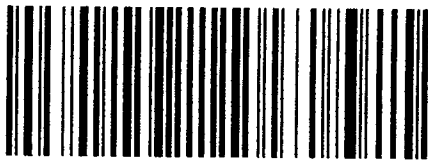
Doddridge County Floodplain Permits

(Week of September 18, 2017)

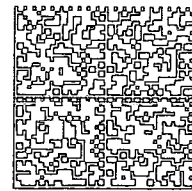
Please take notice that on the **12th day of September, 2017**, **Sherwood Midstream LLC** filed an application for a Floodplain Permit (**#17-485**) to develop land located at or about **Armstrong Ave. Coordinates 39.283720 N, -80.732358 W**. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **October 9, 2017** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. **This project is for the Smithburg Natural Gas Processing Facility**

CERTIFIED MAIL

Floodplain Manager
Doddridge County Office of Emergency Management
105 Court Street, Suite 3
West Union, WV 26456



7017 1450 0001 5871 7482



HASLER

\$006.59⁰

01/18/2018 ZIP 26456
012E14643162

US POSTAGE

Demetrius Travis
98 Liberty Street
Salem, WV 26426

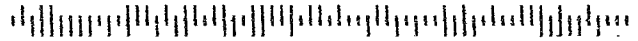
*noticed
1-20*

NIXIE 250 DE 1 0002/16/18

RETURN TO SENDER
UNCLAIMED
UNABLE TO FORWARD

2642631206 050
26456>2012

BC: 26456201205 *1771-08888-18-44



PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT
OF THE RETURN ADDRESS FOLD AT DOTTED LINE

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

Demetrius Travis
98 Liberty Street
Salem, WV 26426



9590 9402 2228 6193 5136 13

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature Agent
 Addressee
X

B. Received by (Printed Name)	C. Date of Delivery
-------------------------------	---------------------

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

- | | |
|---|--|
| <p>3. Service Type</p> <ul style="list-style-type: none"> <input type="checkbox"/> Adult Signature <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Insured Mail <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | <ul style="list-style-type: none"> <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Signature Confirmation Restricted Delivery |
|---|--|

51

Doddridge County Office of
Emergency Management/Floodplain Management
105 Court Street, Suite 3
304-873-1343
doddridgecountyfpm@gmail.com



Dear Sir or Ma'am,

January 18, 2018

You are receiving this letter because you have been identified as a land surface and/or mineral rights owner for property or adjacent property related to the proposed development/project identified by the following page.

No action is required of you. This letter is simply to inform you of the proposed development.

If you would like to comment on this proposed project, or would like additional information, you may contact the Doddridge County Floodplain Manager at the above address.

Respectfully yours,

A handwritten signature in black ink, appearing to read "George Eidel". The signature is written in a cursive, flowing style.

George Eidel, CFM, OEM Director/Floodplain Manager



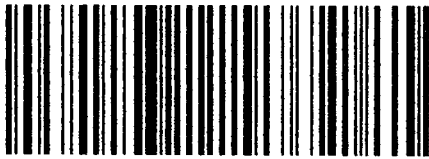
Doddridge County Floodplain Permits

(Week of January 15, 2018)

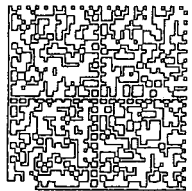
Please take notice that on the **12th** day of **January, 2018**, **Dustin Prettyman** filed an application for a Floodplain Permit (**#18-501**) to develop land located at or about **3393 Greenbrier Rd, Salem, WV 26426** **Coordinates 39.24292 N, 80.63181 W**. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **February 26, 2018** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. **This project is New Residential construction**

CERTIFIED MAIL®

Floodplain Manager
Doddridge County Office of Emergency Management
105 Court Street, Suite 3
West Union, WV 26456



7017 0660 0000 2275 6829



HASLER

\$006.59⁰

09/18/2017 ZIP 26456
012E14643162

US POSTAGE

Virginia L. Nicholson
155 Armstrong Avenue
West Union, WV 26456

9-20

NIXIE 250 DE 1 0010/11/17

RETURN TO SENDER
UNCLAIMED
UNABLE TO FORWARD

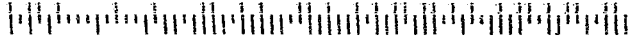
9400921771281250

UNC

BC: 26456201205

*2271-00381-18-44

26456201205



PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT
OF THE RETURN ADDRESS. FOLD AT DOTTED LINE

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

**Virginia L. Nicholson
155 Armstrong Avenue
West Union, WV 26456**



9590 9402 2859 7069 5378 67

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

- Agent
- Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Doddridge County Office of
Emergency Management/Floodplain Management
105 Court Street, Suite 3
304-873-1343
doddridgecountyfpm@gmail.com



Dear Sir or Ma'am,

September 18, 2017

You are receiving this letter because you have been identified as a land surface and/or mineral rights owner for property or adjacent property related to the proposed development/project identified by the following page.

No action is required of you. This letter is simply to inform you of the proposed development.

If you would like to comment on this proposed project, or would like additional information, you may contact the Doddridge County Floodplain Manager at the above address.

Respectfully yours,

A handwritten signature in cursive script, appearing to read "George Eidel".

George Eidel, CFM, OEM Director/Floodplain Manager



Doddridge County Floodplain Permits

(Week of September 18, 2017)

Please take notice that on the **12th day of September, 2017, Sherwood Midstream LLC.** filed an application for a Floodplain Permit (**#17-485**) to develop land located at or about **Armstrong Ave. Coordinates 39.283720 N, -80.732358 W.** The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **October 9, 2017** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. **This project is for the Smithburg Natural Gas Processing Facility**



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 #: 17-485

Date Approved: April 23, 2018

Expires: April 23, 2019

Issued to: Sherwood Midstream, LLC

POC: Richard Lowry

Company Address: 4600 J. Barry Court Suite #500 Canonsburg, PA 15317

Project Address: Smithburg Natural Gas Processing Facility

Firm: 54017C0140C

Lat/Long: 39.283720 N, -80.732358 W

Purpose of development: Construction of Smithburg Natural Gas Processing Facility

Issued by: George C. Eidel, Doddridge County FPM (or designee)

Date: April 23, 2018

For additional information regarding this permit, please contact
Doddridge County Floodplain Manager at 304.873.1343, or via email at
doddridgecountyfpm@gmail.com
105 Court Street Suite 3; West Union, WV 26456



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: #17-485

Date Approved: October 9, 2017

Expires: October 9, 2018

Issued to: Sherwood Midstream, LLC

POC: Richard Lowry

Company Address: 4600 J. Barry Court, Suite 500 Canonsburg, PA 15317

Project Address: Smithburg Natural Gas Processing Facility

Firm: 54017C0140C

Lat/Long: 39.283720N, -80.732358W

Purpose of Development: Construction of Smithburg Natural Gas Processing Facility

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

Date: October 9, 2017

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

COPY

REMOVE DOCUMENT ALONG THIS PERFORATION

MARKWEST

Sherwood Midstream 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

56-1544/441

No. 001006

CHECK NUMBER DATE PAY EXACTLY
001006 29-AUG-17 \$*****25,000.00

Pay Twenty-Five Thousand Dollars And Zero Cents*****

COPY

Doddridge County
Commission
108 E Court St
Suite 1
West Union, WV 26456

Peter Liljen

AUTHORIZED SIGNATURE

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

001006 04415443 00070074

COPY

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

Doddridge County
Commission
108 E Court St
Suite 1
West Union, WV 26456

COPY

COPY

SEE OTHER SIDE FOR
OPENING INSTRUCTIONS

SEE OTHER SIDE FOR
OPENING INSTRUCTIONS

Patent Number US 7,975,904 B2

Doddridge County, West Virginia

RECEIPT NO: 9661

DATE: 2017/09/13

FROM: MARKWEST

AMOUNT: \$ 25,000.00

TWENTY FIVE THOUSAND DOLLARS AND 00 CENTS

FOR: #17-485 SMITHBURG FAIRVIEW

00000001006 FP-BUILDING PERMITS

020-318

TOTAL \$25,000.00

MICHAEL HEADLEY

SHERIFF & TREASURER

MEC

CLERK

Customer Copy

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

FP # 17-485

Doddridge County
Commission
108 E Court St
Suite 1
West Union, WV 26456

SEP 12 17 2:20 PM

SEE OTHER SIDE FOR
OPENING INSTRUCTIONS

SEE OTHER SIDE FOR
OPENING INSTRUCTIONS

FLOODPLAIN PERMIT #17-485

Smithburg Natural Gas Processing Facility-Sherwood Midstream LLC

7017 0660 0000 2275 6812

7017 0660 0000 2275 6850

7017 0660 0000 2275 6829

7017 0660 0000 2275 6836

7017 0660 0000 2275 6843

TASK	COMPLETE (DATE)	NOTES
CHECK RECEIVED	9/12/17	
US ARMY CORP. ENGINEERS (USACE)	4/23/18	
US FISH & WILDLIFE SERVICES (USFWS)	4/23/18	
WV DEPT. NATURAL RESOURCES (WVDNR)	4/23/18	
WV DEPT. ENVIROMENTAL PROTECTION (WVDEP)	4/23/18	
STATE HISTORIC & PRESERVATION OFFICE (SHPO)	4/23/18	
OFFICE of LAND & STREAM (OLS)	4/23/18	
DATE OF COMMISSION READING	9/19/17	
DATE AVAILABLE TO BE GRANTED	10/9/17	
PERMIT GRANTED		
COMPLETE		

7017 0660 0000 2275 6713

7017 0660 0000 2275 6768

7017 0660 0000 2275 6720

7017 0660 0000 2275 6775

7017 0660 0000 2275 6737

7017 0660 0000 2275 6782

7017 0660 0000 2275 6744

7017 0660 0000 2275 6799

7017 0660 0000 2275 6751

7017 0660 0000 2275 6805



Doddridge County Floodplain Permits

(Week of September 18, 2017)

Please take notice that on the **12th** day of **September, 2017**, **Sherwood Midstream LLC**. filed an application for a Floodplain Permit (**#17-485**) to develop land located at or about **Armstrong Ave. Coordinates 39.283720 N, -80.732358 W**. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **October 9, 2017** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. **This project is for the Smithburg Natural Gas Processing Facility**



September 8, 2017

Mr. George Eidel
Doddridge County Floodplain Manager
108 Court Street, Suite 1
West Union, WV 26456

Dear Mr. Eidel:

Subject: Commercial/Industrial Floodplain Development Permit
Proposed Smithburg Natural Gas Processing Facility
Doddridge County, West Virginia
CEC Project 130-359.0209

On behalf of Sherwood Midstream LLC, Civil & Environmental Consultants, Inc. (CEC) is submitting this Commercial/Industrial Floodplain Development Permit associated with the proposed Smithburg Natural Gas Processing Facility located in Doddridge County, West Virginia. The project includes placement of fill within the Meathouse Fork 100-year floodplain.

As part of the Floodplain Development Permit, CEC conducted the attached Hydrologic and Hydraulic (H&H) Analysis for this area to evaluate the potential theoretical impact that the proposed fill will have on the existing floodplain along Middle Island Creek, Meathouse Fork, and Buckeye Creek for the 100-year 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.

Please note, a cost estimate has not been provided because the overall cost of the project exceeds the maximum project cost. Therefore, an application fee of \$25,000 has been included.

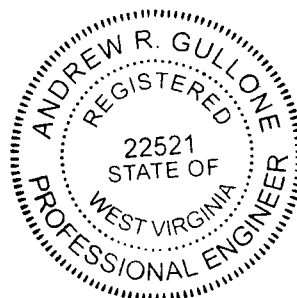
Please contact us at 412-429-2324 if you have any questions.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Andrew Celender
Assistant Project Manager

Andrew R. Gullone, P.E., CPESC, CFM
Project Manager





Permit# 17-485
Smithburg Natural Gas
Project Name: Processing Facility
Permittees Name: Sherwood
Midstream LLC

Doddridge County, WV

Floodplain Development Permit Application

SEP12 17 2:20PM

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. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
7. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
8. I THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE _____

DATE _____


9/8/17

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: Richard.lowry@markwest.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: Richard.lowry@markwest.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVELOPMENT ACTIVITIES:

- 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
- Other (please specify)

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

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

Property Designation: 1 of 2

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

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

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

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

Property Designation: 2 of 2

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

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

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

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

Property Designation: 1 of 1

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

Engineer Firm Information:		
Engineer Firm Name: Civil & Environmental Consultants, Inc.		
Engineer WV License Number: 17441		
Engineer Firm FEIN: 25-1599565	Engineer Firm DUNS: 36-160-9878	
Engineer Firm Primary Point of Contact (POC): Andrew R. Gullone, P.E., CPESC, CFM		
Engineer Firm Primary POC Title: Project Manager		
Engineer Firm Mailing Address: 333 Baldwin Road		
City: Pittsburgh	State: PA	Zip-Code: 15205
Engineer Firm Office Phone: (412) 429-2324		
Engineer Firm Primary POC Phone: (412) 249-3179		
Engineer Firm Primary POC E-Mail: agullone@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 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 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): 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 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 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:

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:

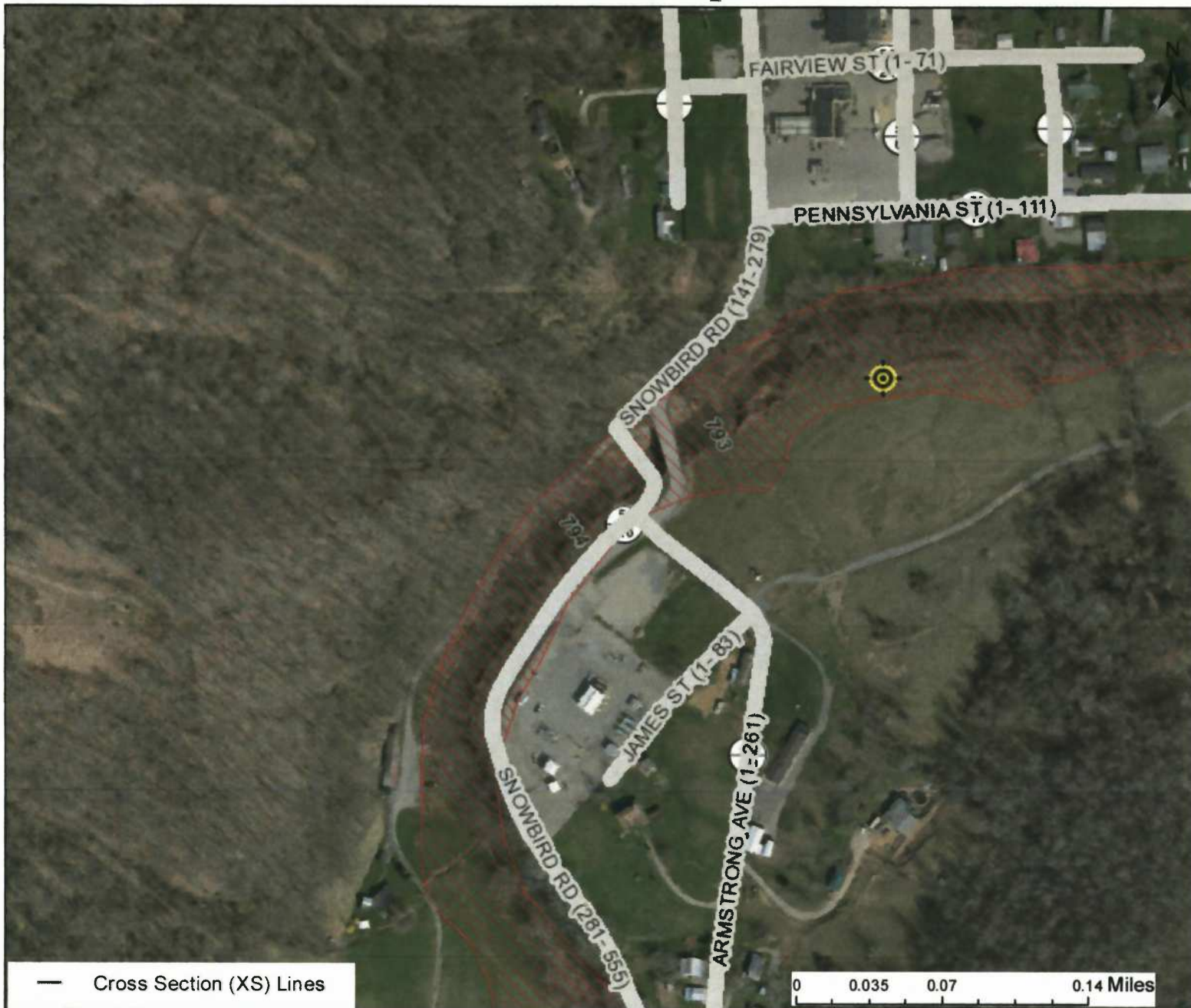
- I certify that I am authorized to submit this application for the primary project developer.
- I certify that the information included in this application is to the best of my knowledge true and complete.
- I certify that all required Federal, State, and local permits required by law and/or ordinance for the above described development of this project have been properly attained, are current and valid, and must be presented with this application before a Doddridge County Floodplain Permit may be 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 or 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 at the next scheduled Doddridge County Commission meeting after the date of issuance. 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. A Certificate of Compliance is required upon substantial completion of the project.**
- 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: _____

Applicant Printed Name: _____

WV Flood Map



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

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

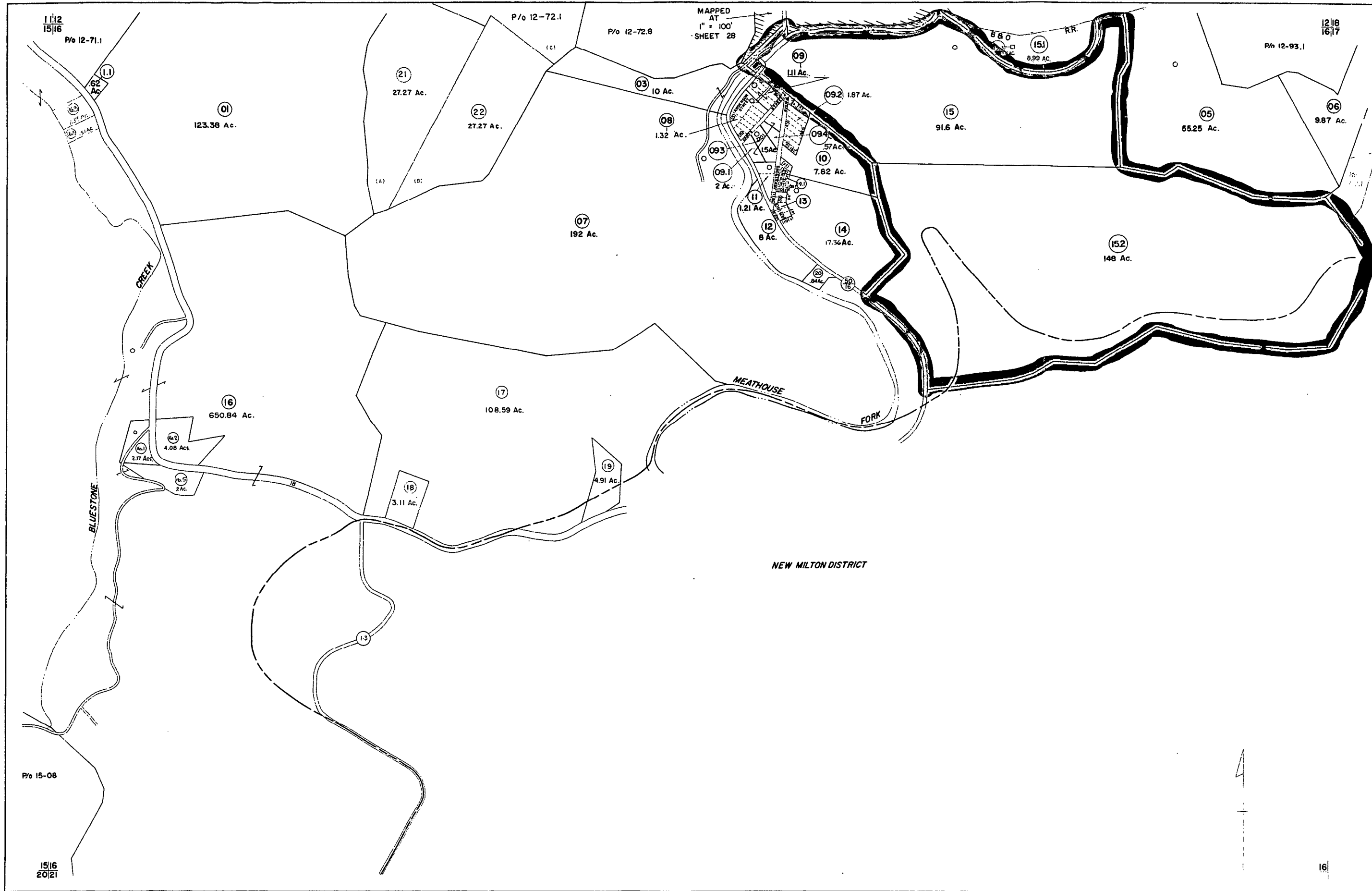
FIRM or DFIRM. Its purpose is to assist with determining potential flood risk for the selected location.

Location of flood information
 User Notes:

Map created on September 12, 2017

Flood Hazard Area: Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.	
Flood Hazard Zone:	AE
Stream:	Meathouse Fork
FEMA Issued Flood Map:	54017C0140C
Watershed (HUC8):	Little Musringum-Middle Island (5030)
Advisory Flood Height:	N/A
Water Depth:	About 8.0 ft (Source: HAZUS)
Elevation:	About 792 ft
Location (long, lat):	(80.732358 W, 39.283720 N)
Location (UTM 17N):	(523083, 4348295)
Contacts:	Doddridge
CRS Information:	N/A
Flood Profile:	54017_015
HEC-RAS Model:	N/A
Parcel Number:	09-08-0016-0015-0000

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.



FOR TAX PURPOSES ONLY

Prepared by
L. ROBERT KIMBALL
 Consulting Engineer
 Ebensburg, Pennsylvania

Legend

Property line	Original lot line
Edge of pavement or roadway	Dead lot number
Cooperation line	Parcel or index number in site
District line	Improvement
County line	Railroad

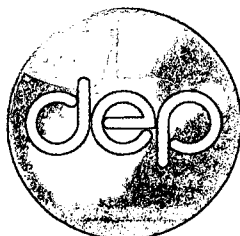
Revisions

1	REVISED 3/1/64			
2	1-20-72	Revised to 7-1-58		
3	8-30-76	OGIS 1-18-91	JB	
4	12-1-78	OGIS 11-93	RD	
5	4-1-89	SLS INC. 3/12/00	JAW	
6	REVISED 7-01	ES 3/23/04	BEK	
7	11-1-14	T. Graves	SBI	

STATE OF WEST VIRGINIA
 DODDRIDGE COUNTY
 Office of Assessor

WEST UNION DISTRICT
 SHEET 16

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



west virginia department of environmental protection

Division of Water and Waste Management
601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0495
Fax (304) 926-0496

Austin Caperton, Cabinet Secretary
dep.wv.gov

March 5, 2018

APR 23 18 11:34AM

Mr. Michael Hatten
Chief, Regulatory Branch
Huntington District, Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701-2070

Re: State 401 Water Quality Certification,
Public Notice No. LRH 2017-614-OHR,
Sherwood Midstream, LLC, construct
Smithburg Natural Gas Processing facility,
within Meathouse Fork and Buckeye Creek
watersheds in Smithburg, Doddridge
County, West Virginia; WQC 170008

Dear Mr. Hatten,

The West Virginia Department of Environmental Protection-Division of Water and Waste Management (WVDEP-DWWM), in conjunction with the West Virginia Division of Natural Resources - Wildlife Resources Section (WVDNR-WRS), has completed review of the above-referenced project.

The applicant proposes to construct a natural gas processing facility to increase raw gas processing capacity to accommodate an increase in shale gas production volume. The proposed facility would support six (6) cryogenic gas processing units, two (2) de-ethanizer units, and associated infrastructure. The facility would be located at latitude 39.28279 N and longitude 80.73322 W.

All stream and wetland impacts associated with the project are permanent and were evaluated utilizing the West Virginia Stream and Wetland Valuation Metric (SWVM). Total permanent stream impacts are proposed to be 6,820 linear feet (lf) including 655 lf of one

Promoting a healthy environment.

Mr. Michael Hatten

Page 2

March 5, 2018

APR23 18 11:34AM

perennial stream, 2,717 lf of five intermittent streams, and 3,448 lf of nineteen ephemeral streams accruing a total of 5,653.642 SWVM stream debits. Cumulative impacts to eight palustrine emergent (PEM) wetlands are proposed to be 0.15 acre resulting in 0.15 SWVM wetland debits. These debits will be mitigated for using the West Virginia In-Lieu Fee Program (ILF) and/or mitigation bank credits at the respective ratios (greater than 1:1 when using ILF). To compensate for permanent stream impacts associated with the project, the applicant has proposed to purchase available SWVM credits from a Corps approved mitigation bank and/or ILF. The proposal is acceptable, provided credits are purchased prior to impacts.

In order to comply with the state's water quality certification and water quality standards regulations the following special conditions must be met:

Special Conditions:


1. Prior to impacts, the applicant will purchase 0.15-acre wetland credits and 5,653.642 stream credits from a USACE approved mitigation bank if available, or if credits are not available 0.336 wetland credits and 6,332.065 stream credits will be purchased from the ILF program.
2. Should water withdrawal be required for the project construction, a forty-five-day advance notification prior to withdrawal must be provided to WVDEP-DWWM and WVDNR-WRS allowing for a determination of whether the water withdrawal will have more than minimal impacts on aquatic resources. The notification must include the maximum water withdrawal rate, designs to minimize impingement and entrainment of aquatic life, and a description of how the intake rate will affect streamflow, or be varied, during periods of seasonal low flow and/or drought.
3. If construction of the project is not completed within five years, the impacts will be reevaluated at the then current rates and methodologies.
4. Representatives from WVDEP-DWWM and WVDNR-WRS must be allowed to inspect the authorized activity at any time deemed necessary to ensure that the terms and conditions of this certification are being met.
5. After completion of the construction activities, the temporary material will be removed and the streams will be restored to their approximate original contours utilizing natural stream design including reestablishment of native vegetation.
6. This State 401 Certification is contingent upon approval by U.S. Army Corps of Engineers of a 404 Permit, including mitigation calculated to be either equal to or greater than that which has been calculated here, for the project described herein.

Mr. Michael Hatten
Page 3
March 5, 2018

APR 23 10 11:34 AM

State 401 Certification, as required by Section 401(a)(1) of the Clean Water Act, is granted and becomes effective 15 days from the date of this certification. Pursuant to West Virginia Legislative Rule §47 CSR 5A Section 7, any person whose property or interest is directly affected by the approval or denial of certification, may request a hearing within 15 days of the certification decision. The request must identify the interest directly affected and set forth the manner in which the person is aggrieved or adversely affected. It should be directed to: Cabinet Secretary, West Virginia Department of Environmental Protection, 601 57th Street SE, Charleston, West Virginia 25304: ATTENTION: 401 Certification Program.

Sincerely,



Scott G. Mandirola
Director

SGM/wir

cc: Mr. Richard Lowry
Sherwood Midstream, LLC
4600 J. Barry Ct., Suite 500
Cannonsburg, Pennsylvania 15317
U.S. Environmental Protection Agency - Jessica Martinsen
U.S. Fish and Wildlife Service - John Schmidt
WVDNR-Wildlife Resources Section, Elkins - Danny Bennett
WVDEP-EE - Tonya Mather

DEC 11 2017



DIVISION OF NATURAL RESOURCES
324 Fourth Avenue, Room 200
South Charleston WV 25303-1228
TDD (304) 558-1439
TDD 1-800-354-6087
Fax (304) 558-6048
Telephone (304) 558-3225

APR23 10 11:35AM

Jim Justice
Governor

Stephen S. McDaniel
Director

December 4, 2017

Division of Natural Resources
RIGHT OF ENTRY

Re: **R-17-VI/09-1921**

Sherwood Midstream LLC
Rick Lowry
c/o Civil & Environmental Consultants, Inc.
Attention: Jonathan Farrell
333 Baldwin Road
Pittsburgh PA, 15205-

Dear Mr. Lowry:

The Division of Natural Resources hereby grants to you for License and Right of Entry for the purpose of conducting activities associated with the construction, operation and reclamation of the Smithburg Natural Gas Processing Plant along unnamed tributaries to Buckeye Creek and Meathouse Fork near Smithburg in Doddridge County, West Virginia.

The proposed project will impact a total of various lengths (see Exhibit A) at twenty-two (22) separate locations of unnamed tributaries to Buckeye Creek and Meathouse Fork. Fill must consist of clean, durable rock and free of pollutants.

The State's issuance of this Right-of-Entry does not provide for the applicant to work outside the requested boundaries nor does the State assume any liability for the applicant's construction activities. By accepting this Right-of-Entry, the applicant assumes liability for any/all damages caused by this activity to both upstream and downstream landowners.

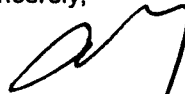
Guidelines of Best Management Practices for Sediment and Erosion Control as outlined by the Section of Water Resources, Division of Environmental Protection must be followed. Copies of those guidelines are available from the Section of Water Resources, Telephone No. (304) 926-0440.

The issuance of this Right of Entry by the Division of Natural Resources does not preclude the necessity to obtain a permit from the Corps of Engineers or any other state or federal permits which may be required by law, nor does this Right of Entry negate the need to comply with the West Virginia Water Pollution Control Act and/or the State Environmental Quality Board's administrative regulations, applicant is also responsible for determining if the proposed activity is located within an identified flood plain and it is the applicant's responsibility for contacting the local governmental agency in charge of that program and obtaining a flood plain development permit for it. This Right of Entry does not grant any rights or privileges, or permission to enter upon or to cross the property of any other person, nor is permission granted to remove any material that lies upon the property of any other persons. Work should be completed in as brief a period as possible and within one year from the date of this letter. In the event you fail or refuse to comply with any of the terms or conditions herein, this Right of Entry will be canceled and considered null and void and the Corporation will reject further applications.

Your check is now due and payable in the amount of twenty-two thousand dollars (\$22,000.00) to the Division of Natural Resources covering the one-time fee for this agreement. Your agreement will be effective upon receipt of your payment in full.

If you have any questions, please contact our office at (304) 558-3225.

Sincerely,



Joe T. Scarberry, Supervisor
Office of Land and Streams

JTS:cb

pc: Paul Johansen, Chief of Wildlife Resources
Bret Preston, Assistant Chief of Fisheries
DNR Fish Biologist, District
Jeremy Bandy, Environmental Enforcement
DNR Conservation Officers, Doddridge County

West Virginia Division of Natural Resources

APR23 18 11:35AM

Invoice

Pay on-line at <http://wvdnr.gov/REM>

In
Acct
With

Sherwood Midstream LLC
Attention: Rick Lowry
4600 J. Barry Court, Suite 500
Canonsburg, PA 15317

Invoice#: 28618
Comp. ID#: 6830
Bill Date: 12/04/2017

AGREEMENT	INVOICE PERIOD	AMOUNT PAID	AMOUNT DUE
<u>AGREEMENT DATED 12/4/2017</u> <u>R-17-VI/09-1921</u> Right of entry for the purpose of conducting activities associated with the construction, operation and reclamation of the Smithburg Natural Gas Processing Plant along unnamed trigs to Buckeye Creek and Meathouse Fork, Doddridge Co., WV	Land and Streams/DNR	\$0.00	\$22000.00
		TOTAL INVOICE:	\$22000.00
		NUMBER OF AGREEMENTS:	1

Please Reference Either Invoice Number or Agreement Re: on Payment

WV Division of Natural Resources
Office of Land & Streams
324 Fourth Avenue, Room 200
South Charleston, WV 25303

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT

Brian Eid (304) 558-3225
brian.n.eid@wv.gov

Table 1
Stream Activity and Impacts
Smithburg Natural Gas Processing Plant

Catchment #	CEC Stream ID	Latitude (NAD83)	Longitude (NAD83)	Linear Feet of Proposed Enclosure
1	UNT 103	39.28270	-80.73118	135
2	UNTs 1, 2, 4, 200	39.28248	-80.72876	1614
3	UNT 6	39.28245	-80.72614	134
4	UNT 13	39.28182	-80.72591	370
5	UNT 8	39.28039	-80.72524	283
6	UNT 201	39.28015	-80.72501	136
7	UNTs 9, 10, 101, 14, 15, 16, 17, 18, 19, 20, 21, 22, 100	39.27773	-80.72402	4148
			TOTAL	6820

APR23 10 11:35AM



APR 23 18 11:35AM

DIVISION OF NATURAL RESOURCES
324 Fourth Avenue, Room 200
South Charleston WV 25303-1228
TDD (304) 558-1439
TDD 1-800-354-6087
Fax (304) 558-6048
Telephone (304) 558-3225

Jim Justice
Governor

Stephen S. McDaniel
Director

December 4, 2017

Division of Natural Resources
RIGHT OF ENTRY

Re: LS-17-VI/09-1922

Sherwood Midstream LLC
Rick Lowry
c/o Civil & Environmental Consultants, Inc.
Attention: Jonathan Farrell
333 Baldwin Road
Pittsburgh, PA 15205-

Dear Mr. Lowry:

The Division of Natural Resources hereby grants to you for a period of ten (10) years from the date hereof, a Right of Entry for the purpose of installing and maintaining an eighteen inch by ninety foot (18"x90') culvert in the streambed (Smithburg Natural Gas Processing Plant) along an unnamed tributary of Meathouse Fork near Smithburg in Doddridge County, West Virginia.

This Right of Entry is subject to the following terms and conditions:

1. No in stream work during the fish-spawning season (April 1-June 30).
2. Work should be completed as quickly as possible during low flows in designated work areas only.
3. All shore areas disturbed by this operation must be reshaped, seeded and mulched immediately upon completion of work. The prompt establishment of vegetative cover will reduce future damage from high water levels.
4. Green concrete must not be put in the stream (highly toxic to aquatic life).
5. Guidance should be obtained from NRCS (formerly SCS) and a registered engineer for the design and construction. Must allow for passage of at least ten-year flood flow.
6. Best management practices should be followed; measures such as hay bales must be used to reduce downstream siltation.

7. Applicant is responsible for removing debris from in and around the installation periodically to prevent stream flow obstruction.
8. Durable head walls of logs, rock, or concrete shall be constructed at both the upstream and downstream ends of crossing to prevent erosion of fill material into the stream.
9. The State's issuance of this Right-of-Entry does not provide for the applicant to work outside the requested boundaries nor does the State assume any liability for the applicant's/landowner's construction activities. By accepting this Right-of-Entry, the applicant/landowner assumes liability for any/all damages caused by this activity to both upstream and downstream landowners.

Guidelines of Best Management Practices for Sediment and Erosion Control as outlined by the Section of Water Resources, Division of Environmental Protection must be followed. Copies of those guidelines are available from the Section of Water Resources, 601 57th Street S.E., Charleston, West Virginia 25304-2345, Telephone No. (304) 926-0440.

The issuance of this Right of Entry by the Division of Natural Resources does not preclude the necessity to obtain a permit from the Corps of Engineers or any other state or federal permits which may be required by law, nor does this Right of Entry negate the need to comply with the West Virginia Water Pollution Control Act and/or the State Environmental Quality Board's administrative regulations, applicant is also responsible for determining if the proposed activity is located within an identified flood plain and it is the applicant's responsibility for contacting the local governmental agency in charge of that program and obtaining a flood plain development permit for it. This Right of Entry does not grant any rights or privileges, or permission to enter upon or to cross the property of any other person, nor is permission granted to remove any material that lies upon the property of any other persons. Work should be completed in as brief a period as possible and within one year from the date of this letter. In the event you fail or refuse to comply with any of the terms or conditions herein, this Right of Entry will be canceled and considered null and void and the Division will reject further applications.

Your payment is now due and payable in the amount of \$100.00 to the Division of Natural Resources covering the first year's annual fee of this agreement. Your agreement will be effective upon receipt of your payment in full. You must notify this office in writing when this installation has been removed.

Sincerely,



Joe T. Scarberry Supervisor
Office of Land and Streams

JTS:cb

pc: DNR Fish Biologist
Jeremy Bandy, Environmental Enforcement
DNR Conservation Officers

West Virginia Division of Natural Resources

Invoice

Pay on-line at <http://wvdnr.gov/REM>

In
Acct
With

Sherwood Midstream LLC
Attention: Rick Lowry
4600 J. Barry Court, Suite 500
Canonsburg, PA 15317

Invoice#: 28619

Comp. ID#: 6830

Bill Date: 12/04/2017

AGREEMENT	INVOICE PERIOD	AMOUNT PAID	AMOUNT DUE
<u>AGREEMENT DATED 12/4/2017</u> <u>LS-17-VI/09-1922</u> Culvert in the streambed (Smithburg Natural Gas Processing Plant) along an unnamed trib of Meathouse Fork, Doddridge Co., WV	For 12/4/2017 to 12/4/2018 Land and Streams/DNR	\$0.00	\$100.00

TOTAL INVOICE: \$100.00

NUMBER OF AGREEMENTS: 1

APR23 18 11:35AM

Please Reference Either Invoice Number or Agreement Re: on Payment

WV Division of Natural Resources
Office of Land & Streams
324 Fourth Avenue, Room 200
South Charleston, WV 25303

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT

Brian Eid (304) 558-3225
brian.n.eid@wv.gov

90' long
culvert in
addition to
rock
underdrain

Table 1
Stream Activity and Impacts
Smithburg Natural Gas Processing Plant

Catchment #	CEC Stream ID	Latitude (NAD83)	Longitude (NAD83)	Linear Feet of Proposed Enclosure
1	UNT 103	39.28270	-80.73118	135
2	UNTS 1, 2, 4, 200	39.28248	-80.72876	1614
3	UNT 6	39.28245	-80.72614	134
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5	UNT 8	39.28039	-80.72524	283
6	UNT 201	39.28015	-80.72501	136
7	UNTS 9, 10, 101, 14, 15, 16, 17, 18, 19, 20, 21, 22, 100	39.27773	-80.72402	4148
			TOTAL	6820

Applicant: Sherwood Midstream, LLC
WQC No.: 170008
Public Notice Number: LRH 2017-614-OHR
Date: March 5, 2018

APR23 18 11:34AM

1. In-stream work in designated warm water streams and their adjacent tributaries during the fish spawning season, April to June and trout waters and their adjacent tributaries during the trout water fish spawning season September 15 to March 31 requires a spawning season waiver from the West Virginia Division of Natural Resources (WV DNR) Coordination Unit, at (304) 637-0245. For information about specific stream designations contact West Virginia Department of Environmental Protection, Water Quality Standards Section at (304) 926-0495. In-stream work may occur during the respective spawning season in ephemeral waters without a waiver if all reasonable measures are taken to minimize turbidity and sedimentation downstream associated with the proposed project.
2. Operation of equipment instream is to be minimized and accomplished during low flow periods when practical. Ingress and egress for equipment shall be within the work site. Location of ingress and egress outside the immediate work area requires prior approval of the West Virginia Department of Environmental Protection, Division of Water and Waste Management in concurrence with the West Virginia Division of Natural Resources.
3. The permittee will investigate for the presence of water supply intakes or other activities within 1/2 mile downstream, which may be affected by suspended solids and turbidity increases caused by work in the watercourse. The permittee will give notice to operators of any such water supply intakes and such other water quality dependent activities as necessary before beginning work in the watercourse in sufficient time to allow preparation for any change in water quality.
4. The permittee will employ measures to prevent or control spills from fuels, lubricants or any other materials used in connection with construction and restrict them from entering the watercourse. Storage areas for chemicals, explosives, lubricants, equipment, fuels, etc., as well as equipment refueling areas, must include containment measures (e.g., liner systems, dikes, etc.) to ensure that spillage of any material will not contact surface or ground waters. Storage areas and refueling areas shall be a minimum distance of 100 feet from any surface waterbody. All spills shall be promptly reported to the State Center for Pollution, Toxic Chemical and Oil Spills, 1-800-642-3074.
5. Upon completion of in-stream operations all disturbances below the ordinary high water mark will be properly stabilized within 24 hours to prevent soil erosion. Where possible, stabilization shall incorporate revegetation using bioengineering as an alternative to rip rap. If rip rap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created due to its placement. Fill is to be clean, nonhazardous and of such composition that it will not adversely affect the biological, chemical or physical properties of the receiving waters. Unsuitable materials include but are not limited to: Cadmium chromium arsenate

(CCA) and creosote treated lumber, car bodies, tires, large household appliances, construction debris, and asphalt. To reduce potential slope failure and/or erosion behind the material, fill containing concrete must be of such weight and size that promotes stability during expected high flows. Loose large slab placement of concrete sections from demolition projects greater than thirty-six inches in its longest dimension and tires are prohibited. Rebar or wire in concrete should not extend further than one (1) inch. All activities require the use of clean and coarse non-erodible materials with 15% or less of like fines that is properly sized to withstand expected high flows.

6. Land disturbances, which are integral to the completion of the permitted activity and are one (1) acre or greater in total area, must comply with the National Pollutant Discharge Elimination System or other state stormwater permit requirements as established by the West Virginia Department of Environmental Protection, Division of Water and Waste Management, if applicable. Best Management Practices for Sediment and Erosion Control, as described in the West Virginia Department of Environmental Protection's Erosion and Sediment Control Best Management Practice Manual, 2006, or similar documents prepared by the West Virginia Division of Highways may be used. These handbooks are available from the respective agency offices.
7. Removal of well-established riparian vegetation not directly associated with the project construction is prohibited. Disturbance and removal of vegetation from project construction area is to be avoided, where possible, and minimized when necessary. Removal of vegetation shall not be allowed where stream bank stability under normal flow conditions would be compromised.
8. All permit modifications must be re-certified.
9. Spoil materials from the watercourse or onshore operations, including sludge deposits, will not be dumped in the watercourse, or deposited in wetlands or other areas where the deposit may adversely affect the surface or ground waters of the state.
10. Excavation, dredging or filling in the watercourse will be done only to the extent necessary to achieve the project's purpose.
11. Runoff from any storage areas or spills will not be allowed to enter storm sewers without acceptable removal of solids, oils and toxic compounds. Discharges from retention/detention ponds must comply with permit requirements of the National Pollutant Discharge Elimination System permit program of the West Virginia Department of Environmental Protection, Division of Water and Waste Management.
12. The permittee will provide written notice of the proposed start-up date to the WVDEP-Environmental Enforcement (EE), fifteen days in advance of initiation of any activity authorized by the certification. The address for EE is 601 57th Street SE, Charleston, West Virginia 25304.

13. Stream activities permitted under the US Army Corps of Engineers 404 Program require that a West Virginia Public Lands Corporation Right of Entry be obtained. Application for this authorization should be made to the West Virginia Division of Natural Resources, Office of Lands and Streams, Building 74, Room 200, 324 Fourth Avenue, South Charleston, West Virginia 25303, or by contacting them at 304-558-3225. Any activity within the 100-year floodplain requires approval from the appropriate Floodplain Manager. The following website provides a statewide listing of Floodplain Managers in West Virginia:
www.dhsem.wv.gov/mitigation/floodplain/Pages/default.aspx
14. Should potentially hazardous waste materials be located, the permittee will advise the WVDEP, Division of Water and Waste Management (Hazardous Waste Section), telephone (304) 926-0495, prior to disturbance of material.
15. The permittee shall provide a copy of the State 401 Certification to the construction contractor. A copy of the State 401 Certification shall be available at the project site until such time as the project is complete.
16. The permittee will comply with water quality standards as contained in the WV Code of State Regulations, Requirements Governing Water Quality Standards Title 47, Series 2.



west virginia department of environmental protection

Division of Water and Waste Management
601 57th Street SE
Charleston, West Virginia 25304-2345
Phone: 304-926-0495
Fax: 304-926-0496

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

March 08, 2018

APR23 18 11:36AM

RICHARD LOWRY
SHERWOOD MIDSTREAM LLC
1515 APAPAHOE ST
TOWER 1, SUITE 1600
DENVER, CO 80202

Re: General Permit Registration No. WVR310965
Smithburg Natural Gas Processing Plant, Doddridge
County, Disturbed Acres (103.4)

Dear Permittee:

Attached is a copy of your completed registration form for your activity with the above assigned registration number. You are now authorized to operate under General Permit No. WV0116815. This registration form should be kept with your copy of the General Permit. You should carefully read the contents of the permit and become familiar with all requirements needed to remain in compliance.

Although you should be aware of all the terms and conditions of this permit, we wish to advise you of the following important requirements:

1. In accordance with Section G.4 of the General Permit, you have developed a complete storm water pollution prevention plan. This plan is to be retained on site and be available for review by the Director or the Director's authorized representative as of the date of your coverage by the General Permit, which is the date of this letter.
2. The erosion control measures approved by this agency for this project shall be maintained in proper condition to individually and collectively perform the functions for which they were designed. In order to ensure the efficiency and proper maintenance of these measures, the permittee shall make sufficiently frequent, periodic inspections to detect any impairment of the designed stability, capacity or environmental requirements of the approved measures. The permittee shall take immediate steps to correct any such impairment found to exist.
3. If this Stormwater Pollution Prevention Plan (SWPPP) proves to be ineffective in controlling erosion and the sediment in storm water discharges associated with industrial/construction activities, or site conditions change, the Permittee shall amend the SWPPP and install appropriate sediment and/or control devices in accordance with Section G.4.c) of this permit and the application instructions
4. The current General Permit expires on May 13, 2018. If you wish to continue an activity regulated by this permit after the expiration date of the permit, provisions for coverage will be made during the public notice process for any new General Permit to be issued at that time.

5. Final stabilization means disturbed areas shall be covered by the appropriate permanent protection. Final stabilization includes: pavement; buildings; stable waterways (riprap, concrete, grass or pipe); a healthy, vigorous stand of perennial grass that uniformly covers at least 70 percent of the ground; stable outlet channels with velocity dissipation which directs site runoff to a natural watercourse; and any other approved structure or material.

Your annual permit fee has been assessed as \$1,500.00. You will be invoiced by this agency one month prior to the anniversary date of your original approval date. Failure to submit the annual fee within 90 days of the due date will render your permit void upon the date you are mailed a certified written notice to that effect. Please be advised that a pro-rated annual permit fee may be assessed upon the completion date and proper stabilization.

Issuance of this approval of the General Permit registration does not authorize any injury to persons or property or invasion of other private rights, or any infringement of federal, state or local law or rules.

The validity of this General Permit Registration is contingent upon payment of the applicable annual permit fee, as required by Chapter 22, Article 11, Section 10 of the Code of West Virginia.

Your efforts toward preventing the degradation of our natural resources are greatly appreciated. If you have any questions, please contact Sharon Mullins of this Division at (304) 926-0499 extension 1132 or at sharon.a.mullins@wv.gov.

Scott G. Mandirola
Director
WV DEP-Division of Water & Waste Mgt.
601 57th St SE
Charleston, WV 25304-2345
Phone: (304) 926-0495
Fax: (304) 926-0463

DEPARTMENT OF THE ARMY PERMIT

Permittee Sherwood Midstream, LLCPermit No. LRH-2017-00614-OHR- Meathouse ForkIssuing Office Huntington District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: You are authorized to permanently discharge dredged and/or fill material into 6,820 linear feet (0.417 acre) of 22 streams (UNT 1, 2, 4, 6, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 100, 101, 103, 200, and 201) and 0.15 acre of eight (8) wetlands (5, 6, 7, 14, 15, 18, 19, and 20) in conjunction with the construction of the Smithburg Natural Gas Processing Facility (see enclosed Table 1 and 2 of the special conditions), as shown in the enclosed drawings (Sheets 1-19).

Project Location: The project is located within unnamed tributaries of Buckeye Creek, unnamed tributaries of Meathouse Fork, and wetlands adjacent to Buckeye Creek and Meathouse Fork, located south of U.S. Route 50 and east of Snowbird Road, in the unincorporated community of Smithburg, Doddridge County, West Virginia (Latitude 39.28279°N, Longitude 80.73322°W).

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2028. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions: Special conditions are found on the attached sheet titled "SPECIAL CONDITIONS FOR SECTION 404 CLEAN WATER ACT INDIVIDUAL STANDARD PERMIT NO. LRH 2017-00614-OHR-MEATHOUSE FORK FOR SHERWOOD MIDSTREAM, LLC'S SMITHBURG NATURAL GAS PROCESSING FACILITY PROJECT, DODDRIDGE COUNTY, WEST VIRGINIA"

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization:
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
 - a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
 - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

- 6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(DISTRICT ENGINEER) (DATE)
PHILIP M. SECRIST III
Colonel, Corps of Engineers

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

APR23 10 11:36AM



The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562

EEO/AA Employer

August 22, 2017

APR23 10 12:06PM

Mr. James T. Marine
Principal Investigator, Tetra Tech
Foster Place 7
661 Anderson Drive
Pittsburgh, PA 15220-2745

RE: Smithburg/Moose Natural Gas Plant, Smithburg, Doddridge County
FR#: 13-528-DO-4

Dear Mr. Marine:

We have reviewed the additional information submitted for the above-mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

Archaeological Resources:

Thank you for providing additional information regarding the terrain located along Middle Island Creek that was not part of the originally considered conceptual plan and not included in the archaeological survey that was conducted for this project in 2013. The additional information demonstrates that this area was previously surveyed for the Moose Wetland Mitigation Site (FR# 13-1040-DO). Our November 22, 2013 letter indicates that no further consultation was necessary regarding archaeological resources. Consequently, we rescind our request for a Phase I archaeological survey. No further consultation is necessary regarding archaeological resources for this proposed project.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A. Lamarre-DeMott, Senior Archaeologist, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMPLLD



The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562

EEO/AA Employer

APR23 10 12:06PM

August 14, 2017

Mr. James T. Marine
Principal Investigator, Tetra Tech
Foster Place 7
661 Anderson Drive
Pittsburgh, PA 15220-2745

RE: Smithburg/Moose Natural Gas Plant, Smithburg, Doddridge County
FR#: 13-528-DO-3

Dear Mr. Marine:

We have reviewed the additional information submitted for the above-mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to submitted information, the conceptual plans and limit-of-disturbance (LOD) for the Smithburg/Moose Natural Gas Plant were recently finalized. In a review letter from our office dated November 22, 2013, our office concurred that the project would impact no archaeological resources. In a subsequent review letter, dated January 17, 2014, we provided our concurrence that the Archibold Cemetery is not eligible for the National Register of Historic Place and requested additional information regarding the final design of the gas plant to allow for the completion of a viewshed assessment for architectural resources.

Archaeological Resources:

The finalized LOD includes terrain located along Middle Island Creek that was not part of the originally considered conceptual plan and, therefore, not included in the archaeological survey that was conducted in 2013. Although our records indicate that no previously documented archaeological resources are located in this area, sites have been identified along Middle Island Creek upstream and downstream from the proposed project area. As a result, we request that this area undergo a Phase I archaeological survey prior to initiating project related construction activities. We will provide further comment upon receipt of the resulting technical report.

Architectural Resources:

We have reviewed the submitted information, and we concur that the community of Smithburg lacks the integrity and significance necessary to be eligible for the National Register of Historic Places. In addition, we remain in concurrence that the Snowbird Bridge (DO-0039) and the unnamed agricultural


August 14, 2017
Mr. Marine
FR#: 13-528-DO-3
Page 2

building (DO-0040) are not eligible for the National Register. Finally, we remain in concurrence that the B&O Railroad Tunnel #4 (DO-0002) and the Smithburg Grade School (DO-0184) are eligible for the National Register of Historic Places.

We agree that the proposed project will not affect the B&O Railroad Tunnel #4 (DO-0002) because there will be no view of the proposed natural gas plant from this resource. Although the Smithburg Grade School (DO-0184) will have a view of the proposed natural gas plant, we agree that the proposed project will not adversely affect the school's ability to convey its historic significance. No further consultation is necessary regarding architectural resources; however, we do ask that you contact our office if your project should change.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A. Lamarre-DeMott, Senior Archaeologist, or Benjamin M. Riggle, Structural Historian, at (304) 558-0240.*

Sincerely,



APR23 18 12:06PM

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/BMR/LLD

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

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

- A N D -

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

WITNESSETH, that in consideration of [REDACTED] Dollars [REDACTED] 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 1/2 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 3/4 poles to a stone; South 2 1/2 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 3/4 degrees East, 29 3/4 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 1/2 poles to a maple; South 79 7/8 degrees East, 24 1/2 poles to a stone; North 62 degrees East, 9 3/4 poles to a white oak; South 66 1/4 degrees East, 35.5 poles to a locust, South 70 1/2 degrees East, 11.5 poles to a sugar; South 81 1/2 degrees East, 16.1 poles to a locust; South 88 3/4 degrees East, 17.4 poles to a chestnut oak; North 69 1/2 degrees East, 7.4 poles to a white oak; South 32 degrees East, 45 1/4 poles to a stone; south 84 1/2 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 1/4 poles to a stone; South 60 degrees West, 37 poles to a stone; south 88 1/4

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 Map 16, Parcel 15
Tax Ticket Number: 27559

DECLARATION OF RESIDENT STATUS

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

DECLARATION OF CONSIDERATION OR VALUE

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

AND the said grantors hereby covenant and agree that they will warrant **SPECIALLY** the property hereby conveyed.

In Witness Whereof, the parties of the first part have hereunto set their hands and seals. Dated the day and year first above written.

Sealed and Delibered
IN THE PRESENCE OF US:

Clara Babb

Gene P. Moose {SEAL}
GENE P. MOOSE

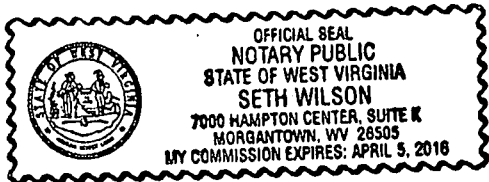
Clara Babb

Linda G. Moose {SEAL}
LINDA G. MOOSE

State of West Virginia :
County of Monongalia : ss

On this the 15th day of July, 2013, before me, a Notary Public for the State of West Virginia, the undersigned Officer, personally appeared **GENE P. MOOSE** and **LINDA G. MOOSE**, known to me (or satisfactorily proven) to be the persons whose names are subscribed to the within instrument, and acknowledged that they executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.



Seth Wilson
Notary Public
My commission expires 4/5/2016

The address of the above-named Grantee is:
1515 ARAPAHOE STREET, TOWER 1
SUITE 1600
DENVER, CO. 80202

Seth Wilson
On behalf of the Grantees

File No. **A-1764**

Prepared by Adams Abstract Associates, Inc., 69
Gettysburg, PA 17325

Beth A Rogers
DODDRIDGE County 08:39:10 AM
Instrument No 180085
Date Recorded 07/19/2013
Document Type DEED
Pages Recorded 4
Book Page 310-243
Recording Fee \$11.00
Transfer Tax \$7,480.00
Additional \$25.00

BOWELS RICE MCDAVID GRAFF & LOVE LLP
7000 HAMPTON CENTER
MORGANTOWN, WV 26505-1720



MarkWest Liberty Midstream & Resources, L.L.C.

October 10, 2017

Mr. George Eidel,
Director/Floodplain Manager
Doddridge County Office of Emergency Management
105 Court Street, Suite 3
West Union, WV 26456-2095

Subject: Legal Notice 17-485 Comment
Smithburg Plant Floodplain Permit
Doddridge County, West Virginia

Dear Mr. Eidel:

On behalf of Sherwood Midstream L.L.C., please accept this response to the comments issued on the above referenced project received via email from your office on October 10, 2017.

The Individual permit (collectively Sections 401 and 404), was submitted to both WVDEP and USACE on August 16, 2017 and are currently under review at both agencies. The 401 Water Quality Certification was deemed administratively complete by WVDEP on August 21, 2017 and the public comment period has ended. The USACE has published their public notice on September 29, 2017.

With respect to the Floodplain application submitted to your office on September 8, 2017 regarding the Smithburg Plant, we understand that the floodplain permit will not be valid until proof of issuance of the 401/404 Individual Permit has been provided to your office. We will forward these approvals to you as they are issued.

Please let me know if you have any follow up questions regarding the project as your review progresses.

Respectfully,

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC



Rick Lowry
Environmental Manager

CLERK OF THE COUNTY COURT

108 Court Street

West Union, WV 26456

OCT10 17 9:44AM

October 9, 2017

RE: 17-485 Floodplain permit for Smithburg Plant


To Whom It May Concern:

I am writing in response to the Legal notice referencing 17-485 floodplain permit. This permit is for a processing plant similar to the Mark West Cryogenic Extraction plant located close to Morgansville, RT 50 Doddridge County. This plant appears to be 1/2 the size of the Mark West Plant and appears to be located across the creek for the Doddridge County Health Department. The location also appears to be less than a mile from Doddridge County Middle & Elementary Schools. It also less than a mile from the Doddridge County Park.

The permit application states that on page 15 that all required permits have been received.

- 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 been properly attained, are current and valid, and must be presented with this application before a Doddridge County Floodplain Permit may be issued.

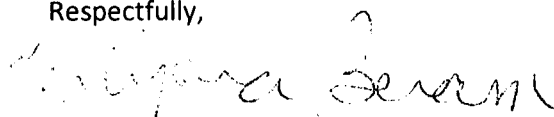
This permit application was signed by

Applicant Signature:  Date: 9/8/17
 Applicant Printed Name: Rick Lowry

I respectfully request that no decisions are made regarding this permit application until Mr. Lowry shows proof that the WV DEP 401 and the USACE 404 permits have been issued. As of this date, 10-9-2017, neither has been issued and were definitely not issued by 9-8-17.

I also ask, due to the magnitude of this project, that a public meeting be had to give the impacted community an opportunity to express concerns.

Respectfully,

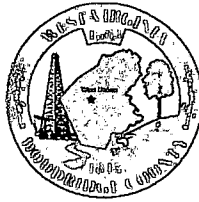

 Mirijana Beram

615 Riggins Run Road

West Union, WV 26456

Cc: George Eidel, County Commission Assistant for the commissioners.

*Submitted
 10-10-17
 because Clerks
 office was
 closed on
 10-9-17
 MDE*



Freedom Of Information Act (FOIA) Request Form

Doddridge County, WV Office of Emergency Management

This FOIA request is for the below listed record/file. By signing below, the applicant acknowledges that they will be allowed access to the requested record/file, **after review and authorization** of the application by the Emergency/Floodplain Manager. An appointment will be made to view the requested record/file in the Emergency Management Office, or copies of the requested record/file may be purchased at the cost of \$1.50 for the first 2 pages of the record/file, and \$1.00 per page thereafter. **By signing below, the applicant acknowledges that records/files are the property of Doddridge County, and agrees that they will not remove any items, documents, or contents of any record/file, under penalty of law. They also acknowledge that this request will be filed with the WV Secretary of State's Office FOIA Data Base.**

Date of request: 10-3-17 Applicant Signature: Mirijana Beram

Applicant Name:	Mirijana Beram
Applicant Address:	615 Riggins Run Rd
Applicant Phone:	304-873-2828
Applicant Email:	miri-beram@yahoo.com

Record/File Requested: See Attached Specific Information Requested: See Attached
scanned copy requested

The above request was received on 10/3/17 and was granted / rejected on 10/5/17 Initials: JG
 Applicant viewed record/file on: 10/3/17 Applicant received 1 SCANNED + EMAILED copies on: 1 Total cost: 0
 Verified by: Doddridge County FPM (or designee) [Signature]

Doddridge County Office of Emergency Management
 304-873-1343 doddridgecountyfpm@gmail.com
 105 Court Street Suite #3; West Union, WV 26456



George Eidel <doddridgecountyfpm@gmail.com>

Request for information

3 messages

George Eidel <doddridgecountyfpm@gmail.com>
To: m b <miri_beram@yahoo.com>

Wed, Oct 4, 2017 at 9:00 AM

Ms. Beram,

Good morning, I want to apologize for having to leave so abruptly yesterday. I am working on getting you your information as soon as possible. In your request you didn't put what information you wanted. Could you reply to this email and state what information you wanted, for example the floodplain permit application (who's permit, I think you have the number) or whatever else you were wanting. I want to make sure I scan and send you what you need, this way I get you everything once. If you have any other questions contact me.

Thank You

-

George C. Eidel, CFM, OEM Director/Floodplain Manager
Doddridge County Office of Emergency Management
105 Court Street Suite 3
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

CONFIDENTIALITY NOTE: This email message is for the sole use of the intended recipient(s) and may contain confidential, privileged, or sensitive information. Any unauthorized review, use, disclosure, or distribution is strictly prohibited and may be legally accountable.

m b <miri_beram@yahoo.com>
To: George Eidel <doddridgecountyfpm@gmail.com>

Wed, Oct 4, 2017 at 9:40 AM

Mr. Eidel,

No apologies needed. I was sorry to hear that a fatality was involved.

I was interested in a scanned copy of the flood plain permit application for the Smithburg Processing Plant and also a scanned copy of the legal ad that was placed for it..I appear to have misplaced the card that I had the number printed on.

Mirijana Beram
[Quoted text hidden]

George Eidel <doddridgecountyfpm@gmail.com>
To: m b <miri_beram@yahoo.com>

Wed, Oct 4, 2017 at 10:54 AM

Ms. Beram,

For your records the permit number is 17-485, the company name is Sherwood Midstream LLC. I will try and get the information to you as soon as I can.

[Quoted text hidden]



September 8, 2017

Mr. George Eidel
Doddrige County Floodplain Manager
108 Court Street, Suite 1
West Union, WV 26456

Dear Mr. Eidel:

Subject: Commercial/Industrial Floodplain Development Permit
Proposed Smithburg Natural Gas Processing Facility
Doddrige County, West Virginia
CEC Project 130-359.0209

On behalf of Sherwood Midstream LLC, Civil & Environmental Consultants, Inc. (CEC) is submitting this Commercial/Industrial Floodplain Development Permit associated with the proposed Smithburg Natural Gas Processing Facility located in Doddrige County, West Virginia. The project includes placement of fill within the Meathouse Fork 100-year floodplain.

As part of the Floodplain Development Permit, CEC conducted the attached Hydrologic and Hydraulic (H&H) Analysis for this area to evaluate the potential theoretical impact that the proposed fill will have on the existing floodplain along Middle Island Creek, Meathouse Fork, and Buckeye Creek for the 100-year storm event. Based on these results, CEC concludes the proposed Smithburg Natural Gas Processing Plant meets the FEMA and Doddrige County requirements for proposed development within a FEMA designated Zone AE floodplain.

Please note, a cost estimate has not been provided because the overall cost of the project exceeds the maximum project cost. Therefore, an application fee of \$25,000 has been included.

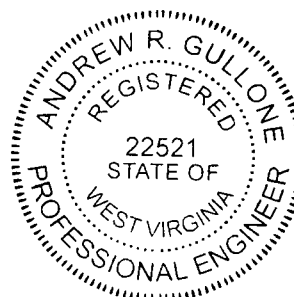
Please contact us at 412-429-2324 if you have any questions.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Andrew Celender
Assistant Project Manager

Andrew R. Gullone, P.E., CPESC, CFM
Project Manager





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**

118 East Court Street

West Union, WV 26456

LETTER OF TRANSMITTAL

DATE: **9/8/17**

Project No

130-359

ATTENTION: **George Eidel**

RE: **Smithburg Natural Gas Processing
Plant Floodplain Permit**

WE ARE SENDING YOU

ATTACHED

SEPARATE COVER

VIA

FedEx Priority

THE FOLLOWING ITEMS:

SHOP DWGS

PRINTS

PLANS

SAMPLES

SPECIFICATIONS

COPY OF LETTER

CHANGE ORDER

REPORT

COPIES	DATE	NUMBER	DESCRIPTION
2	9/8/17		Cover Letter
2	9/8/17		Floodplain Development Permit Application
1	8/29/17	1006	Application Fee
2	7/15/13		Deed
2	9/8/17		Tax Parcel Map
2	9/8/17		Floodplain Site Plan
2	9/8/17		Hydrologic and Hydraulic Analysis of Middle Island Creek, Meathouse Fork & Buckeye Creek

WE ARE SENDING YOU

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

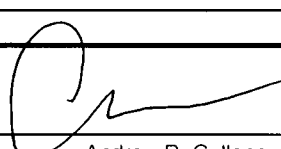
REMARKS

George,

Attached is the floodplain permit application for the Smithburg Natural Gas Processing Plant. Please review and let me know if you need any additional information. Thank you,

COPY TO: Green File

SIGNED: _____


Andrew R. Gullone, P.E., CPESC, CFM



Permit#	17-485
Project Name:	Smithburg Natural Gas Processing Plant
Permittees Name:	Sherwood Midstream LLC

SEP12 17 2:21PM

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. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
7. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
8. I THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE _____

DATE _____


9/8/17

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: Richard.lowry@markwest.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: Richard.lowry@markwest.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVELOPMENT ACTIVITIES:

- 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
- Other (please specify)

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?		Is the development in the floodplain?	
<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No Zone: _____	
Notes:			

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property 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? <input type="checkbox"/> Yes <input type="checkbox"/> No		Is the development in the floodplain? <input type="checkbox"/> Yes <input type="checkbox"/> No Zone: _____	
Notes:			

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

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: <u> 1 </u> of <u> 2 </u>
--

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: <u> 2 </u> of <u> 2 </u>
--

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

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

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

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

Property Designation: 1 of 1

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

Engineer Firm Information:		
Engineer Firm Name: Civil & Environmental Consultants, Inc.		
Engineer WV License Number: 17441		
Engineer Firm FEIN: 25-1599565	Engineer Firm DUNS: 36-160-9878	
Engineer Firm Primary Point of Contact (POC): Andrew R. Gullone, P.E., CPESC, CFM		
Engineer Firm Primary POC Title: Project Manager		
Engineer Firm Mailing Address: 333 Baldwin Road		
City: Pittsburgh	State: PA	Zip-Code: 15205
Engineer Firm Office Phone: (412) 429-2324		
Engineer Firm Primary POC Phone: (412) 249-3179		
Engineer Firm Primary POC E-Mail: agullone@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 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 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): 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 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 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:

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 been properly attained, are current and valid, and must be presented with this application before a Doddridge County Floodplain Permit may be 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 or 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 at the next scheduled Doddridge County Commission meeting after the date of issuance. 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. A Certificate of Compliance is required upon substantial completion of the project.**
- 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: _____

Applicant Printed Name: _____

Rick Lowrey

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

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

- A N D -

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

WITNESSETH, that in consideration of [REDACTED] Dollars [REDACTED] 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 1/2 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 3/4 poles to a stone; South 2 1/2 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 3/4 degrees East, 29 3/4 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 1/2 poles to a maple; South 79 7/8 degrees East, 24 1/2 poles to a stone; North 62 degrees East, 9 3/4 poles to a white oak; South 66 1/4 degrees East, 35.5 poles to a locust, South 70 1/2 degrees East, 11.5 poles to a sugar; South 81 1/2 degrees East, 16.1 poles to a locust; South 88 3/4 degrees East, 17.4 poles to a chestnut oak; North 69 1/2 degrees East, 7.4 poles to a white oak; South 32 degrees East, 45 1/4 poles to a stone; south 84 1/2 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 1/4 poles to a stone; South 60 degrees West, 37 poles to a stone; south 88 1/4

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 Map 16, Parcel 15
Tax Ticket Number: 27559

DECLARATION OF RESIDENT STATUS

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

DECLARATION OF CONSIDERATION OR VALUE

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

AND the said grantors hereby covenant and agree that they will warrant **SPECIALLY** the property hereby conveyed.

In Witness Whereof, the parties of the first part have hereunto set their hands and seals. Dated the day and year first above written.

Sealed and Delibered
IN THE PRESENCE OF US:

Clara Babb

Gene P. Moose {SEAL}
GENE P. MOOSE

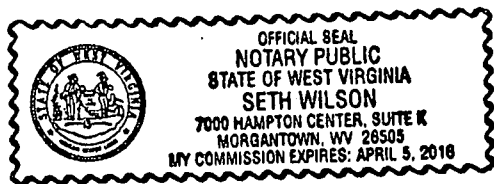
Clara Babb

Linda G. Moose {SEAL}
LINDA G. MOOSE

State of West Virginia :
County of Monongalia : ss

On this the 15th day of July, 2013, before me, a Notary Public for the State of West Virginia, the undersigned Officer, personally appeared **GENE P. MOOSE** and **LINDA G. MOOSE**, known to me (or satisfactorily proven) to be the persons whose names are subscribed to the within instrument, and acknowledged that they executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.



Seth Wilson
Notary Public
My commission expires 4/5/2018

The address of the above-named Grantee is:
1515 ARAPAHOE STREET, TOWER 1
SUITE 1600
DENVER, CO. 80202

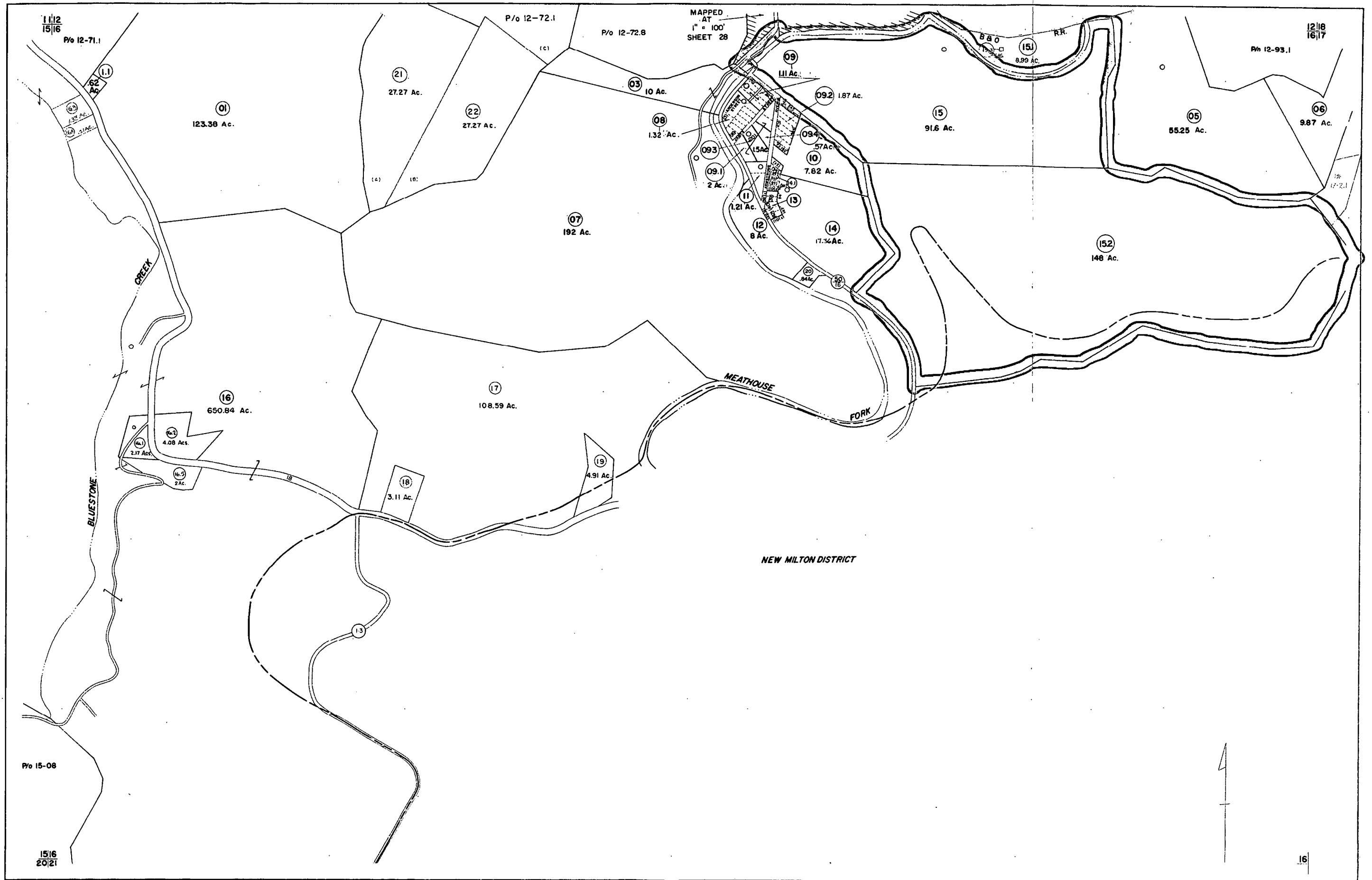
Seth Wilson
On behalf of the Grantees

File No. **A-1764**

Prepared by Adams Abstract Associates, Inc., 69
Gettysburg, PA 17325

Beth A Rogers
DODDRIDGE County 08:39:10 AM
Instrument No 180085
Date Recorded 07/19/2013
Document Type DEED
Pages Recorded 4
East Middle St
BOOK-Page 310-243
Recording Fee \$11.00
Transfer Tax \$7,480.00
Additional \$25.00

HOWELS RICE McDAVID GRAFF & LOVE LLP
7000 HAMPTON CENTER
MORGANTOWN, WV 26505-1720



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 parenthesis
Corporation line	Parcel or index number in circle
District line	Improvement
County line	Railroad

Revisions	
1 REVISED 3/1/84	2 Revised to 7-1-58
3 1-20-72	4 OGIS 1-18-91 JB
5 8-30-76 BAH	6 OGIS 11-93 RD
7 12-17-76	8 SLS INC. 3/13/00 JAW
9 4-1-80	10 ESI 3/29/01 BEK
11 REVISED 7-81 T. Gross	12 2/27/04 SBH
13 3.6.184	14 1/21

STATE OF WEST VIRGINIA
 DODDRIDGE COUNTY
 Office of Assessor

WEST UNION DISTRICT
 SHEET 16

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

Council Member Sinnett - aye, Council Member Davisson - aye, Council Member Plaughter - aye, Mayor Samples - aye, Council Member Golden - aye, Council Member Luzader - aye, Council Member Samples - aye.

City Manager Ronnie Davis informed Council Members that he was able to get a quote for dirt for the Mill Street playground.

City Manager Ronnie Davis informed Council Members that a primary survey was recently completed on the water system. The water system received two significant and 5 moderate defaults. Mr. Davis stated that the main concern is that the Nicholson Tank has outlived its useful life and that there is no fence around the tank and no road to get to the tank. The City originally had 120' to correct the problem but an extension until July 1, 2018 has been granted. The City has applied for a Phase III Water System Improvement Project Grant that will cover the cost of a new water tank at a different location. It will be imperative that an alternative funding solution be discussed if the City does not receive the grant this year. Mr. Davis stressed that the City could receive a fine if this is not effected.

Clerk's Report:

Clerk Kayla Nicholas presented Council Members with the financial summary. The Water Fund revenue for the month is approximately \$118,000 year to date. The Water Fund revenue for the month is approximately \$35,000 and \$167,000 year to date. The General Fund revenue for the month are approximately \$7,000 and \$300,000. The Outstanding Checks are approximately \$10,000. The Liability Forecast is approximately \$30,000. The General expenditures for this month are approximately \$45,000 and \$242,000 year to date. The Water Fund expenditures for this month are approximately \$136,000 year to date. The Water Fund expenditures for the year are approximately \$27,000 and \$7,000 year to date.

Report

Chief Eric Flevaris reported for the month of July the Police Department conducted 270 hours of 92 traffic stops and issued the following citations: 14 speeding; 4 no obey stop sign; 3 no insurance/expired MVI; 1 no seatbelt; 1 improper backing; 1 change address; 1 indecent exposure; 2 shoplifting; 1 trespassing; 1 marijuana/pills/meth; 3 expired registration; and 2 suspended. Thirty five writ-

HOPE, Inc. held a ribbon-cutting ceremony

On September 13th, HOPE, Inc. held a ribbon-cutting ceremony for our new shelter facility. Hope, Inc. is a non-profit United Way Agency, licensed by the WV Family Protection Services Board, which provides shelter and outreach services to victims of domestic violence and sexual assault and their families in Marion, Harrison, Lewis, Doddridge, and Gilmer Counties. The shelter, located in Marion County, was generously donated by a local religious organization and has been in operation since 1980. Their kindness has allowed thousands of victims to find safety and support.

Over the past decade, the Board of Directors and staff of HOPE, Inc. have worked to obtain a new facility for the victims who need our services and support. In 2007, HOPE, Inc. submitted the final application for acquisition of the 1st Lt. Harry B. Colburn Army Reserve Center. A public hearing was held in December 2007. After the conclusion of this hearing, the Fairmont Planning Commission made their official recommendation to the Department of Defense that HOPE, Inc. receive the property. In April 2009, HOPE entered into a legally binding agreement with the Fairmont Planning Commission for the Reserve Center. Environmental and contractual issues kept the process from being finalized until June 2015, when the property was deeded to HOPE, Inc. Renovations began in 2015. Phase One included all living quarters, kitchen, and baths for residents, and was completed in the Fall of 2016. Phase Two, which is the staff offices and storage, began in April of 2017 and has just been completed.

We hope to be moved into our new shelter facility by the end of 2017.

Floodplain Public Notice • Legal Notice

Please take notice that on the 12th day of September, 2017, Sherwood Midstream LLC filed an application for a Floodplain Permit (#17-485) to develop land located at or about Armstrong Ave. Coordinates 39.283720 N, -80.732358 W. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by October 9, 2017 (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. This project is for the Smithburg Natural Gas Processing Facility C2 9/15 - 9/22

Floodplain Public Notice • Legal Notice

Please take notice that on the 12th day of September, 2017, F2S Infrastructure Inc. filed an application for a Floodplain Permit (#17-484) to develop land located at or about Douglas Camp Run @ Route 18S Coordinates 39.261103 N, -80.719880 W. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by October 9, 2017 (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. This project is road improvement project (Replacement of a culvert pipe to a larger diameter, clearing of ditches and widening of the road. C2 9/15 - 9/22

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On July 13, 2017, Antero Midstream LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to modify a natural gas compressor facility located off of Long Run Road, West Union, Doddridge County, WV at latitude 39.32610 and longitude -80.84273. A preliminary evaluation has determined that all State and Federal air quality requirements will be met by the proposed facility. The DAQ is providing notice to the public of its preliminary determination to issue the permit as R13-3216B.

The following increase in potential emissions will be authorized by this permit action: Volatile Organic Compounds, 24.49 tons per year (TPY); Total Hazardous Air Pollutants, 0.01 TPY; Carbon Dioxide Equivalents, 1,715 TPY.

The following decrease in potential emissions will be authorized by this permit action: Nitrogen Oxides, 0.11 TPY; Carbon Monoxide, 0.09 TPY; Particulate Matter less than 10 microns, 0.01 TPY.

Written comments or requests for a public meeting must be received by September 22, 2017.

Doddridge Co. Lion's Club Needs

The building that we are in is leased from the thru 2023, it is in desperate need of a new roof taking bids with the range of \$10,000-\$15,000. We need additional resources and so do we. Any donations for materials or business would greatly be appreciated.

You can donate at the West Union Bank or to the Community Building Fund. The account at the bank is under, Doddridge County Community Building Fund. Thank you for your support!

Legal Advertisement

REQUEST FOR PROPOSAL for concrete sidewalks and County High School Softball field. Closing Date: September 26, 2017. Doddridge County Schools is seeking qualified contractors to construct concrete pathways at the Doddridge County High School Softball field. The following work: Prepare area marked and provide appropriate concrete sidewalks. All construction shall be complete in accordance with the specifications of Doddridge County Schools and shall include welded wire mesh reinforcement. The respondent shall obtain and provide all permits needed for proposed work. Contract for work with Doddridge County Schools. c. Provide adequate insurance per the requirements of this Request. d. Provide all equipment and supplies. e. Contractor shall comply with all State statutes and regulations as well as local ordinances received by the Doddridge County Schools, 1117 WV RT 18 later than 2:00 p.m., local time, on September 26, 2017. Proposals will not be considered. The full Request For Proposal can be obtained from the Doddridge County Board of Education Central Office at 1117 WV RT 18, West Union, WV. For more information and to view the site contact Jeff H. Hester, 873-2300. The Doddridge County Board of Education reserves the right to accept or reject all bids received, and to make a contract award for the best value in the manner deemed by it, in its sole discretion, to be in the best interest of Doddridge County Schools and in accordance with the intent of West Virginia Code.

Legal Notice • Legal Advertisement

STATE OF WEST VIRGINIA,
 COUNTY OF DODDRIDGE, TO-WIT:
 We, the undersigned Ballot Commissioners for said County announce and certify that the foregoing is a SAMPLE BALLOT of the Constitutional Amendment 1: "Roads to Prosperity Amendment of 2017" prepared from the Secretary of States Office, as provided by law, to be held on October 7, 2017.

Given under our hands this 11th day of September, 2017.



Resh G. Rogers
Donna B. Allen
Quinn McAfee
 Board of Ballot Commissioners
 Of Doddridge County, WV

OFFICIAL BALLOT - SPECIAL ELECTION
Ballot on Constitutional Amendment
Doddridge County
State of West Virginia

associated Press
t. (AP) — Three inmates who were
der as teenagers decades ago have
ed their pleas for freedom under
aw that allows parole for juveniles
ous crimes.

oard rejected bids by William E.
e T. Redman and Larry D. Hall II
hearings Wednesday at St. Marys
ter.

er board told each prisoner in brief
d that it wasn't ready to let them go.
eduled their next hearings in Sep-

ring came three years after they
ial bids for release following the
he law. The state parole board ap-
retroactively and singled out sev-
n murder cases, including Wayne,

acted two years after the U.S. Su-
112 banned mandatory life without
es convicted of murder. Last year,
ruling was retroactive for the more
ers serving such sentences nation-

dman were 17 when their crimes

lren and another one on the way in
sentenced to life without parole in
f a man in a confrontation at Hall's
arty in Taylor County. Hall's attor-
t was under the influence of alco-
d LSD at the time.

a 2011 car accident that paralyzed
r was the low point of his life.

has changed my outlook," Hall
w to myself then, I've got to do ev-
win freedom.

tears and closed his eyes as he lis-
the board from his father, Larry.
the elder Hall said he was shocked
ision.

new law. They need to start honor-
der Hall said.

convicted for the September 1984
ley County shopkeeper for \$104 in

ack to a family that I lost," Redman
ve done everything I can do here."

een in prison for 42 years and now
no hope at all" before the state law

ore than a dozen prisoners who
old state penitentiary in Mounds-
in an off-duty state trooper was
reakout.

breakout, Wayne had been serv-
without parole for killing a shop-
ounty during a 1975 robbery. He
ence with the chance for parole in
h.

es convicted for murders commit-
e scheduled for hearings later this

convicted of the December 1979
a County woman and her two

DODDRIDGE COUNTY COMMISSION

108 COURT STREET, SUITE 1
WEST UNION, WV 26456

AGENDA

Tuesday, Sept. 19, 2017, 6 pm
Doddridge County Courthouse

1. Prayer
2. Pledge of Allegiance
3. Call to Order
Gregory L. Robinson, President
Ronnie L. Travis, Commissioner
Shawn Glaspell, Commissioner
Beth A. Rogers, County Clerk
Randeel Britton, Administrative Assistant
4. Approval of previous meeting minutes
5. Public Comments
6. New Business
 - A) DCAA - Restructuring the Organizational Structure
 - B. DCAA- Approve Revisions to Personnel Handbook
 - C) Thrasher- Review and Approve Change Order for Additional Construction Repairs
 - D) Approve Mark Younkin to fill position vacated by Joe Thorpe as Representative for Town of West Union on Planning Commblsion
 - E) Approve Amberly Taylor to fill position vacated by Joe Thorpe as Representative for Town of West Union on the DCEDA Board of Directors
 - F) Clinton Means - Solid Waste Authority
 - G) Wayne Dunn - Consolidation of Land
 - H) Approve Juvenile Justice and Delinquency Prevention Grant
 - I) DC Park- Playground Replacement Funding Request
 - J) DC Park- Full time Hire Recommendation
- 7 Floodplain Permits
 - a. F2S Infrastructure Inc. #17 ... 484 Douglas Camp Run @Rt.18S 39.261103N -80.719880W
 - b. Sherwood Midstream LLC #17-48S Armstrong Ave., 39.283720N, - 80.732358W
7. OES Report
8. DCAA Report
9. Clerk of Courts Report
10. Budget Revisions if applicable
11. Exonerations if applicable
12. Probate Orders approved if applicable
13. Adjournment
(Copies of Agenda are available in the County Clerk's Office)

Thierstein to be Inaugurated at Homecoming as Wesleyan's Nineteenth President

SHOP 'n SAVE EXPRESS

Steak Fry!

Friday, September 22nd
Starting at 11AM until they are all gone!

Only \$6.00

Meal includes Steak, Baked Potato, Corn, Roll and a Drink

We appreciate our customers!

So, come & enjoy a steak with us!

Floodplain Public Notice • Legal Notice

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Floodplain Public Notice • Legal Notice

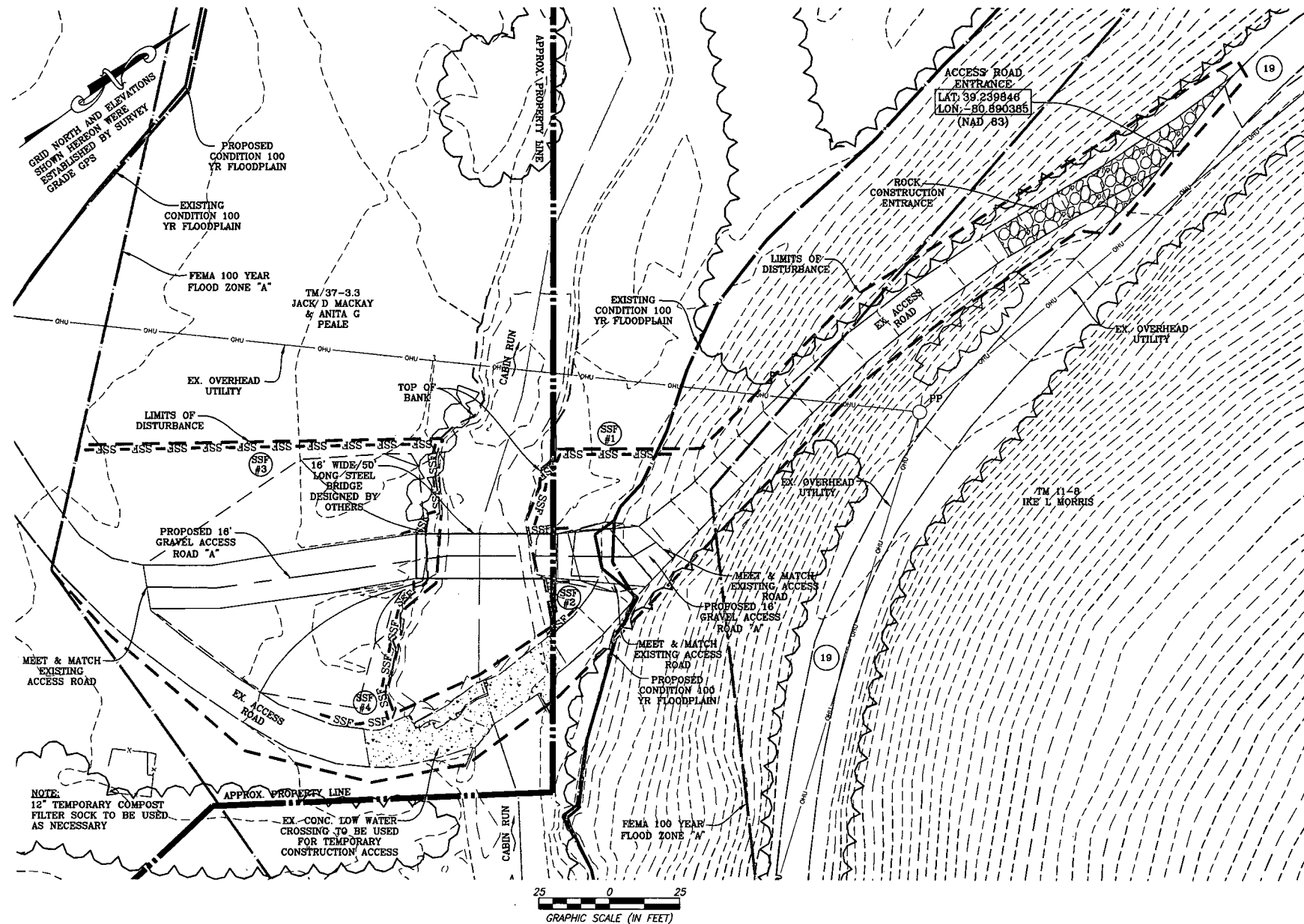
Please take notice that on the 12th day of September, 2017, Sherwood Midstream LLC filed an application for a Floodplain Permit (#17-485) to develop land located at or about Armstrong Ave. Coordinates 39.283720 N, -80.732358 W. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by October 9, 2017 (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. This project is for the Smithburg Natural Gas Processing Facility C2 9/15-9/22

Legal Notice • Legal Notice

STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO-WIT:
We, the undersigned Ballot Commissioners for said County and State, do hereby certify that the foregoing is a SAMPLE BALLOT, of the Constitutional Amendment No. 1: "Roads to Prosperity Amendment of 2017" prepared from the Order of the WV SECRETARY OF STATES OFFICE, as provided by law, to be held on Saturday, October 7, 2017.

Sept. 15, 2017
Edition

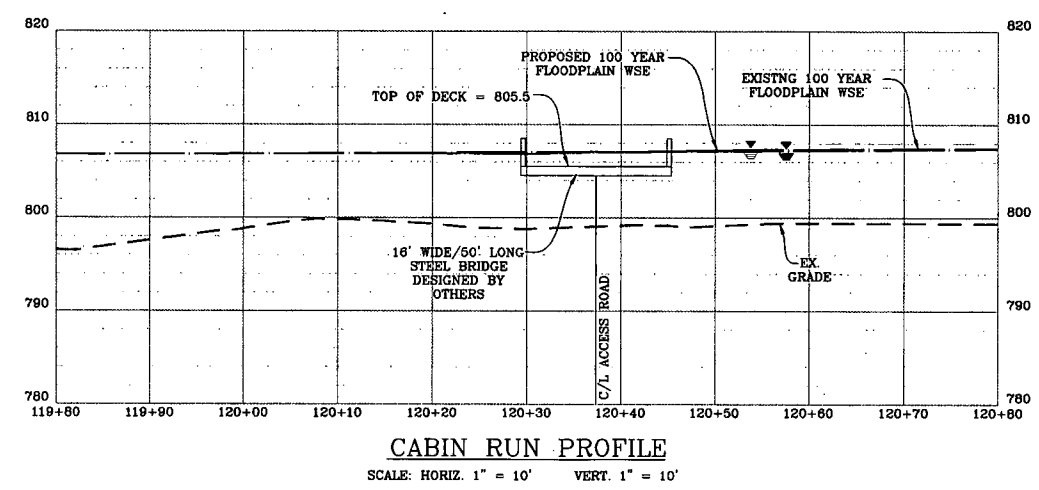
BRIDGE PLAN VIEW



GENERAL NOTES:

1. THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON APRIL 4, 2016 AERIAL PHOTOGRAPHY COMPILED DECEMBER, 2017 BY BLUE MOUNTAIN AERIAL MAPPING, BURTON, WEST VIRGINIA.
2. PROPERTY LINE INFORMATION SHOWN IS PRELIMINARY. BOUNDARY INFORMATION IS CURRENTLY BEING PREPARED.
3. UTILITIES AND THEIR LOCATIONS AS SHOWN HEREON ARE BASED ON: A) OBSERVABLE EVIDENCE OF THOSE VISIBLE, ABOVE-GROUND FACILITIES, FEATURES, AND MARKERS WHICH WERE FOUND ON THE SUBJECT PROPERTY AT THE TIME OF SURVEY PERFORMED BY NAVITUS ENGINEERING AND B) FIELD MARKINGS PLACED BY UTILITY COMPANIES IN RESPONSE TO THE WV 811 TICKET SUBMITTED BY NAVITUS ENGINEERING. NAVITUS ENGINEERING CANNOT GUARANTEE THE ACCURACY OF THE UTILITY MARKINGS PERFORMED BY OTHERS OR THAT ALL UTILITIES EXISTING WITHIN THE LIMITS OF THIS PLAN ARE SHOWN. ANY UTILITIES ENCOUNTERED SUBSEQUENT TO PLAN APPROVAL OR DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE PLAN SHOULD BE REPORTED TO NAVITUS ENGINEERING AND ANTERO RESOURCES CORPORATION.

Description	MACKAY BRIDGE					Length of Slope (FT)
	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	
Access Road "A"	38.6	38.3	0.0	1.7	11.6	35.0
Totals	36.6	38.3	0.0	1.7	n/a	n/a
	Total Spoil (CY) =			-1.7		



CABIN RUN PROFILE
SCALE: HORIZ. 1" = 10' VERT. 1" = 10'

GENERAL STREAM CROSSING NOTES:

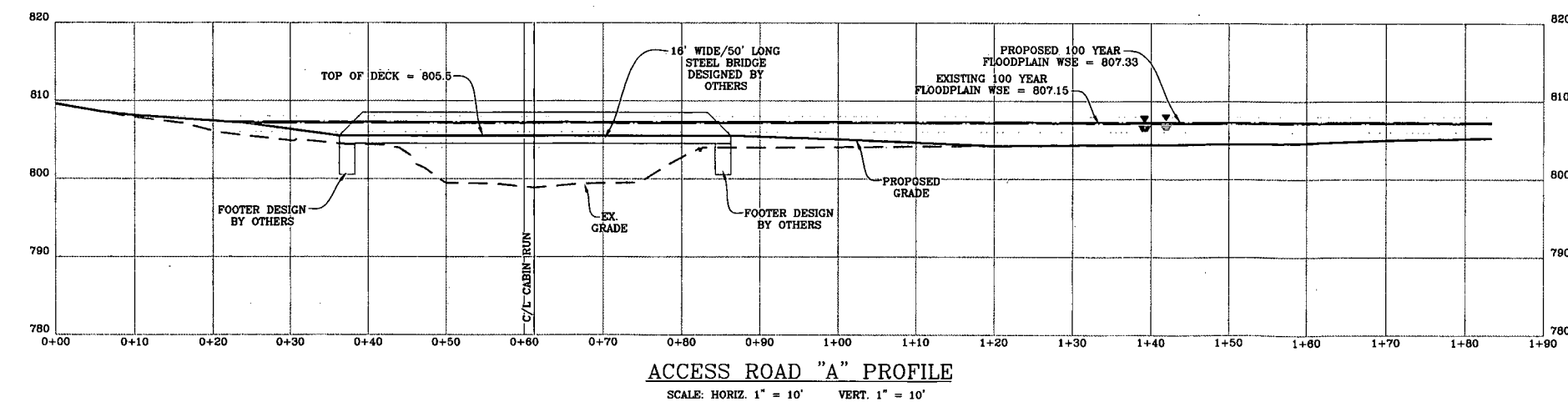
- 1) DO NOT USE ERODIBLE MATERIAL FOR CONSTRUCTION OF THE CROSSING.
- 2) CLEARING AND EXCAVATION OF THE STREAMBED AND BANKS SHALL BE KEPT TO A MINIMUM.
- 3) A WATER DIVERTING SWALE OR PUMP AROUND SYSTEM SHALL BE CONSTRUCTED ACROSS THE ROADWAY ON EITHER SIDE OF THE STREAM CROSSING AS DIRECTED.
- 4) APPROPRIATE PERIMETER CONTROLS SUCH AS COMPOST FILTER SOCK, SUPER SILT FENCE AND/OR SEDIMENT TRAPS SHALL BE EMPLOYED ALONG THE BANKS AND PARALLEL TO THE STREAMBED.
- 5) ABUTMENTS ON THE UPSTREAM AND DOWNSTREAM SIDE OF THE CULVERT INSTALLATION SHALL BE INSTALLED TO REDUCE STRUCTURAL DAMAGE DURING HIGH VELOCITY WATER OVERFLOW PERIODS.
- 6) STREAMBED MATERIAL IS NOT TO BE USED AS FILL.
- 7) GREEN CONCRETE SHALL NOT BE PLACED IN CONTACT WITH FLOWING WATER.
- 8) DURING ROUTINE MAINTENANCE DO NOT GRADE MUD AND DEBRIS OVER THE SIDES OF THE CROSSING INTO THE STREAM.
- 9) THE CROSSING MUST BE INSPECTED AFTER EVERY RAIN EVENT OF 0.5 INCHES OR MORE AND ONCE A WEEK TO ENSURE THAT THE CULVERTS, STREAMBED, AND STREAM BANKS ARE MAINTAINED AND NOT DAMAGED. NEVER ALLOW THE CULVERTS TO BECOME CLOGGED WITH DEBRIS AND REMOVE ANY OBSTRUCTIONS IMMEDIATELY.

PUMP AROUND NOTES:

- 1) CONSTRUCTION SHOULD BE PERFORMED DURING LOW FLOW PERIODS.
- 2) PUMP(S) SHOULD BE SUFFICIENTLY LARGE TO PUMP THE ENTIRE STREAM FLOW AROUND THE SITE.
- 3) THE COFFERDAM CONSTRUCTED MUST BE IMPERVIOUS TO WATER.
- 4) THE INLET OF THE PUMP(S) IS TO BE SUSPENDED ABOVE THE STREAMBED IN ORDER TO PREVENT SUCKING MUD AND SEDIMENT.
- 5) THE DISCHARGE POINT MUST BE STABILIZED WITH ROCK TO DISPERSE THE ENERGY AND PREVENT EROSION.

NOTES:

- 1) ANTERO RESOURCES SHALL OBTAIN A STREAM ACTIVITY PERMIT THROUGH THE PUBLIC LAND CORPORATION OFFICE OF LAND AND STREAMS FOR STREAM CROSSING.
- 2) E&S CONTROLS TO BE FIELD ADJUSTED DURING CONSTRUCTION AS NECESSARY. ADDITIONAL E&S CONTROLS MAY BE REQUIRED.



ACCESS ROAD "A" PROFILE
SCALE: HORIZ. 1" = 10' VERT. 1" = 10'

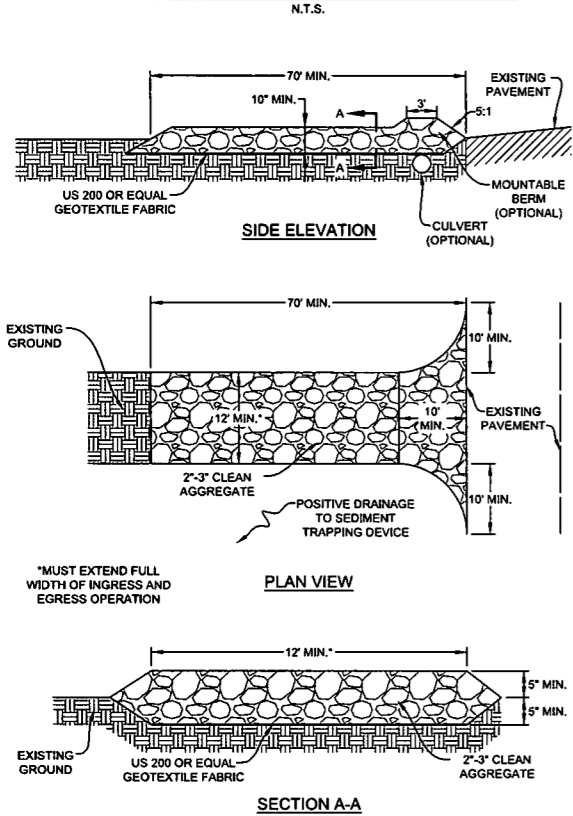
REVISION
DATE



PLAN VIEW & PROFILES
MACKAY BRIDGE
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

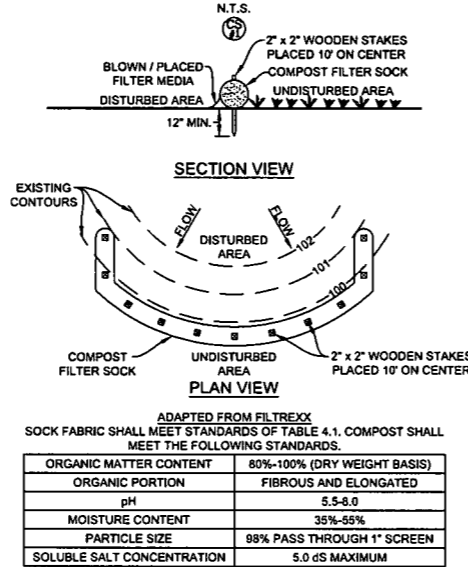


ROCK CONSTRUCTION ENTRANCE



(MODIFIED) SOURCE: ADAPTED FROM THE 1983 MARYLAND STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL AND VA. DSWC.

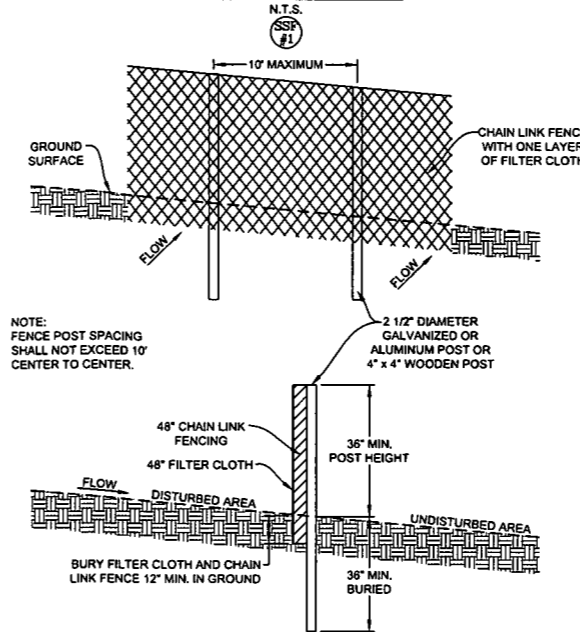
COMPOST FILTER SOCK



- NOTES:
- COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8' UP THE SLOPE OR TO A HEIGHT EQUAL TO THE EFFECTIVE SOCK HEIGHT, WHICHEVER IS GREATER, AT 45° TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED MANUFACTURER'S MAXIMUM PERMISSIBLE SLOPE LENGTH.
 - TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
 - ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
 - SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
 - BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 8 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
 - UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.
 - IN THE EVENT THE GROUND IS FROZEN, REBAR WITH SAFETY CAPS SHALL BE USED INSTEAD OF WOODEN STAKES TO ANCHOR THE FILTER SOCK. ONCE THE GROUND THAWS, THE REBAR ANCHORS SHALL BE REMOVED AND REPLACED WITH 2" x 2" WOODEN STAKES AND INSTALLED AS SHOWN IN THE DETAIL ABOVE.

(MODIFIED) SOURCE: WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

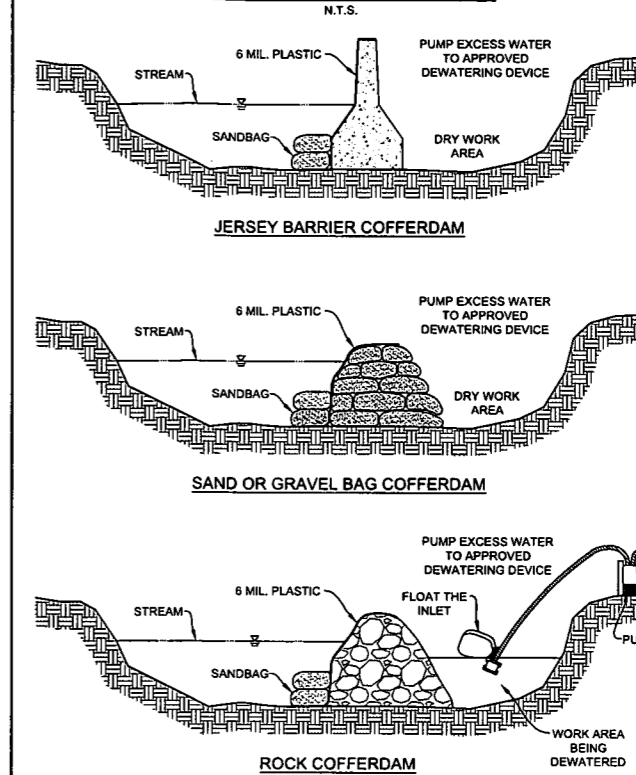
SUPER SILT FENCE



- NOTES:
- SUPER SILT FENCE IS A TEMPORARY BARRIER OF GEOTEXTILE FABRIC OVER CHAIN LINK FENCE.
 - SUPER SILT FENCE SHOULD BE PLACED AS CLOSE TO THE CONTOUR AS POSSIBLE.
 - ENDS SHALL BE EXTENDED UP HILL A MINIMUM OF 2 VERTICAL FEET.
 - CHAIN LINK FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES OR STAPLES. GEOTEXTILE FABRIC SHALL BE FASTENED SECURELY TO THE CHAIN LINK FENCE WITH TIES SPACED EVERY 24" AT THE TOP AND MID-SECTIONS.
 - GEOTEXTILE FABRIC AND CHAIN LINK FENCE SHALL BE EMBEDDED A MINIMUM OF 12" INTO THE GROUND. WHEN 2 SECTIONS OF GEOTEXTILE FABRIC ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6" AND FOLDED.
 - METAL POSTS AS SPECIFIED BY WV DOT CAN BE REPLACED BY PRESSURE-TREATED 4" x 4" POSTS.
 - SUPER SILT FENCE SHOULD BE INSPECTED AT A MINIMUM ONCE EVERY 7 CALENDAR DAYS OR WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCHES OF RAIN PER 24 HOUR PERIOD. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

(MODIFIED) SOURCE: WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

COFFERDAM (ALL MAJOR CROSSINGS)



(MODIFIED) SOURCE: WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS (TABLE 4.1)

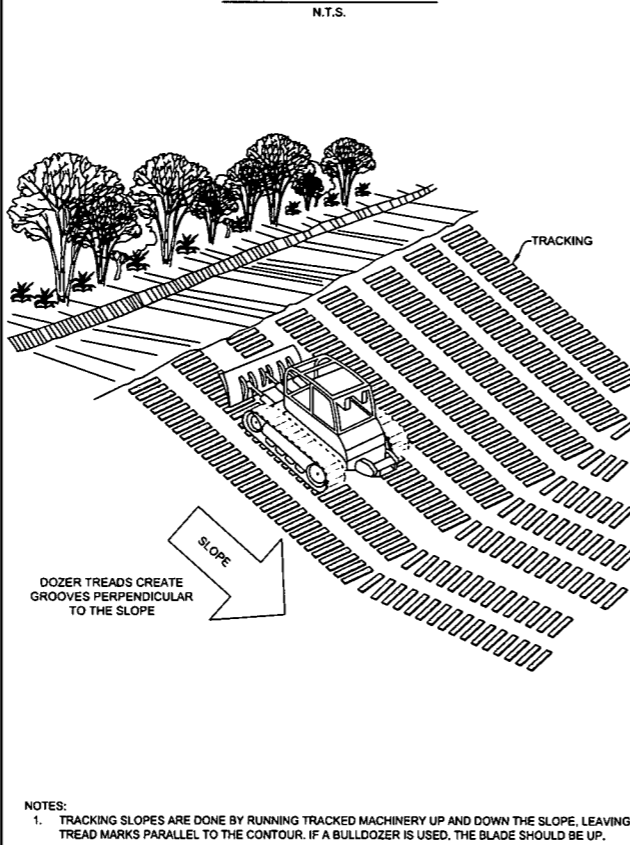
MATERIAL TYPE	3 MIL. HDPE	5 MIL. HDPE	5 MIL. HDPE	MULTI-FILAMENT POLYPROPYLENE (MPPP)	HEAVY DUTY MULTI-FILAMENT POLYPROPYLENE (HDMPPP)
MATERIAL CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	1/8"
TEXTILE STRENGTH		26 PSI	26 PSI	44 PSI	202 PSI
ULTRAVIOLET STABILITY % ORIGINAL STRENGTH (ASTM G-155)	23% AT 1000 HR.	23% AT 1000 HR.		100% AT 1000 HR.	100% AT 1000 HR.
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS

TWO-PLY SYSTEMS

INNER CONTAINMENT NETTING	HDPE BIAXIAL NET CONTINUOUSLY WOUND FUSION-WELDED JUNCTURES
	3/4" x 3/4" MAX. APERTURE SIZE
OUTER FILTRATION MESH	COMPOSITE POLYPROPYLENE FABRIC (WOVEN LAYER & NON-WOVEN FLEECE MECHANICALLY FUSED VIA NEEDLE PUNCH)
	3/16" MAX. APERTURE SIZE

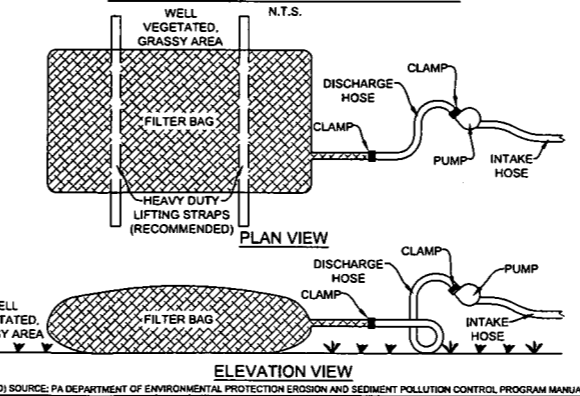
SOCK FABRICS COMPOSED OF BURLAP MAY BE USED ON PROJECTS LASTING 6 MONTHS OR LESS.

SLOPE TRACKING



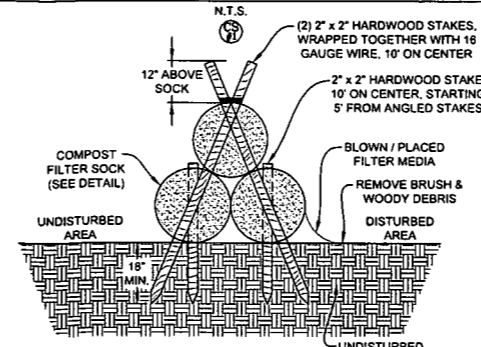
(MODIFIED) SOURCE: WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

PUMPED WATER FILTER BAG



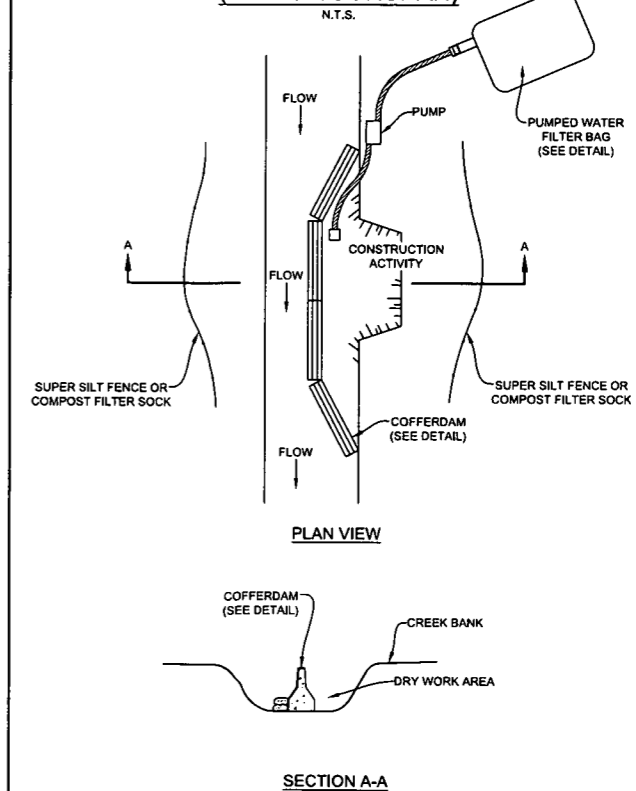
(MODIFIED) SOURCE: PA DEPARTMENT OF ENVIRONMENTAL PROTECTION EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL.

PYRAMID COMPOST FILTER SOCK DETAIL



- NOTES:
1. HARDWOOD STAKE LENGTH VARIES IN ACCORDANCE WITH COMPOST FILTER SOCK SIZE.

COFFERDAM CROSSING (BRIDGE/CONSPAN)



(MODIFIED) SOURCE: WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

REVEGETATION
 TAKEN FROM THE
 WEST VIRGINIA EROSION AND SEDIMENT CONTROL FIELD MANUAL
 WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS
 CHARLESTON, W.VA.
 SECTION IV

TEMPORARY SEEDING:

- a. GENERAL CONDITIONS WHERE PRACTICE APPLIES
 WHERE EXPOSED SOIL SURFACES ARE NOT TO BE FINE-GRADED OR WORKED FOR PERIODS LONGER THAN 21 DAYS. TEMPORARY VEGETATIVE COVER WITH SEDIMENT CONTROLS MUST BE ESTABLISHED WHERE RUNOFF WILL GO DIRECTLY INTO A STREAM. IMMEDIATELY UPON CONSTRUCTION OF THE SITE (SITE INCLUDES ROAD AND LOCATION). VEGETATION MUST BE ESTABLISHED ON ROAD BANK AND LOCATION SLOPES. A PERMANENT VEGETATIVE COVER SHALL BE APPLIED TO AREAS THAT WILL BE LEFT UNWORKED FOR A PERIOD OF MORE THAN SIX MONTHS.
- b. SEED MIXTURES AND PLANTING DATES
 REFER TO TABLES IV-2 THROUGH IV-4 FOR RECOMMENDED DATES TO ESTABLISH VEGETATIVE COVER AND THE APPROVED LISTS OF TEMPORARY AND PERMANENT PLANT SPECIES AND PLANTING RATES. TABLE IV-3 GIVES RECOMMENDED TYPES OF TEMPORARY VEGETATION, RATES OF APPLICATION, AND OPTIMUM SEEDING DATES. IN SITUATIONS WHERE ANOTHER COVER IS DESIRED, CONTACT THE LOCAL SOIL CONSERVATION DISTRICT FOR SEEDING RECOMMENDATIONS.
- c. SEED APPLICATION
 APPLY SEED BY BROADCASTING, DRILLING, OR BY HYDROSEED ACCORDING TO THE RATES INDICATED IN TABLE IV-3. PERFORM ALL PLANTING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. NECESSARY SITE PREPARATION AND ROUGHENING OF THE SOIL SURFACE SHOULD BE DONE JUST PRIOR TO SEEDING. SEEDBED PREPARATION MAY NOT BE REQUIRED ON NEWLY DISTURBED AREAS.

PERMANENT SEEDING:

- a. GENERAL
 PERMANENT VEGETATIVE COVER WILL BE ESTABLISHED WHERE NO FURTHER SOIL DISTURBANCE IS ANTICIPATED OR NEEDED. SOIL FERTILITY AND PH LEVEL SHOULD BE TESTED AND ADJUSTED ACCORDING TO SEED SPECIES PLANTED. PLANTING OF PERMANENT VEGETATIVE COVERS MUST BE PERFORMED ON ALL DISTURBED AREAS AFTER COMPLETION OF THE DRILLING PROCESS. ANY SITE THAT CONTAINS SIGNIFICANT AMOUNTS OF TOPSOIL SHALL HAVE THE TOPSOIL REMOVED AND STOCKPILED WHEN FEASIBLE. TOPSOIL SHOULD NOT BE ADDED TO SLOPES STEEPER THAN 2:1 UNLESS A GOOD BONDING TO THE SUB-LAYER CAN BE ACHIEVED. AFTER PROPER GRADING AND SEEDBED PREPARATION, THE VEGETATION WILL REESTABLISH GROUND COVER FOR THE CONTROL OF SURFACE WATER RUNOFF EROSION. ALL REQUIRED SEEDBED PREPARATION AND LOOSENING OF SOIL BY DISKING OR DOZER TRACKING SHOULD BE PERFORMED JUST PRIOR TO SEEDING. IF SEEDBED PREPARATION IS NOT FEASIBLE, 50% MORE SEED SHALL BE ADDED TO THE RECOMMENDED RATES SHOWN IN TABLES IV-3 AND IV-4. WHEN HYDROSEEDING, SEEDBED PREPARATION MAY NOT BE NECESSARY IF ADEQUATE SITE PREPARATION WAS PERFORMED. INCORPORATE THE APPROPRIATE AMOUNT OF LIME AND/OR FERTILIZER IN THE SLURRY MIX WHEN HYDROSEEDING. WHEN HYDROSEEDING, FIRST MIX THE LIME, FERTILIZER, AND HYDRO-MULCH IN THE RECOMMENDED AMOUNT OF WATER. MIX THE SEED AND INOCULANTS TOGETHER WITHIN ONE HOUR PRIOR TO PLANTING, AND ADD TO THE SLURRY JUST BEFORE SEEDING. APPLY THE SLURRY UNIFORMLY OVER THE PREPARED SITE. ASSURE THAT AGITATION IS CONTINUOUS THROUGHOUT THE SEEDING OPERATION AND THE MIX IS APPLIED WITHIN ONE HOUR OF INITIAL MIXING.
- b. LIME AND FERTILIZER
 1. LIME SHALL BE APPLIED TO ALL PERMANENT SEEDINGS. THE PH OF THE SOIL IS TO BE DETERMINED AND LIME APPLIED ACCORDINGLY. ONCE THE PH IS KNOWN, SELECT THE AMOUNT OF LIME TO BE APPLIED FROM TABLE IV-5.
 2. FERTILIZER SHALL BE APPLIED IN ALL PERMANENT SEEDINGS. APPLY THE EQUIVALENT FOR 500 LBS. MINIMUM 10-20-20 FERTILIZER PER ACRE OR USE THE AMOUNT OF FERTILIZER AND LIME RECOMMENDED BY A CERTIFIED SOIL TEST.
 3. APPLICATION: FOR BEST RESULTS AND MAXIMUM BENEFITS, THE LIME AND FERTILIZER ARE TO BE APPLIED AT THE TIME OF SEEDBED PREPARATION.
- c. PERMANENT SEED MIXTURES
 PLANNERS SHOULD TAKE INTO CONSIDERATION THE SPECIES MAKEUP OF THE EXISTING PASTURE AND THE LANDOWNER'S FUTURE PASTURE MANAGEMENT PLANS WHEN RECOMMENDING SEED MIXTURES. SELECTION: FROM TABLES IV-4A AND IV-4B. PERMANENT SEEDING MIXTURES SUITABLE FOR ESTABLISHMENT IN WEST VIRGINIA.
 NOTES:
 1. ALL LEGUMES MUST BE PLANTED WITH THE PROPER INOCULANTS PRIOR TO SEEDING.
 2. LATHCO FLATPEA IS POTENTIALLY POISONOUS TO SOME LIVESTOCK.
 3. ONLY ENDOPHYTE FREE VARIETIES OF TALL FESCUE SHOULD BE USED. TALL FESCUE AND CROWN VETCH ARE ALSO VERY INVASIVE SPECIES, NON-NATIVE TO WV.
 4. FOR UNPREPARED SEEDBEDS OR SEEDING OUTSIDE THE OPTIMUM TIMEFRAMES, ADD 50% MORE SEED TO THE SPECIFIED RATE. MIXTURES IN TABLE IV-4B ARE MORE WILDLIFE AND FARM FRIENDLY; THOSE LISTED IN BOLD ARE SUITABLE FOR USE IN SHADED WOODLAND SETTINGS. MIXTURES IN ITALIC ARE SUITABLE FOR USE IN FILTER STRIPS.
- d. SEEDING FOR WILDLIFE HABITAT
 CONSIDER THE USE OF THE NATIVE PLANTS OR LOCALLY ADAPTED PLANTS WHEN SELECTING COVER TYPES AND SPECIES FOR WILDLIFE HABITAT. WILDLIFE FRIENDLY SPECIES OR MIXES THAT HAVE MULTIPLE VALUES SHOULD BE CONSIDERED. SEE WILDLIFE FRIENDLY SPECIES/MIXTURES IN TABLE IV-4B. CONSIDER SELECTING NO OR LOW MAINTENANCE LONG-LIVED PLANTS ADAPTABLE TO SITES WHICH MAY BE DIFFICULT TO MAINTAIN WITH EQUIPMENT.

MULCHING

- a. GENERAL ORGANIC MULCHES
 THE APPLICATION OF STRAW, HAY, OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION. STRAW MADE FROM WHEAT OR OATS IS THE PREFERRED MULCH. THE USE OF HAY IS PERMISSIBLE, BUT NOT ENCOURAGED DUE TO THE RISK OF SPREADING INVASIVE SPECIES. MULCH MUST BE APPLIED TO ALL TEMPORARY AND PERMANENT SEEDING ON ALL DISTURBED AREAS. DEPENDING ON SITE CONDITIONS, IN CRITICAL AREAS SUCH AS WATERWAYS OR STEEP SLOPES, ADDITIONAL OR SUBSTITUTE SOIL PROTECTIVE MEASURES MAY BE USED IF DEEMED NECESSARY. EXAMPLES INCLUDE JUTE MESH AND SOIL STABILIZATION BLANKETS OR EROSION CONTROL MATTING.
 AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDING SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING. MULCHES CONSERVE DESIRABLE SOIL PROPERTIES, REDUCE SOIL MOISTURE LOSS, PREVENT CRUSTING AND SEALING OF THE SOIL SURFACE, AND PROVIDE A SUITABLE MICROCLIMATE FOR SEED GERMINATION.
 AREAS THAT CANNOT BE SEEDING BECAUSE OF THE SEASON SHOULD BE MULCHED TO PROVIDE SOME PROTECTION TO THE SOIL SURFACE. AN ORGANIC MULCH, STRAW, OR HAY SHOULD BE USED AND THE AREA THEN SEEDING AS SOON AS WEATHER OR SEASONAL CONDITIONS PERMIT. DO NOT USE FIBER MULCH (CELLULOSE-HYDROSEED) ALONE FOR THIS PRACTICE; AT NORMAL APPLICATION RATES IT WILL NOT GIVE THE SOIL PROTECTION OF OTHER TYPES OF MULCH.
 WOOD CELLULOSE FIBER MULCH IS USED IN HYDROSEEDING OPERATIONS AND APPLIED AS PART OF THE SLURRY. IT CREATES THE BEST SEED-SOIL CONTACT WHEN APPLIED OVER THE TOP OF (AS A SEPARATE OPERATION) NEWLY SEEDING AREAS. FIBER MULCH DOES NOT ALONE PROVIDE SUFFICIENT PROTECTION ON HIGHLY ERODIBLE SOILS, OR DURING LESS THAN FAVORABLE GROWING CONDITIONS. FIBER MULCH SHOULD NOT BE USED ALONE DURING THE DRY SUMMER MONTHS OR WHEN USED FOR LATE FALL MULCH COVER. USE STRAW MULCH DURING THESE PERIODS AND FIBER MULCH MAY BE USED TO TACK (ANCHOR) THE STRAW MULCH. FIBER MULCH IS WELL SUITED FOR STEEP SLOPES, CRITICAL AREAS, AND AREAS SUSCEPTIBLE TO WIND.
- b. CHEMICAL MULCHES, SOIL BINDERS, AND TACKIFIERS
 A WIDE RANGE OF SYNTHETIC SPRAY ON MATERIALS ARE MARKETED TO STABILIZE AND PROTECT THE SOIL SURFACE. THESE ARE MIXED WITH WATER AND SPRAYED OVER THE MULCH AND TO THE SOIL. THEY MAY BE USED ALONE IN SOME CASES AS TEMPORARY STABILIZERS, OR IN CONJUNCTION WITH FIBER MULCH, STRAW, OR HAY.
 WHEN USED ALONE, MOST CHEMICAL MULCHES DO NOT HAVE THE CAPABILITY TO INSULATE THE SOIL OR RETAIN SOIL MOISTURE THAT ORGANIC MULCHES HAVE.
- c. SPECIFICATIONS
 FROM TABLE IV-6 SELECT THE TYPE OF MULCH AND RATE OF APPLICATION THAT WILL BEST SUIT THE CONDITIONS AT THE SITE.
- d. ANCHORING
 DEPENDING ON THE FIELD SITUATION, MULCH MAY NOT STAY IN PLACE BECAUSE OF WIND ACTION OR RAPID WATER RUNOFF. IN SUCH CASES, MULCH IS TO BE ANCHORED MECHANICALLY OR WITH MULCH NETTING.
 1. MECHANICAL ANCHORING
 APPLY MULCH AND PULL MULCH ANCHORING TOOL OVER THE MULCH. WHEN A DISK IS USED, SET THE DISK STRAIGHT AND PULL ACROSS SLOPE. MULCH MATERIAL SHOULD BE TUCKED INTO THE SOIL ABOUT 3".
 2. MULCH NETTING
 FOLLOW MANUFACTURER'S RECOMMENDATION WHEN POSITIONING AND STAPLING THE MULCH NETTING IN THE SOIL.

ANTERO'S PREFERRED SEED MIXTURE

HALL'S #1 PASTURE MIXTURE			
Species/Contains	Pure Seed	Germ	Origin
Bestfor Intermediate Ryegrass	29.95%	90%	OR
Climax Timothy	24.96%	90%	CAN
Annual Ryegrass *	24.92%	90%	OR
Medium Red Clover *	9.99%	90%	OR
Potomac Orchardgrass	9.46%	90%	OR
Other Crop Seeds:	0.01%		* Variety Not Stated
Inert Matter:	0.69%		
Weed Seeds:	0.02%		AMS: 5143

Table IV-1 Recommended Seeding Dates		
Planting Dates	Recommended Seeding Dates	Suitability
March 1 - April 15 and August 1 - October 1	Best Seeding Periods	
April 15 - August 1	HIGH RISK - moisture stress likely	
October 1 - December 1	HIGH RISK - freeze damage to young seedlings	
December 1 - March 1	Good seeding period. Dormant seeding	

Table IV-2 Acceptable Fertilization Recommendation			
Species	N (lbs/ac)	P2O5 (lbs/ac)	Example Rec. (per acre)
Cool Season Grass	40	80	400 lbs. 10-20-20
CS Grass & Legume	30	60	300 lbs. 10-20-20
Temporary Cover	40	40	200 lbs. 19-19-19

Table IV-3 Temporary Cover				
Species	Seeding Rate (lbs/acre)	Optimum Seeding Dates	Drainage	pH Range
Annual Ryegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Poorly	5.5 - 7.5
Field Bromegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Mod. Well	6.0 - 7.0
Spring Oats	96	3/1 - 6/15	Well - Poorly	5.5 - 7.0
Sundagrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Winter Rye	168	8/15 - 10/15	Well - Poorly	5.5 - 7.5
Winter Wheat	180	8/15 - 11/15	Well - Mod. Well	5.5 - 7.0
Japanese Millet	30	6/15 - 8/15	Well	4.5 - 7.0
Redtop	5	3/1 - 6/15	Well	4.0 - 7.5
Annual Ryegrass	26	3/1 - 6/15	Well - Poorly	5.5 - 7.5
Spring Oats	64	3/1 - 6/15	Well - Poorly	5.5 - 7.5

NOTE: These rates should be increased by 50% if planted April 15 - August 1 and October 1 - March 1.

Table IV-4A Permanent Seeding Mixture			
Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
Crownvetch / Tall Fescue	10 - 15	Well - Mod. Well	5.0 - 7.5
Crownvetch / Perennial Ryegrass	20	Well - Mod. Well	5.0 - 7.5
Flatpea or Perennial Pea / Tall Fescue	15	Well - Mod. Well	4.0 - 8.0
Ladino Clover / Serecla Lespedeza / Tall Fescue	25	Well - Mod. Well	4.5 - 7.5
Tall Fescue / Ladino Clover / Redtop	40	Well - Mod. Well	5.0 - 7.5
Crownvetch / Tall Fescue / Redtop	20	Well - Mod. Well	5.0 - 7.5
Tall Fescue / Birdsfoot Trefoil / Redtop	10	Well - Mod. Well	5.0 - 7.5
Serecla Lespedeza / Tall Fescue / Redtop	25	Well - Mod. Well	4.5 - 7.5
Redtop / Tall Fescue / Creeping Red	30	Well - Mod. Well	5.0 - 7.5
Tall Fescue / Perennial Ryegrass / Tall Fescue / Lathco Flatpea *	50	Well - Poorly	4.5 - 7.5
Perennial Ryegrass / Tall Fescue / Lathco Flatpea *	10	Well - Poorly	5.8 - 8.0

* Lathco Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.
 Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-4B Wildlife and Farm Friendly Seed Mixtures			
Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
KY Bluegrass / Redtop / Ladino Clover or Birdsfoot Trefoil	20	Well - Mod. Well	5.5 - 7.5
Timothy / Alfalfa	5	Well - Mod. Well	6.5 - 8.0
Timothy / Birdsfoot Trefoil	12	Well - Poorly	5.5 - 7.5
Orchardgrass / Ladino Clover / Redtop	10	Well - Mod. Well	5.5 - 7.5
Orchardgrass / Ladino Clover	2	Well - Mod. Well	5.5 - 7.5
Orchardgrass / Perennial Ryegrass	10	Well - Mod. Well	5.5 - 7.5
Creeping Red Fescue / Perennial Ryegrass	30	Well - Mod. Well	5.5 - 7.5
Orchardgrass or KY Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil / Redtop / Orchardgrass	10	Well - Mod. Well	5.5 - 7.5
Lathco Flatpea */ Perennial Ryegrass	30	Well - Mod. Well	5.5 - 7.5
Lathco Flatpea */ Orchardgrass	20	Well - Mod. Well	5.5 - 7.5

* Lathco Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.
 Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-5 Lime and Fertilizer Application Table		
pH of Soil	Lime in Tons per Acre	Fertilizer, lbs. per Acre (10-20-20 or Equivalent)
Above 6.0	2	500
5.0 to 6.0	3	500
Below 5.0	4	500

The pH can be determined with a portable pH testing kit or by sending the soil samples to a soil testing laboratory. When 4 tons of lime per acre are applied it must be incorporated into the soil by disking, backblading or tracking up and down the slope.

Table IV-6 Mulch Materials Rates and Uses			
Material	Minimum Rates per acre	Coverage	Remarks
Hay or Straw	2 to 3 Tons	Cover 75% to 90% of Surface	Subject to wind blowing or washing unless tled down
Wood Fiber	100 to 150 bales	Cover all Areas	For hydroseeding
Pulp Fiber	1000 to 1500 lbs		
Wood - Cellulose			
Recirculated Paper			

STANDARD STAKEOUT RIBBON COLOR SCHEME

N.T.S.

YELLOW RIBBON:
 YELLOW RIBBON USED TO INDICATE TOP OF CUTS (C)
 CUT TO BE DETERMINED AT TIME OF STAKEOUT
 SLOPE DETERMINED BY SITE DESIGN

YELLOW & ORANGE RIBBON:
 YELLOW AND ORANGE RIBBON USED TO INDICATE GRADE AT TOP OF PAD/POND/PIT

ORANGE RIBBON:
 ORANGE RIBBON USED TO INDICATE TOES OF FILLS (F)
 FILL TO BE DETERMINED AT TIME OF STAKEOUT
 SLOPE DETERMINED BY SITE DESIGN

PINK RIBBON:
 PINK RIBBON USED TO INDICATE TOP HOLE LOCATION
 PINK RIBBON USED TO INDICATE SURVEY CONTROL LOCATION

PINK & BLACK STRIPE RIBBON:
 PINK & BLACK STRIPE RIBBON USED TO INDICATE VERTICAL CUT (VC) AT PAD/POND/PIT CORNER OR EDGE
 PINK & BLACK STRIPE RIBBON USED TO INDICATE VERTICAL FILL (VF) AT PAD/POND/PIT CORNER OR EDGE
 VERTICAL CUT/VERTICAL FILL TO BE DETERMINED AT TIME OF STAKEOUT

BLUE & WHITE STRIPE RIBBON:
 BLUE & WHITE STRIPE RIBBON USED TO INDICATE CLEARING LIMITS/CONSTRUCTION LIMITS

ORANGE & BLACK STRIPE RIBBON:
 ORANGE & BLACK STRIPE RIBBON USED TO INDICATE VERTICAL CUT (VC) AT CENTERLINE OR EDGE OF ACCESS ROAD
 ORANGE & BLACK STRIPE RIBBON USED TO INDICATE VERTICAL FILL (VF) AT CENTERLINE OR EDGE OF ACCESS ROAD

PINK & WHITE STRIPE RIBBON:
 PINK & WHITE STRIPE RIBBON USED TO INDICATE EROSION AND SEDIMENT CONTROL STRUCTURES
 SILT FENCE (SF) REINFORCED FILTER FENCE (RFF) SUPER SILT FENCE (SSF)
 FILTER SOCK (FS)

ORANGE & WHITE STRIPE RIBBON:
 ORANGE & WHITE STRIPE RIBBON USED TO INDICATE TOPSOIL STOCKPILE LOCATIONS

BLUE RIBBON:
 BLUE RIBBON USED TO INDICATE CENTERLINE (CL) DITCH
 BLUE RIBBON USED TO INDICATE BOTTOM (BTM) SEDIMENT TRAPS

MODIFIED SOURCE: ANTERO RESOURCES CORPORATION

NAVITUS
 ENERGY ENGINEERING

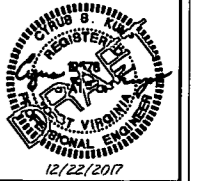
Telephone: (888) 682-4185 | www.NavitusEng.com

REVISION	DATE

Antero
 Resources

THIS DOCUMENT
 WAS PREPARED FOR:
 ANTERO RESOURCES
 CORPORATION

CONSTRUCTION DETAILS
MACKAY BRIDGE
 CENTRAL DISTRICT
 DODDRIDGE COUNTY, WEST VIRGINIA



DATE: 12/22/2017
 SCALE: N/A
 SHEET 6 OF 6

MACKAY BRIDGE

SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

CENTRAL DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA
CABIN RUN-NORTH FORK HUGHES RIVER WATERSHED

PULLMAN, OXFORD, PENNSBORO, & WEST UNION USGS 7.5 QUAD MAP(S)



WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
NORTH ZONE, NAD83 ON NAVD83
ESTABLISHED BY SURVEY GRADE GPS & OPUS
POST-PROCESSING

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.239846 LONGITUDE: -80.890385 (NAD 83)
N 4343398.78 E 509459.84 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

THE BRIDGE REPLACEMENT IS BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED IN FLOOD ZONES "X" & "A" PER FEMA MAP NUMBER #54017C0200C. THE SITE ENTRANCE IS LOCATED IN FLOOD ZONE "X" AND THE REST OF THE SITE IS LOCATED IN FLOOD ZONE "A". A DETAILED FLOODPLAIN STUDY HAS BEEN PERFORMED BY NAVITUS ENGINEERING TO ANALYZE THE IMPACTS OF CROSSING THE EXISTING FLOODPLAIN.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT:

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

ENVIRONMENTAL NOTES:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN XXXXXXX BY XXXXXXXXXXXXXXXXXXXX TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE XXXXXXXX STREAM AND WETLAND DELINEATION INDEX MAP WAS PREPARED BY XXXXXXXXXXXXXXXXXXXX AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

PROJECT CONTACTS:

OPERATOR:

ANTERO RESOURCES CORPORATION
535 WHITE OAKS BLVD.
BRIDGEPORT, WV 26330
PHONE: (304) 842-4100
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JON McEVERS - OPERATIONS SUPERINTENDENT
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CELL: (405) 227-8344

ROBERT B. WIRKS - FIELD ENGINEER
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LEA ANNE HAWKINS - LAND AGENT
CELL: (XXX) XXX-XXXX

ENGINEER/SURVEYOR:

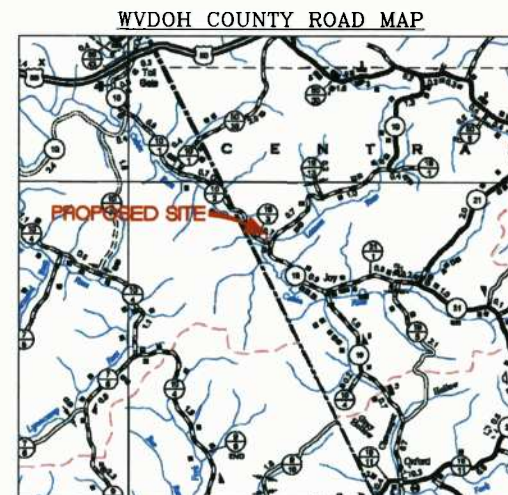
NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT
MANAGER/ENGINEER
OFFICE: (888) 682-4185 CELL: (540) 686-6747

ADD ENVIRONMENTAL

STRUCTURAL:
ENGINEERING TECHNIQUES
DAN J. HOTEK - STRUCTURAL ENGINEER
OFFICE: (540) 7835-1521



(NOT TO SCALE)



SCALE: 1" = 5000'

MISS Utility of West Virginia
1-800-245-4848
West Virginia State Law
(Section XIV: Chapter 24-C)
Requires that you call two
business days before you dig in
the state of West Virginia.
IT'S THE LAW!!

REPRODUCTION NOTE

THESE PLANS WERE CREATED TO BE PLOTTED ON 22"x34" (ANSI D) PAPER. HALF SCALE DRAWINGS ARE ON 11"x17" (ANSI B) PAPER.

THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

SHEET INDEX:

- 1 - COVER SHEET
- 2 - NOTES
- 3 - LEGEND & MATERIAL QUANTITIES
- 4 - PLAN VIEW & PROFILES
- 5 - CONSTRUCTION DETAILS
- 6 - CONSTRUCTION DETAILS

APPENDIX PART 1 - FOOTER DESIGN BY ENGINEERING TECHNIQUEST

MACKAY BRIDGE LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (184')	0.53
Total Affected Area	0.53
Total Wooded Acres Disturbed	0.00
Impacts to the L. Morris TM 11-8	
Access Road "A" (38')	0.21
Total Affected Area	0.21
Total Wooded Acres Disturbed	0.00
Impacts to Jack D. Mackay & Anita G. Peale TM 37-3.3	
Access Road "A" (148')	0.32
Total Affected Area	0.32
Total Wooded Acres Disturbed	0.00

REVISION
DATE

CONSTRUCTION AND E&S CONTROL NOTES

CONSTRUCTION NOTES:

1. THE CONTRACTOR IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND WILL NOTIFY NAVITUS ENGINEERING AT (868) 662-4165 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN. ANY WORK PERFORMED BY THE CONTRACTOR AFTER THE FINDING OF SUCH DISCREPANCIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
2. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS. SHOULD A CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, AND PLANS OCCUR, THE MOST STRINGENT REQUIREMENT WILL APPLY. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
3. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE. ALSO, A REPRESENTATIVE OF THE DEVELOPER MUST BE AVAILABLE AT ALL TIMES.
4. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING MUD FROM TRUCKS AND/OR OTHER EQUIPMENT PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS, ALLAY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE STREETS ARE MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITION AT ALL TIMES.
5. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS AND/OR GIS DATA. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES AS NEEDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY CONFLICTS ARISING FROM HIS EXISTING UTILITY VERIFICATION AND THE PROPOSED CONSTRUCTION.
6. THE CONTRACTOR SHALL PROVIDE NOTIFICATION TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPELINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS WITH THE EXISTING RIGHT-OF-WAY.
8. WHEN GRADING IS PROPOSED WITHIN EASEMENTS OF UTILITIES, LETTERS OF PERMISSION FROM ALL INVOLVED COMPANIES MUST BE OBTAINED PRIOR TO GRADING AND/OR SITE DEVELOPMENT.
9. THE DEVELOPER WILL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITIES WHICH IS REQUIRED AS A RESULT OF HIS PROJECT. THE RELOCATION SHOULD BE DONE PRIOR TO CONSTRUCTION.
10. THESE PLANS IDENTIFY THE LOCATION OF ALL KNOWN GRAVESITES. GRAVESITES SHOWN ON THIS PLAN WILL BE PROTECTED IN ACCORDANCE WITH STATE LAW. IN THE EVENT GRAVESITES ARE DISCOVERED DURING CONSTRUCTION, THE OWNER AND ENGINEER MUST BE NOTIFIED IMMEDIATELY.
11. THE CONTRACTOR(S) SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NOT MORE THAN TEN (10) WORKING DAYS, PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION.
12. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.
13. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR 2 DAYS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR IS RESPONSIBLE FOR ALL FILL MATERIAL PLACEMENT REQUIRED DURING THE CONSTRUCTION OF THIS PROJECT. ALL MATERIAL TESTS SHALL BE CONDUCTED BY THE ON-SITE INSPECTOR. ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THE CONSTRUCTED FACILITY. FAILURE TO CONDUCT THE DENSITY TESTS AND/OR NECESSARY REPAIRS TO DEFICIENT AREAS AS A RESULT OF THE DENSITY TESTING SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE CONSTRUCTED FACILITY.
15. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SITE IN ACCORDANCE WITH THE DESIGN PLANS AND CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK SHALL CONFORM WITH THE GRADES, BERMS, DEPTHS, DIMENSIONS, ETC. SHOWN HEREON.
16. SUPER SILT FENCE CAN BE USED IN PLACE OF ANY COMPOST FILTER SOCK.
17. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS, INCLUDING THE 1970 OSHA ACT. PRECAUTION FOR THE PROTECTION OF PERSONS, INCLUDING EMPLOYEES AND PROPERTY, SHALL ALWAYS BE EXERCISED BY THE CONTRACTOR. INITIATION, MAINTENANCE, AND SUPERVISION OF ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK, INCLUDING ALL REQUIREMENTS PER CFR 1910.146, SHALL ALSO BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE AREAS SHOWN ON THE PLANS WITHIN THE LIMITS OF DISTURBANCE, UNLESS OTHERWISE AUTHORIZED BY ANTERO RESOURCES CORPORATION. MODIFICATION PLAN MUST BE SUBMITTED TO THE DEP FOR ANY ACTIVITIES PERFORMED OUTSIDE OF THE LIMITS OF DISTURBANCE.
19. PRESERVATION OF BENCHMARKS, PROPERTY CORNERS, REFERENCE POINTS, STAKES AND OTHER SURVEY REFERENCE MONUMENTS OR MARKERS IS THE RESPONSIBILITY OF THE CONTRACTOR. IN CASES OF WILLFUL OR CARELESS DESTRUCTION THE CONTRACTOR SHALL BE REQUIRED TO REPLACE OR RESTORE SAID MONUMENT OR MARKER. RESETTING OF MARKERS SHALL BE PERFORMED BY A PROFESSIONAL SURVEYOR AS APPROVED BY ANTERO RESOURCES CORPORATION.
20. THE CONTRACTOR SHALL MAINTAIN ADEQUATE CLEARANCE FROM ALL ELECTRIC LINES, IF ANY, IN ACCORDANCE WITH NATIONAL ELECTRICAL SAFETY CODE.
21. THE CONTRACTOR SHALL MINIMIZE ALL CLEARING AND DISTURBANCE TO THE ENVIRONMENT TO THE MAXIMUM EXTENT POSSIBLE. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE.
22. ANY DIGITAL FILES PROVIDED TO THE CONTRACTOR BY NAVITUS ENGINEERING, INC. ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONSTRUCTION OF THE SITE SHALL MEET ALL DESIGN PARAMETERS OF THE WV DEP APPROVED NAVITUS ENGINEERING, INC. DESIGN PLANS. NAVITUS ENGINEERING, INC. WILL NOT BE HELD LIABLE FOR THE CONTRACTOR USING THE DIGITAL FILES TO WAIVER FROM THE APPROVED DESIGN PLANS.
23. ANY CONSTRUCTION ISSUES OR QUESTIONS SHALL BE BROUGHT TO THE ENGINEER IMMEDIATELY. THE CONSTRUCTION INSPECTOR SHALL BE CONTACTED AND MUST RELAY THESE ISSUES OR QUESTIONS TO THE ENGINEER FOR RESOLUTION. TEMPORARY STABILIZATION SHALL BE APPLIED AS NECESSARY.
24. ALL EXISTING AND DESIGNED CULVERTS AND CULVERT SUMPS SHALL BE CLEANED AND CLEARED OF DEBRIS DURING THE COURSE OF CONSTRUCTION. ANY EXCESS EROSION DUE TO THE PLUGGING OF A CULVERT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

EROSION AND SEDIMENT CONTROL NARRATIVE:

PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT A GAS WELL DRILLING PAD TO AID IN THE DEVELOPMENT OF INDIVIDUAL GAS WELLS. THE ACCESS ROAD ENTRANCE TO THE PROPOSED SITE IS LOCATED ON THE WEST SIDE OF CO RT. 19, 0.01 MILES SOUTH OF THE INTERSECTION OF CO RT. 19 & CO RT. 19/3 IN CENTRAL DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA. THE TOTAL APPROXIMATE LAND DISTURBANCE ASSOCIATED WITH THIS PROJECT IS 0.53 ACRES.

EXISTING SITE CONDITIONS: THE EXISTING SITE IS APPROXIMATELY 0.01% WOODED. THE TOPOGRAPHY RANGES FROM MODERATE TO STEEP TERRAIN (1% TO 50% SLOPES). PRESENT ON SITE ARE ACCESS ROADS, OVERHEAD UTILITIES, AND A LOW WATER CROSSING. X PERENNIAL STREAM, X INTERMITTENT STREAM(S), AND X EPHEMERAL STREAM(S) ARE LOCATED ON SITE. THE SITE IS LOCATED IN A FLOODPLAIN AND DRAINS TO CABIN RUN. NO EROSION WAS NOTICED ON SITE.

ADJACENT PROPERTY: THE SITE IS BORDERED BY FORESTED AND MEADOW LANDS ON ALL SIDES. NOTE EXISTING STRUCTURES (NEAR SITE) & NATURAL FEATURES.

CRITICAL AREAS: THE AREA(S) SHOWN ALONG THE FIELD DELINEATED STREAMS, WETLANDS, AND PONDS, AS SHOWN ON THE PLANS, ARE DESIGNATED AS CRITICAL AREA(S). IF PRESENT, ALL 3:1 SLOPES AND STEEPER, DITCHES, AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED AND MAINTAINED DAILY DURING CONSTRUCTION AND AFTER EACH RAINFALL OF 0.5 INCHES OR GREATER. COMPOST FILTER SOCKS ARE TO BE USED TO PROTECT THESE FIELD DELINEATED AREA(S) FROM SEDIMENT LEAVING THE SITE. ADDITIONALLY, ORANGE SAFETY FENCE IS RECOMMENDED TO BE INSTALLED ABOVE/AROUND THESE AREA(S), TO SERVE AS A PHYSICAL BARRIER, ENSURING THE AREA(S) ARE NOT DISTURBED. THE LOCAL GOVERNING AUTHORITY WILL HAVE THE AUTHORITY TO RECOMMEND THE PLACEMENT OF ADDITIONAL EROSION CONTROL MEASURES IN THESE AREAS IF IT BECOMES EVIDENT DURING CONSTRUCTION THAT THE ONES IN PLACE ARE NOT FUNCTIONING SUFFICIENTLY.

SOILS: NO SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED.

OFF SITE AREAS: THERE ARE NO BORROW AREA(S) OR EXPORT STOCKPILE AREA(S) OUTSIDE OF THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT.

EROSION AND SEDIMENT CONTROL MEASURES: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

STRUCTURAL PRACTICES:

1. INSTALL ORANGE SAFETY FENCE TO ENSURE NO DISTURBANCE TO THE DELINEATED AREA(S).
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
3. INSTALL COMPOST FILTER SOCKS AND/OR SILT FENCE AS SHOWN ON THE PLANS TO REMOVE SEDIMENT FROM RUNOFF. SELECTIVELY REMOVE TREES REQUIRED TO INSTALL COMPOST FILTER SOCK IN WOODED AREAS. CLEARING AND GRUBBING SHALL BE KEPT AT A MINIMUM TO INSTALL E&S CONTROLS.
4. FILL SLOPE SURFACE SHALL BE LEFT IN A ROUGHENED CONDITION TO REDUCE EROSION. CONTRACTOR SHALL REDIRECT RUNOFF AWAY FROM THE FILL SLOPE BY INSTALLING EARTHEN DIVERSION BERMS AND DIVERTING THE RUNOFF TO SEDIMENT TRAPPING DEVICES.
5. INSTALL V-DITCHES, DITCH RELIEF CULVERTS, AND OUTLET PROTECTION (RIP-RAP APRONS) AS SHOWN ON THE PLANS.

DEVICES LISTED ABOVE ARE CONSIDERED MINIMUM EROSION AND SEDIMENT CONTROLS. ADDITIONAL CONTROL MEASURES MAY BE NECESSARY DUE TO CONTRACTOR PHASING OR OTHER UNFORESEEN CONDITIONS. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMP'S TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION. ALL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL. ALL RUNOFF FROM DISTURBED AREAS SHALL PASS THROUGH A SEDIMENT FILTERING DEVICE LOCATED BELOW THE DISTURBED AREA. AT NO TIME WILL UNFILTERED SEDIMENT LADEN RUNOFF BE ALLOWED TO LEAVE THE SITE AND ENTER STATE WATERS.

PERMANENT STABILIZATION: ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN SEVEN (7) DAYS. AT NO TIME SHALL LAND LAY DORMANT LONGER THAN TWENTY-ONE (21) DAYS.

MAINTENANCE PROGRAM: DURING CONSTRUCTION ACTIVITIES, ALL CONTROL MEASURES SHALL BE INSPECTED DAILY BY THE SITE SUPERINTENDENT OR HIS REPRESENTATIVE AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY SIGNIFICANT RAIN EVENT, WHICH SHALL BE DEFINED AS RAINFALL OF TWO (2) INCHES OR MORE IN A SIX (6) HOUR PERIOD. ONCE CONSTRUCTION ACTIVITIES HAVE CONCLUDED, THE SITE SHALL BE INSPECTED EVERY TWO (2) WEEKS FOR THE LIFE OF THE FACILITY AND WITHIN TWENTY-FOUR (24) HOURS OF A SIGNIFICANT RAIN EVENT AS DEFINED ABOVE. ANY DAMAGED STRUCTURAL MEASURES ARE TO BE REPAIRED, BY THE END OF THE DAY, OR AT THE EARLIEST TIME IN WHICH IT IS SAFE TO DO SO. SEEDING AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. ALL AREAS SHALL BE FERTILIZED AND RESEDED AS NEEDED UNTIL GRASS IS ESTABLISHED.

TRAPPED SEDIMENT IS TO BE REMOVED AS REQUIRED TO MAINTAIN 50% TRAP AND/OR SOCK EFFICIENCY AND DISPOSED OF AS ENGINEERED FILL ON THE STOCKPILES.

INLETS AND OUTLETS OF DITCH RELIEF CULVERTS SHALL BE CHECKED REGULARLY FOR SEDIMENT BUILD-UP. IF THE INLET AND/OR OUTLET IS CLOGGED BY 50% OR GREATER, IT SHALL BE REMOVED AND CLEANED OR REPLACED IMMEDIATELY.

SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED OR SWEEPED INTO ANY ROADSIDE DITCH, CULVERT OR SURFACE WATER.

ANY DISTURBED AREAS ALONG THE ACCESS ROAD SHALL BE STABILIZED AS CONSTRUCTION PROCEEDS, PRIOR TO CONTINUING FURTHER ACCESS ROAD CONSTRUCTION, WITH EITHER ROCK STABILIZATION OR SEEDING AND MULCHING METHODS.

NOTE: THE WV DEP RETAINS THE RIGHT TO ADD AND/OR MODIFY THESE EROSION AND SEDIMENT CONTROL MEASURES DURING THE CONSTRUCTION PROCESS, WITHIN REASON, TO ENSURE ADEQUATE PROTECTION TO THE PUBLIC AND THE ENVIRONMENT.

SEEDING (SOIL STABILIZATION):

1. CONTRACTOR SHALL APPLY SEED AND STABILIZATION IN ACCORDANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL, BASED UPON SITE SPECIFIC SOIL CHARACTERISTICS.
2. WHEREVER SEEDING IS TO BE APPLIED TO STEEP SLOPES (≥ 3H:1V), SEED MIXTURES SHOULD BE SELECTED THAT ARE APPROPRIATE FOR STEEP SLOPES.

DUST CONTROL:

1. TEMPORARY SEEDING SHALL BE APPLIED TO ALL DISTURBED AREAS SUBJECT TO LITTLE OR NO CONSTRUCTION TRAFFIC.
2. ALL HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES SHALL BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET AND REPEATED AS NEEDED TO CONTROL DUST.

CONSTRUCTION SEQUENCE:

THE DEVELOPMENT OF THIS SITE SHALL BE CONSISTENT WITH THE FOLLOWING GENERAL SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL IMPLEMENT, MAINTAIN, AND OPERATE ALL PROPOSED EROSION AND SEDIMENT CONTROL MEASURES TO EFFECTIVELY MITIGATE THE HAZARD OF ACCELERATED EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S SUPERINTENDENT AS NEEDED TO ELIMINATE ANY POTENTIAL EROSION CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WV DEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

1. A PRE-CONSTRUCTION CONFERENCE WITH THE CONTRACTOR AND THE APPROPRIATE EROSION AND SEDIMENT CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.
2. STAKE THE LIMITS OF CONSTRUCTION AND MARK/FLAG ALL IDENTIFIED WETLANDS, STREAMS, UTILITIES, AND OTHER AREAS OF CONCERN FOR CONSTRUCTION ACTIVITIES. INSTALL SIGNS TO DESIGNATE THE AREAS AND ORANGE SAFETY FENCE TO IDENTIFY IMPORTANT PROJECT ATTRIBUTES SUCH AS APPROVED ACCESS ROADS, NO REFUELING ZONES, WETLANDS/STREAM BOUNDS, ETC.
3. CONSTRUCT THE ROCK CONSTRUCTION ENTRANCE. ALL VEHICLES ENTERING AND EXITING THE SITE SHALL DO SO VIA THE ROCK CONSTRUCTION ENTRANCE.
4. CONSTRUCT ALL BMP'S AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW. ONCE INSTALLED, THE AREA ENCOMPASSING THE BMP'S OUTSIDE OF THE GRADING LIMITS SHALL BE SEEDED AND MULCHED IMMEDIATELY.
5. CLEAR AND GRUB THE SITE AS NECESSARY TO INSTALL BRIDGE AND ACCESS ROAD. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, BOULDERS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY SEDIMENT CONTROLS. TREES SIX INCHES IN DIAMETER AND LARGER SHALL BE CUT AND LOGS STACKED. SMALLER TREES, BRUSH, AND STUMPS SHALL BE CUT AND/OR GRUBBED AND WINDROWED IN APPROPRIATE AREAS FOR USE AS SEDIMENT BARRIERS AT WATER DRAINAGE OUTLETS (AS SHOWN ON THE PLANS), WINDROWED BELOW THE WELL SITE, USED FOR WILDLIFE HABITAT, BURNED (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY OTHER METHODS APPROVED BY WV DEP.
6. STRIP THE TOPSOIL FROM THE ACCESS ROAD. TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT ACCESS ROAD. PRIOR TO PLACING ANY FILL, THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS, OR RE-SPREAD AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED 2:1 OR FLATTER SLOPES, AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.
7. INSTALL BRIDGE FOUNDATION PER PLANS BY STRUCTURAL ENGINEER. CARE SHALL BE TAKEN TO NOT DISTURB THE PROPOSED STREAM. IF WORK INSIDE THE STREAM BANKS IS DEEMED NECESSARY A TEMPORARY COFFER DAM SHALL BE INSTALLED AND A PUMP AROUND TO DE-WATER THE AREA SHALL BE SIZED TO PROPERLY HANDLE THE PROPOSED FLOW. ONCE THE FOUNDATION IS COMPLETE IN AREA THE TEMPORARY DE-WATERING MEASURES SHALL BE REMOVED AND THE STREAM BANKS RESTORED TO PRE-CONSTRUCTION CONDITIONS.
8. INSTALL PROPOSED BRIDGE CROSSING PER THE PLANS. THE BRIDGE SHALL BE PROPERLY ANCHORED PER THE REQUIREMENTS OF THE DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.
9. CONSTRUCT THE ACCESS ROAD. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS. IT IS ALSO RECOMMENDED THAT EACH LIFT BE PROOF ROLLED WITH A LOADED HAUL TRUCK WHERE APPLICABLE. STABILIZE THE ROAD WITH GEOTEXTILE FABRIC & STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. TOPSOIL IS TO BE REAPPLIED AS NECESSARY. SLOPES SHALL BE TRACKED BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. ALL DITCH LINES SHALL BE CLEARED PRIOR TO INSTALLATION OF LINED PROTECTION.
10. ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN EXCESS OF 0.5" AND ON A BIWEEKLY BASIS.
11. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
12. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WV DEP.
13. ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED.


CONSTRUCTION STANDARDS:

THE DESIGN, CONSTRUCTION, AND REMOVAL OF FILL FOR OIL AND GAS SITES MUST BE ACCOMPLISHED IN SUCH A MANNER AS TO PROTECT THE HEALTH AND SAFETY OF THE PEOPLE, THE NATURAL RESOURCES, AND ENVIRONMENT OF THE STATE. THE SITE SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO BE STRUCTURALLY SOUND AND REASONABLY PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES.

1. ALL FILL AREAS SHOULD BE CLEARED OF TREES, STUMPS, AND ANY VEGETATION AND STRIPPED OF TOPSOIL/ORGANIC SOILS PRIOR TO THE START OF FILL PLACEMENT.
2. ANY GROUNDWATER ENCOUNTERED DURING CONSTRUCTION SHALL BE DRAINED TO THE OUTSIDE/DOWNSTREAM TOE OF THE SLOPE. CONSTRUCTED DRAIN SECTION SHALL BE AN EXCAVATED 2' x 2' TRENCH AND BACK FILLED WITH #57 STONE, COMPACTED BY HAND TAMPER. GEOTEXTILE FABRIC SHALL BE USED TO LINE TRENCH.
3. SATISFACTORY MATERIALS FOR USE AS FILL FOR FILL AREAS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS GW, GP, GM, GC, SW, SP, SM, SC, ML, AND CL GROUPS.
4. GENERALLY, UNSATISFACTORY MATERIALS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CH, MH, OL, OH, AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER.
5. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.
6. ROCK LIFTS ARE NOT PROPOSED FOR THE CONSTRUCTION OF THIS SITE. HOWEVER, LARGER ROCK PARTICLES OR BOULDERS THAT ARE ENCOUNTERED DURING CONSTRUCTION NEED TO BE BROKEN DOWN TO A MANAGEABLE SIZE (MAXIMUM 3'x3'x1' THICK) TO BE PLACED AS FILL DURING PLACEMENT OF FILL CONTAINING LARGER SIZE ROCK PARTICLES. IT IS CRITICAL THAT NO VOID SPACES BE LEFT BETWEEN THE ROCKS. SMALLER ROCK FRAGMENTS AND SOIL MUST BE WORKED INTO ANY OPENINGS BETWEEN THE BOULDERS AFTER THEY ARE PUT IN PLACE. ADDITIONAL GUIDANCE REGARDING ENCOUNTERED ROCK CAN BE FOUND IN THE GEOTECHNICAL REPORT.
7. THE PLACEMENT OF ALL FILL MATERIAL SHALL BE FREE OF WOOD, STUMPS AND ROOTS, LARGE ROCKS AND BOULDERS, AND ANY OTHER NONCOMPACTABLE SOIL MATERIAL. NO FILL SHALL CONTAIN OR BE PLACED ON FROZEN MATERIAL. THE FILL SHALL BE COMPACTED TO A MINIMUM OF VISIBLE NO-MOVEMENT, HOWEVER, THE COMPACTION EFFORT SHALL NOT EXCEED THE OPTIMUM MOISTURE LIMITS.
8. ALL EXPOSED AREAS, NOT COVERED BY COMPACTED GRAVEL OR RIP-RAP SHALL BE LIMED, FERTILIZED, SEEDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVER IN COMPLIANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL FIELD MANUAL MUST BE ESTABLISHED UPON THE COMPLETION OF CONSTRUCTION. SLOPES SHALL BE MAINTAINED WITH A GRASSY VEGETATIVE COVER AND FREE OF BRUSH AND/OR TREES.
9. IF STANDING WATER IS PRESENT ON SITE, CONTRACTOR TO CORRECT DRAINAGE ISSUE BY DIRECTING WATER TO PROPER E&S CONTROLS OR OUTLET WITH POSITIVE DRAINAGE. IF NECESSARY, CONTACT ENGINEER FOR GUIDANCE IN CORRECTING DRAINAGE ISSUES.
10. ALL DRAINAGE DITCHES, DIVERSIONS, AND CULVERTS SHALL HAVE POSITIVE DRAINAGE AND OUTFALL INTO THE PROPER OUTLET PROTECTION OR LEVEL SPREADING DEVICE. SUPER SILT FENCE, OR APPROVED ALTERNATIVE, SHALL BE INSTALLED WITHIN 5 FEET OF THE OUTLET PROTECTION OR LEVEL SPREADING DEVICE TO PREVENT EROSION DOWNSTREAM. IF EROSION IS PRESENT DOWNSTREAM OF AN EROSION CONTROL DEVICE, CONTRACTOR TO INSTALL ADDITIONAL EROSION CONTROLS AND STABILIZATION TO PREVENT FURTHER EROSION.
11. ALL DRAINAGE DITCHES AND DIVERSIONS THAT ARE ROCK LINED SHALL BE INSTALLED PER THE DETAILS ON THIS PLAN INCLUDING THE NECESSARY INSTALLATION OF ANY GEOTEXTILE FABRIC UNDERNEATH THE ROCK LINING.
12. IF THE EROSION CONTROL DEVICES SHOW EVIDENCE OF BEING INADEQUATE DUE TO CONSTRUCTION MEANS AND METHODS, THE CONTRACTOR IS TO INSTALL ADDITIONAL DRAINAGE DEVICES OR EROSION CONTROLS TO PREVENT FURTHER EROSION FROM OCCURRING.
13. ALL SLOPES SHALL BE TRACKED IN PER THE DETAILS ON THESE PLANS. CONTRACTOR SHALL REPEAT THIS METHOD ANY TIME AN AREA HAS BEEN DISTURBED PRIOR TO THAT AREA BEING STABILIZED.
14. ALL MAINTENANCE OF EROSION AND SEDIMENT CONTROLS MUST BE PERFORMED IMMEDIATELY ONCE THE CONTRACTOR IS NOTIFIED OF THE DISCREPANCY. CONTRACTOR TO PERFORM MAINTENANCE OR IMMEDIATELY NOTIFY THE SUB-CONTRACTOR PERFORMING THE E&S TASKS. ANY EROSION CONTROL MAINTENANCE THAT IS DEEMED TO BE AN EMERGENCY SHALL BE PERFORMED IMMEDIATELY UPON THE CLIENT, ENGINEER, OR STATE'S REQUEST.
15. ALL LANDOWNER ACCESS ROADS AND EXISTING WELL ROADS THAT ARE BEING MAINTAINED SHALL BE KEPT OPEN DURING THE ENTIRE COURSE OF CONSTRUCTION TO PROVIDE CONTINUOUS ACCESS. IF CLOSURE IS NECESSARY, THE CONTRACTOR SHALL PROVIDE AN EQUIVALENT DETOUR ROUTE TO THE SATISFACTION OF THE LANDOWNER OR WELL OWNER.


SITE CLEANUP & RECYCLE PROGRAM:

1. GARBAGE, FUELS OR ANY SUBSTANCE HARMFUL TO HUMAN, AQUATIC OR FISH LIFE, WILL BE PREVENTED FROM ENTERING SPRINGS, STREAMS, PONDS, LAKES, WETLANDS OR ANY WATER COURSE OR WATER BODY.
2. OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.
3. ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.
4. ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDED AND MULCHED AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.
5. ALL POLLUTION AND EMERGENCY SPILLS SHALL BE IMMEDIATELY REPORTED TO ANTERO RESOURCES CORPORATION AND THE WV DEP OFFICE OF OIL AND GAS. (EMERGENCY #1-800-642-3074)



NAVITUS ENERGY ENGINEERING
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REVISION	DATE	DESCRIPTION




THIS DOCUMENT WAS PREPARED FOR:
ANTERO RESOURCES CORPORATION

CONSTRUCTION AND E&S CONTROL NOTES

MACKAY BRIDGE

CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA



12/22/2017

DATE: 12/22/2017

SCALE: N/A

SHEET 2 OF 6

LEGEND & MATERIAL QUANTITIES

LEGEND

EX. INDEX CONTOUR & CONTOUR LABEL	--- 1000 ---	PR. INDEX CONTOUR (10' INTERVAL) & CONTOUR LABEL	--- 1000 ---
EX. INTERMEDIATE CONTOUR	-----	PR. INTERMEDIATE CONTOUR (2' INTERVAL)	-----
EX. PROPERTY LINE	=====	PR. INTERMEDIATE CONTOUR (1' INTERVAL)	-----
EX. EDGE OF GRAVEL/DIRT	-----	PR. INDEX ROAD CONTOUR (10' INTERVAL) & CONTOUR LABEL	--- 1000 ---
EX. EDGE OF PAVEMENT	-----	PR. INTERMEDIATE ROAD CONTOUR (2' INTERVAL)	-----
EX. ROAD CENTERLINE	-----	PR. PADS/STOCKPILE TOPO LIMITS	-----
EX. EDGE OF CONCRETE	-----	PR. LIMITS OF DISTURBANCE	-----
EX. GUARDRAIL	-----	PR. ROAD/IMPOUNDMENT EDGE OF GRAVEL	-----
EX. BRIDGE	-----	PR. ROAD CENTERLINE	-----
EX. DITCHLINE/DRAINAGE FEATURE	-----	PR. GUARDRAIL	-----
EX. RIP-RAP	RR	PR. ROCK CONSTRUCTION ENTRANCE	-----
EX. CULVERT	-----	PR. AIR BRIDGE	-----
EX. TREELINE	-----	PR. CULVERT	-----
EX. BUILDING	-----	PR. DITCH	-----
EX. MISCELLANEOUS FEATURE	-----	PR. RIP-RAP TRAPEZOIDAL DITCH	-----
EX. 100-YR FEMA FLOODPLAIN	-----	PR. OUTLET PROTECTION	-----
EX. DELINEATED STREAM	-----	PR. DIVERSION	-----
EX. DELINEATED WETLAND/POND	-----	PR. ROCK FILTER OUTLET	-----
100' WETLAND/STREAM BUFFER	-----	PR. COMPOST FILTER SOCK	-----
STREAM/WETLAND DELINEATION STUDY AREA	-----	PR. SUPER SILT FENCE	-----
EX. FENCELINE/PERIMETER SAFETY FENCE	-----	PR. STRAW WATTLE	-----
EX. GATE	-----	PR. WELL HEAD	-----
EX. ACCESS GATE WITH EMERGENCY LIFELINE	-----	PR. PAD DEWATERING SYSTEM	-----
EX. WELL HEAD ON DESIGNED PAD	-----	PR. TOP OF PAD CONTAINMENT BERM	-----
EX. GAS WELL	-----	PR. 220' X 320' PAD FOOTPRINT	-----
EX. PIPELINE	-----	PR. SPOT SHOT	1000 X
EX. PIPELINE R/W	-----	PR. PERIMETER SAFETY FENCE	-----
EX. PIPELINE METER	-----	PR. ACCESS GATE WITH EMERGENCY LIFELINE	-----
EX. PIPELINE VALVE	-----	PR. PIPELINE	-----
EX. PIT	-----	PR. PIPELINE R/W	-----
EX. POWER POLE/GUY WIRE	-----	PR. OVERHEAD UTILITY	-----
EX. OVERHEAD UTILITY	-----	PR. POWER POLE/GUY WIRE	-----
EX. UNDERGROUND ELECTRIC	-----	PR. OVERHEAD UTILITY R/W	-----
EX. UNDERGROUND TELEPHONE	-----	PR. TELEPHONE LINE	-----
EX. UNDERGROUND FIBER OPTIC	-----	PR. WATERLINE	-----
EX. UTILITY R/W	-----	PR. RIGHT-OF-WAY	-----
EX. WATERLINE	-----	PR. PERMANENT DRAINAGE EASEMENT	-----
EX. SANITARY LINE	-----	PR. TEMPORARY CONSTRUCTION EASEMENT	-----
EX. WATER WELL/EX. SPRING	-----	BORING LOCATION	-----
EX. COMPOST SOCK	-----	X-SECTION/PROFILE GRID INDEX	-----
EX. SUPER SILT FENCE	-----	X-SECTION/PROFILE GRID INTERMEDIATE	-----
EX. SILT FENCE	-----	X-SECTION/PROFILE PROPOSED GRADE	-----
EX. STRAW WATTLE	-----	X-SECTION/PROFILE EXISTING GRADE	-----
EX. RIGHT-OF-WAY	-----	X-SECTION/PROFILE WATER SURFACE	-----
MATCHLINE	-----	X-SECTION/PROFILE CULVERT	-----

MATERIAL QUANTITIES			
SITE: MACKAY BRIDGE			
	Item Description	Quantity	Unit
1.0	Mobilization (Limited to 10% of Total Base Bid)	1	LS
2.0	Erosion & Sediment Control		
2.1	Clearing and Grubbing		
2.1.2	Open Field	0.53	AC
2.2	Super Silt Fence	360	LF
3.0	Unclassified Earthwork		
3.1	Access Road "A"		
3.1.1	Topsoil Removal to Stockpile (Assume Depth)	0	CY
3.1.2	Excavation (Cut to Compact Fill)	37	CY
3.1.3	Excavation (Import from Stockpile)	2	CY
4.0	Stone and Aggregate Surfacing		
4.1	Construction Entrance/Broad Based Dip		
4.1.1	2"-3" Clean Aggregate (10" Depth)	6	TONS
4.1.2	Geotextile Fabric (US 200 or Equal)	111	SY
4.2	Access Road "A"		
4.2.1	2"-3" Clean Aggregate (6" Depth)	67	TONS
4.2.2	3/4"-1 1/2" Crusher Run (2" Depth)	25	TONS
4.2.3	Geotextile Fabric (US 200 or Equal)	249	SY
4.2.4	Soil Cement (12" Min.) 8% Ratio @ 110 PCF	249	SY
4.3	Stream Crossing Fill Material		
4.3.1	3/4"-1" Aggregate - Class I Backfill Material	0	TONS
4.3.2	0"-1/2" Aggregate - Bedding Material	0	TONS
5.0	Miscellaneous		
5.1	Seeding and Mulching		
5.1.1	Permanent Seeding (Hydro Seeding - includes Hall's Pasture Seed Mix, Lime, & Fertilizer) with Hay Mulch w/Tack	1.00	AC

REVISION

DATE



THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

LEGEND & MATERIAL QUANTITIES

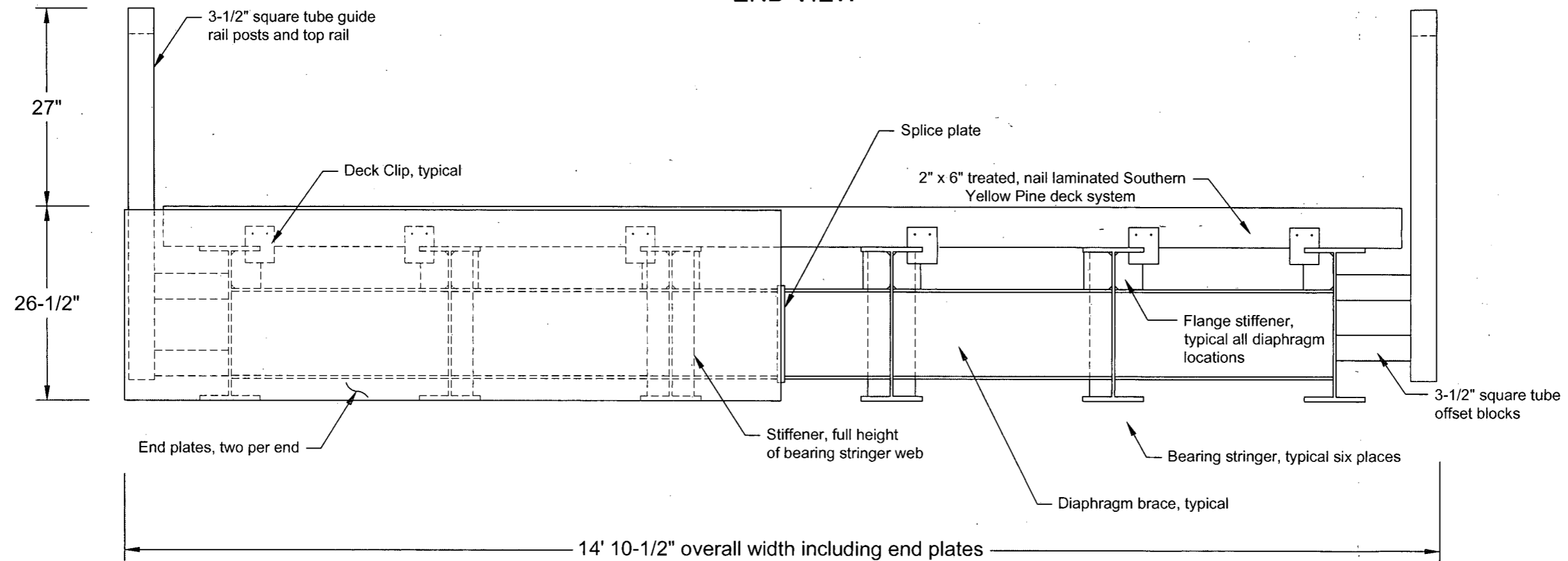
MACKAY BRIDGE

CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA



DATE: 12/22/2017
SCALE: N/A
SHEET 3 OF 6

END VIEW



SAMPLE DRAWING

Project specific drawings will be generated upon receipt of signed contract and Notice to Proceed

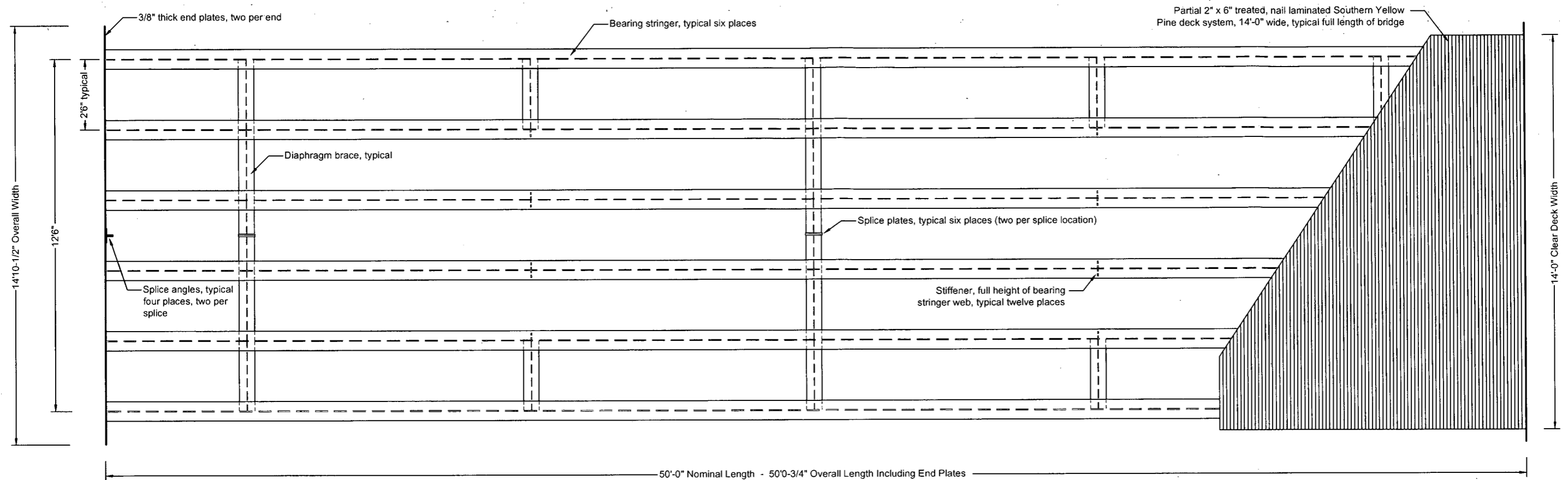
ADM Welding and Fabrication, LLC
 37 Broadhead Street
 Warren, PA 16365
 Phone: 814.723.7227
 Fax: 814.723.7326
 Email: admwelding@verizon.net
 Website: www.admwelding.com

ADM Welding & Fabrication, LLC
 Standard Modular Bridge
 14'W x 50'L x HS25
 vehicular load capacity (45-ton, 5-axle combination vehicle)
 subject to a 10 MPH maximum speed restriction

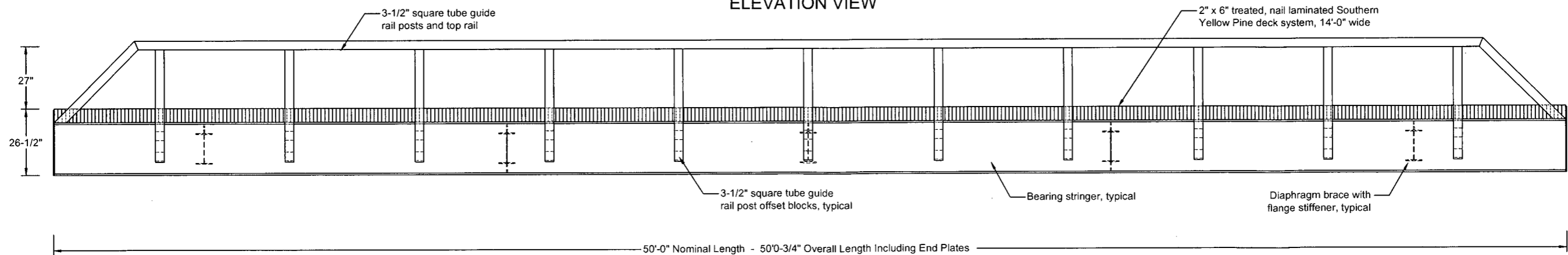
Sheet 2 of 2

Grade 50 steel with epoxy primer and urethane topcoat

PLAN VIEW



ELEVATION VIEW



Notes

1. Railing and full decking not shown on plan view for clarity.
2. All connections welded with a 1/4" minimum fillet weld unless otherwise specified.
3. Each board in the deck system is nailed to the preceding board with 3-1/4" x 0.120" diameter hot-dipped galvanized nails spaced approximately 6" apart (and at both ends), staggered vertically toward the top and bottom edges.
4. Deck clips are 12 gauge galvanized steel with 3/16" holes for 16D galvanized spiral nail. Deck clips need to be staggered on beam flanges to prohibit lateral movement in both directions.
5. One row of deck clips is installed on every deck panel (approximately every 3'-6")

SAMPLE DRAWING

Project specific drawings will be generated upon receipt of signed contract and Notice to Proceed

ADM Welding and Fabrication, LLC
37 Broadhead Street
Warren, PA 16365

Phone: 814.723.7227
Fax: 814.723.7326

Email: admwelding@verizon.net
Website: www.admwelding.com

ADM Welding & Fabrication, LLC
Standard Modular Bridge

14'W x 50'L x HS25
vehicular load capacity (45-ton,
5-axle combination vehicle)
subject to a 10 MPH maximum
speed restriction

Sheet 1 of 2

Grade 50 steel with epoxy primer and urethane topcoat



LEGEND

	EXISTING PROPERTY LINE
	EXISTING RIGHT-OF-WAY
	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING PAVED ROADWAY
	EXISTING UNPAVED DRIVEWAY
	EXISTING FENCE
	EXISTING GUIDERAIL
	EXISTING GAS LINE
	EXISTING EPHEMERAL STREAM
	EXISTING INTERMITTENT STREAM
	EXISTING PERENNIAL STREAM
	APPROXIMATE EXISTING STREAM BANKS (NOT DELINEATED BY CEC)
	EXISTING WETLAND
	FEMA ZONE AE FLOODPLAIN
	EXISTING TREELINE
	EXISTING BUILDING
	PROPOSED GRAVEL
	PROPOSED STANDARD PARKING STALLS AND STRIPING
	PROPOSED ASPHALT PAVEMENT
	PROPOSED GAS LINE
	PROPOSED GUIDERAIL
	PROPOSED FENCE
	PROPOSED TREE CLEARING WITHOUT GRUBBING
	PROPOSED TREE LINE
	APPROXIMATE STREAM CENTERLINE
	PRE-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
	POST-DEVELOPMENT 100-YEAR FLOODPLAIN LIMITS
	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR

ALL THE THREE (3) TRACTS OF LAND SITUATE ON THE WATERS OF BUCKEYE FORK AND MEATHOUSE FORK, 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 EVEN 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 47-1/2 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, 3-3/4 POLES TO A STONE; SOUTH 2-1/2 DEGREES EAST, 24.5 POLES TO A CHESTNUT; SOUTH 26 DEGREES WEST, 9 POLES TO A STONE; SOUTH 2 DEGREES WEST, 20.9 POLES TO A BEECH; SOUTH 5-3/4 DEGREES EAST, 29 X 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, 3-1/2 POLES TO A MAPLE; SOUTH 79-7/8 DEGREES EAST, 24-1/2 POLES TO A STONE; NORTH 62 DEGREES EAST, 9-3/4 POLES TO A WHITE OAK; SOUTH 66-1/4 DEGREES EAST, 35.5 POLES TO A LOCUST; SOUTH 70-1/2 DEGREES EAST, 11.5 POLES TO A SUGAR; SOUTH 81-1/2 DEGREES EAST, 16.1 POLES TO A LOCUST; SOUTH 88-3/4 DEGREES EAST, 17.4 POLES TO A CHESTNUT OAK; NORTH 69-1/2 DEGREES EAST, 7.4 POLES TO A WHITE OAK; SOUTH 32 DEGREES EAST, 45-1/4 POLES TO A STONE; SOUTH 84-1/2 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, 26-1/4 POLES TO A STONE; SOUTH 60 DEGREES WEST, 37 POLES TO A STONE; SOUTH 88-1/4 DEGREES WEST, 25 POLES TO A STONE; SOUTH 60 DEGREES WEST, 15 POLES TO A STONE; SOUTH 77-1/2 DEGREES WEST, 10-3/4 POLES TO A DOUBLE CHESTNUT OAK; SOUTH 85 DEGREES WEST, 2-1/4 POLES TO A STAKE; THENCE WITH LINES AS SURVEYED IN JULY, 1947, (IN REVERSE) NORTH 23-1/2 DEGREES WEST, 35 POLES TO A LEANING LOCUST; NORTH 20-1/2 DEGREES WEST, 15.5 POLES TO A LOCUST (DEAD); NORTH 9-1/2 DEGREES WEST, 19.6 POLES TO A STAKE; NORTH 44-1/2 DEGREES EAST, 12.36 POLES TO A STAKE; NORTH 39-1/2 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, 12-1/4 POLES TO A STONE; NORTH 83 DEGREES WEST, 11-1/4 POLES TO A STONE CORNER TO LAND OF JOHN L. DAVISSON, AND WITH THREE LINES OF SAME, NORTH 82-1/4 DEGREES WEST, 29 POLES TO A STONE IN LOW GAP; NORTH 76-3/4 DEGREES WEST, 35-3/4 POLES TO A HICKORY STUMP; SOUTH 60 DEGREES WEST, 4-1/4 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, 26-1/2 POLES TO A STONE AND LOCUST BUSH IN LINE OF LAND OF JOHN FITZWILLIAMS AND WITH SAME NORTH 83-1/2 DEGREES EAST, 128 POLES TO THE BEGINNING, CONTAINING 24-1/2 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, 103 POLES TO A STAKE; THENCE SOUTH 39-1/2 DEGREES WEST, 12.2 POLES TO A STAKE; THENCE SOUTH 44-1/2 DEGREES WEST, 12.36 POLES TO A STAKE; THENCE SOUTH 9-1/2 DEGREES EAST, 19.6 POLES TO A DEAD LOCUST; THENCE SOUTH 20-1/2 DEGREES EAST, 15.5 POLES TO A LEANING LOCUST; THENCE SOUTH 23-1/2 DEGREES EAST, 35 POLES TO A STAKE; THENCE SOUTH 85 DEGREES WEST, 48-1/4 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, 16-1/4 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 42-1/2 DEGREES WEST, 14 POLES TO A LOCUST; THENCE NORTH 18 DEGREES WEST, 23 POLES TO A STONE; THENCE NORTH 51-1/2 DEGREES WEST, 105 POLES TO A STONE; THENCE NORTH 17-1/2 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 25 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, 26-1/4 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 51-1/2 DEGREES WEST, 102.5 POLES TO THE CENTER OF THE CREEK; THENCE NORTH 18-1/2 DEGREES EAST, 11-1/2 POLES TO A STAKE; THENCE NORTH 58 DEGREES EAST, 3 POLES TO A STONE; THENCE SOUTH 50-1/2 DEGREES EAST, 91 POLES TO A STONE; THENCE SOUTH 9-1/2 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.

REVISION RECORD

NO.	DATE	DESCRIPTION

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

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

FLOODPLAIN SITE PLAN

TGU
 ARG
 DATE: 9/8/17
 DWS SCALE: 1"=200'
 PROJECT NO: 130-358-0209
 APPROVED BY: *HAND SIGNATURE ON FILE

DRAWING NO: **SP03**

P:\2017\130-358-0209\130-358-0209-CIVIL-01\1518172017 - 10.mxd - LP 9/8/2017 12:58 PM

- REFERENCE**
- EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING AERIAL SURVEY DATA PREPARED BY NOR EAST MAPPING, INC. AND SUPPLEMENTED BY FIELD SURVEYS CONDUCTED BY CEC. TOPOGRAPHY REFERENCES THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). CONTRACTOR IS TO VERIFY ALL ELEVATIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
 - STREAM AND WETLAND DELINEATION COMPLETED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. IN JUNE 2017.
 - EXISTING GAS LINES LOCATED BY CEC IN JUNE AND JULY 2017.
 - FLOODPLAIN BOUNDARY FROM FEMA FIRM PANEL 54017C0140C, EFFECTIVE 10/4/2011.

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

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

Prepared for:

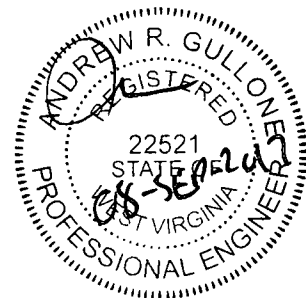
SHERWOOD MIDSTREAM LLC

Prepared by:

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

CEC Project 130-359.0209

September 2017



Civil & Environmental Consultants, Inc.

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1.1 Background.....	1
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4.3 Summary.....	5

APPENDICES

Appendix A – Site Location, and WV Flood Maps

Appendix B – FEMA Flood Insurance Study and FIRM

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

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

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

1.0 INTRODUCTION

1.1 BACKGROUND

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

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

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

1.2 PURPOSE

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

2.0 HYDROLOGIC ANALYSIS

2.1 METHODOLOGY

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

3.0 HYDRAULIC ANALYSIS

3.1 METHODOLOGY

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

3.2 EXISTING CONDITIONS

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

3.3 PROPOSED CONDITIONS

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

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

4.0 CONCLUSIONS

4.1 EXISTING CONDITIONS

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

4.2 PROPOSED CONDITIONS

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

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

4.3 SUMMARY

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

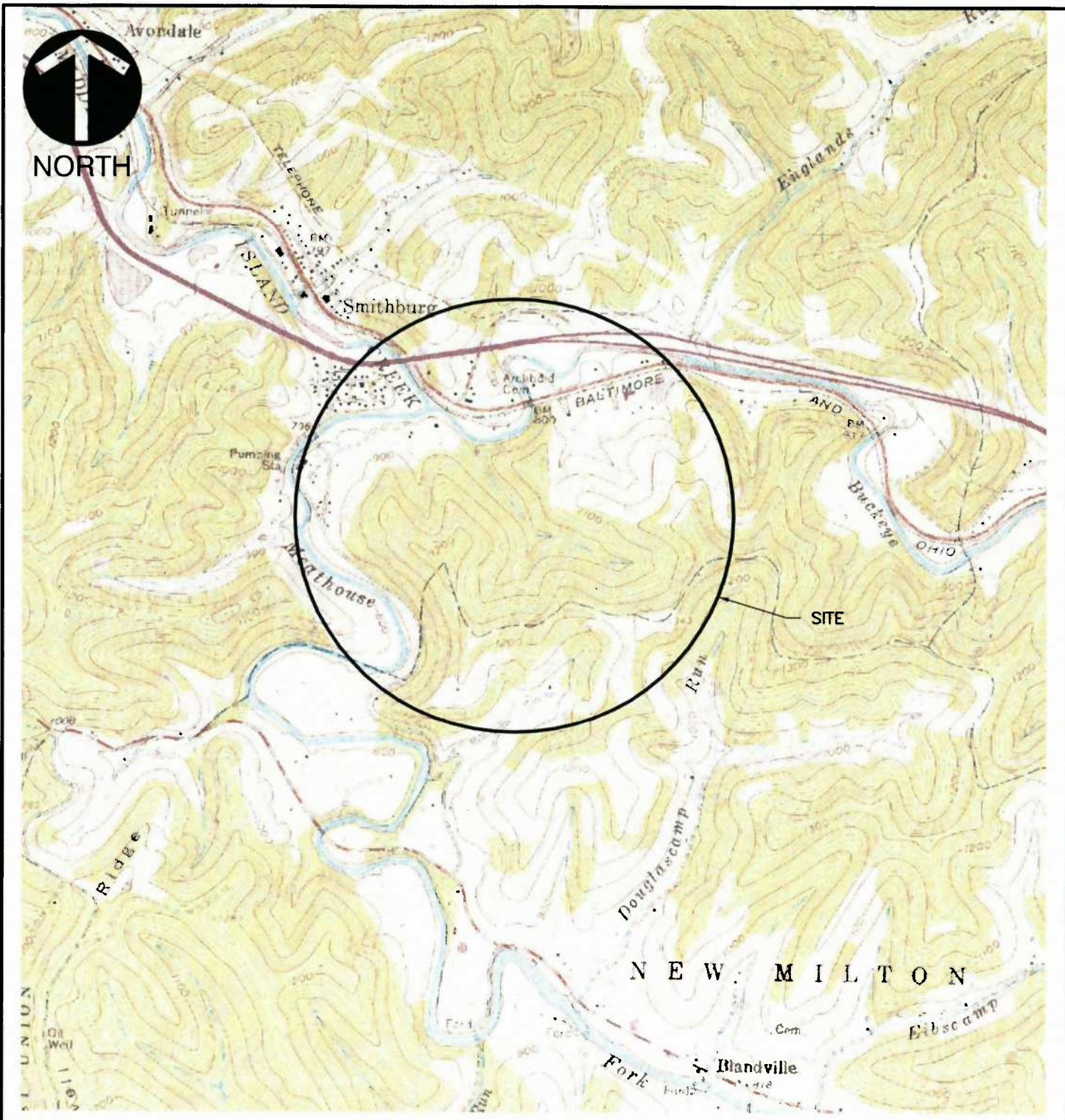
- The WSEL will increase in the proposed conditions from section 14+49 (M) to 18+60 (DD) along Meathouse Fork by a maximum of 0.09' during the 100-year, 24-hour storm event. The 0.09' increase is within the FEMA and Doddridge County allowable limit increase of one foot.
- The WSEL will not increase upstream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

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

Appendix A

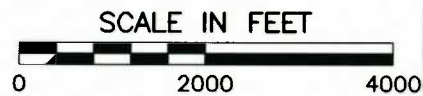
APPENDIX A

SITE LOCATION AND WV FLOOD MAPS



REFERENCE

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



Civil & Environmental Consultants, Inc.

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 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:	ARG	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\LAYOUT\LS(01/09/2017 - btomiczek) - LP: 9/1/2017 4:35 PM

WV Flood Map



— Cross Section (XS) Lines

Base Flood Elevation (BFE) Lines - FIRM or DFIRM. Its purpose is to assist with determining potential flood risk for the selected location.

- ~ 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

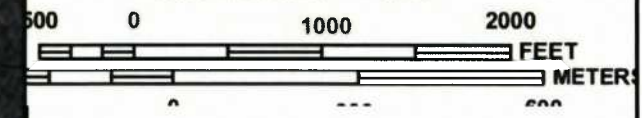
Flood Hazard Area:
 Flood Hazard Area: Location is NOT WITHIN identified flood hazard area, but within 75 feet of an identified

Flood Hazard Zone: N/A
Stream: N/A
FEMA Issued Flood Map: 54017C0140C
Watershed (HUC8): Little Musringum-Middle Island (50302C)
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'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

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

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

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

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

MAP NUMBER
 54017C0140C
 MAP REVISED
 OCTOBER 4, 2011
 Federal Emergency Management Agency

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

Appendix B

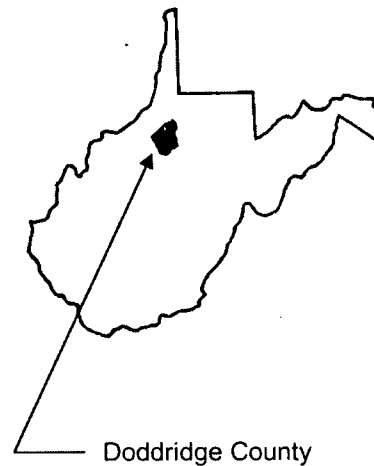
APPENDIX B

FEMA FLOOD INSURANCE STUDY AND FIRM

FLOOD INSURANCE STUDY



DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS



COMMUNITY NAME

WEST UNION, TOWN OF
DODDRIDGE COUNTY (UNINCORPORATED
AREAS)

COMMUNITY NUMBER

540025
540024



Effective: October 4, 2011

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
54017CV000A

**NOTICE TO
FLOOD INSURANCE STUDY USERS**

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

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

Initial Countywide FIS Effective Date: March 18, 1991

Flood Insurance Study Revised: October 4, 2011

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

1.0 INTRODUCTION

1.1 Purpose of Study

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

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

1.2 Authority and Acknowledgments

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

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

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

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

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

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

1.3 Coordination

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

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

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

2.0 AREA STUDIED

2.1 Scope of Study

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

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

Table 1 – Areas Studied by Detailed Methods

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

Table 1 – Areas Studied by Detailed Methods - continued

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

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

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

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

2.2 Community Description

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

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

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

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

2.3 Principal Flood Problems

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

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

2.4 Flood Protection Measures

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

3.0 ENGINEERING METHODS

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

3.1 Hydrologic-Analyses

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

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

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

Table 2 – Summary of Discharges

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

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

3.2 Hydraulic Analyses

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

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

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

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

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

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

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

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

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

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

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

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

3.3 Vertical Datum

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

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

Table 3 – Vertical Datum Conversion Values

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

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

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

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

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

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

4.1 Floodplain Boundaries

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

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

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

4.2 Floodways

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

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

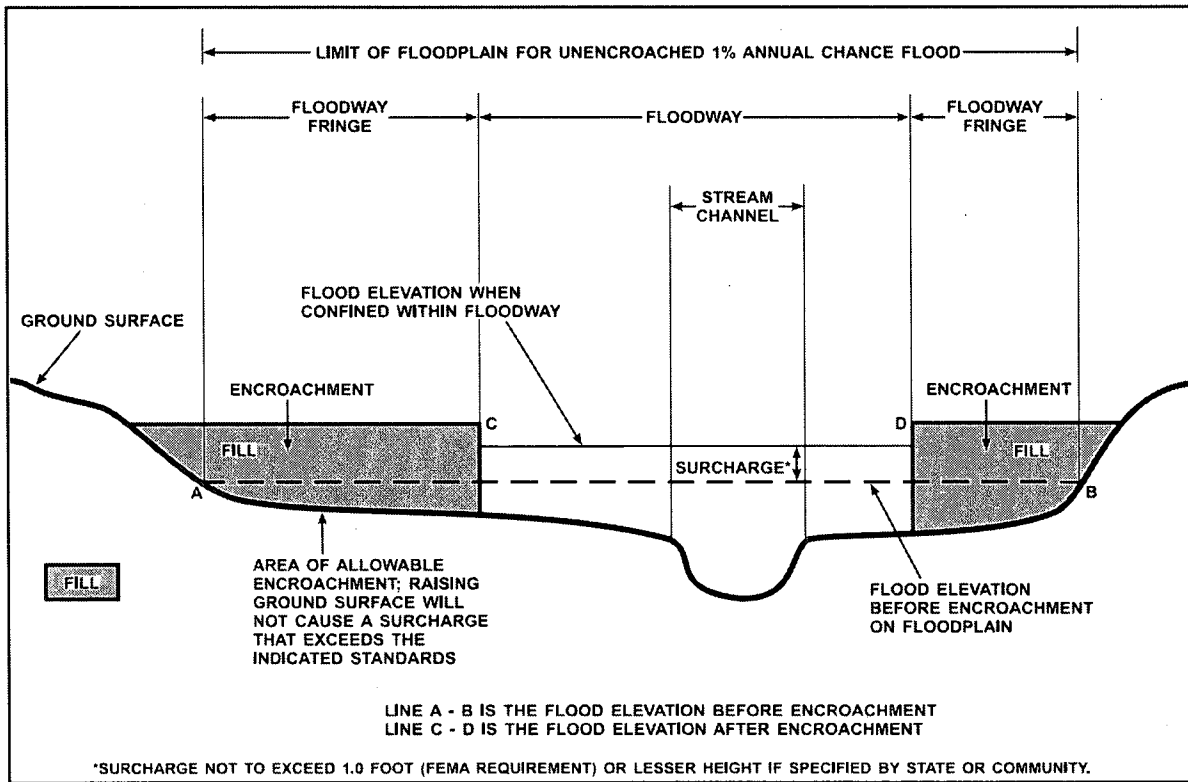


Figure 1 - Floodway Schematic

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

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

Zone AR

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

Zone A99

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

Zone V

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

Zone VE

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

Zone X

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

Zone X (Future Base Flood)

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

Zone D

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

6.0 **FLOOD INSURANCE RATE MAP**

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

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

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

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

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

TABLE 4

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).

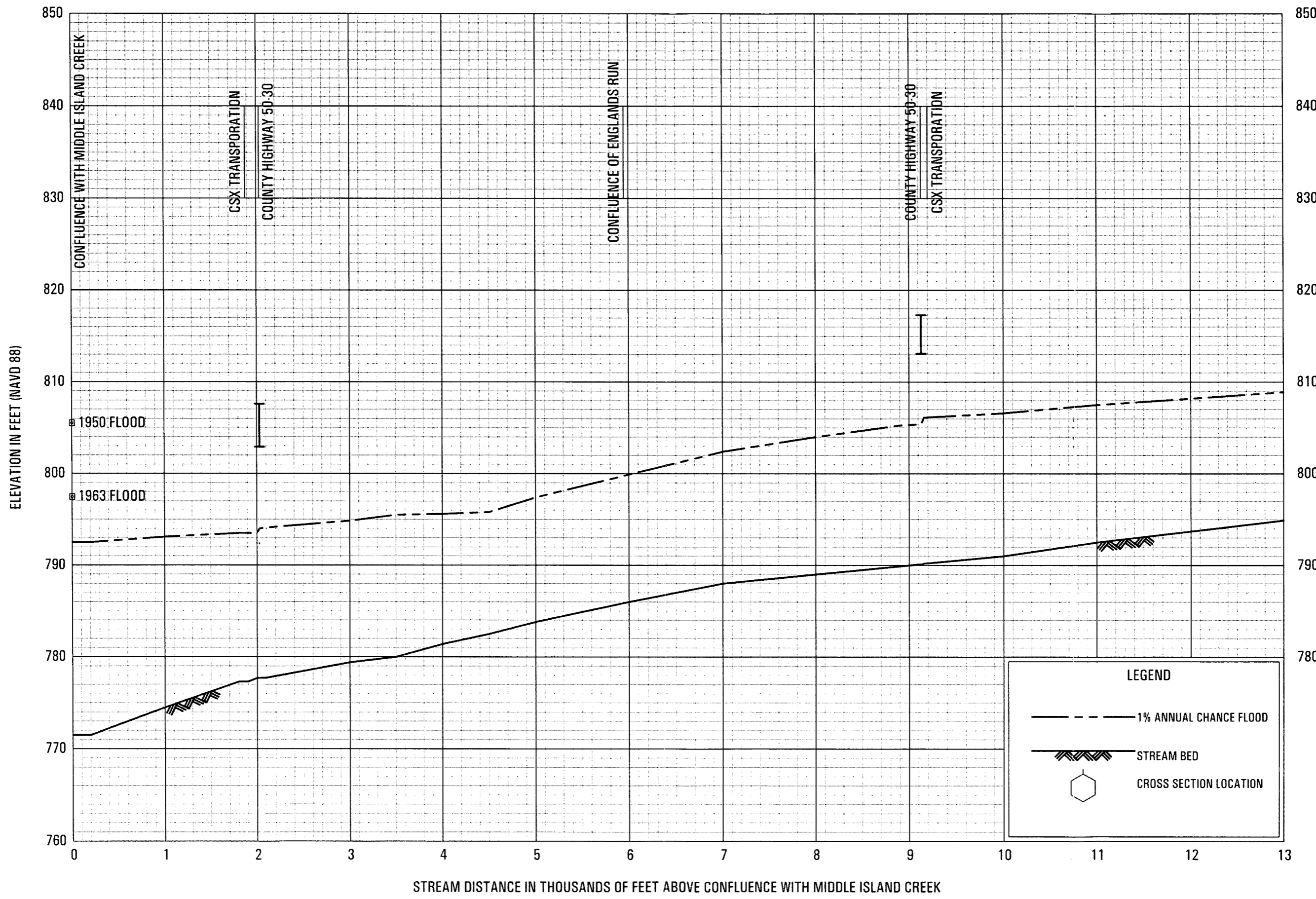
8.0 LOCATION OF DATA

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

1. Holmes, Darrell E., West Virginia Blue Book, Chapman Printing, 2005.
2. U. S. Department of the Interior, Geological Survey, Hydrology of Area 8, Eastern Coal Province, West Virginia, January 1987.
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.
4. U. S. Department of the Interior, Geological Survey, in cooperation with the West Virginia Department of Highways, Runoff Studies on Small Drainage Areas by G. S. Runner, Washington, D. C., October 1980.
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, Huntington 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.

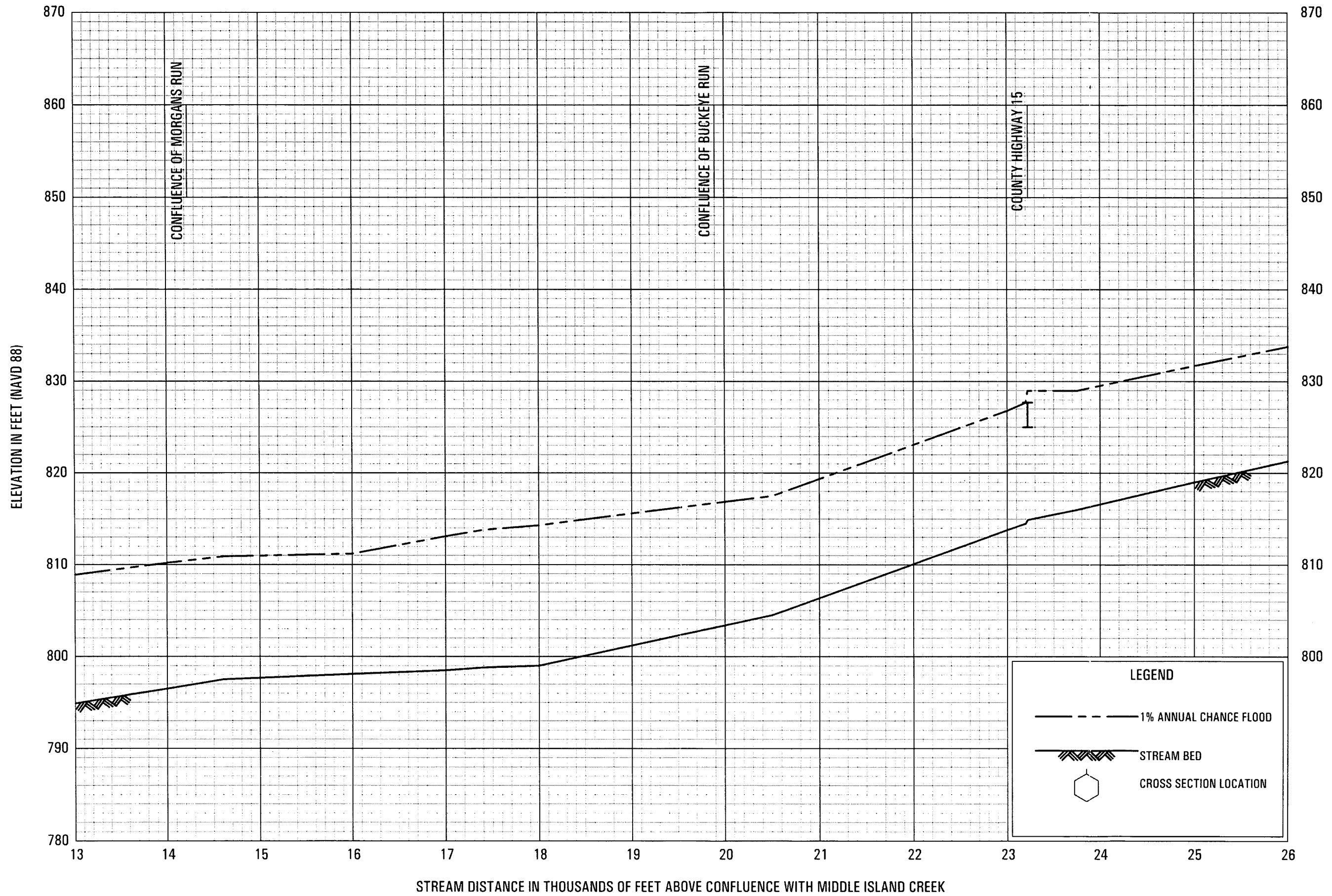
8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of West Union, Doddridge County, West Virginia, April 2, 1976.
9. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Unincorporated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

BUCKEYE CREEK

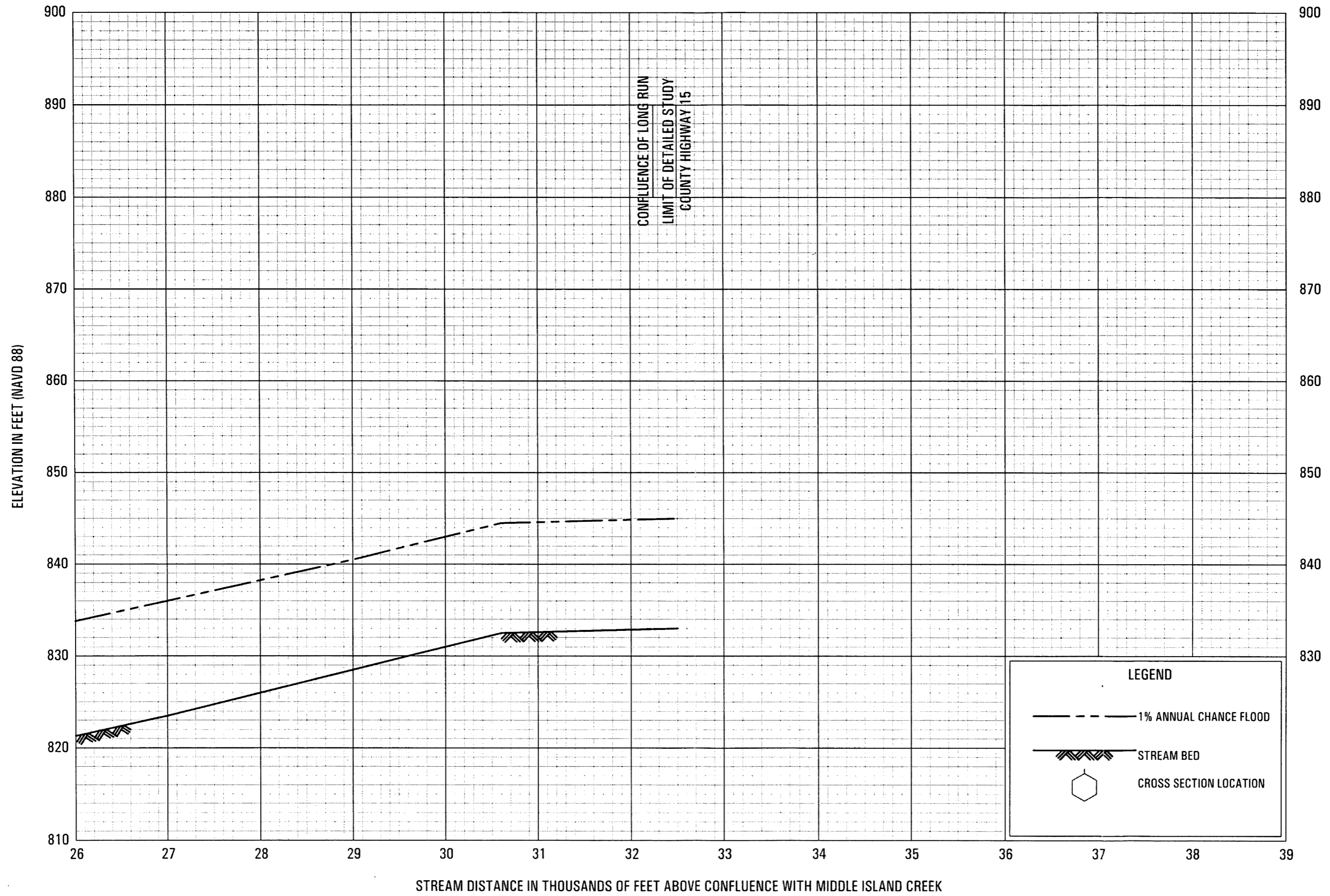
FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

BUCKEYE CREEK

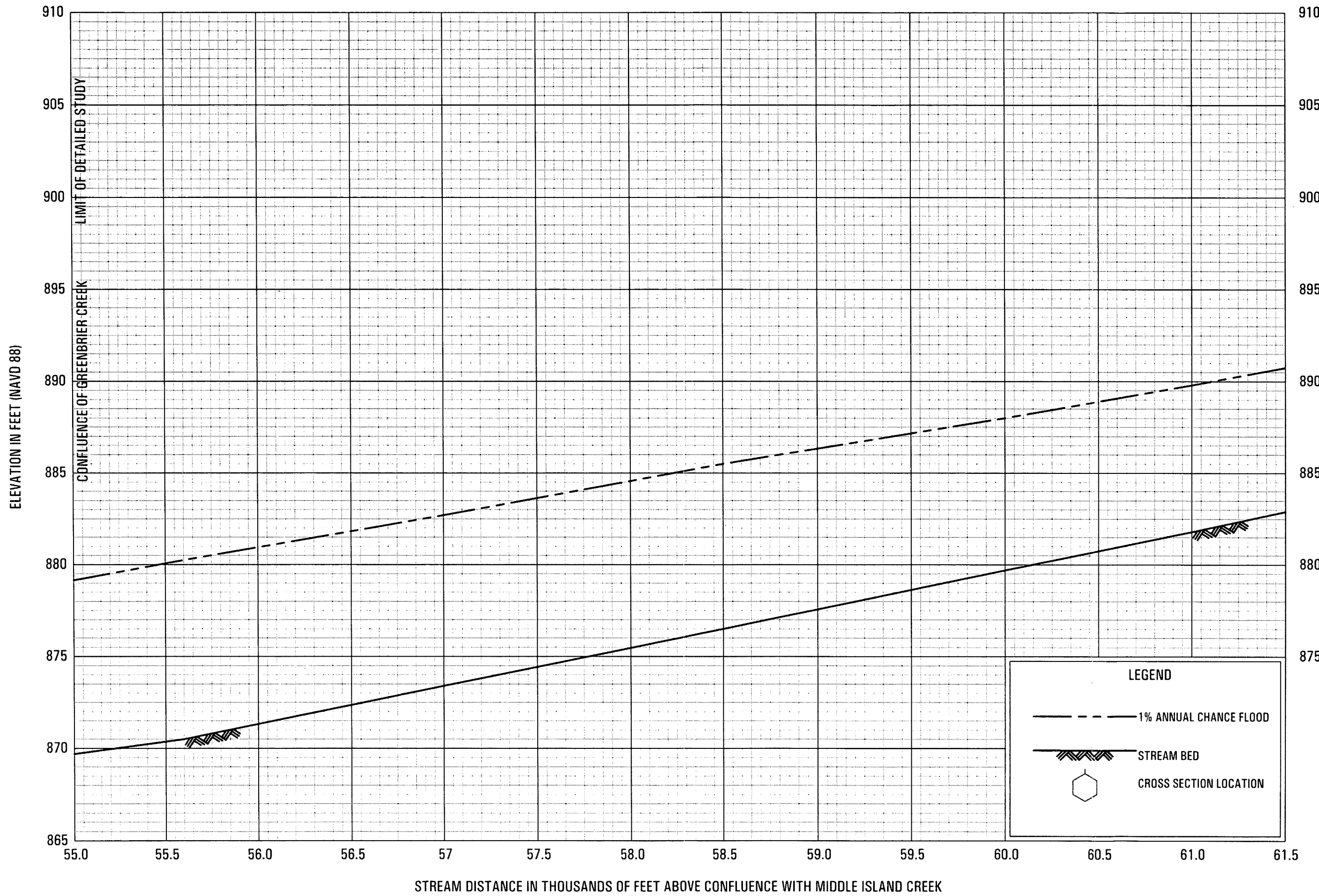
FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

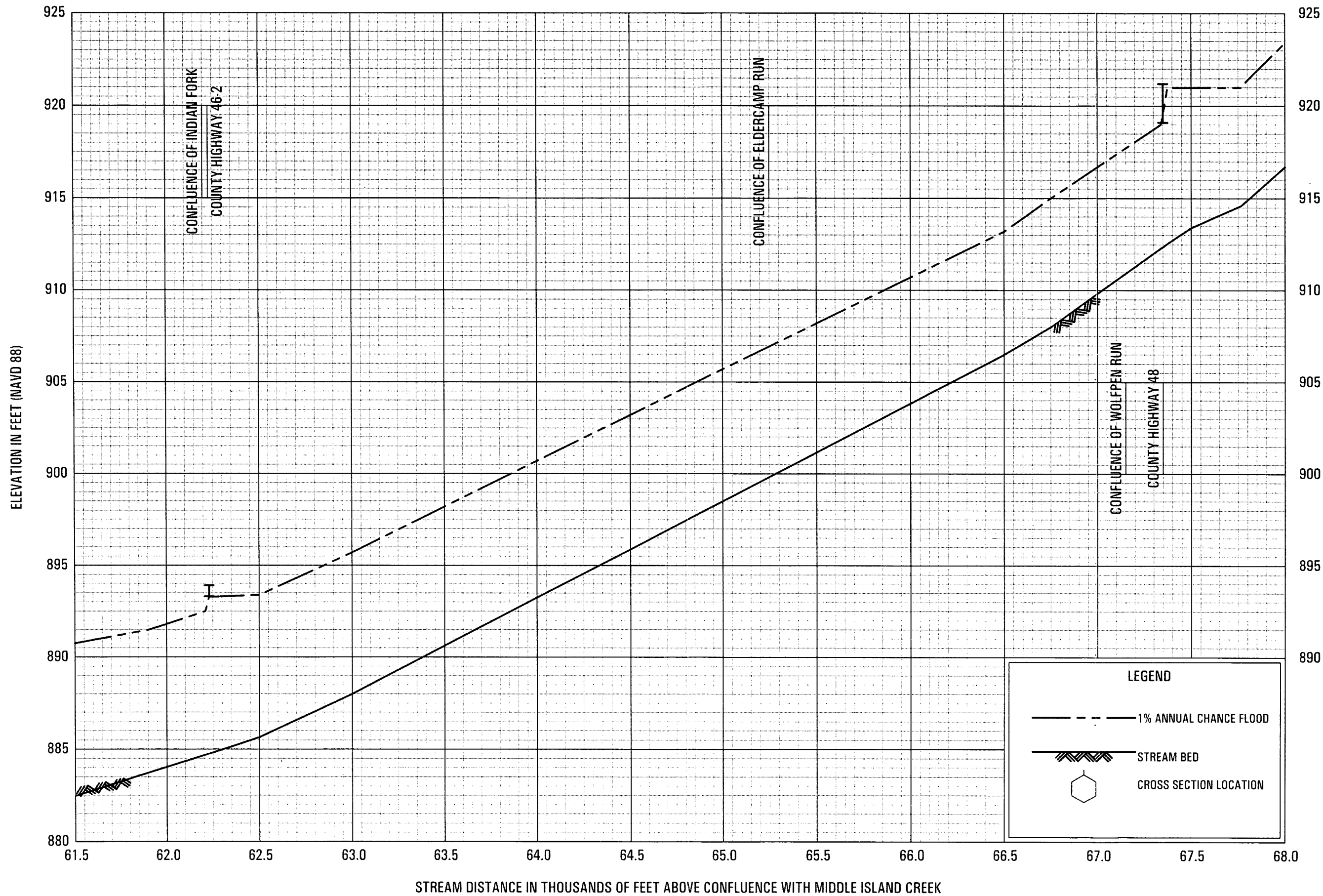


FLOOD PROFILES

BUCKEYE CREEK

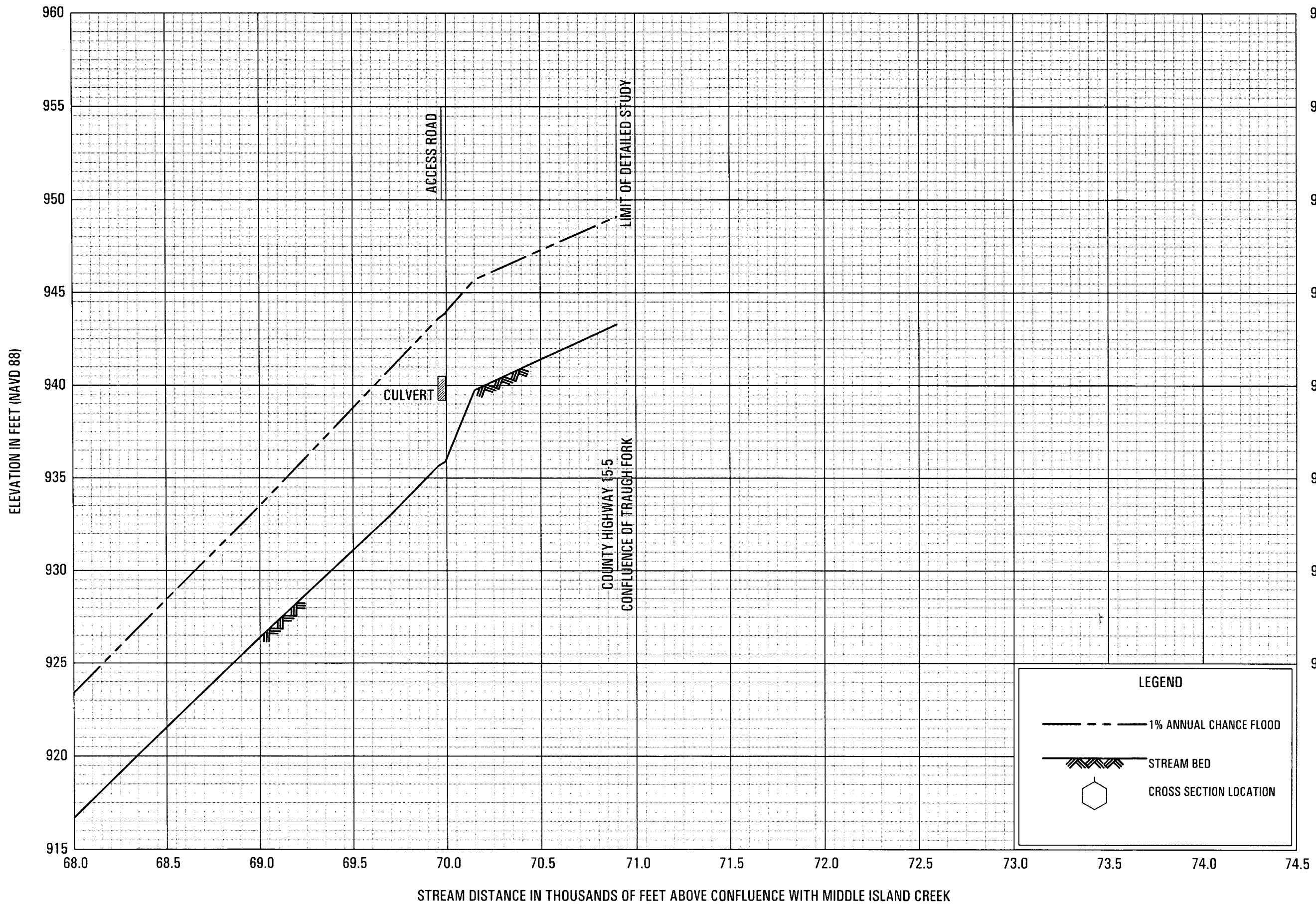
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

05P



FLOOD PROFILES
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS

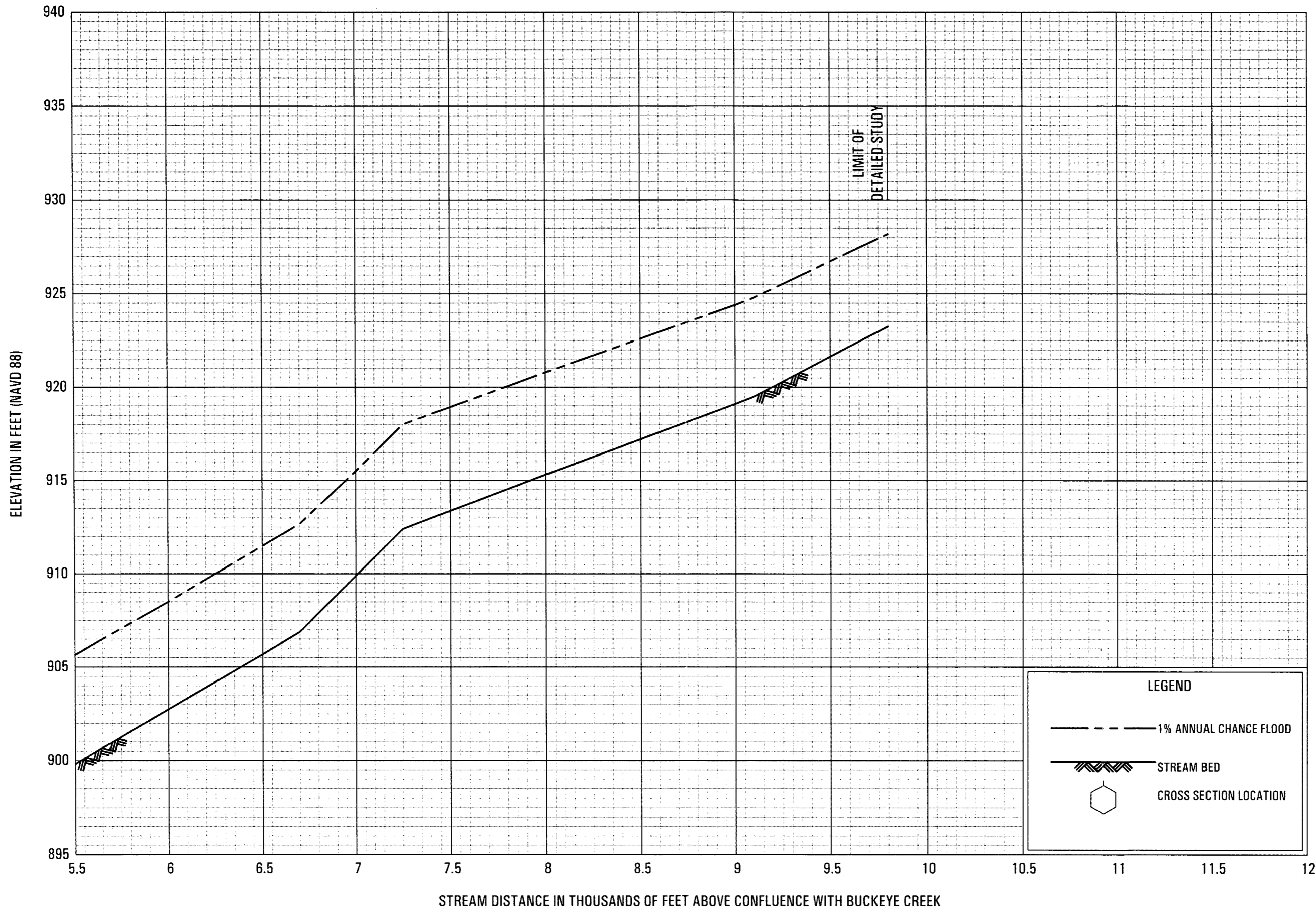


FLOOD PROFILES

BUCKEYE CREEK

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

07P



FLOOD PROFILES

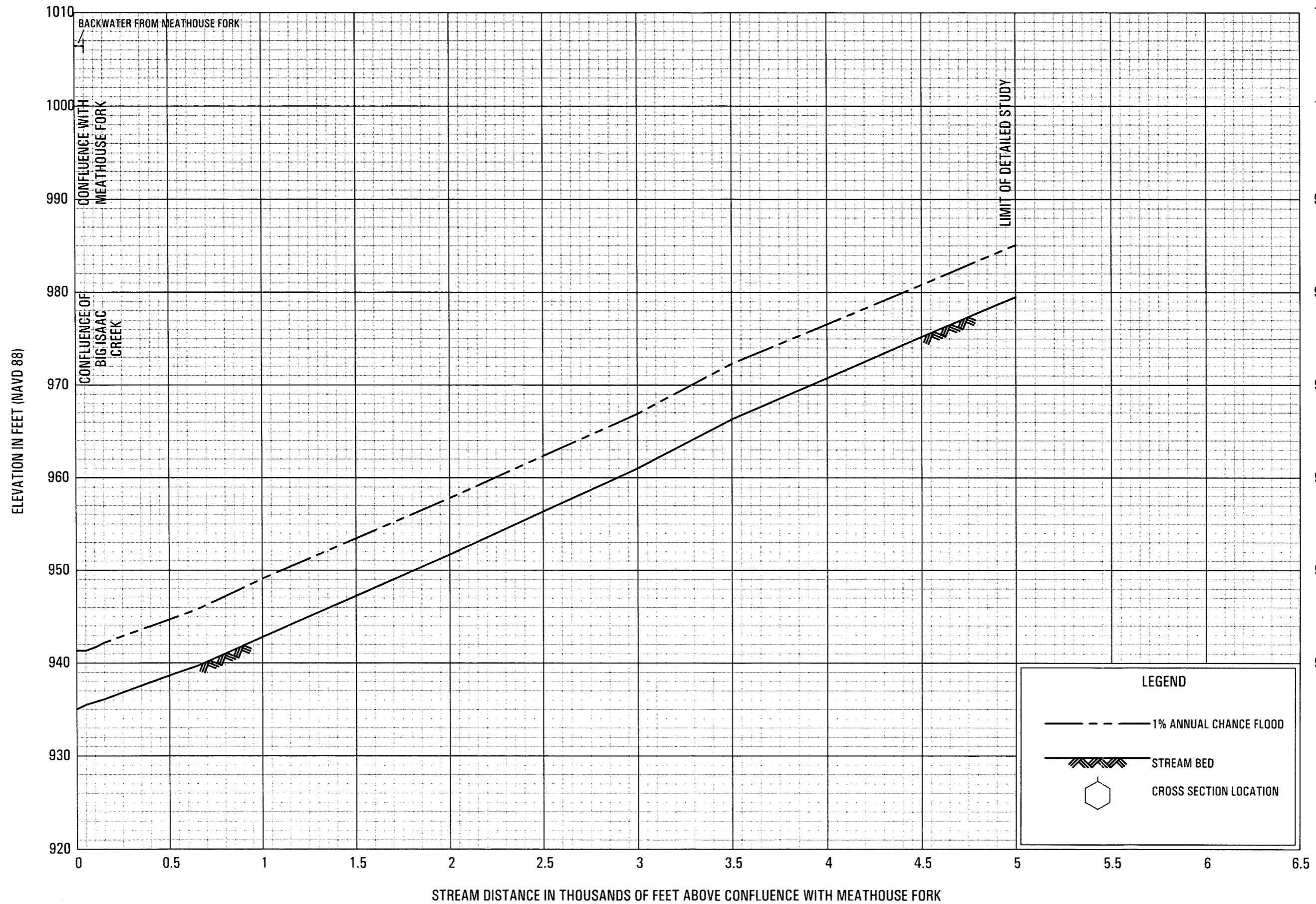
GREENBRIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

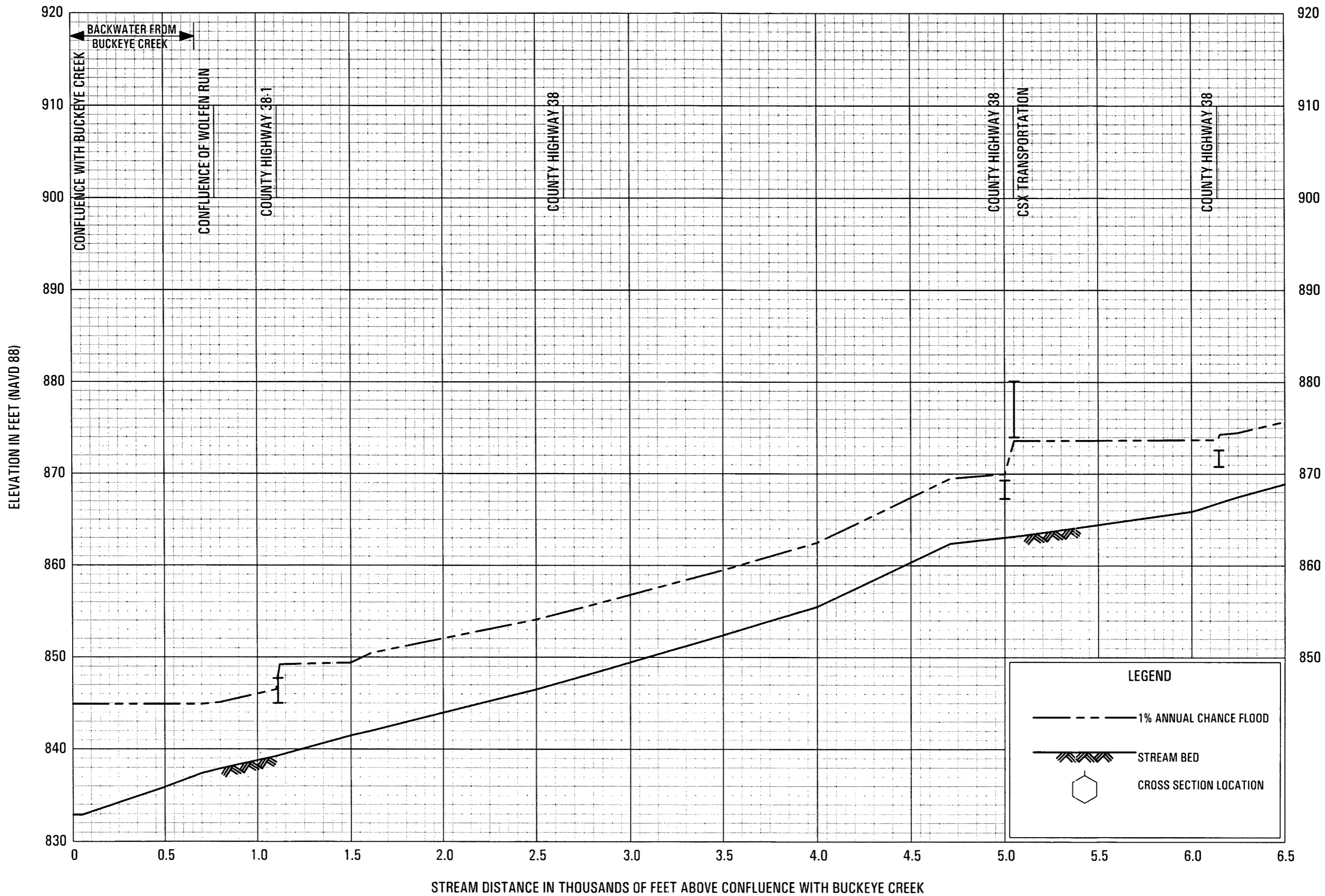
09P



FLOOD PROFILES

LAUREL RUN

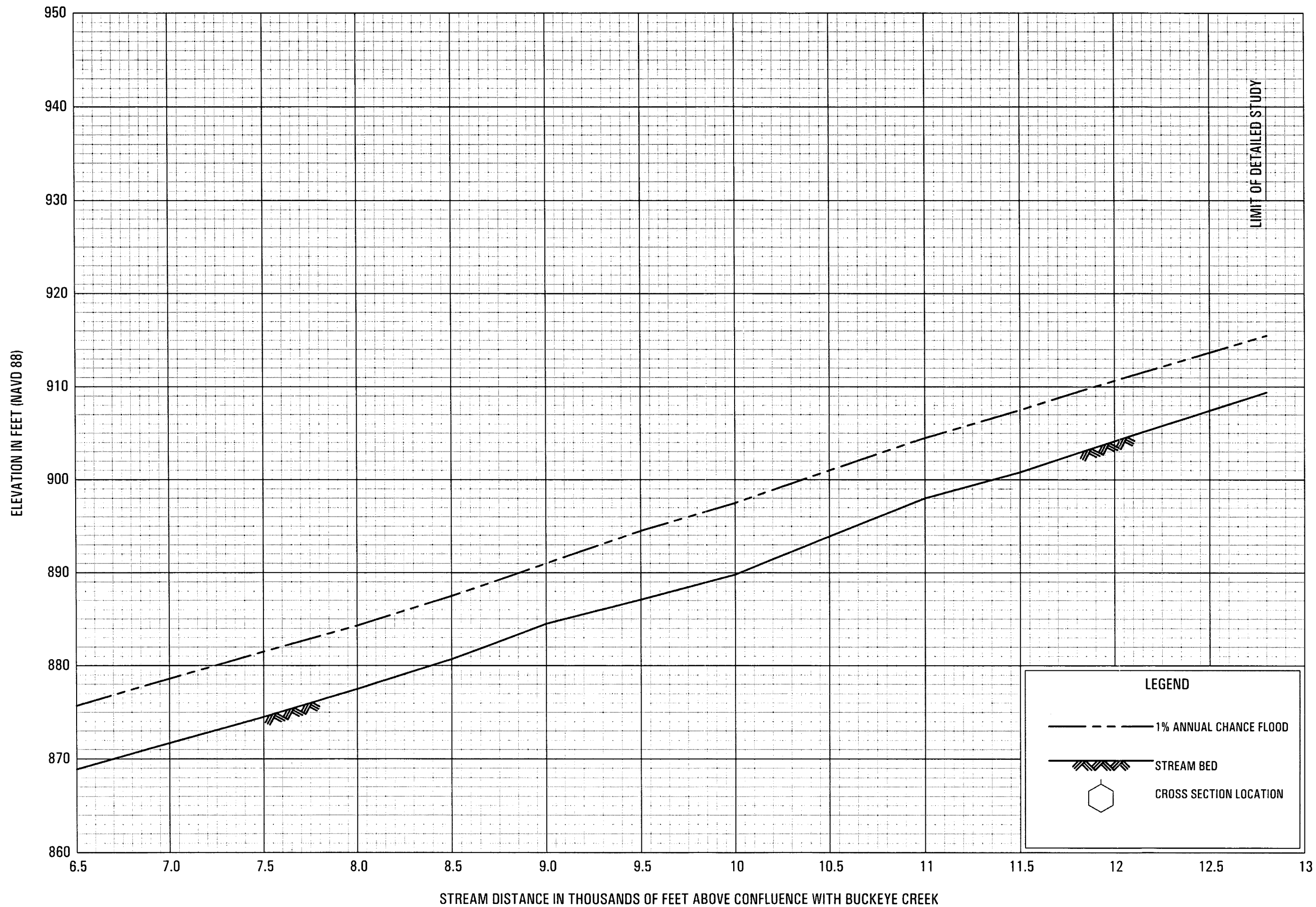
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

LONG RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

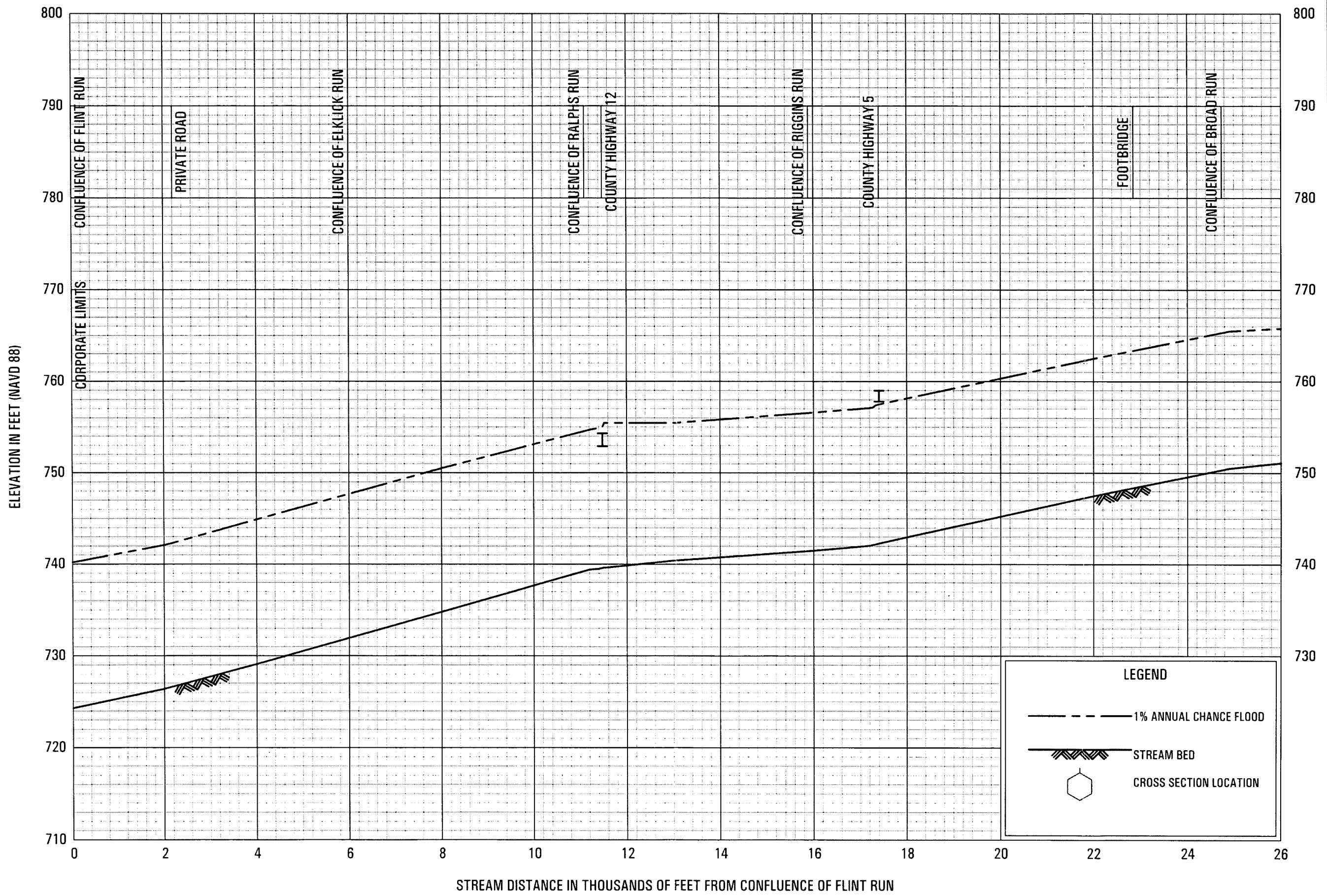


LEGEND

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

FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

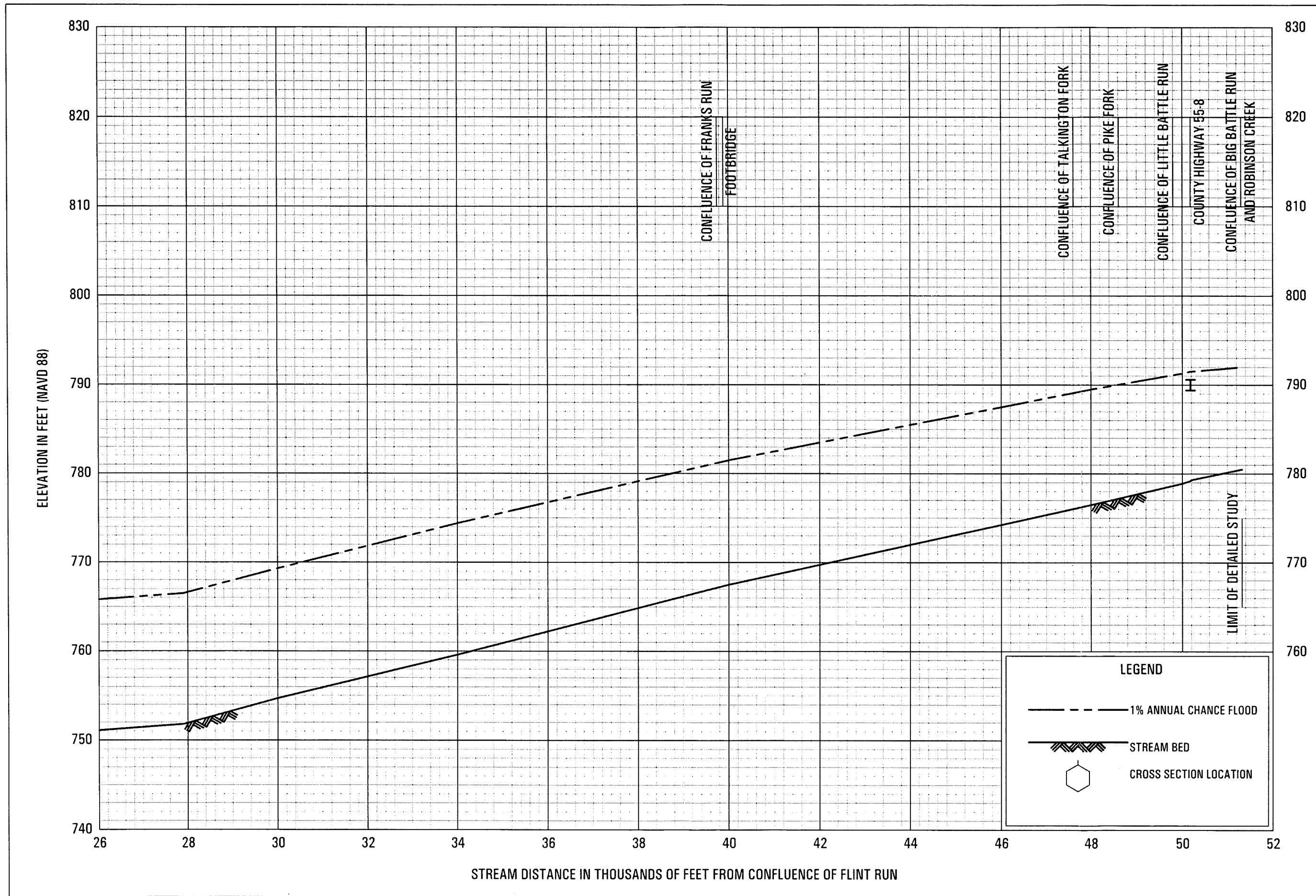
FLOOD PROFILES
 LONG RUN



FLOOD PROFILES

MCELROY CREEK

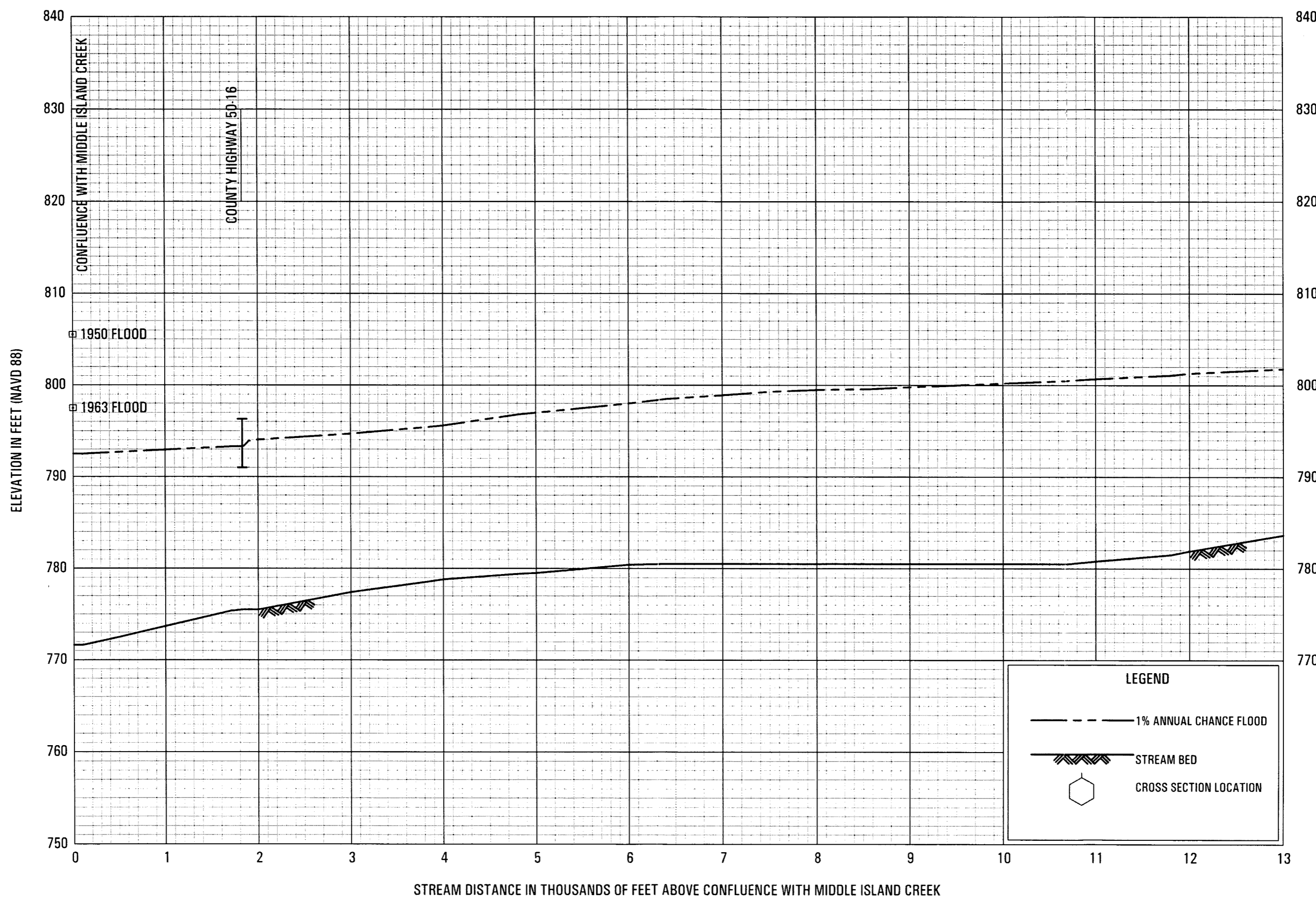
FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

MCELROY CREEK




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 AND INCORPORATED AREAS



ELEVATION IN FEET (NAVD 88)

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

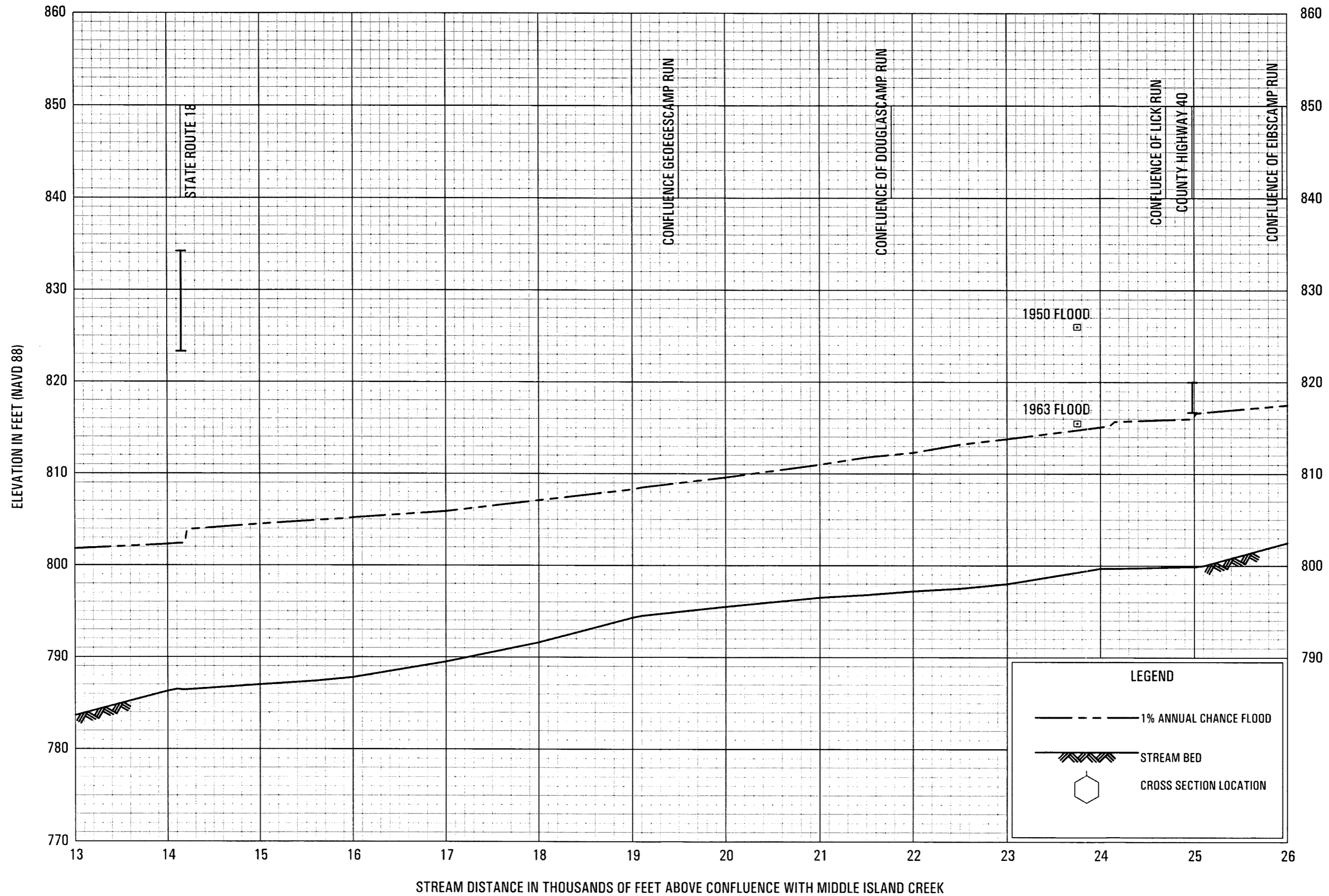
LEGEND

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

FLOOD PROFILES

MEATHOUSE FORK

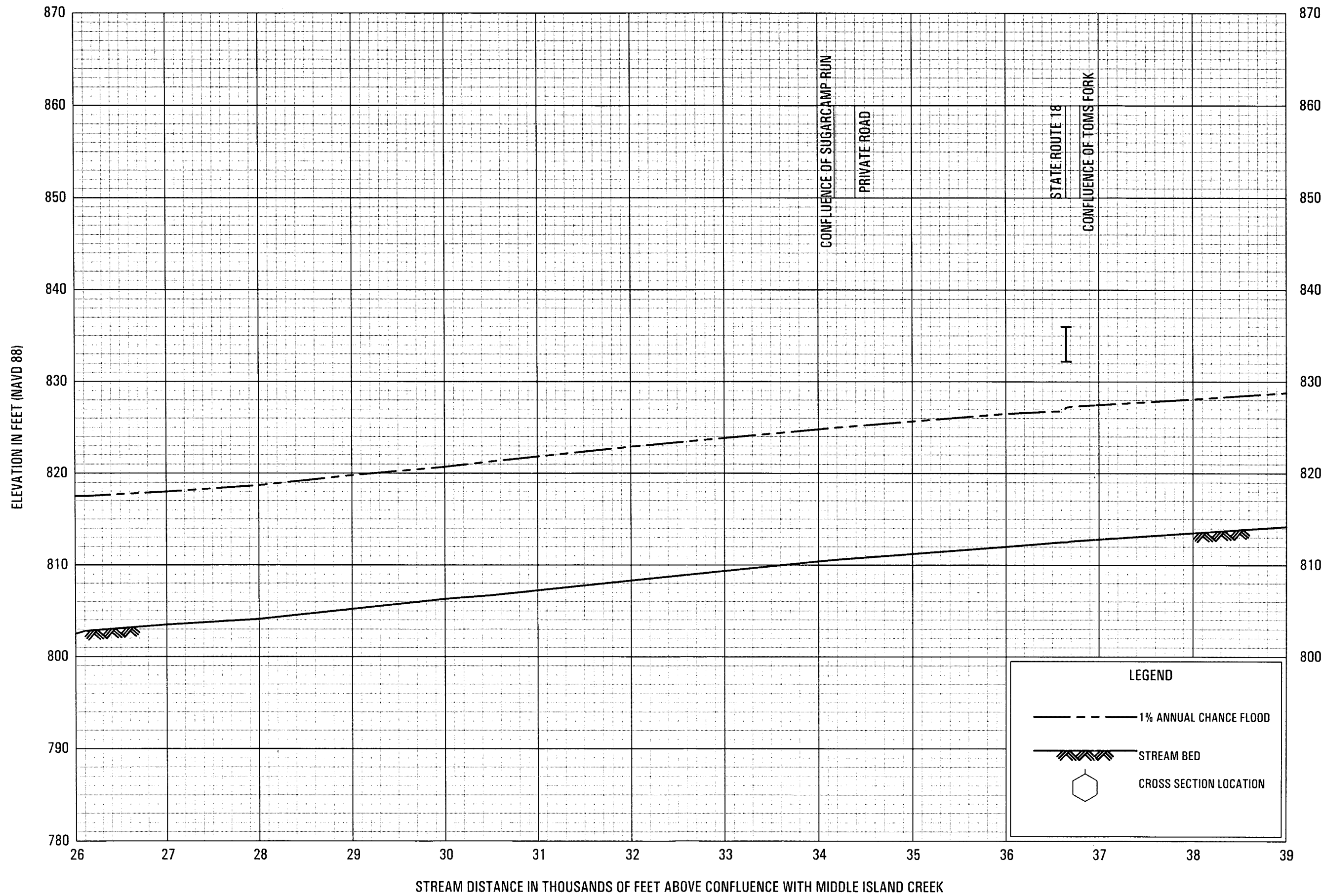
FEDERAL EMERGENCY MANAGEMENT AGENCY
 DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

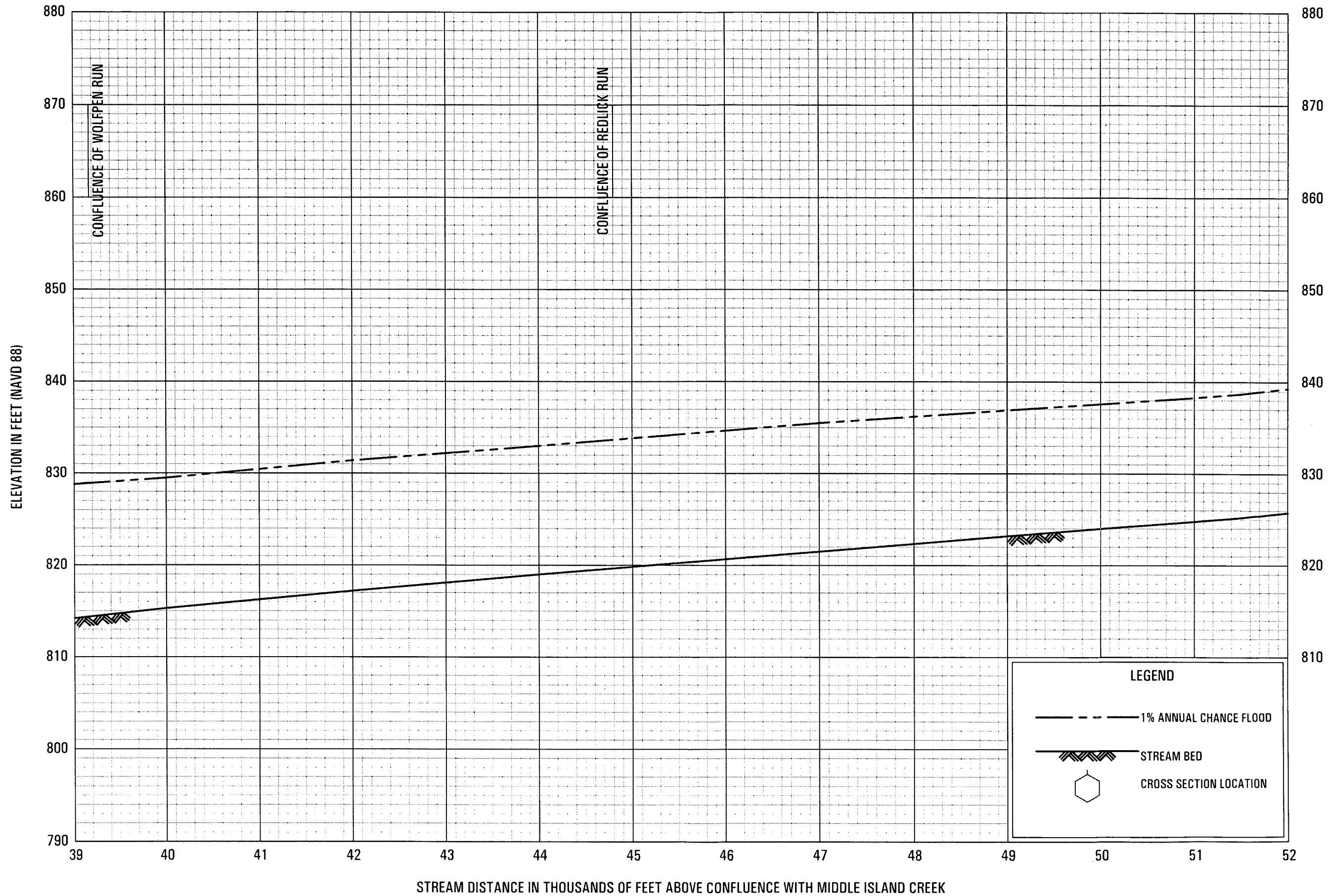
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



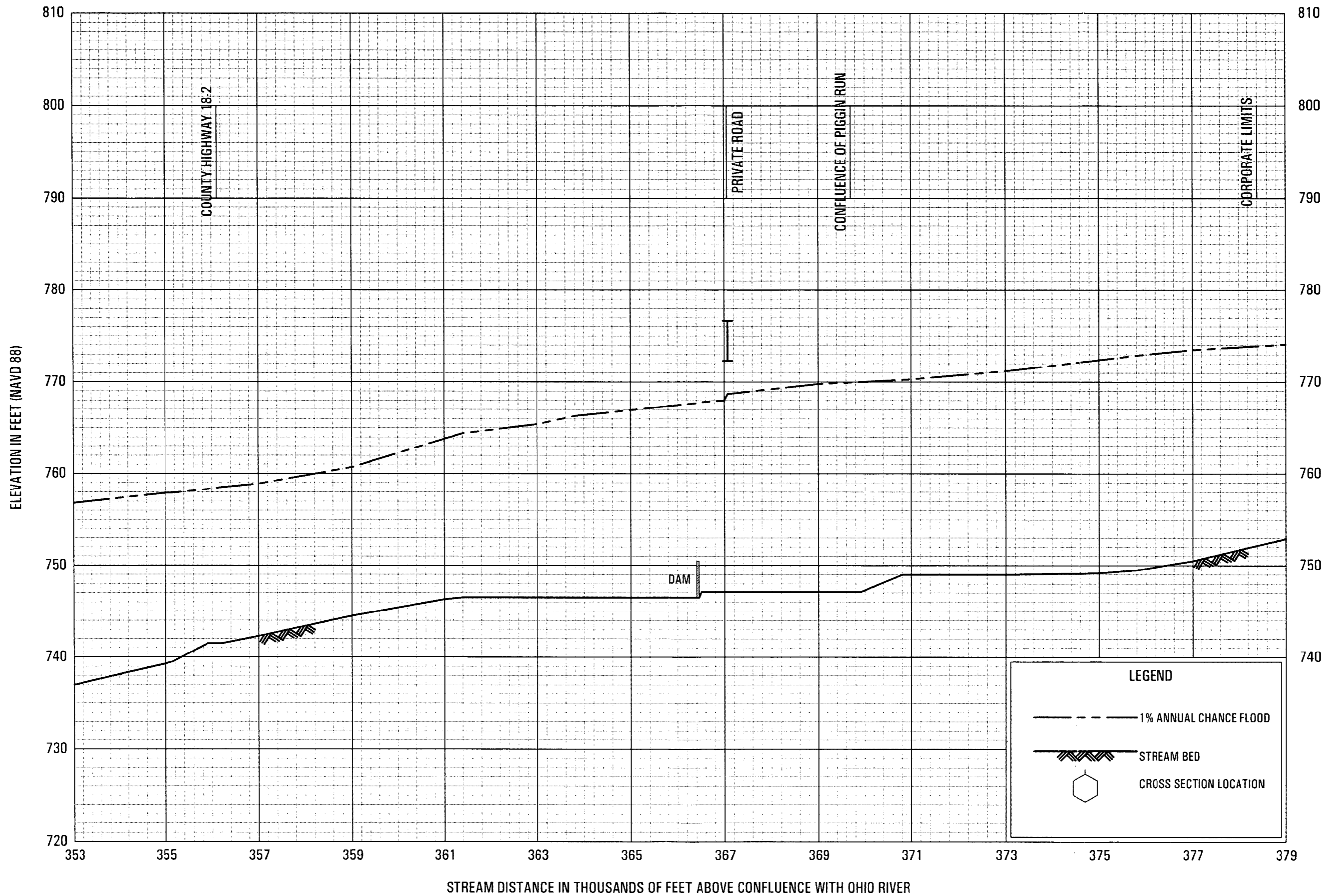
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MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY
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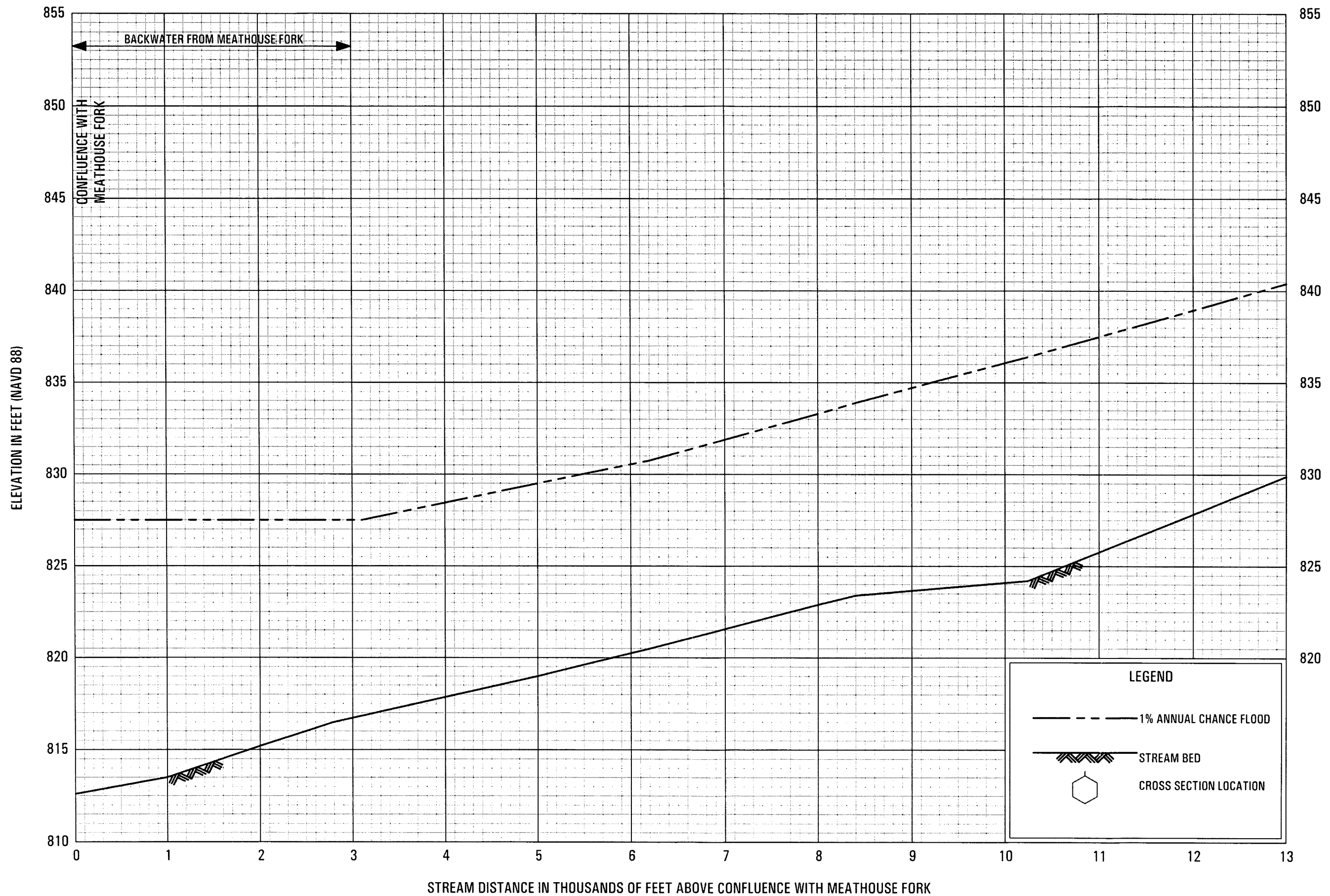
FLOOD PROFILES
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS



FLOOD PROFILES
MIDDLE ISLAND CREEK

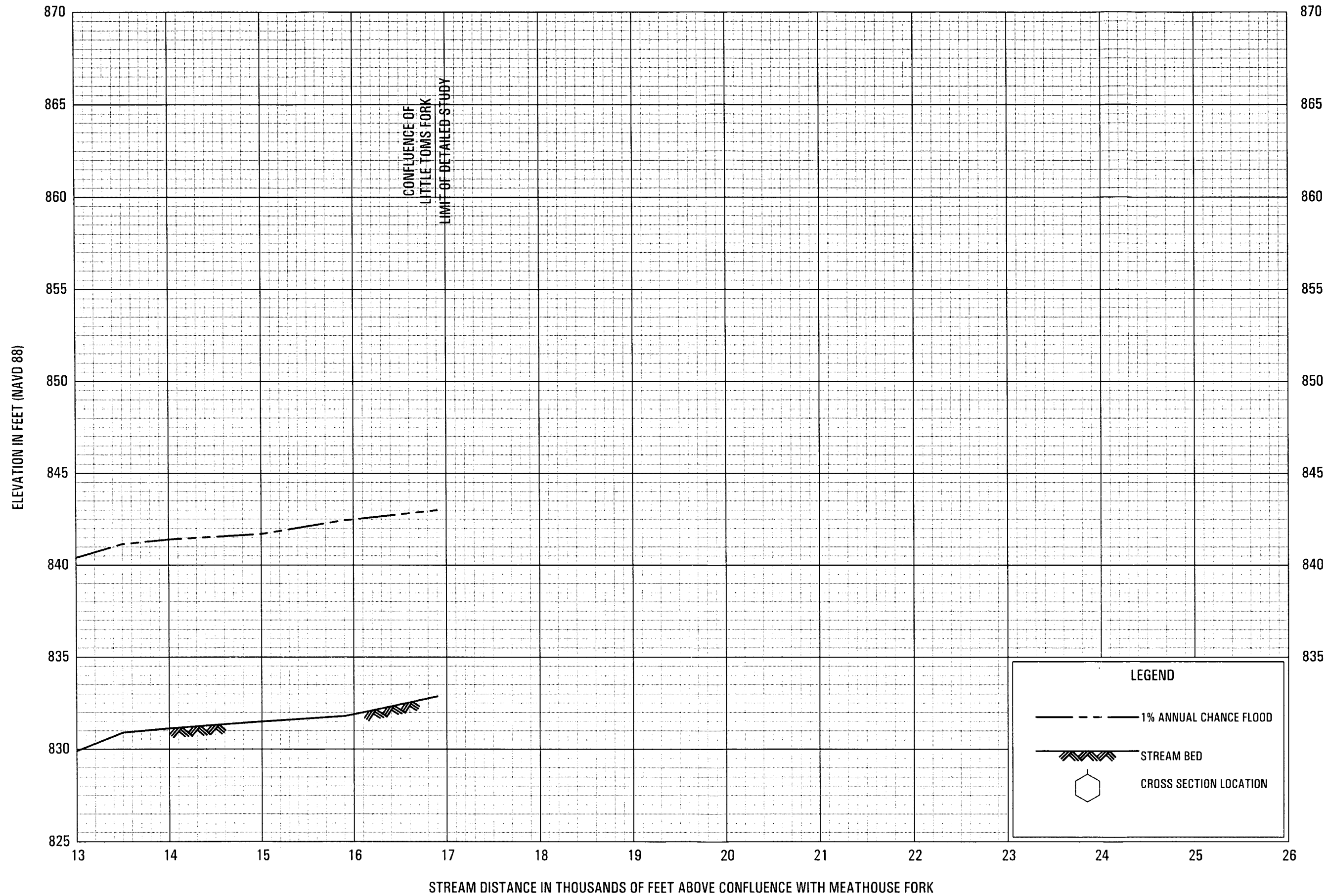
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DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS



FLOOD PROFILES

TOMS FORK

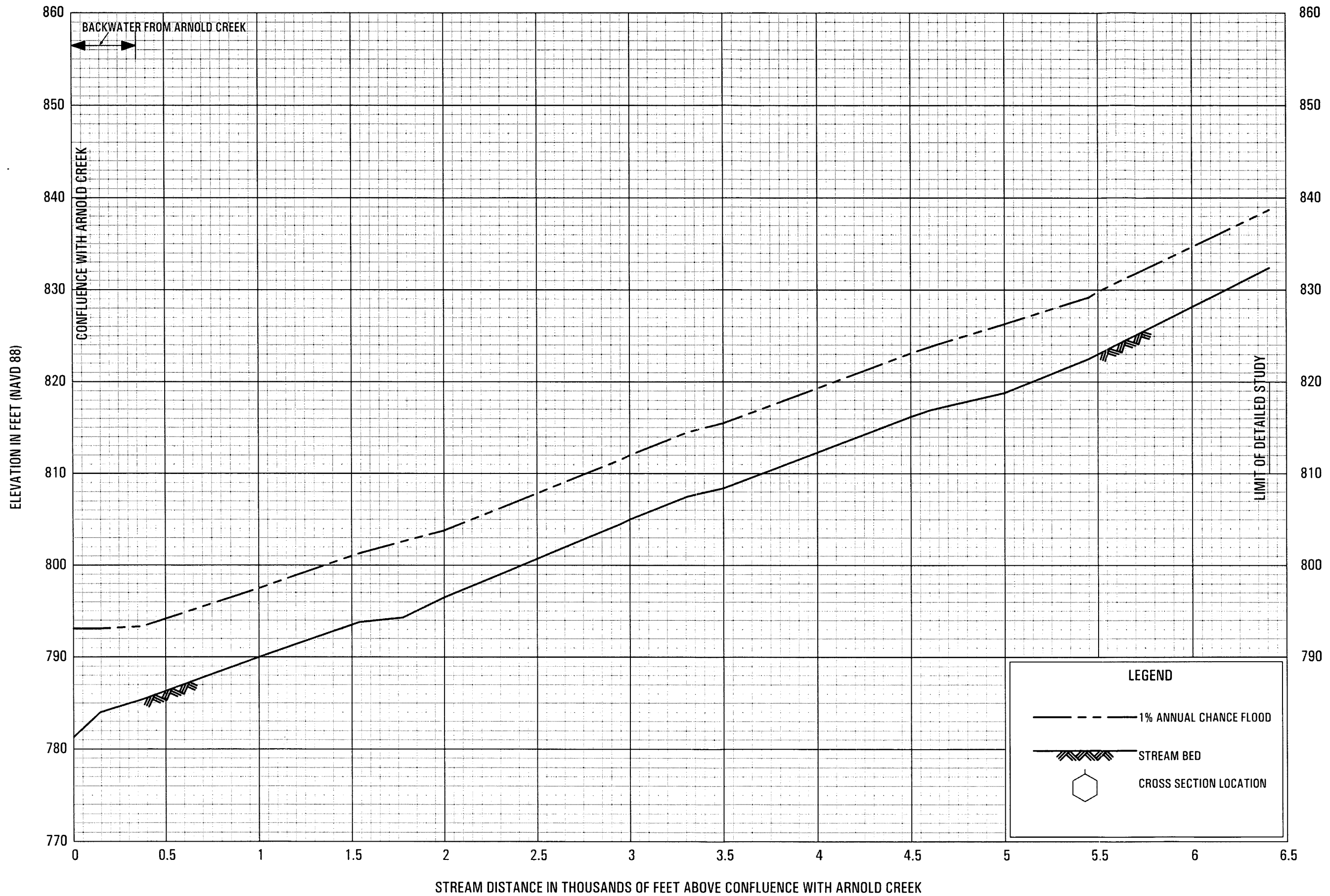
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS



FLOOD PROFILES

TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS



FLOOD PROFILES

WILHELM RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
 AND INCORPORATED AREAS

Appendix C

APPENDIX C

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

130359_SMITH_HECRAS.rep

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

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

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

Project in English units

Project Description:

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

September 2017

Smithburg Natural Gas Processing Plant

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

CEC Engineering Team:

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

Prepared By: ARC 9/8/17
CHECKED BY: ARC 08-SEP-2017

Model Creation:

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

130359_SMITH_HECRAS.rep

"Existing."

Proposed (Post-project): CEC

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

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

Data Sources:

Geometry - Existing surface created from Noreast Aerial.

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

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

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

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

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

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

PLAN DATA

Plan Title: Existing

Plan File : p:\2013\130-359\Calculations\Phase

2\20170821_H&H\130359_SMITH_HECRAS.p05

Geometry Title: 130-359-Existing

Geometry File : p:\2013\130-359\Calculations\Phase

2\20170821_H&H\130359_SMITH_HECRAS.g02

Flow Title : Existing Flow

Flow File : p:\2013\130-359\Calculations\Phase

2\20170821_H&H\130359_SMITH_HECRAS.f01

Plan Summary Information:

Number of: Cross Sections = 31 Multiple Openings = 0

Culverts = 0 Inline Structures = 0

Bridges = 1 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01

Critical depth calculation tolerance = 0.01

Maximum number of iterations = 20

Maximum difference tolerance = 0.3

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

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

FLOW DATA

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

Flow Data (cfs)

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

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Middle Island Cr	MIDDLE ISLAND CRPF 1		
Known WS = 792.7			

GEOMETRY DATA

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

Reach Connection Table

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

JUNCTION INFORMATION

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1266.73

INPUT

Description:

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	5.76001	846.8715	15.06003	840	26.38	831.6429	25.82001	829.18
36.76001	824.6258	28.93002	81060	37.84003	808.7470	47.34003	798.9872	56.48001	796.79
83.61002	785.4387	47.56003	78498	56.61002	78099	66.06003	779.84	75.103.96	778.22
125.84	776.03	56.145.27	778.26	65.148.42	780	75.155.58	784	84.157.02	784.71
158.99	785.78	65.164.78	786	74.169.56	786.17	83.170.54	786.19	92.172.15	786.59
177.97	788	74.182.93	789.21	83.188.95	790.48	92.196.42	792	100.197.98	792.31
209.04	792.73	83.209.75	792.76	91.210.55	792.78	100.223.59	793.21	109.225.76	793.27
228.03	793.38	91.232.48	793.76	100.233.81	793.85	109.234.09	793.87	117.236.22	794
242.41	794.29	100.245.83	794.52	109.257.47	794.73	117.261.16	794.82	125.264.72	794.88
273.9	795	109.278.43	795.24	117.281.63	795.31	125.287.94	796	134.288.98	796.11
289.82	796.16	117.293.88	796.43	125.297.36	796.54	134.305.43	797.03	142.309.85	797.28
319.57	797.75	125.321.43	797.83	134.323.23	797.89	142.328.17	798	150.332.92	798.11
349.84	798.32	134.354.92	798.4	142.359.62	798.49	150.359.86	798.5	158.372.81	798.82
376.88	798.79	142.378.66	798.77	150.402.67	800				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0683	61.002	.055	158.99	.06

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

CROSS SECTION

130359_SMITH_HECRAS.rep

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1166.73

INPUT

Description:

Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850.649994	845.0327	570.01	831.8630	350.01	830.34	459.99	827.26	
39.48999	824.3362	850.01	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		.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	419.98	810.76	669.98	794.7477	299.99	794.02
84.62	786.8392	109.99	784	97.5	781.97	111.36	778.2	133.95	775.97
153.11	778.2	155.41	780	162.96	786	163.71	786.59	165.16	786.85
167.46	787.06	171.55	788.53	173.51	789.01	175.9	789.52	178.04	789.9
179.44	790	182.71	790.23	189.25	790.58	199.84	791.11	201.06	791.16
201.42	791.18	205.98	792	206.85	792.16	207.16	792.17	213.6	792.42
217.28	792.43	225.36	792.54	234.12	792.65	239.08	792.71	244.33	792.76
253.6	792.84	264.83	793.23	267.9	793.33	269.79	793.37	275.53	793.55

130359_SMITH_HECRAS.rep

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 966.73

INPUT

Description:

Station Elevation Data num= 97

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

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 866.35

INPUT

Description:

Station Elevation Data num= 110

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

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

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

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent

0 68.52 795

F

CROSS SECTION

RIVER: Buckeye Creek

REACH: BUCKEYE CREEK

RS: 726.73

INPUT

Description:

Station Elevation Data			num= 88						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8241.399994	823.543.359985	822.816.720001	821.3814.41998	818.89				
15.64999	818.41	19.88	816.5824.35999	814.6829.67999	811.0130.65999	810.36			
32.07999	809.6232.50999	809.437.40999	806.8139.43999	806	39.7	805.9			
40.51999	805.7641.39999	804.5243.53999	801.3	45.87	797.79	47.56	794.49		
49.50999	792.4551.25999	79051.32999	789.9154.87999	786.8856.40999	785.74				
57.81999	784.4360.65999	782.04	64.56	780.8468.14999	780	68.5	779.92		
75.73999	778.8976.68999	778.74	78.75	778.61	81.95	778.0982.42999	778		
84.03	777.68	108.4	776.03	128.22	777.62	128.72	778	130.86	779.65
132.46	781.12	133.34	782.17	136.18	786	136.3	786.17	138.53	786.39
141.38	787.3	141.47	787.33	141.58	787.31	141.74	787.33	152.9	787.8
155.64	787.92	156.31	787.94	157.26	788	168.77	788.66	173.38	788.82
176	789	180.44	790	181.71	790.29	183.06	790.6	184.43	790.73
186.14	790.96	186.33	790.99	192.41	792	193.97	792.26	198.55	792.68
207.27	793.29	210.44	793.54	212.34	793.6	222.61	794	224.45	794.07
228.94	794.24	230.76	794.46	231.93	794.51	233.64	794.76	237.86	795.32
240.17	795.4	245.8	795.69	249.33	795.92	250.48	796	257.43	796.51
259.19	796.61	260.1	796.68	260.79	796.79	268.59	797.47	271.5	797.66
272.68	797.72	277.19	797.96	278.93	798				

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.0654.87999	.055	136.3	.06	

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

CROSS SECTION

RIVER: Buckeye Creek

REACH: BUCKEYE CREEK

RS: 626.73

INPUT

Description:

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

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0	814	.75	813.883.369995	813.27	10.8	811.97	11.77	811.83
20.69	810.23	21.19	81021.46001	809.87	25.63	807.6525.84001		807.53
27.89	806.3933.73001		803.4935.93001	800	38.39	793.64	40.75	789.42
42.39	787.847.34001		784.2348.59001	783.1450.79001		781.6652.59001		780
53.39	779.2559.23001		778	60.77	777.5762.84001	777.0781.01001		775.78
107.9	778	113.99	780.82	117.8	784.31	119.49	786	120.66
127.74	787.03	131.32	786.97	133.25	786.86	137.61	786.41	144.48
149.83	786.65	163.39	786.77	163.6	786.78	163.82	786.78	179.84
189.13	787.94	190	788	192.32	788.14	193.24	788.2	193.68
195	788.49	200.12	789.3	204.37	790.8	204.72	790.98	205.2
210.8	794	212.03	794.61	217.01	795.45	221.41	796	227.73
231.28	796.62	246.6	797.34	250.32	797.54	250.74	797.55	252.03
253.03	797.61	253.6	797.63	255.15	797.61	256.86	797.64	260.32
262.84	797.84	263.86	797.86	265.57	797.95	266.38	798	

Manning's n Values num= 3

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

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.34001	120.66		105.28	100	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	804.3099976	803.943.830002	803.310.32001	802	15.84	800.96			
22.32001	798.822.57001	798.7224.46001	798.17	24.86	798	26.23	797.37		
31.89999	794	32.08	793.89	36.09	790.35	36.31	79037.82001	787.6	
40.53999	786	42.38	784.94	44.13	783.68	44.95	782.86	48.39	779.96
50.00999	778.851.42999		77853.03999	776.94	73.34	775.52	98.18	776.99	
102.8	781.08	108.95	783.93	109.02	783.96	109.17	784	111.04	784.36
113.42	785.02	115.56	785.15	123.87	785.75	132.3	785.86	133.07	785.87
135.34	785.7	142.1	785.17	143.83	785.29	153.21	785.74	156.5	786
161.01	786.33	164.19	786.59	167.51	787.09	169.29	787.32	169.85	787.4
170.85	788	173.04	789.31	176.92	791.39	178.22	792.03	182.75	794
184.03	794.55	187.24	795.09	193.84	796	201.62	796.68	205.84	797.06
207.07	797.14	212.9	797.3	221	798				

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 426.73

INPUT

Description:

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.029999	803.588.549988	802.4	16.78	800.9121.32999	800			
24.34	799.4	31.22	798.1846.17999	796.1347.02998	796	47.37	795.95		
50.17999	795.5661.16998	794.0561.21999	794.0461.72998	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

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 226.73

INPUT

Description:

Station Elevation Data num= 103

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

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 136.73

INPUT

Description:

Station Elevation Data num= 99

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

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432.35 805.7 436.85 809.57 446.05 815.28 447.61 816.26

Manning's n Values num= 3
 Sta n Val Sta n Val
 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	795.021	4.92001	794.272	2.80002	793.38
25.94	793.032	7.70001	792.83	34.94	792.213	8.68002	791.994	5.42001	791.54
48.44	791.344	9.05002	791.350	0.65002	791.19	51.5	791.14	53.47	791.07
59.62	790.836	3.99002	790.62	64.41	790.576	6.70001	789.496	9.29001	787.65
71.22	786.517	2.01001	786.01	77.38	784.057	8.74002	783.55	84.25	782.28
92.69	779.989	3.08002	779.88	100.63	777.48	102.24	776.95	111.23	775.95
123.23	775.34	135.23	776.03	142.58	776.95	142.91	777.16	144.29	778.04
148.13	780.48	158.85	785.95	160.02	786.52	161.63	787.3	163.13	787.76
163.37	787.83	164.31	788.06	172.54	790.07	172.97	790.17	175.83	790.32
179.83	790.5	189.07	790.8	193.42	790.95	199.57	791.2	217.65	791.82
218.37	791.84	218.83	791.84	234.97	791.93	234.98	791.94	235.65	791.9
236.76	791.89	238.63	791.95	239.25	791.91	241.05	791.93	249.28	791.9
249.69	791.9	252.31	791.88	253.41	791.93	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
 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

130359_SMITH_HECRAS.rep

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1860

INPUT

Description:

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
0	796.81	640015	796.585	559998	794.65	12.73	999	790.51	23.31	786.06	
24.66	785.49	26.78	784.54	41.26	8001	780.36	42	780.22	44.48	778.93	
49.19	776.44	56.5	775.66	70	774.64	83.5	775.79	84.52	002	776.5	
85.54	777.08	85.56	777.09	87.38	777.59	1.73	999	779.91	94.45	999	781.34
95.11	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		.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	2.97	0001	803.86	3.47	0001	803.78
24.59	802.35	27.85	802.07	29.41	801.98	40.73	801.17	43.97	800.85
45.42	799.91	50.54	796.69	52.26	796.13	53.10	795.84	53.79	795.6
54.01	795.53	55.17	794.58	55.44	792.47	55.67	792.49	55.67	791.97
56.26	791.81	63.87	789.67	63.04	786.48	63.23	784.04	63.32	783.99
76.45	783.97	65.80	783.82	65.64	783.78	65.86	779.01	65.81	776.73
88.94	776.64	68.08	776.55	68.11	776.53	68.35	776.38	68.37	776.36

130359_SMITH_HECRAS.rep

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	776.11
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
110.27	775.88	110.46	775.88	110.92	775.87	111.84	775.85
112.92	775.9	112.94	775.9	113.49	775.93	114.05	775.96
115.69	776.03	116.32	776.06	116.74	776.07	117.15	776.09
118.16	776.14	118.66	776.16	119.31	776.18	125.94	776.35
126.75	776.38	127.13	776.4	127.53	776.42	127.94	776.43
128.85	776.47	129.25	776.48	129.65	776.5	130.07	776.51
130.78	776.54	131.25	776.56	131.74	776.58	132.49	776.56
133.41	776.98	133.88	777.19	134.36	777.41	134.78	777.6
135.63	777.98	136.04	778.16	136.46	778.35	137.08	778.62
137.93	779.01	138.36	779.2	138.81	779.4	139.25	779.6
140.13	780	140.56	780.19	140.6	780.21	141.1	780.42
142.14	780.87	152.62	786.98	152.64	786.99	152.67	787
152.72	787.03	152.75	787.04	152.76	787.05	152.77	787.05
155.84	788.18	156.45	788.32	157.61	795.62	158.1	795.98
163.19	795.31	168.48	795.03	169.74	794.71	171.64	795.06
179.59	795.63	179.79	795.65	181.04	795.61	196.26	795
197	794.98	197.4	794.97	197.83	794.96	198.28	794.95
199.28	794.92	199.8	794.91	200.36	794.9	200.98	794.89
202.39	794.86	203.2	794.84	204.1	794.82	205.1	794.8
206.19	794.78	207.38	794.75	208.4	794.72	209.27	794.69
210.7	794.65	211.3	794.63	211.51	794.63	211.8	794.62
212.66	794.59	213.02	794.58	218.06	794.37	218.61	794.35
219.55	794.32	219.92	794.31	219.95	794.31	220.35	794.29
221.04	794.27	221.34	794.26	221.6	794.26	221.85	794.25
225.51	794.16	227.03	794.1	228.68	793.62	229.14	793.41
232.5	792.2	240.27	791.82	246.62	790.96	250.86	790.89
259.67	791.5	265.4	792.01	274.55	792.8	278.3	793.18
279.87	793.27	287.23	793.56	293.04	793.69	294.82	793.72
305.77	793.81	310.93	793.88	315.68	793.85	323.42	793.93
329.03	793.98	333.86	793.97	335.08	794.01	336.17	794.04
345.37	794.25	352.08	794.33	353.15	794.36	361.8	794.52
370.4	794.65	373.67	794.75	379.56	794.9	383.16	795.04
393.21	795.33	397.72	795.54	402.69	795.73	408.12	795.91
416.55	796.37	420.84	796.53	430.41	796.81	431.69	796.88

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

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

130359_SMITH_HECRAS.rep

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

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

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

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

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

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

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

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

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

Bank Sta: Left Right Coeff Contr. Expan.

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

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

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

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Meathouse Fork

REACH: MEATHOUSE FORK RS: 1760

INPUT

Description:

Station Elevation Data num= 227

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

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

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

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

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

143 193.7 799.9

T

CROSS SECTION

RIVER: Meathouse Fork

REACH: MEATHOUSE FORK

RS: 1733.17

INPUT

Description:

Station Elevation Data		num=		75							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	803.164	140015	802.158	550018	800.313	080002	798.621	7.980001	797.14		
19.21002	796.641	19.36002	796.49	19.5	796	20.69	791.623	19.90002	790		
37.05002	783.41	39.06	782.453	39.001	782.274	21.0001	780.46	37.0003	776.57		
51	776.01	76	775	101.61	776.13	102.77	776.94	110.15	782.11		
119.67	788	120.03	788.22	121.26	788.26	130.47	788.56	132.84	788.59		
145.81	788.88	147.96	788.92	151.84	788.95	163.13	788.83	172.07	788.76		
178.88	788.73	186.32	788.77	190.9	788.75	192.43	788.82	203.45	789.18		
205.57	789.32	211.06	790	213.25	790.23	213.93	790.36	222.6	791.77		
224.97	792	228.23	792.32	229.94	792.51	233.74	792.69	238.93	793.01		
244.83	793.05	248.72	793.13	256.33	793	256.66	792.99	256.97	792.98		
257.46	792.99	257.92	793.01	262.55	793.18	263.26	793.2	267.93	793.26		
270.96	793.32	277.36	793.5	283	793.62	283.85	793.64	286.19	793.71		
290.96	793.88	293.54	794	294.38	794.04	298.47	794.04	303.43	794.16		
310.92	794.36	313.28	794.42	315.9	794.49	321.87	794.67	326.19	794.85		
331.63	795.04	335.59	795.21	341.61	795.54	344.38	795.65	351.48	796		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0623	190002	.055	120.03	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	23.90002	120.03		128.75	137.97		.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	Sta	Elev
0	8085.07	99987	804.647	209991	803.11	14.16	798.192	0.94998	793.56		
25.60999	791.58	34.97	787.9	38.03	786.694	44.60999	785.52	50.72	783.77		
60.81998	77863.35	9999	776.43	79	776	101.5	774.74	123	776		

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1449.39

INPUT

Description:

Station Elevation Data num= 99

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

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

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1279.24

INPUT

Description:

Station Elevation Data num= 97
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 832.093.289978 830.957.090027 829.87 7.76001 829.658.140015 829.49
 23.52002 823.828.32001 821.6831.98999 820.2732.21002 82055.23001 792.59
 57.41 790 58.97 788.1462.32001 784.1664.01001 783.42 68.16 781.41
 72.64999 779.3673.48999 778.8878.14001 776.43 104.77 774.29 127.86 776.43
 128.51 776.97 129.77 778 133.99 781.49 139.51 784 141.87 785.07
 142.67 785.43 142.98 785.46 147.26 785.64 151.38 785.19 153.2 785.04
 157.35 785.17 169.52 785.75 178.81 785.84 191.12 785.74 193.78 786.2
 194.7 786.36 200.61 787.09 201.12 787.15 208.66 787.64 212.14 787.8
 221.61 787.61 223.9 787.56 234.58 787.3 234.63 787.3 234.93 787.31
 243.77 787.8 245.37 787.9 246.02 788 252.12 788.99 259.74 790.21
 264.9 791.35 267.9 792 269.72 792.38 283.01 793.11 286.23 793.32
 291.87 793.35 301.25 793.39 310.27 793.23 316.32 793.1 327.99 792.97
 329.64 792.95 332.74 792.9 340.58 792.61 348.33 792.6 354.91 792.62
 357.16 792.56 365.64 792.29 374.02 792.43 381.88 792.59 396.03 792.88
 401.01 792.97 410.87 793.19 417.2 793.32 418.26 793.34 424.5 793.38
 435 793.8 437.43 793.92 438.22 794 438.91 794.07 439.96 794.1
 446.97 794.32 449.86 794.44 470.14 794.81 473.41 794.92 491.12 796
 493.73 796.15 497.31 796.32 509.94 797.05 520.46 797.64 522.52 797.77
 523.55 797.79 527.82 798.03 537.97 798.51 538.42 798.58 539.05 798.66
 546.31 799.39 551.13 799.96

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1152.99

INPUT

Description:

Station Elevation Data		num= 88									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	828.921	419983	828.775	630005	828.44	14.56	825.7916	07999	825.39		
18.41	825.07	24	824.39	24.69	82426.03998		823.23	33.13	819.31		
45.31998	797.8749	19998	790.0149	57999	789.2550	51999	788.5252	70999	786.84		
60.04999	781.0666	31998	777.568	31998	776.4268	32999	776.4195	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	.0652	70999	.055	134.92	.06

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1052.99

INPUT

Description:

Station Elevation Data		num= 83									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	824	11.88	822.5915	26999	82218.17001		821.4323	58002	820.13		
27.11002	819.2528	92999	818	37.97	811.45	44.09	80849.60001		800.33		

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57.31	791.6458.61002	790.1759.82001	789.2171.61002	780.3676.23999	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	.0671.61002	.055	135.44	.06	

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 952.99

INPUT

Description:

Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	818 .710022	817.81.610016	817.559.650024	812.3723.37003	803.59				
29.31003	80037.20001	795.3343.26001	791.9847.15002	790 47.19	789.98				
58.22	783.56 60.72	781.8664.96002	778 66.69	776.4390.71002	773.66				
116.66	776.43 120.47	778.57 120.57	778.61 125.02	782 125.93	782.68				
127.02	783.7 128.68	783.7 139.29	784.22 142.31	784.58 151.09	784.31				
157.71	784.12 161.97	784.12 163.32	784.12 175.92	784.12 181	784.12				
184.14	784.14 187.61	784.53 192.54	786 193.74	786.34 197.66	788.62				
200.41	790 200.68	790.13 204.85	790.78 207.76	791.22 209.63	791.44				
211.21	791.48 214.66	791.52 225.96	791.61 235.93	791.84 240.13	791.86				
244.77	791.88 255.33	791.72 265.58	791.54 272.12	791.32 275.01	791.25				
288.54	791.06 299.92	791.57 301.63	791.63 302.81	791.66 305.58	791.68				
314.1	791.82 316.91	792 322.51	792.35 326.81	792.57 336.29	794				
336.73	794.07 337.06	794.1 340.21	794.42 349.29	795.28 350.88	795.34				
361.24	795.75 367.14	795.84 370.4	795.94 371.13	796 371.3	796.01				
377.04	796.41 379.58	797.09 381.43	797.6 382.08	797.7 385.58	798.11				

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

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 852.99

INPUT

Description:

Station Elevation Data num= 86
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 8084.070007 805.25 14.06 798.6918.20001 796.16 29.19 791.2
 29.23999 791.1832.45999 79041.45999 786.6845.07999 785.42 53.44 780.71
 57.29001 778.5758.42001 778.2159.14999 77864.70999 776.43 88.59 773.4
 114.39 776.43 116.48 778 117.28 778.61 117.44 778.75 117.87 779.08
 124.4 783 129.99 783.34 132.94 783.49 139.02 784 143.49 784.37
 145.17 784.54 145.57 784.56 146.9 784.48 159.15 783.66 170.2 783.22
 172.42 783.18 176.45 783.11 178.47 784.1 181.79 786.62 187.06 790
 187.82 790.48 189.89 791.64 195.28 791.95 196.23 792 201.8 792.31
 206.57 792.33 214.64 792.35 218.58 792.41 227.42 792.45 236.77 792.28
 243.48 792.21 248.26 792.32 251.27 792.38 262.18 792.49 271.57 792.47
 274.71 792.47 279.93 792.51 286.65 792.49 289.48 792.48 295.62 792.39
 301.14 792.36 310.73 792.57 311.48 792.59 312.37 792.63 319.4 793.03
 322.86 793.33 326.2 793.63 328.51 793.75 332.49 794 333.64 794.07
 335.84 794.34 337.64 794.53 341.15 795.48 343.08 795.82 346.23 795.84
 354 795.76 360.21 795.63 363.57 795.56 364.81 796 365.01 796.07
 365.17 796.12 365.28 796.11 368.14 795.91 368.29 796.28 369.44 797.46
 378.93 800 381.97 800.81 382.52 801.04 382.71 801.09 384.13 801.73
 389.22 804

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .0645.07999 .055 124.4 .06

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

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 752.99

INPUT

Description:

Station Elevation Data num= 75

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 612.99

INPUT

Description:

Station Elevation Data num= 102

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

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

Manning's n Values num= 3

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

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	159.77	236.68		116.53	119.3		.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	17.60	001	792.93	28.91	792.46	34.10	001	792.31			
34.70	001	79235.73	999	791.34	37.51	001	791.53	39.17	001	791.57	43.59	791.34		
47.76	001	791.14	49.20	999	791.09	57.92	999	790.02	59.42	999	789.86	61.89	001	789.68
67.39	999	789.37	0.23	999	788.93	74.17	001	788.48	79.73	001	788.86	86.14	001	787.46
92.42	999	787.46	97.44	787.44	99.92	001	787.42	109.61	787.23	121.29	786.15			
123.9	786.01	125.13	784.67	132.75	776.43	156.88	772.53	175.1	776.43					
176.17	776.77	177.1	777.17	181.98	777.12	183.28	777.15	183.92	777.5					
187.37	779.15	192.58	782	193.04	782.25	194.7	783.09	197.79	782.95					
204.96	782.9	208.86	783.12	212.59	783.23	219.13	783.17	227.95	783.13					
233.13	783.25	247.48	783.44	248.62	783.38	250.63	783.5	265.4	784.23					
266.28	784.28	268.13	784.74	272.13	785.96	276.35	787.56	277.8	787.89					
280.56	788.52	281.86	788.81	286.82	789.04	294.4	789.4	298.21	789.63					
305.85	790.14	308.04	790.29	322.22	790.75	323.77	790.79	331.75	791.06					
335.37	791.29	336.8	791.66	340.36	792.93	341.72	793.04	345.95	793.39					
354	793.39	355.2	793.4	355.38	793.39	358.08	793.44	358.11	793.44					
360.76	793.21	363.15	794.48	364.21	794.79	365.23	795.01	367.18	795.55					

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372.7 796.96 379.12 798.47 382.13 799.09 384.16 799.58 385.75 800

Manning's n Values num= 3
 Sta n Val Sta n Val
 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	14.39	999	793.58	28.31	793.59	34.99	8	793.54	
45.21	793.66	48.68	997	793.62	52.28	793.59	57.31	998	793.49	80.82	999	792.91
84.51	792.83	85.26	999	792.85	85.54	999	792.86	85.92	999	792.87	87.87	792.6
91.21	792.19	94.51	999	792.96	20.99	999	791.84	97.97	998	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
 0 .06 198.86 .055 266.19 .06

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

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 258.95

INPUT

Description:

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.330017	795.688	789978	795.310	40997	795.4415	79999	795.4	
32.40997	794.9447	33002	794.7157	20996	794.5577	35999	794.3382	77002	794.23
94.98999	794	102.8	793.76	104.39	793.76	128.11	793.57	133.05	793.63
138.85	793.6	141.18	793.59	154.56	793.43	164.84	793.33	172.49	793.06
173.67	793.02	179.93	792.86	180.62	792.88	182.66	792.96	189.11	793.11
193.3	793.29	202.23	793.01	204.44	792.93	205.17	792.86	213.66	792
214.84	791.87	214.92	791.86	230.01	791.25	237.24	791.09	250.05	791
251.02	790.98	264.75	790.56	278.27	790	288.42	789.49	298.73	788
309.34	786.45	311.98	786.03	315.5	785.98	323.17	785.86	326.61	785.97
328.1	785.98	338.03	786.11	347.35	786.11	356.32	785.79	366.97	785.17
377.9	784.59	384.12	784	395.03	782.94	395.98	782.85	397.07	782.73
398.53	782.62	414.49	781.18	418.76	781.06	420.3	780.66	421.15	780
422.77	778.74	425.59	776.43	447.8	772.47	467.59	776.43	467.74	776.47
469.54	776.62	474.48	777.08	475.47	777.4	476.41	778	486.24	783.28
496.78	785.8	500.11	786.62	500.92	786.88	506.04	788.49	513.69	791.41
514.67	791.74	522.54	793.11	526.23	793.72	526.65	793.8	529.64	794
538.12	794.28	539.03	794.35	543.39	794.56	557.58	795.03	572.49	795.22
574.1	795.22	575.71	795.29	586.86	795.68	594.95	795.79	595.9	795.8
595.95	795.8	595.98	795.8	596.01	795.81	596.18	795.81	606.2	795.87
608.11	795.94	610.42	796.24	615.65	796.31	618.06	796.42	621.21	796.57
628.52	796.78	632.84	797.1	644.22	798.17	651.28	798.88	656.06	799.35
666.56	800.38	674.12	800.63	684.49	800.98				

Manning's n Values num= 3

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

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

CROSS SECTION

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

INPUT

Description:

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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0	7967.190002	795.69	8.72998	795.2910.45996	795.4415.32996	795.41
32.88	794.9145.39996	794.757.45996	794.573.61996	794.3184.77997	794.08	
88.86996	794 101.38	793.64 115.4	793.47 131.65	793.3 135.21	793.27	
148.59	793 149.85	792.99 155.08	792.9 182.04	792 183.08	791.96	
183.15	791.96 183.25	791.95 183.36	791.94 183.48	791.93 184.98	791.87	
197.8	791.27 209.94	791.03 211.02	791.03 211.11	791.02 211.3	791	
211.52	790.98 211.71	790.97 212.64	790.93 214.98	790.73 223.8	790.58	
237.63	790 248.4	789.38 256.91	789.13 271.09	788.72 276.38	788.59	
287.87	788 299.46	787.46 299.79	787.45 319.69	786.73 320.92	786.65	
328.75	786 340.18	784.93 345.95	784.29 347.4	784.11 351.35	783.49	
359.11	782.3 360.21	782.22 365.45	782.11 366.71	782 371.03	781.62	
372.43	781.52 391.1	781.35 391.84	781.33 393.48	781.04 398.96	780.11	
401.51	779.68 402.68	779.59 405.35	778.92 413.27	777.3 418.1	776.04	
418.26	776 419.17	775.76 419.64	775.59 442.83	775.59 455.13	775.63	
486.04	775.72 487.7	778.45 492.83	784.08 494.67	784.24 496.08	784.4	
503.78	789.33 505.69	790.51 508.49	792.62 515.7	798.03 519.99	798.55	
528.52	799.96 531.73	800.5 540.37	800.4 544.44	800.57 546.8	800.7	
550.47	800.86 551.85	800.74 556.2	800.54 559.97	803.72563.5699	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	30		.1	.3

CROSS SECTION

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

INPUT

Description:

Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7966.820007	795.718.609985	795.2311.33002	795.4413.08002	795.43				
25.69	795.03 33.44	794.736.95001	794.6437.08002	794.63 37.31	794.63				
37.57001	794.6237.83002	794.6138.08002	794.6157.39999	794.1558.06998	794.14				
63.22	794.04 63.78	794.0364.60999	794.0265.73999	794 68.28	793.93				
71.91	793.8375.82999	793.7284.81998	793.6 87.69	793.56 89.66	793.52				
102.9	793.2 108.48	793.13 121.72	792.82 136.06	792.46 142.42	792.39				
150.76	792.42 159.8	792.35 164.4	792.2 166.29	792.14 170.24	792				
175.22	791.77 191.14	791.51 192.36	791.48 193.74	791.42 198.69	791.2				
211.06	790.61 216.24	790.36 221.71	790 240.83	789.21 258.3	788.38				
260.29	788.29 261.88	788.21 265.18	788 275.62	787.29 277.98	786.85				
279.83	786.42 282.4	786 287.82	785.11 288.71	785 296.75	784.74				

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

Manning's n Values num= 3

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

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

SUMMARY OF MANNING'S N VALUES

River: Buckeye Creek

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

River: Meathouse Fork

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

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

River: Middle Island Cr

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

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

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

River: Meathouse Fork

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

River: Middle Island Cr

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Buckeye Creek

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

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					
(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs) (sq ft)	(ft) (ft)

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

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

0.26

Profile Output Table - Standard Table 2

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

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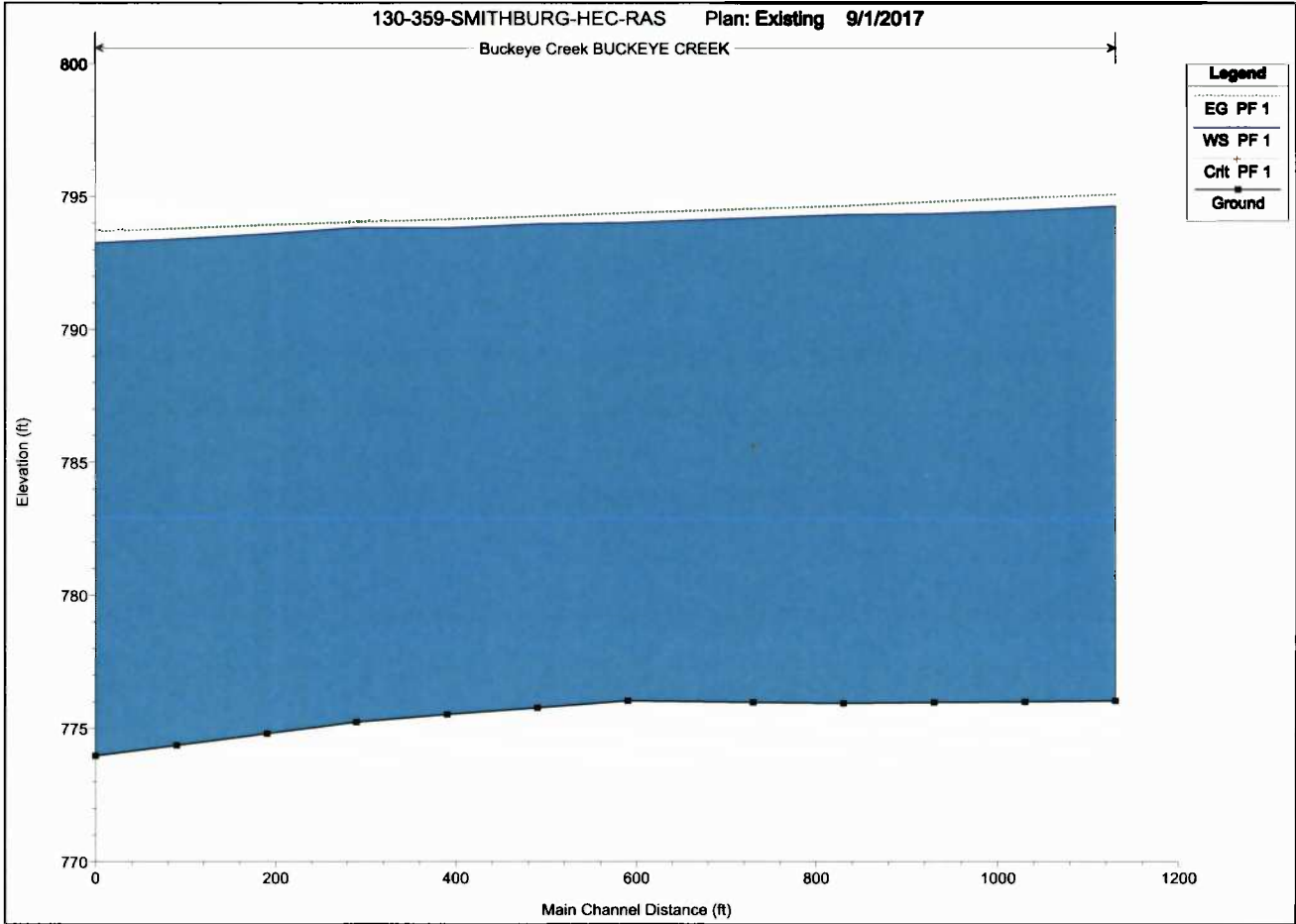
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	794.63
794.39 0.24	0.08	0.01 33.94	6479.57	3086.50
371.65				
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	794.54
794.21 0.33	0.10	0.01 295.67	6319.44	2984.89
322.35				
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	794.43
794.02 0.41	0.11	0.00 214.22	7036.63	2349.16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

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

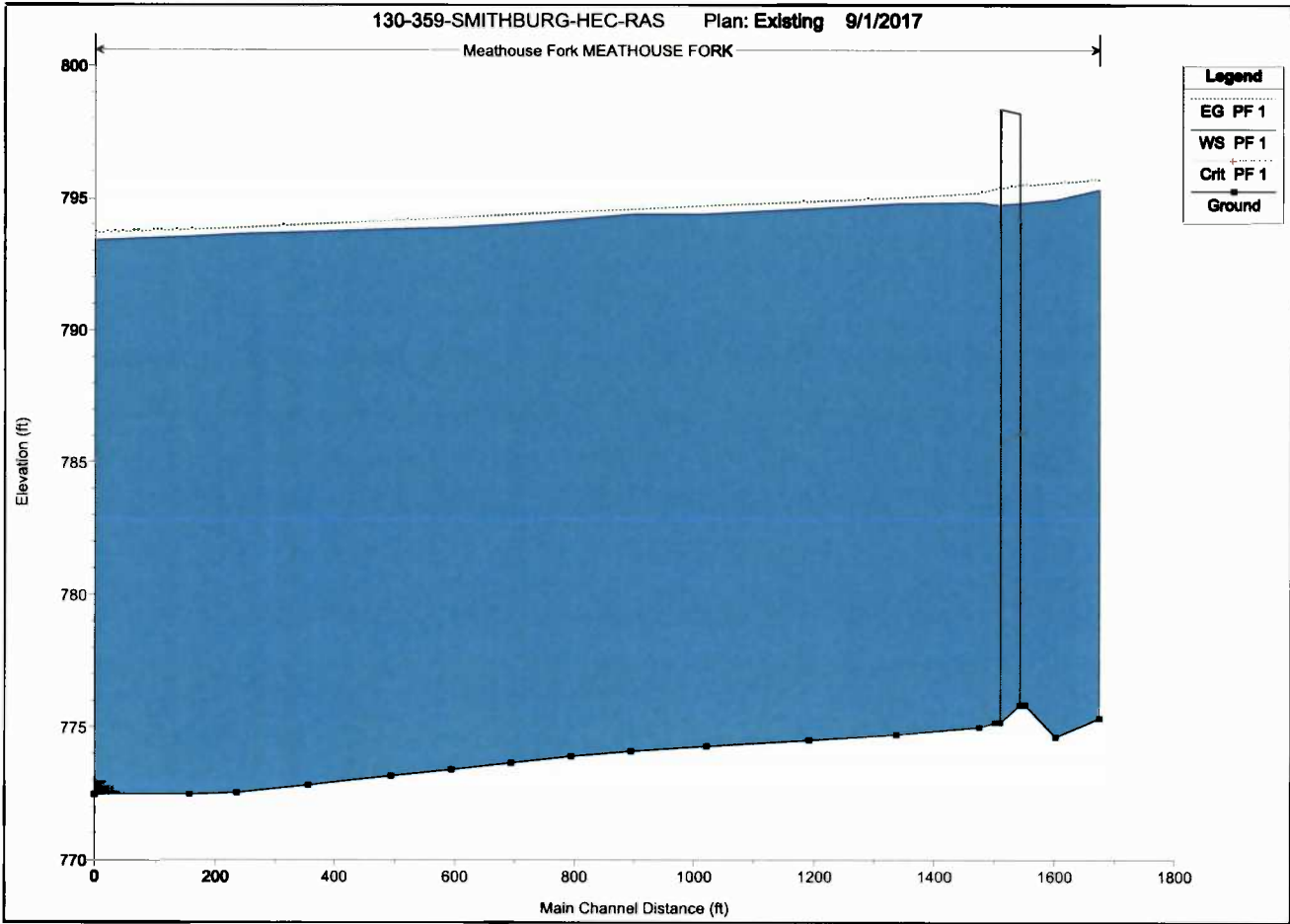
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Buckeye Creek BUCKEYE CREEK



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Meathouse Fork MEATHOUSE FORK



Legend

EG PF 1

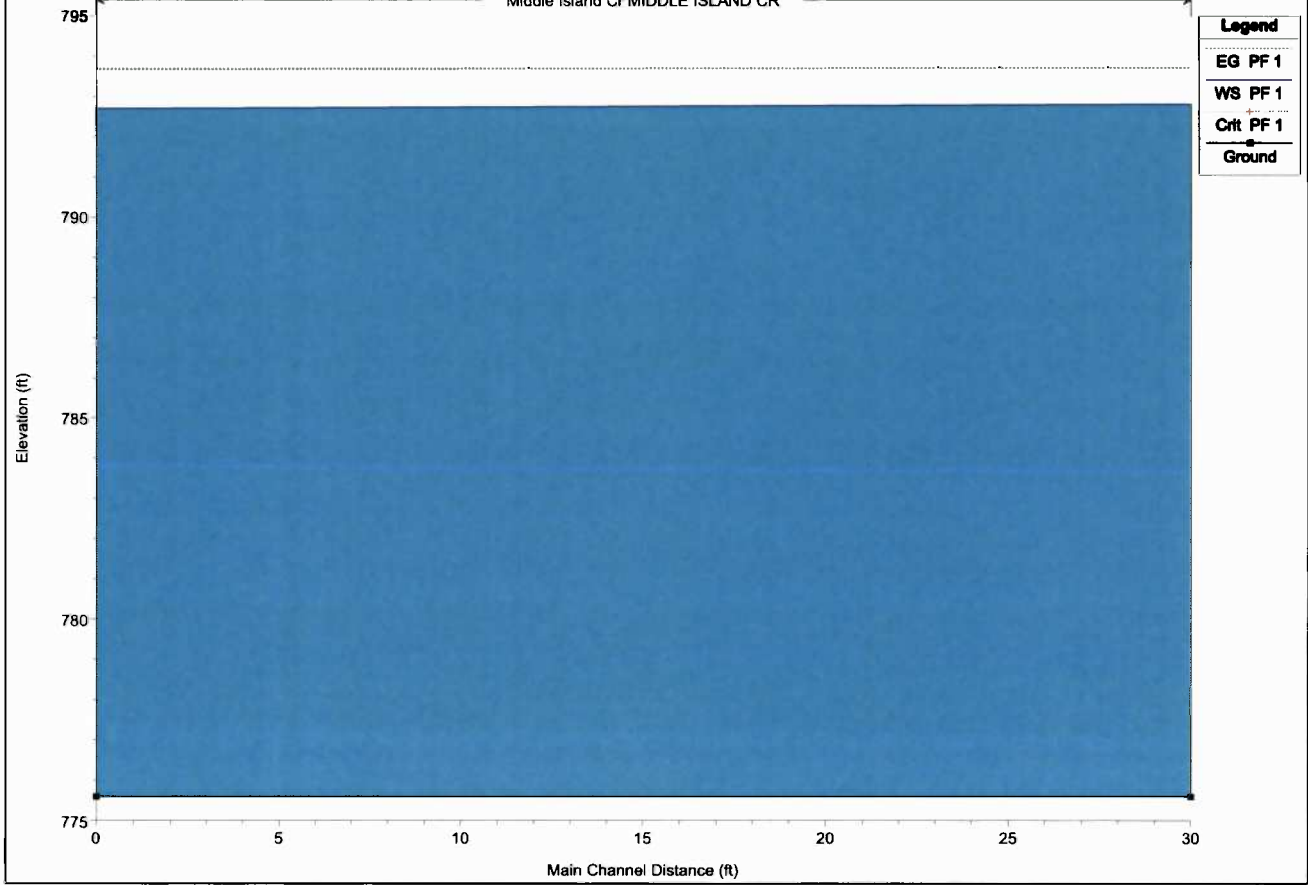
WS PF 1

Crit. PF 1

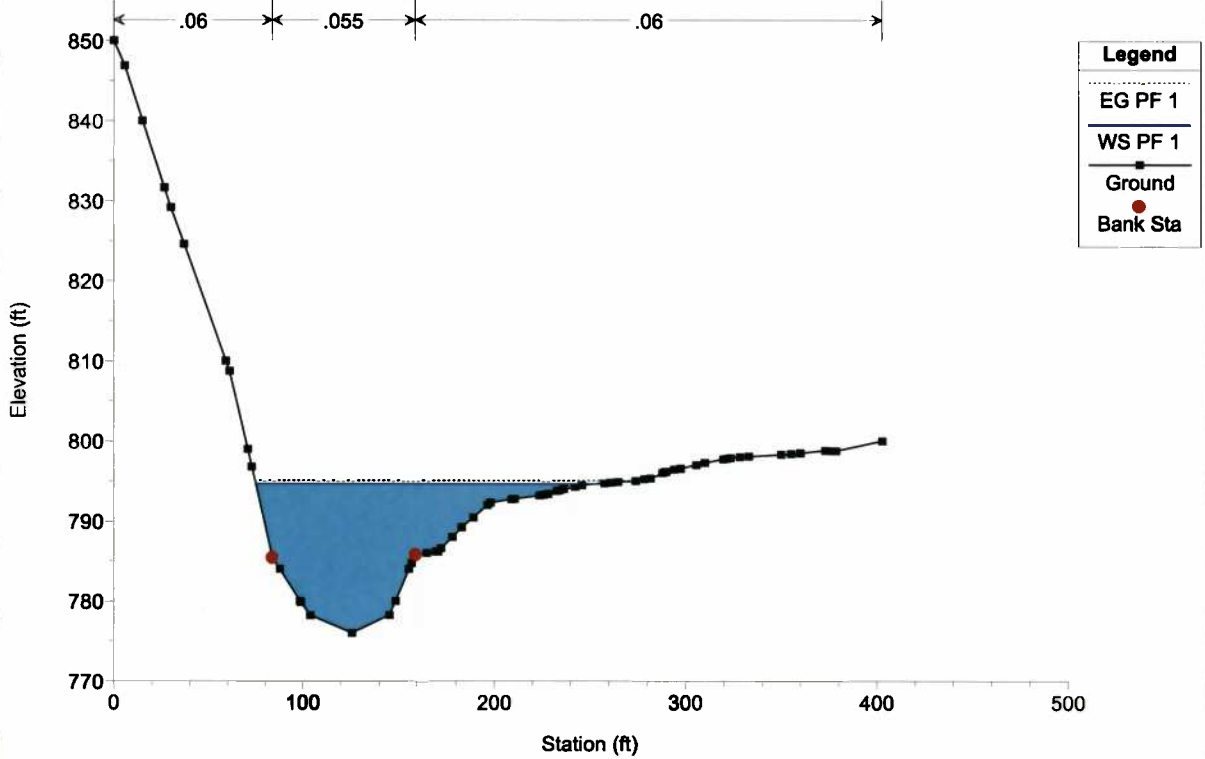
Ground

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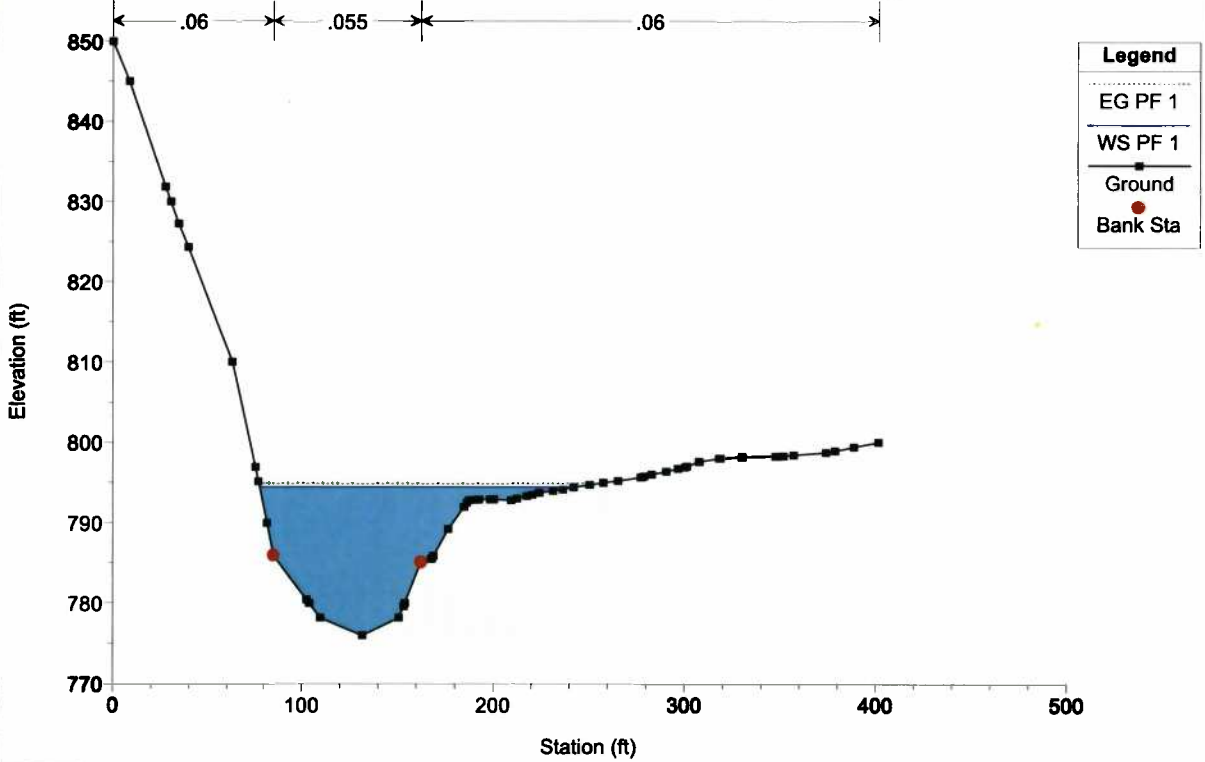
Middle Island Cr MIDDLE ISLAND CR



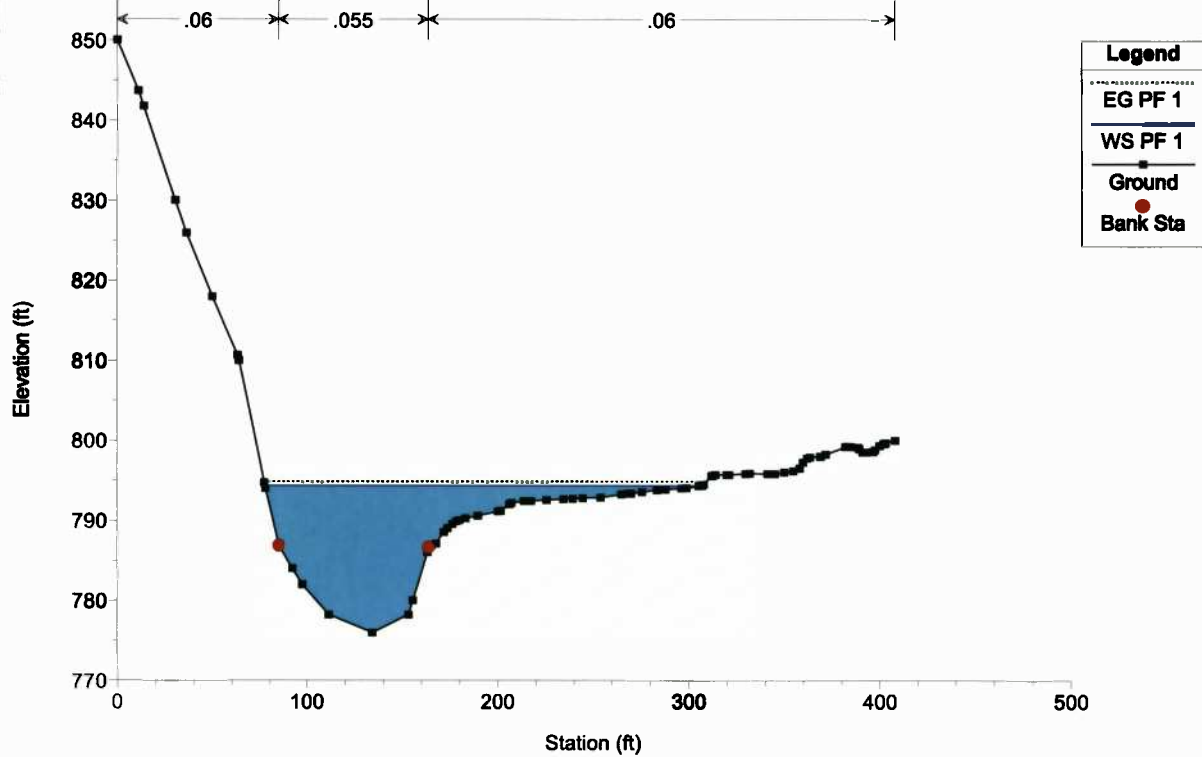
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1266.73



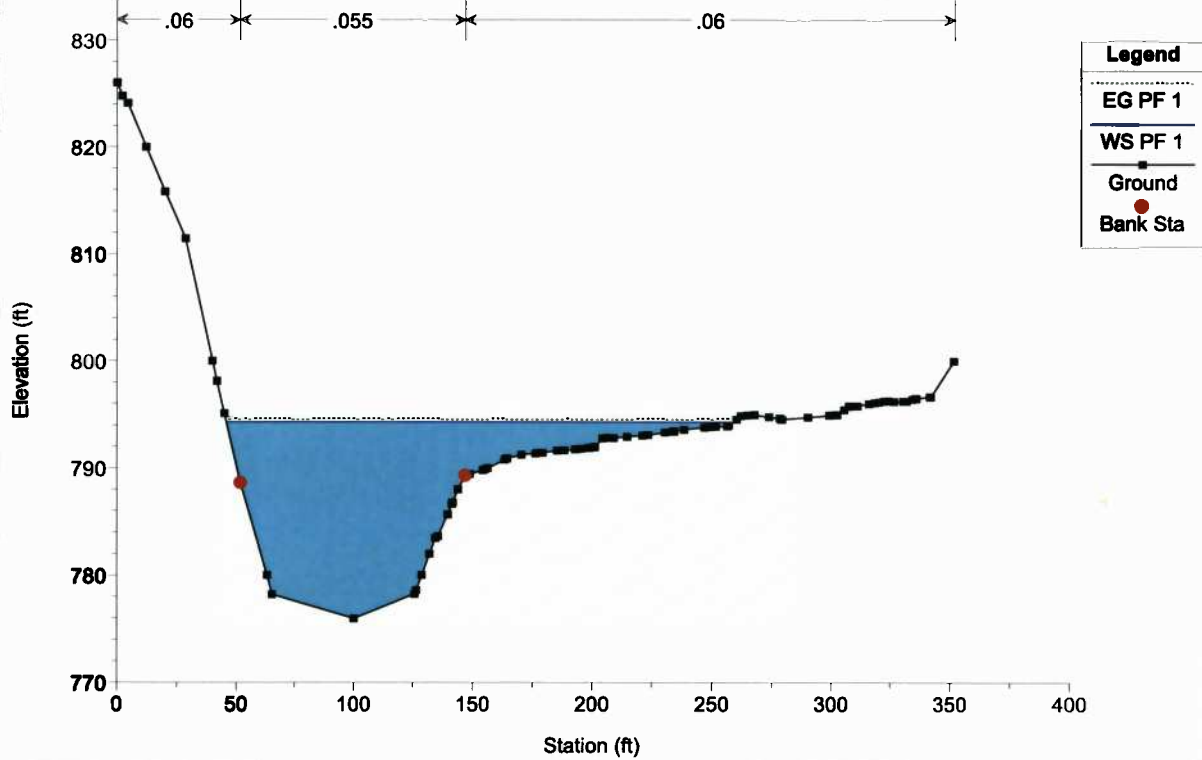
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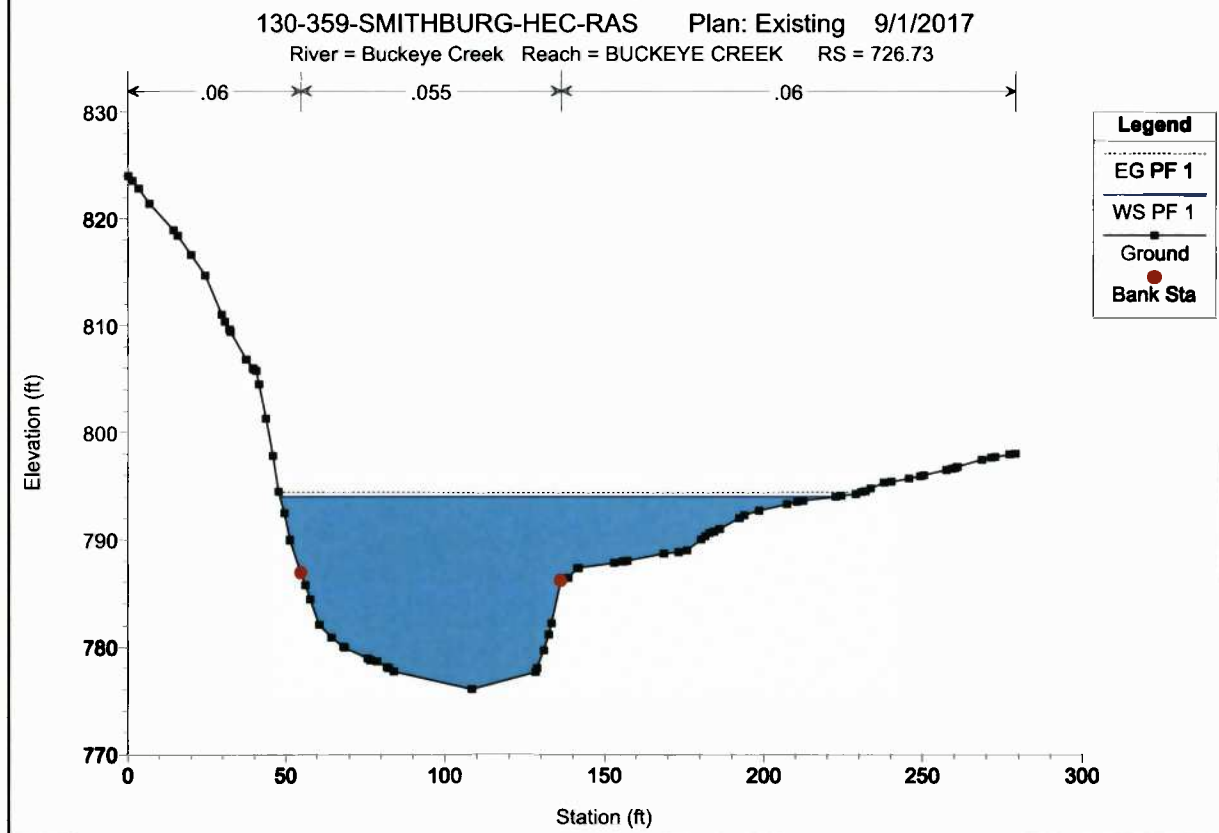
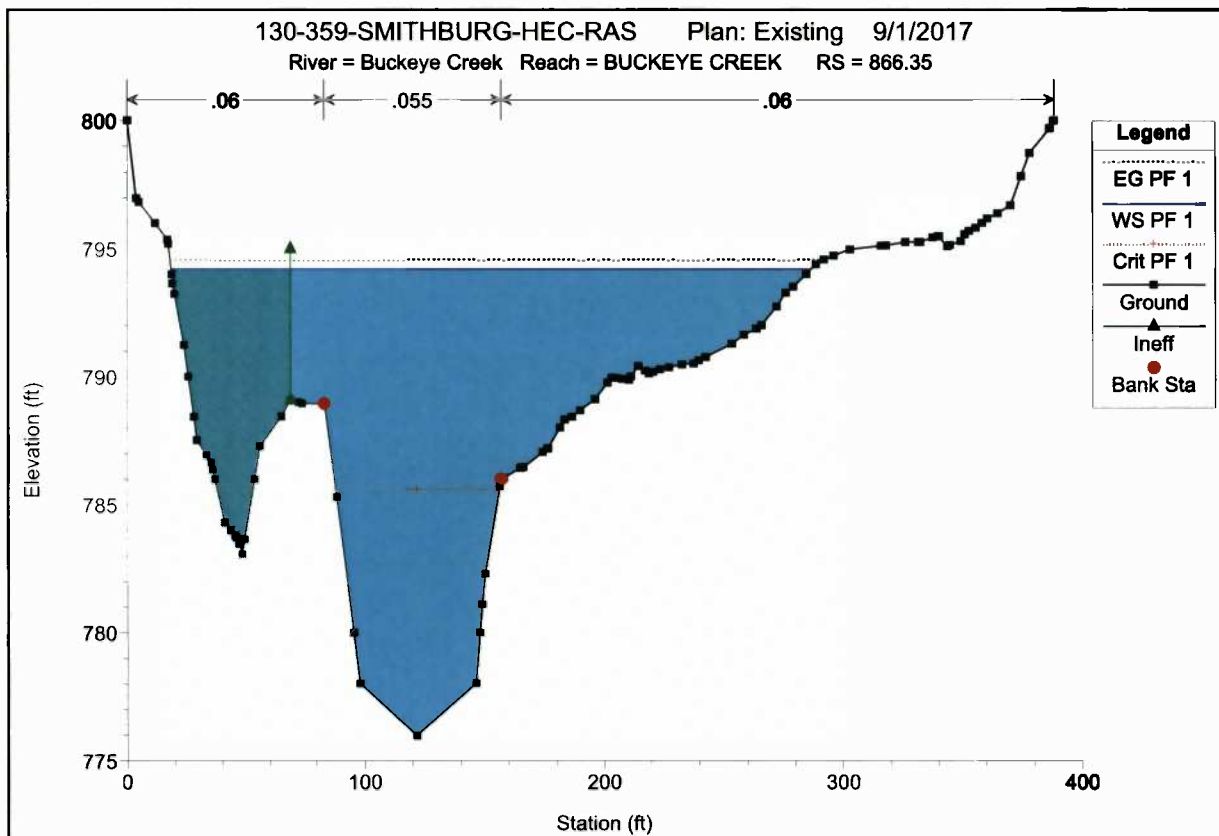


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 River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1066.73

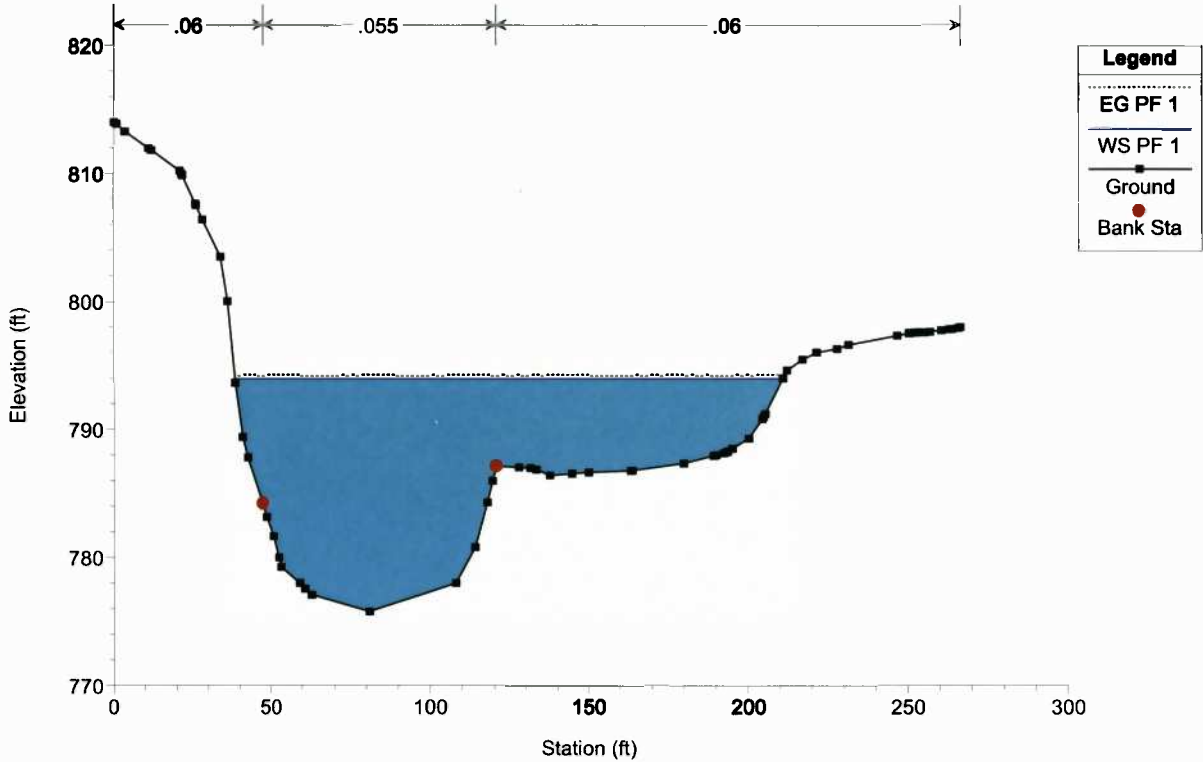


130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
 River = Buckeye Creek Reach = BUCKEYE CREEK RS = 966.73

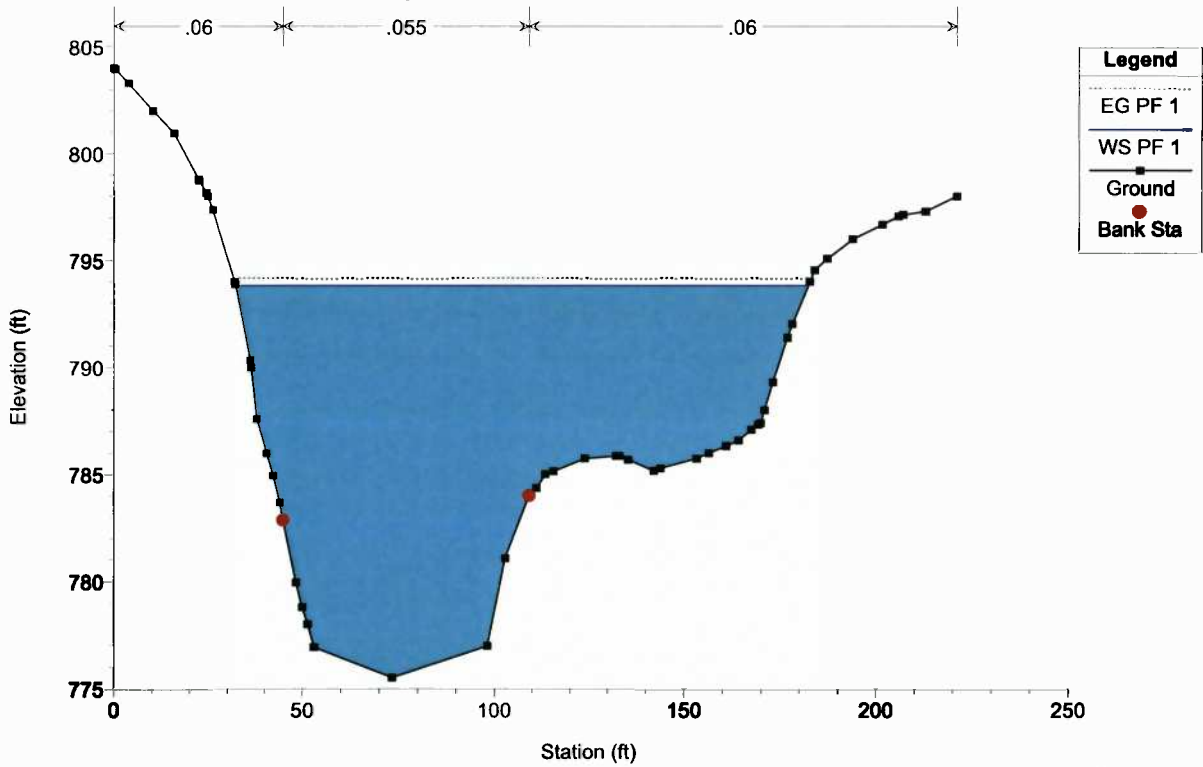




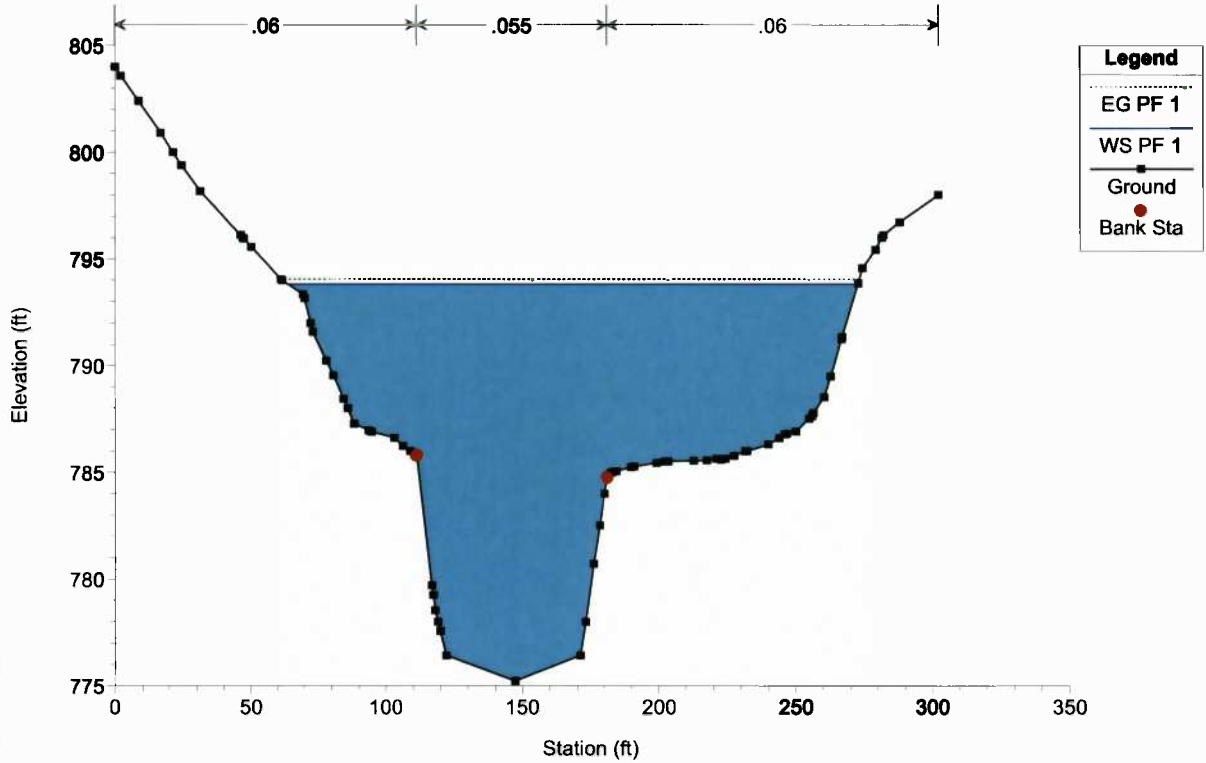
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
 River = Buckeye Creek Reach = BUCKEYE CREEK RS = 626.73



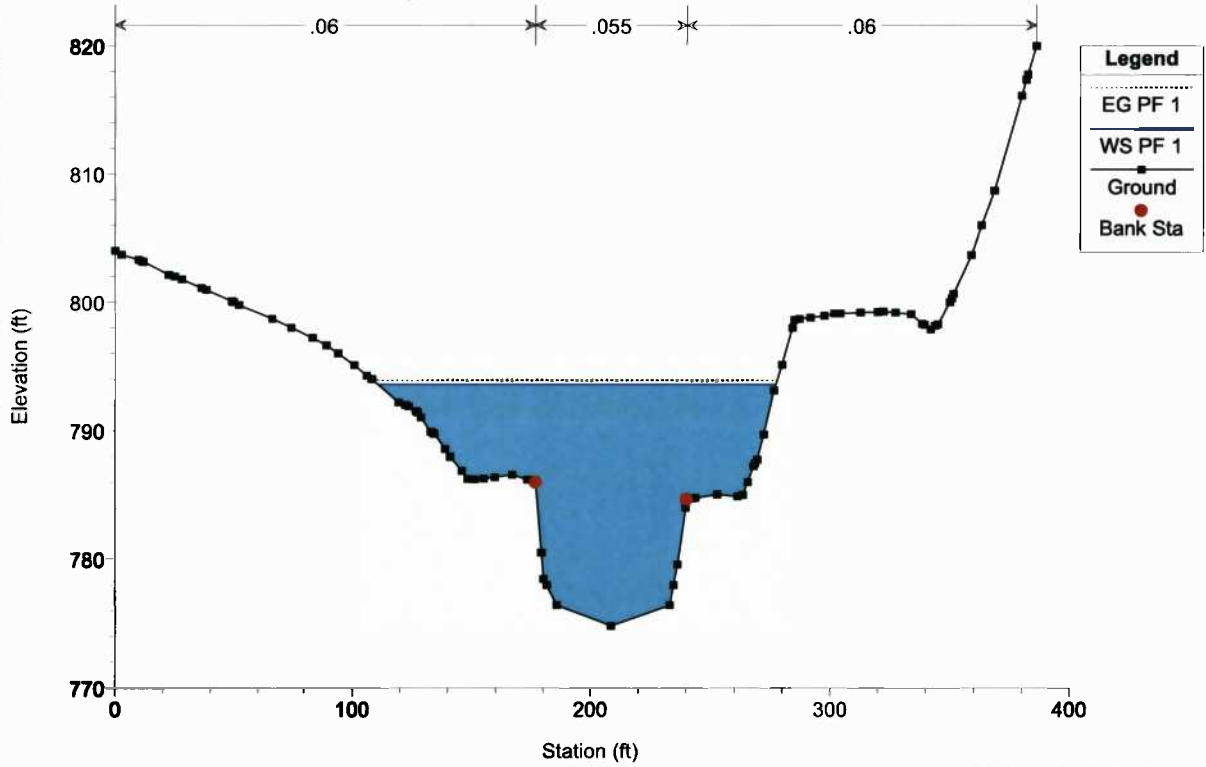
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 River = Buckeye Creek Reach = BUCKEYE CREEK RS = 526.73



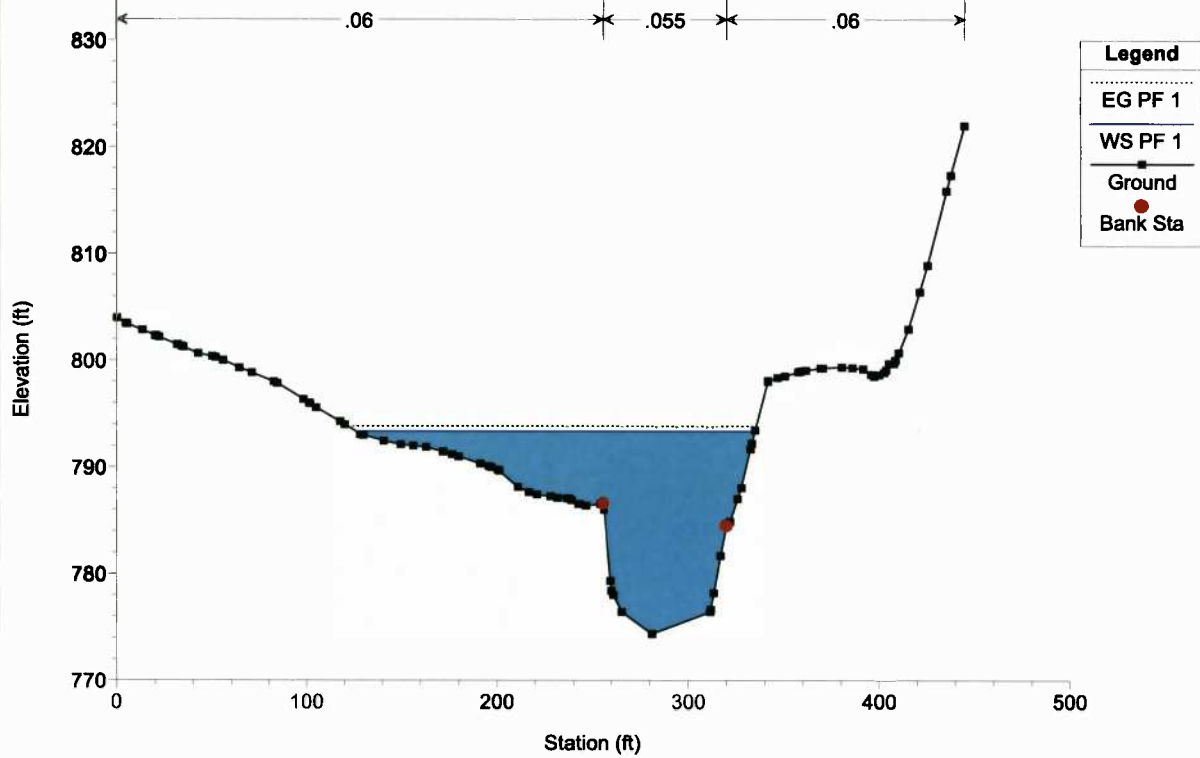
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River = Buckeye Creek Reach = BUCKEYE CREEK RS = 426.73



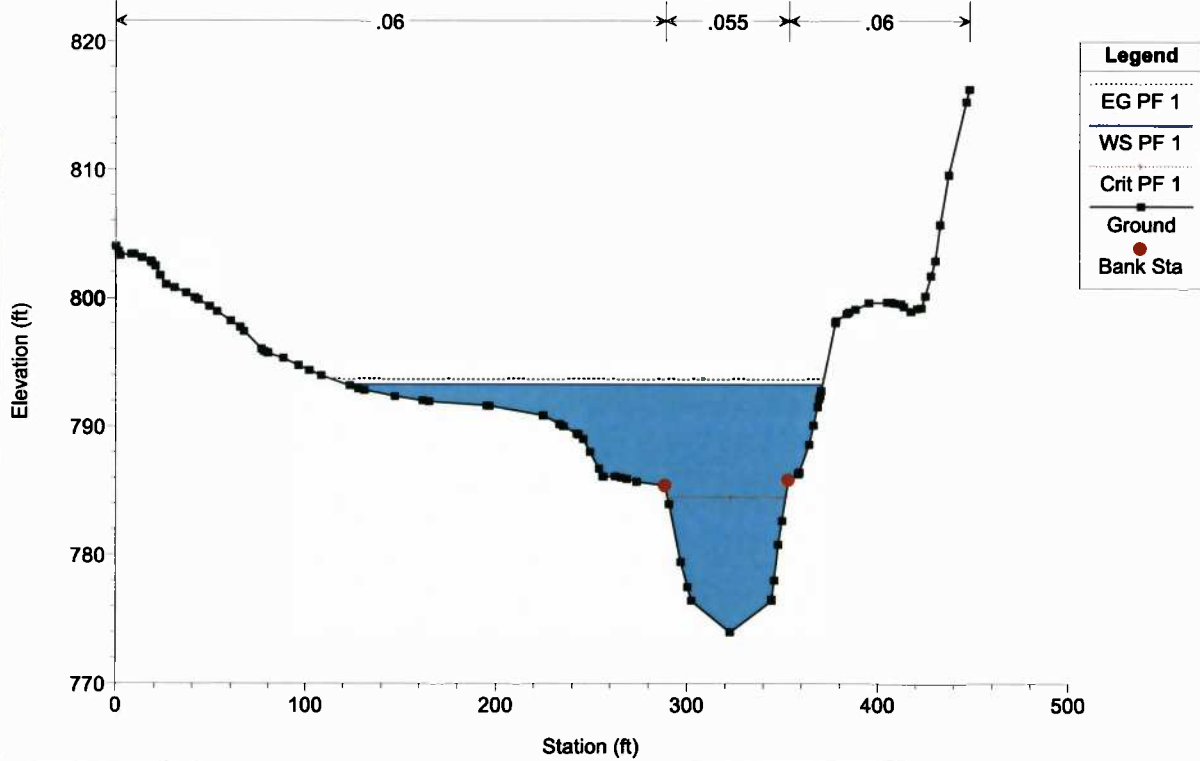
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River = Buckeye Creek Reach = BUCKEYE CREEK RS = 326.73

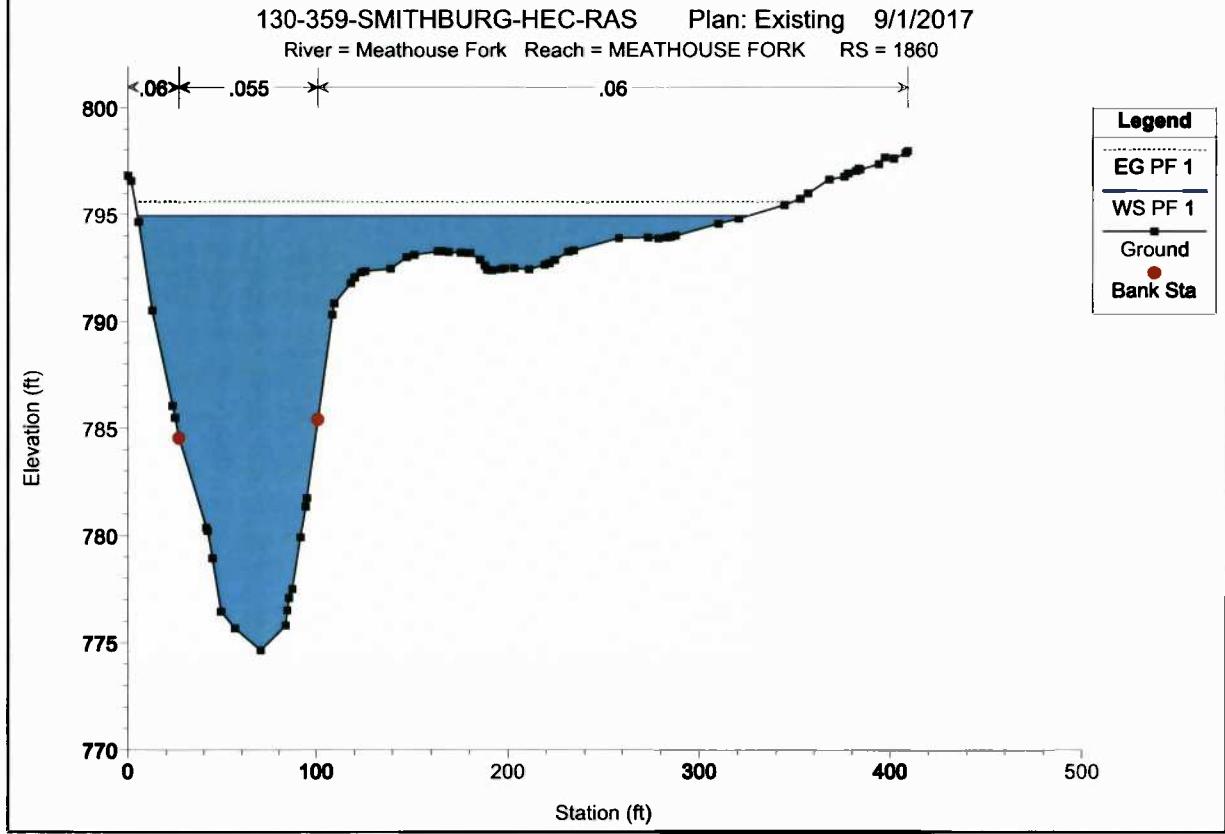
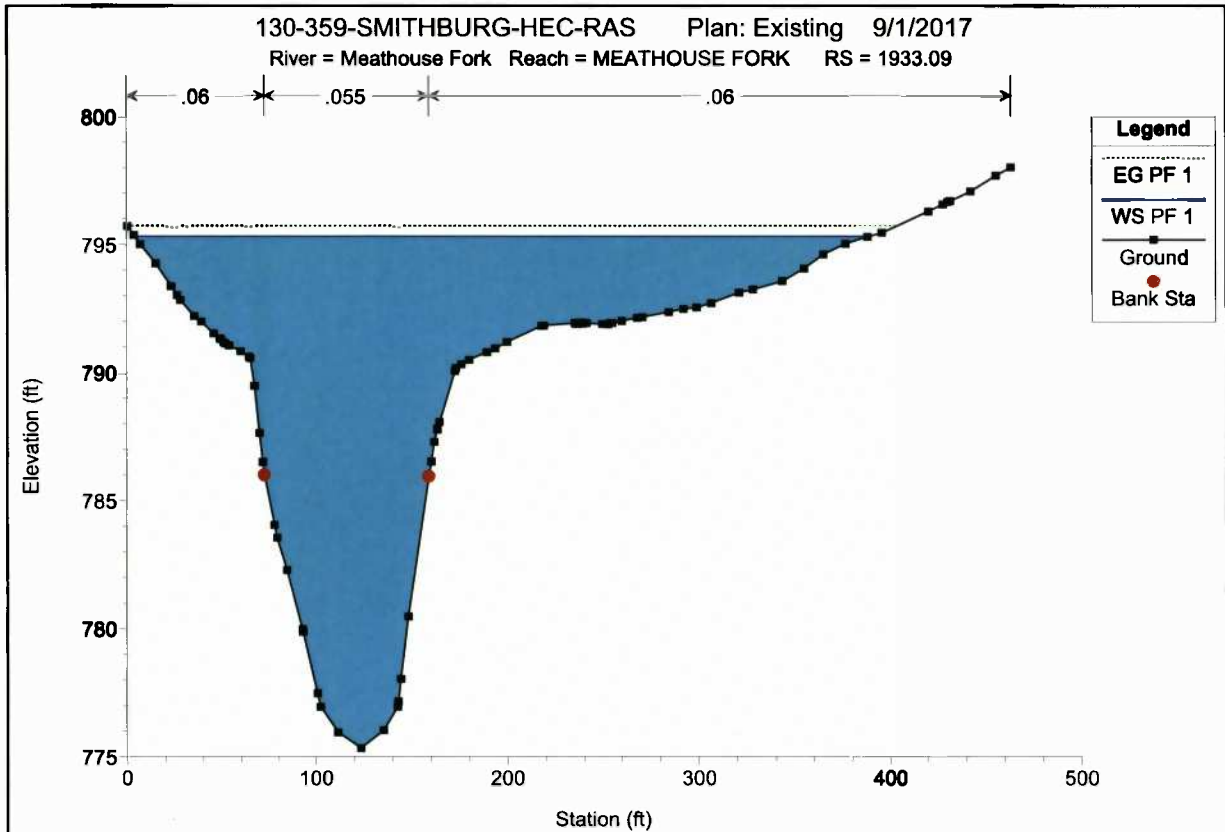


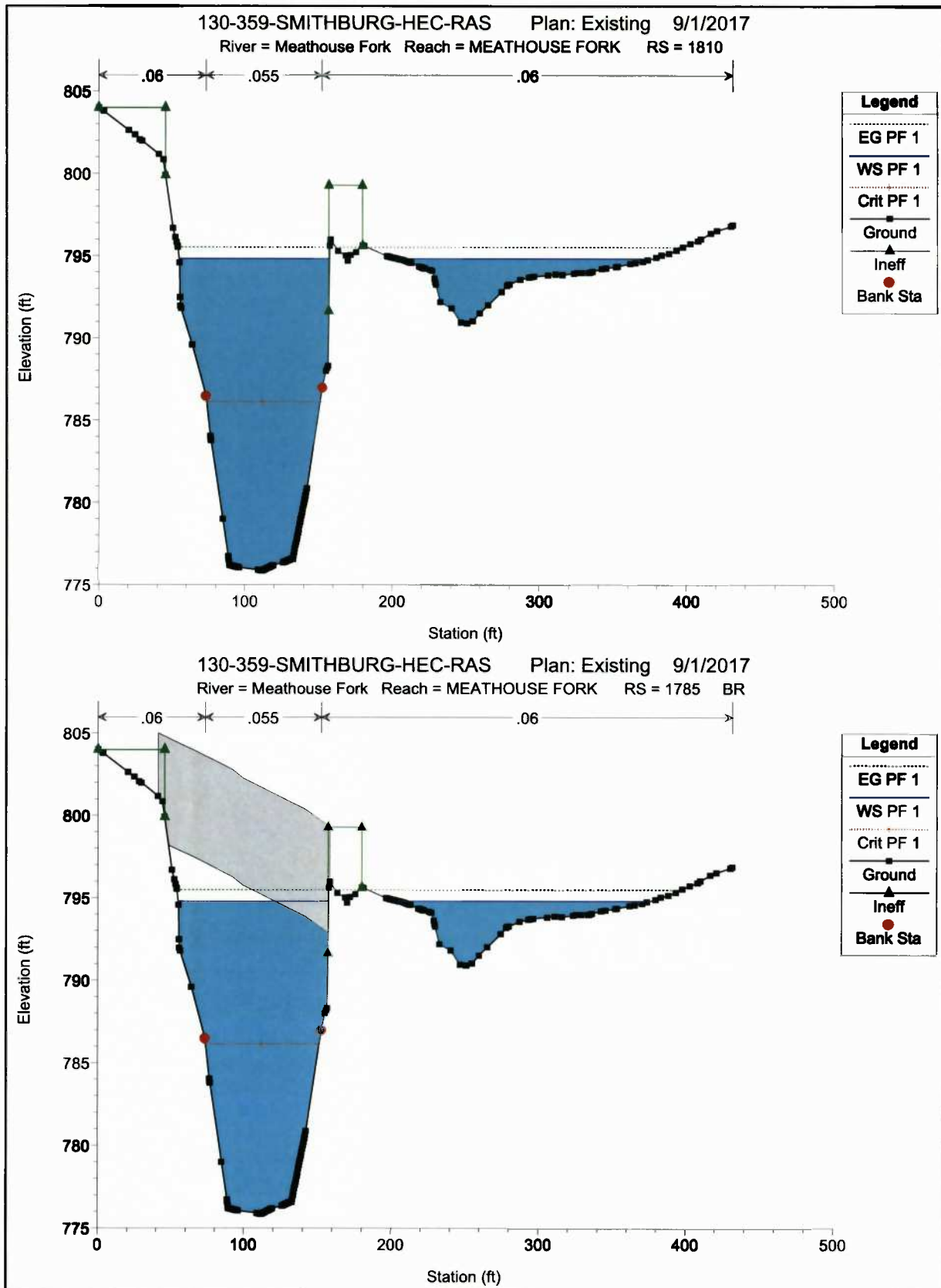
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 226.73

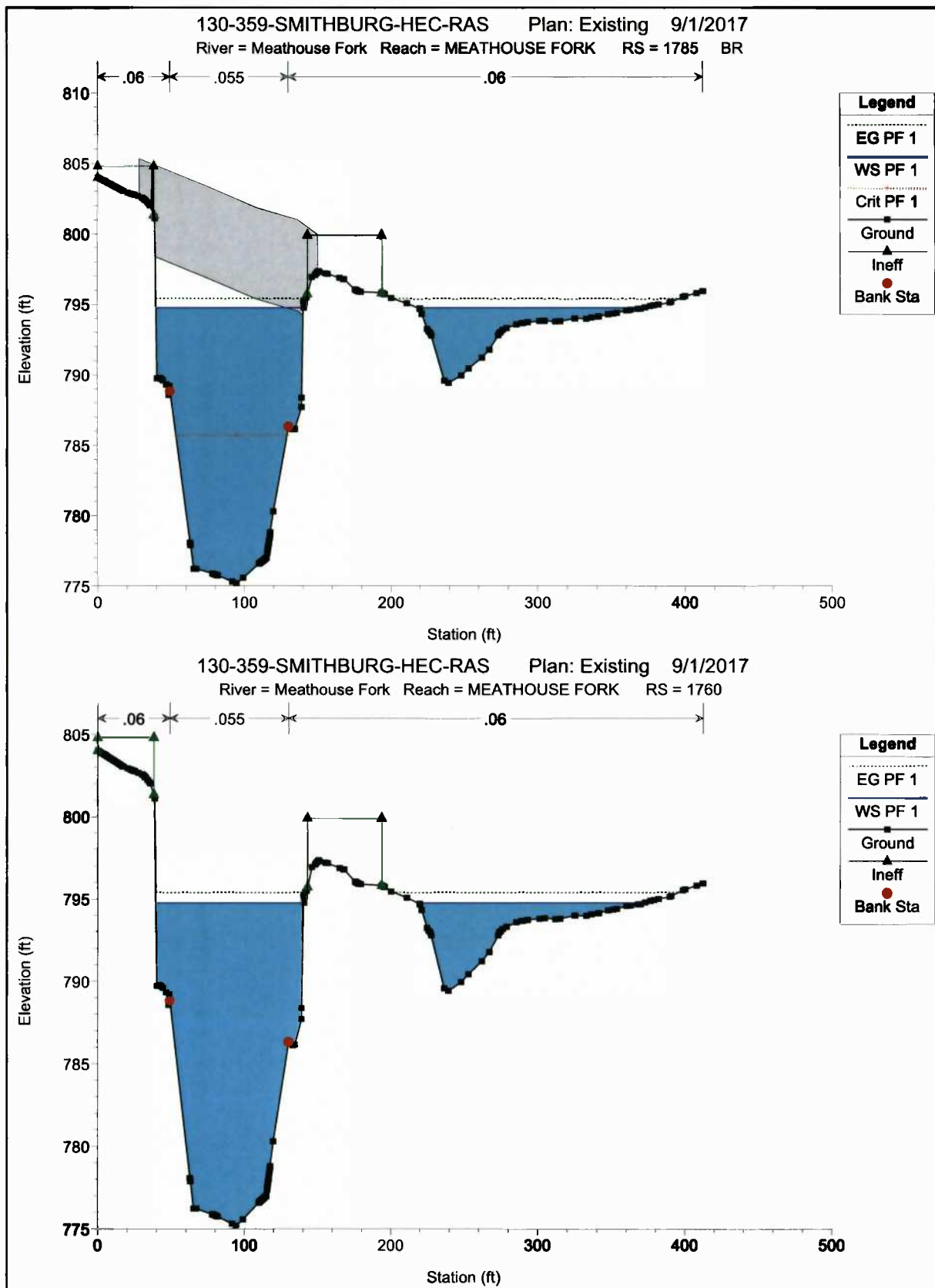


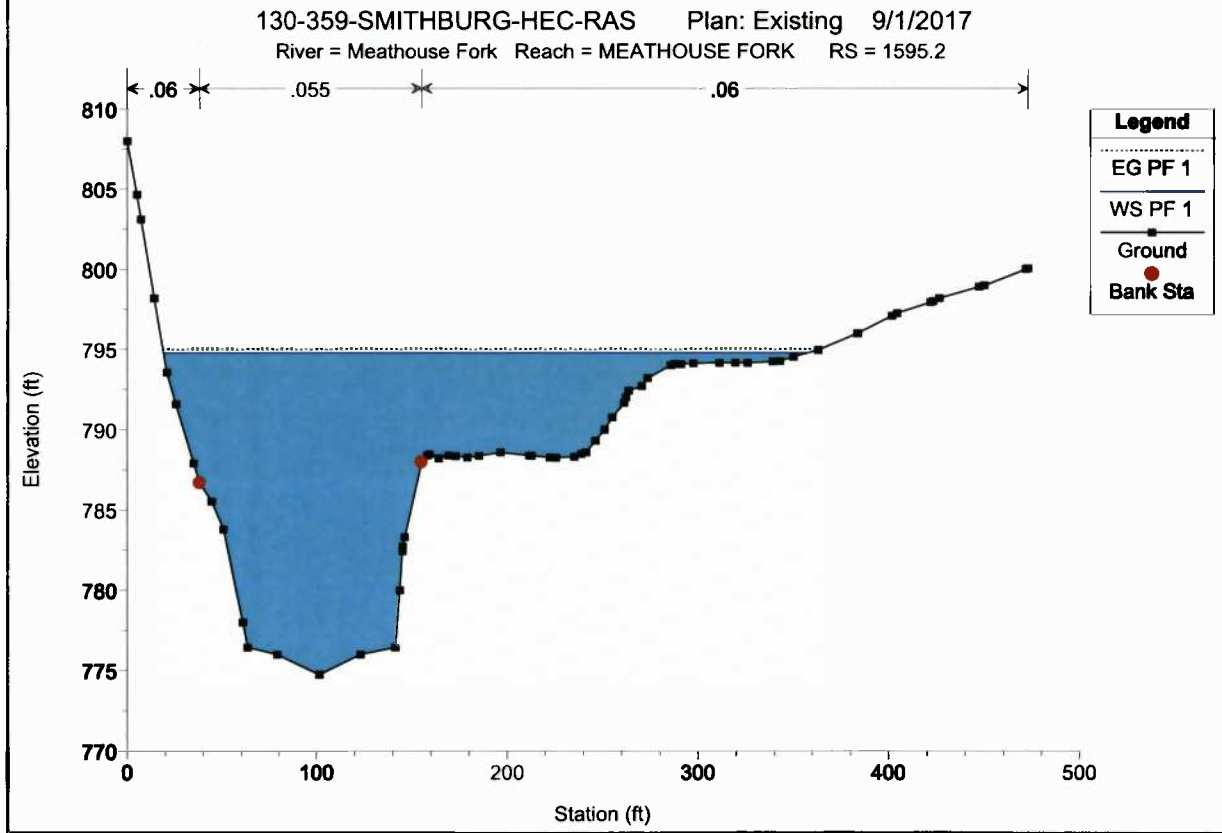
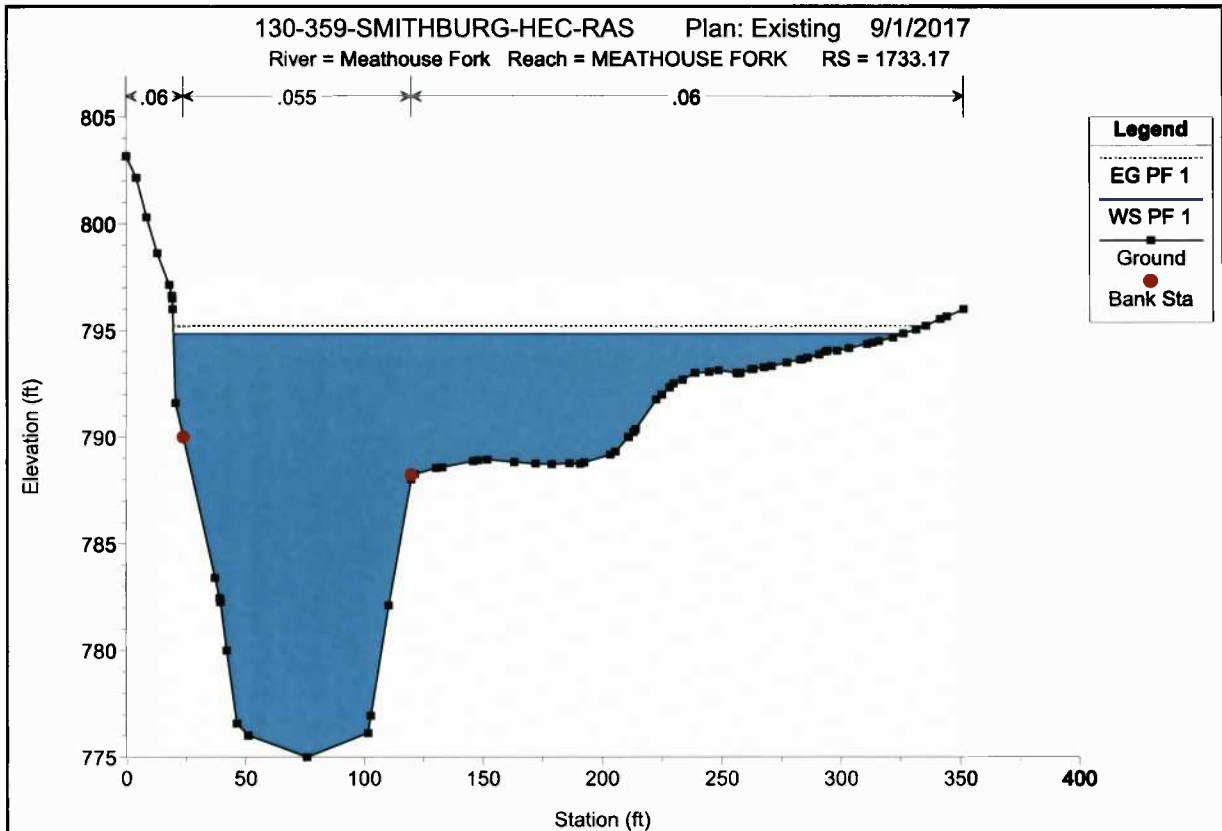
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Buckeye Creek Reach = BUCKEYE CREEK RS = 136.73

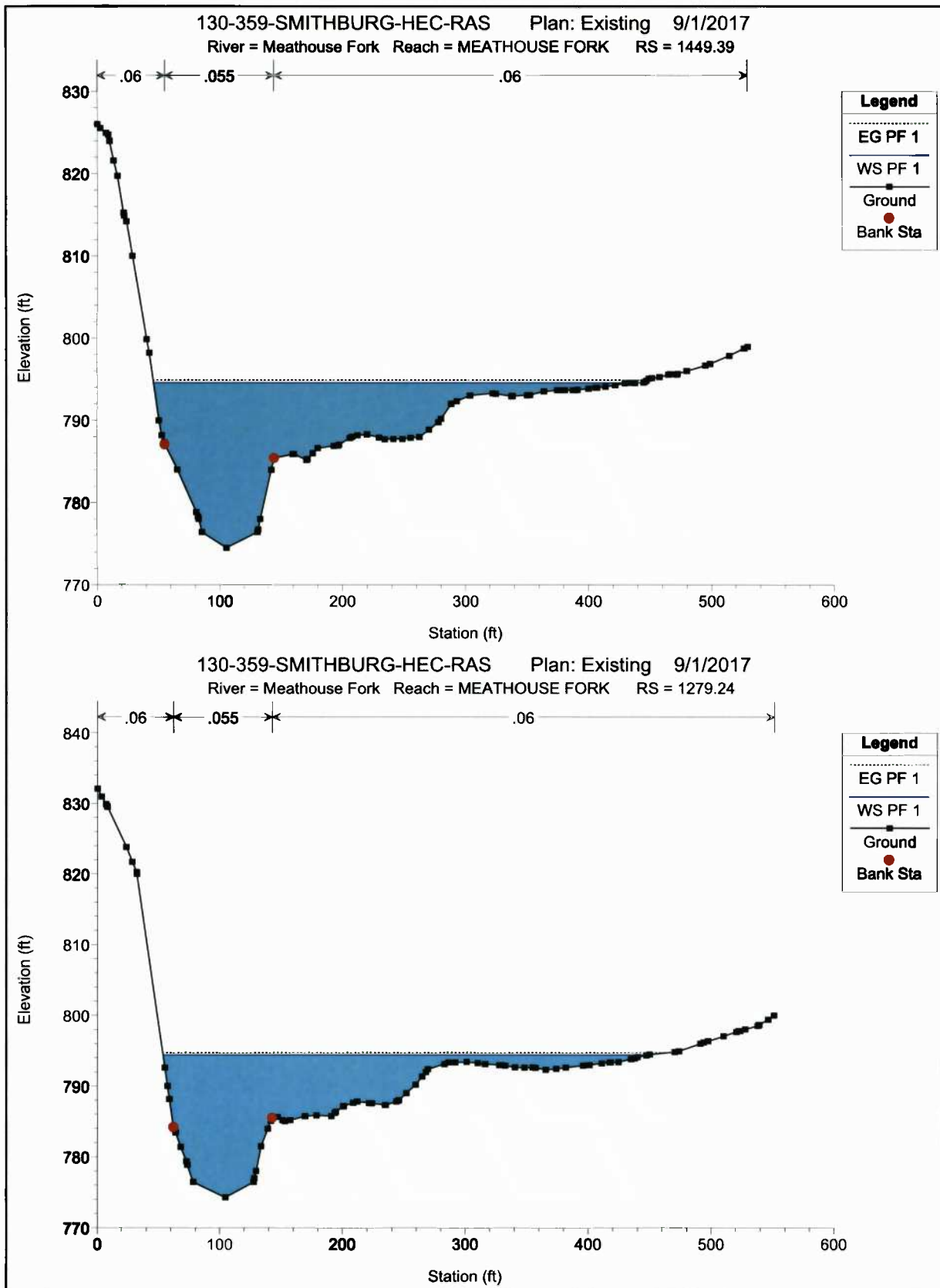




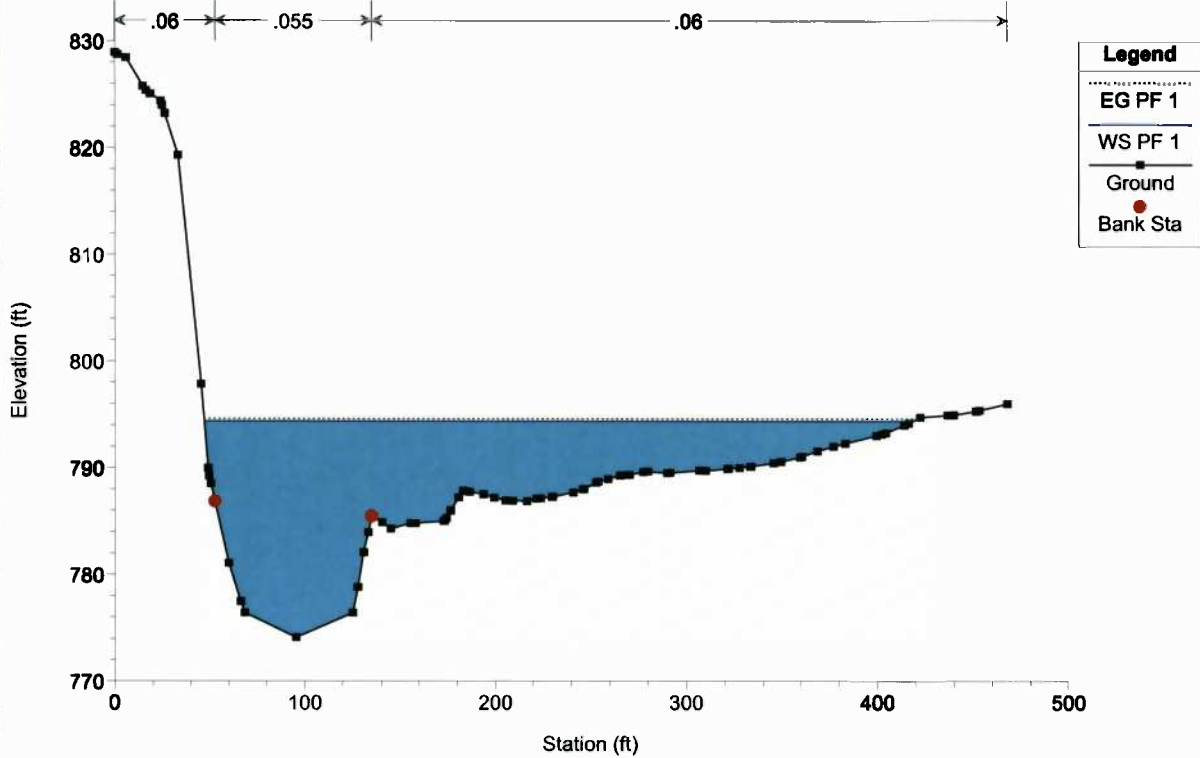




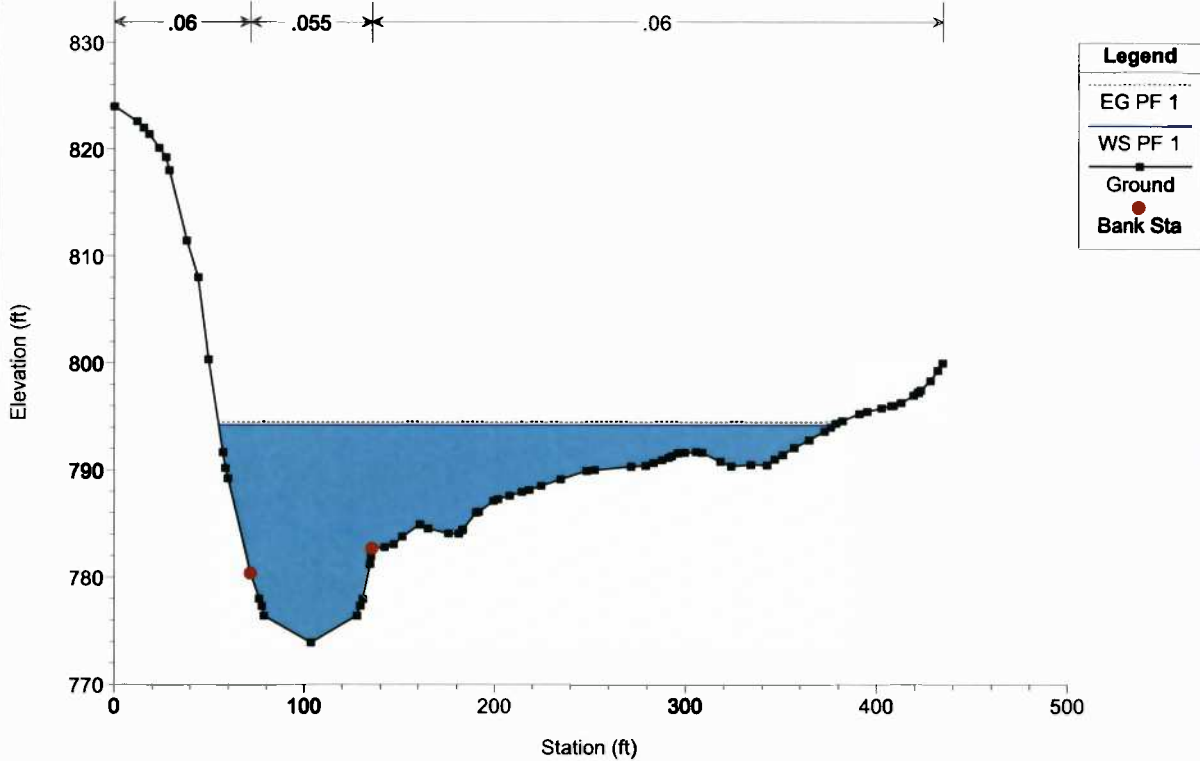




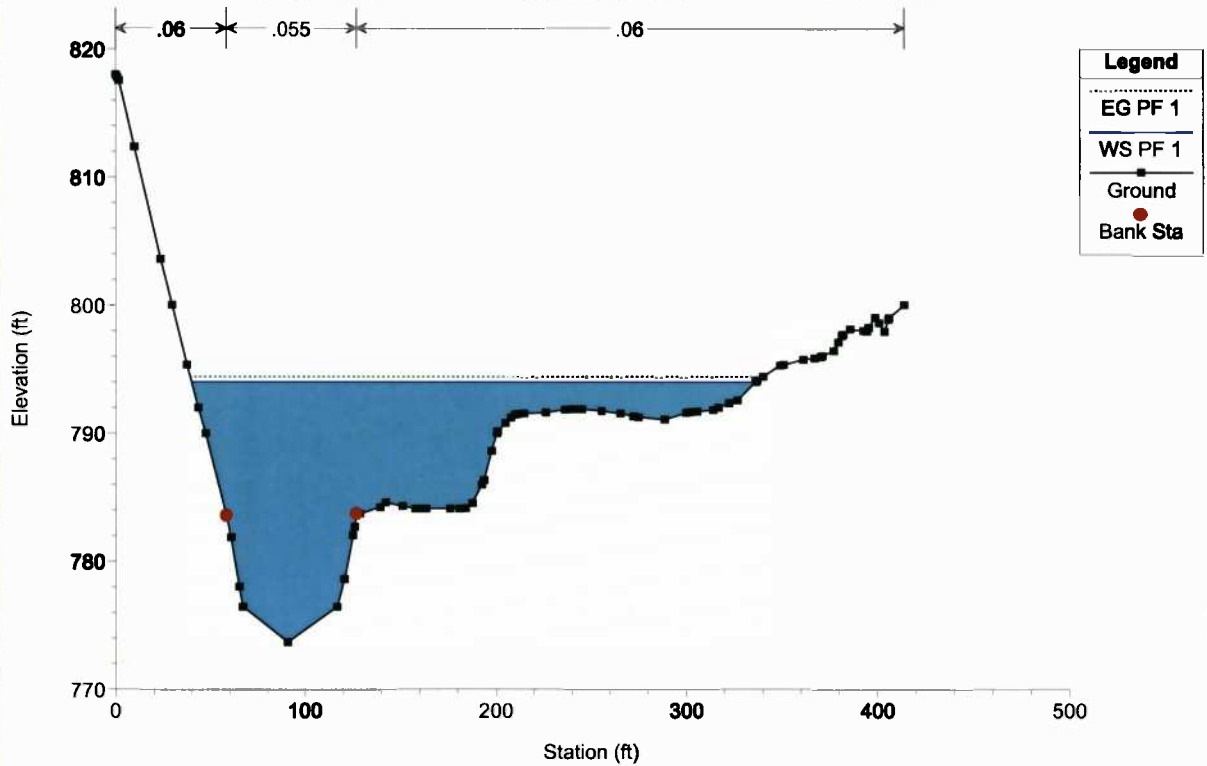
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1152.99



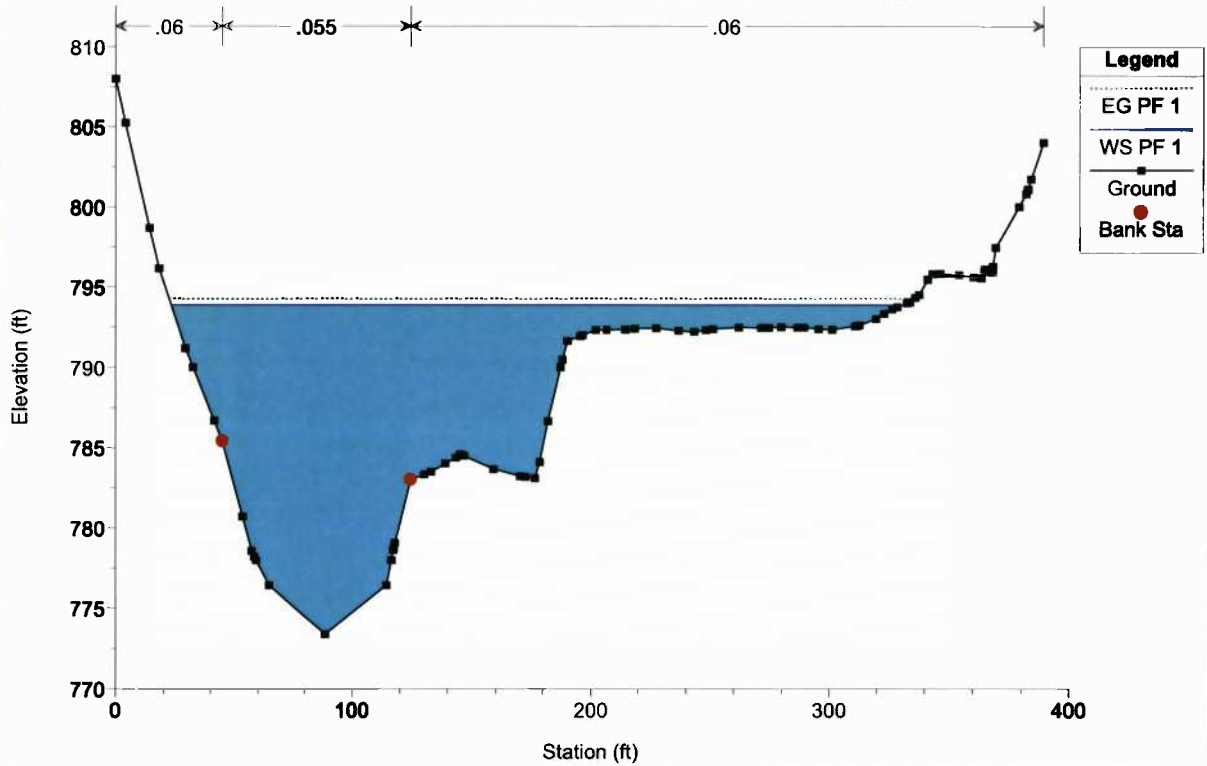
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 1052.99



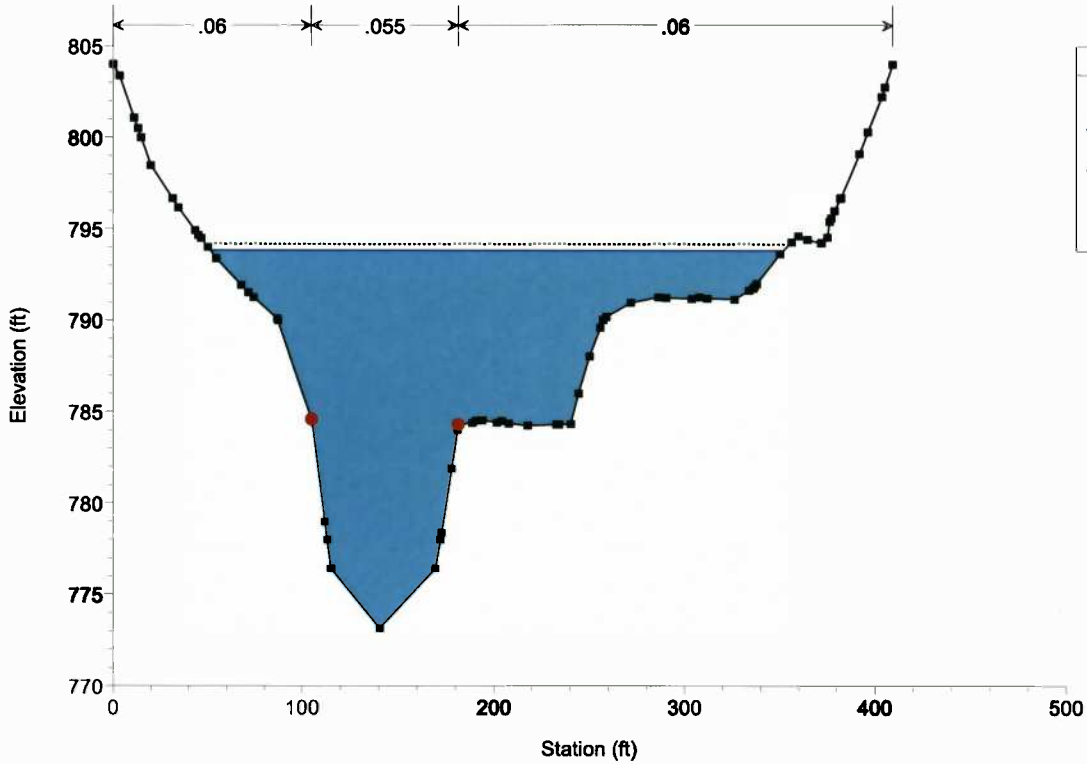
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 952.99



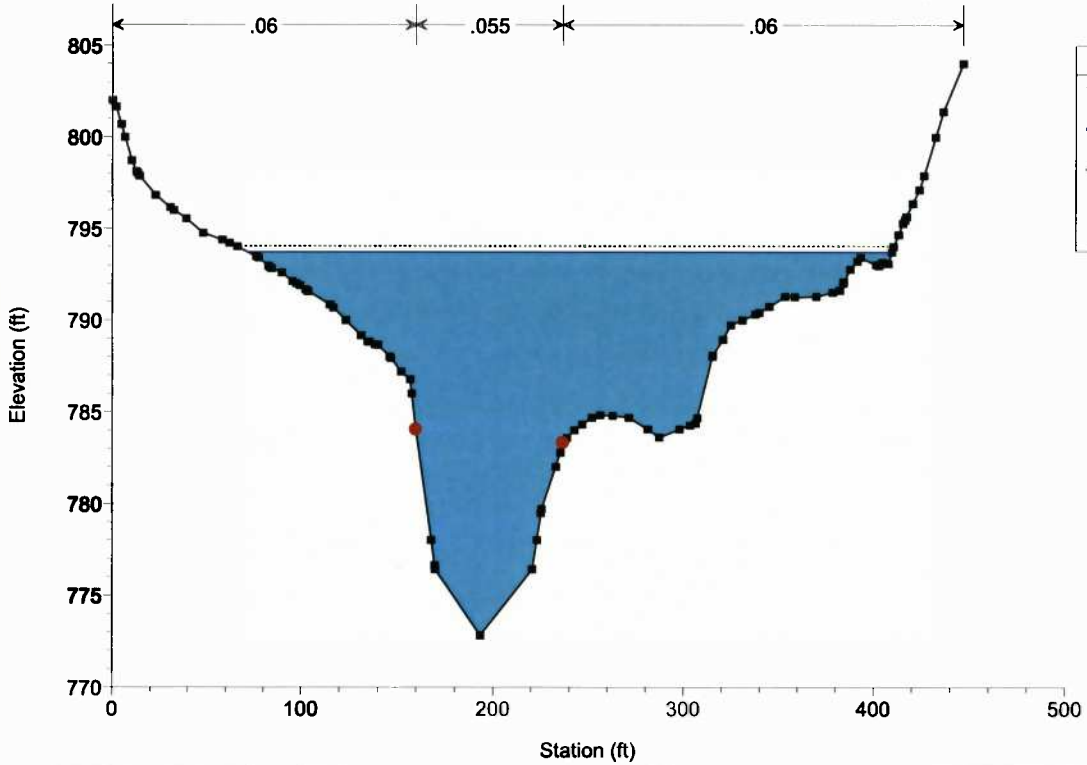
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 852.99

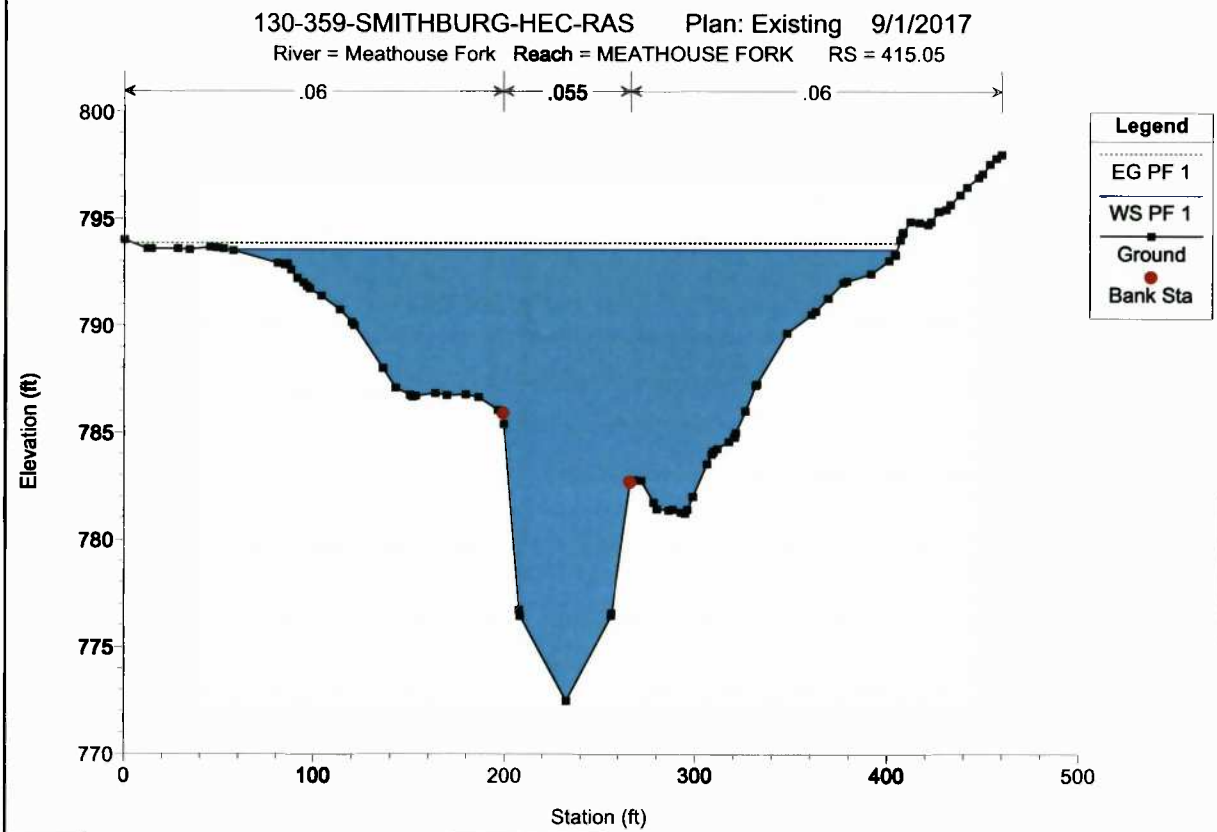
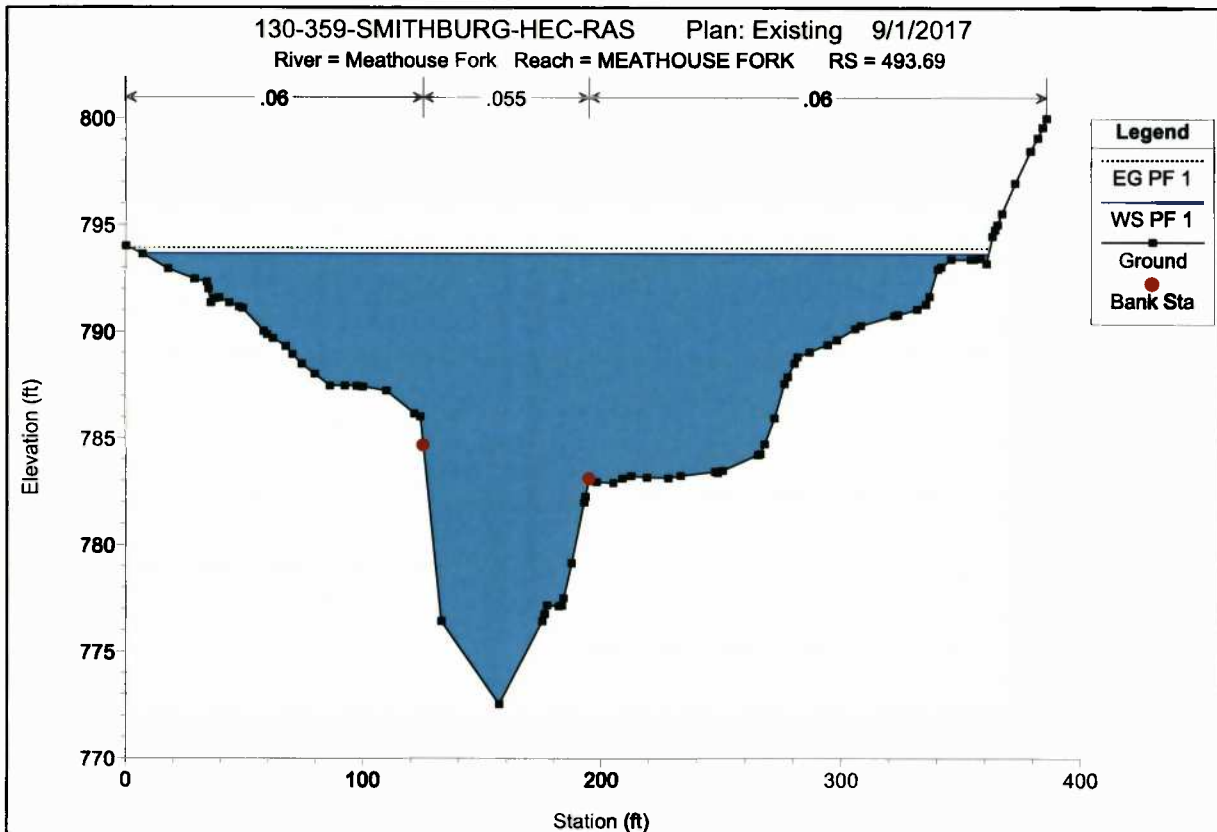


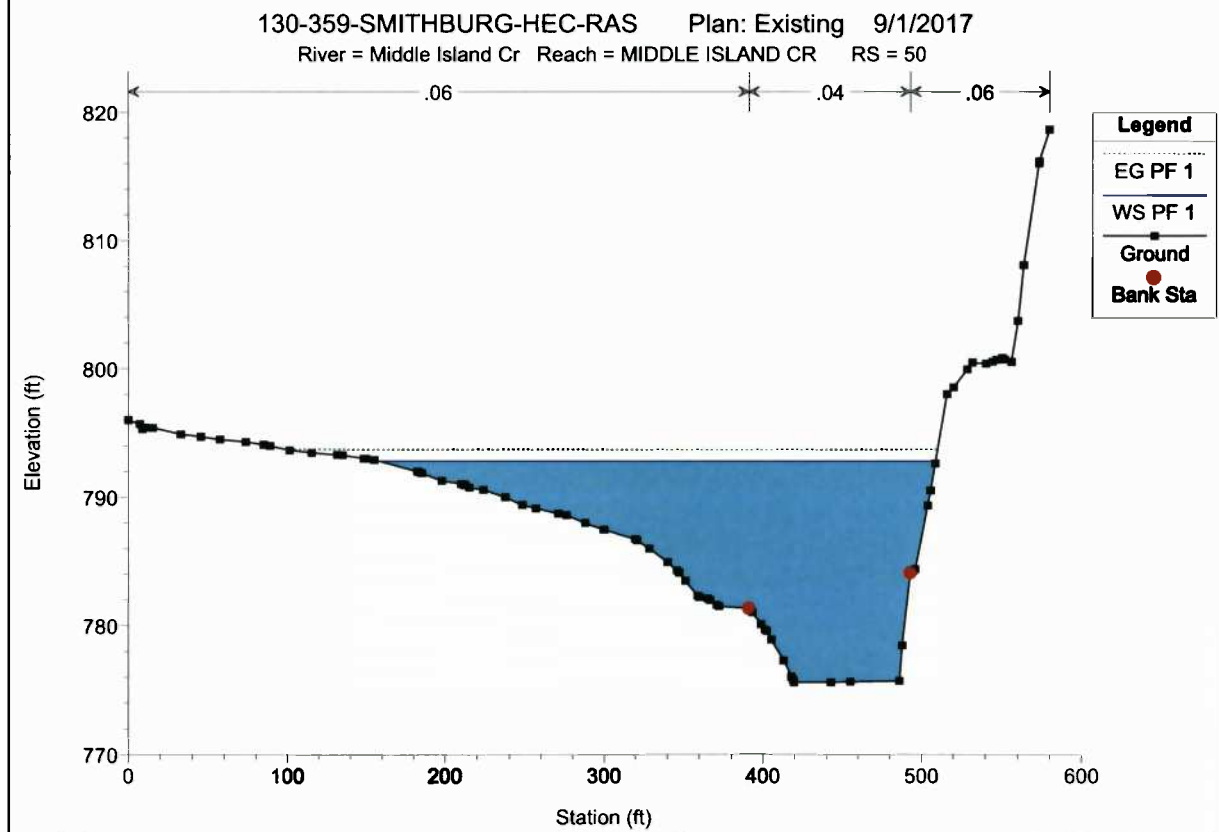
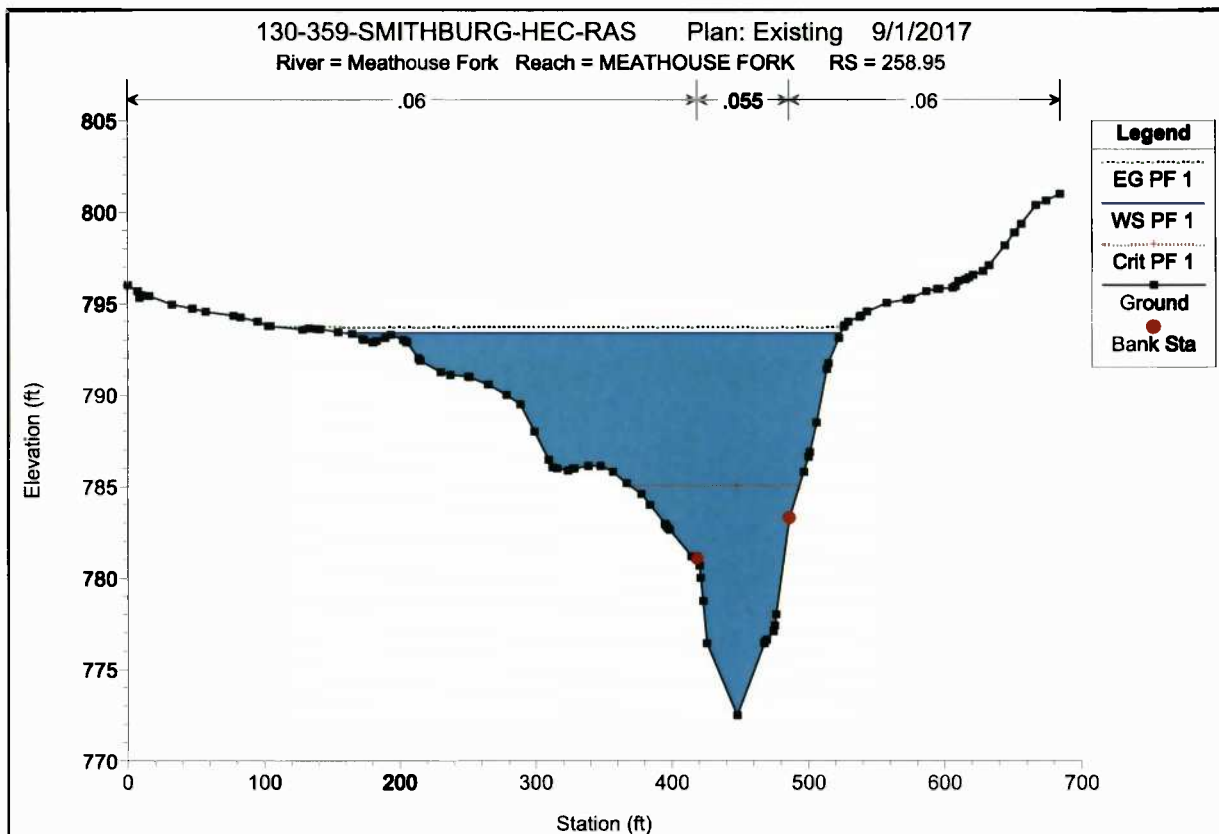
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 752.99



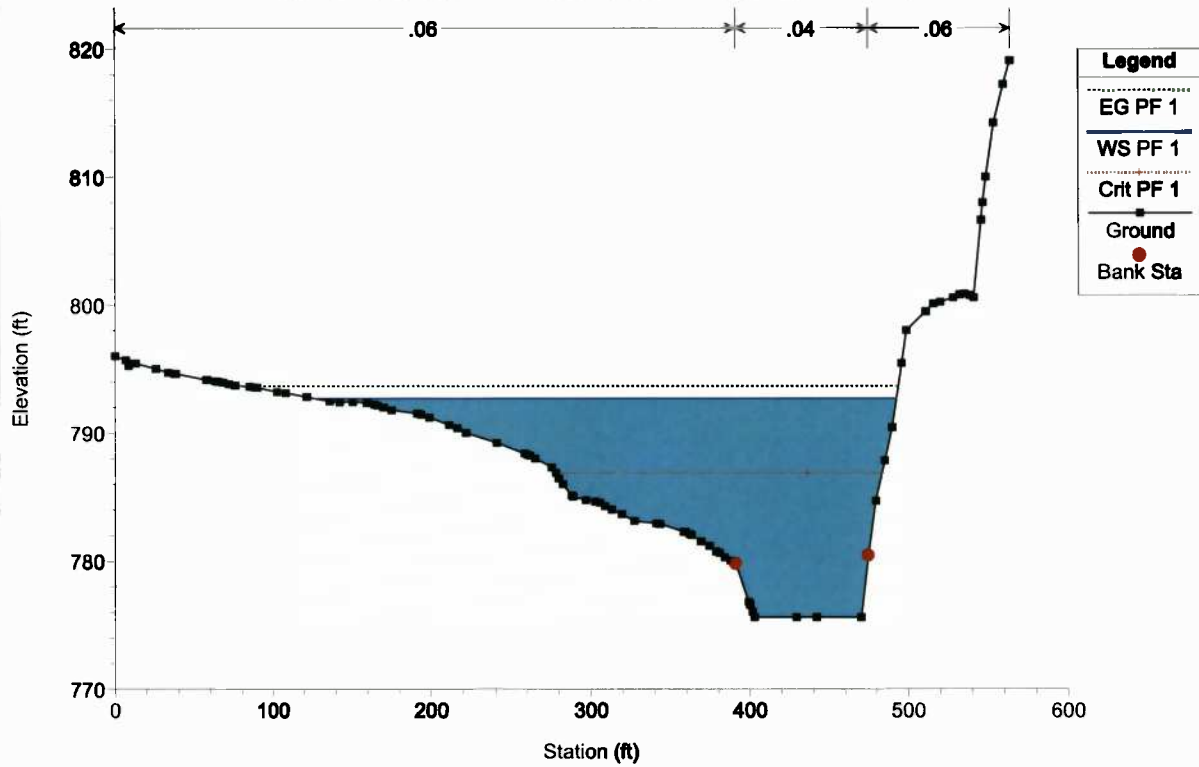
130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Meathouse Fork Reach = MEATHOUSE FORK RS = 612.99







130-359-SMITHBURG-HEC-RAS Plan: Existing 9/1/2017
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 20





LEGEND

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

REVISION RECORD

NO.	DATE	DESCRIPTION

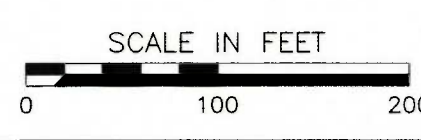
Civil & Environmental Consultants, Inc.
 333 Baldwin Road - Pittsburgh, PA 15205
 412-225-2324 - 800-365-2324
 www.cecinc.com

**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

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



DRAWING NO.: **SP01**

P:\2017\130-359-0209-0209-0101-SP01.dwg | 15/09/2017 2:03 PM | LP: 9/8/2017 2:03 PM

Appendix D

APPENDIX D

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

130359_SMITH_HECRAS.rep

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

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

PROJECT DATA

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

Project in English units

Project Description:

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

September 2017

Smithburg Natural Gas Processing Plant

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

CEC Engineering Team:

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

Prepared By: ARC - 9/6/17
CHECKED BY: ARC 08-SEP-2017

Model Creation:

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

130359_SMITH_HECRAS.rep

"Existing."

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

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

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

Data Sources:

Geometry - Existing surface created from Noreast Aerial.

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

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

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

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

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

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

PLAN DATA

Plan Title: Proposed

Plan File : p:\2013\130-359\Calculations\Phase

2\20170821_H&H\130359_SMITH_HECRAS.p01

Geometry Title: 130-359-Proposed

Geometry File : p:\2013\130-359\Calculations\Phase

2\20170821_H&H\130359_SMITH_HECRAS.g01

Flow Title : Existing Flow

Flow File : p:\2013\130-359\Calculations\Phase

2\20170821_H&H\130359_SMITH_HECRAS.f01

Plan Summary Information:

Number of: Cross Sections = 31 Multiple Openings = 0

Culverts = 0 Inline Structures = 0

Bridges = 1 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01

Critical depth calculation tolerance = 0.01

Maximum number of iterations = 20

Maximum difference tolerance = 0.3

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

130359_SMITH_HECRAS.rep

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

FLOW DATA

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

Flow Data (cfs)

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

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Middle Island Cr	MIDDLE ISLAND CRPF 1		
Known WS = 792.7			

GEOMETRY DATA

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

Reach Connection Table

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

JUNCTION INFORMATION

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1266.73

INPUT

Description:

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850	5.76001	846.8715	0.6003	840	26.38	831.6429	0.82001	829.18
36.76001	824.6258	9.3002	81060.84003	808.7470	3.4003	798.9872	4.8001	796.79	
83.61002	785.4387	5.6003	78498.61002	78099.06003	779.84	103.96	778.22		
125.84	776.03	145.27	778.26	148.42	780	155.58	784	157.02	784.71
158.99	785.78	164.78	786	169.56	786.17	170.54	786.19	172.15	786.59
177.97	788	182.93	789.21	188.95	790.48	196.42	792	197.98	792.31
209.04	792.73	209.75	792.76	210.55	792.78	223.59	793.21	225.76	793.27
228.03	793.38	232.48	793.76	233.81	793.85	234.09	793.87	236.22	794
242.41	794.29	245.83	794.52	257.47	794.73	261.16	794.82	264.72	794.88
273.9	795	278.43	795.24	281.63	795.31	287.94	796	288.98	796.11
289.82	796.16	293.88	796.43	297.36	796.54	305.43	797.03	309.85	797.28
319.57	797.75	321.43	797.83	323.23	797.89	328.17	798	332.92	798.11
349.84	798.32	354.92	798.4	359.62	798.49	359.86	798.5	372.81	798.82
376.88	798.79	378.66	798.77	402.67	800				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0683	6.1002	.055	158.99	.06

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

CROSS SECTION

130359_SMITH_HECRAS.rep

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1166.73

INPUT

Description:

Station Elevation Data num= 64

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 1066.73

INPUT

Description:

Station Elevation Data num= 88

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

130359_SMITH_HECRAS.rep

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 966.73

INPUT

Description:

Station Elevation Data num= 97

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

130359_SMITH_HECRAS.rep

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 866.35

INPUT

Description:

Station Elevation Data num= 110

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

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

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

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent

0 68.52 795

F

CROSS SECTION

RIVER: Buckeye Creek

REACH: BUCKEYE CREEK

RS: 726.73

INPUT

Description:

Station Elevation Data num= 88

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek

REACH: BUCKEYE CREEK

RS: 626.73

INPUT

Description:

Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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0	814	.75	813.883.369995	813.27	10.8	811.97	11.77	811.83
20.69	810.23	21.19	81021.46001	809.87	25.63	807.6525.84001		807.53
27.89	806.3933.73001		803.4935.93001	800	38.39	793.64	40.75	789.42
42.39	787.847.34001		784.2348.59001	783.1450.79001		781.6652.59001		780
53.39	779.2559.23001		778	60.77	777.5762.84001	777.0781.01001		775.78
107.9	778	113.99	780.82	117.8	784.31	119.49	786	120.66
127.74	787.03	131.32	786.97	133.25	786.86	137.61	786.41	144.48
149.83	786.65	163.39	786.77	163.6	786.78	163.82	786.78	179.84
189.13	787.94	190	788	192.32	788.14	193.24	788.2	193.68
195	788.49	200.12	789.3	204.37	790.8	204.72	790.98	205.2
210.8	794	212.03	794.61	217.01	795.45	221.41	796	227.73
231.28	796.62	246.6	797.34	250.32	797.54	250.74	797.55	252.03
253.03	797.61	253.6	797.63	255.15	797.61	256.86	797.64	260.32
262.84	797.84	263.86	797.86	265.57	797.95	266.38	798	

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 526.73

INPUT

Description:

Station Elevation Data num= 58

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 426.73

INPUT

Description:

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.0	29999	803.588	549988	802.4	16.78	800.912	1.32999	800
24.34	799.4	31.22	798.184	6.17999	796.134	7.02998	796	47.37	795.95
50.17999	795.566	1.16998	794.056	1.21999	794.046	1.72998	794	69.60999	793.35
70.10999	793.177	2.44998	792	73.24998	791.597	8.07999	790	2380.75999	789.54
84.39999	788.458	5.84999	788	88.15999	787.299	3.53999	786.98	93.87	786.95
94.63998	786.91	103.01	786.62	106.18	786.24	108.97	786	111.27	785.79
116.76	779.71	117.36	779.27	118.03	778.54	119.02	778	119.8	777.57
122.04	776.43	147.26	775.23	171.15	776.43	173.1	778	176.02	780.72
178.28	782.51	180.15	784	181.15	784.76	182.49	784.98	183.23	785.03
184.5	785.06	189.8	785.25	190.93	785.28	199.11	785.45	201.92	785.51
202.24	785.5	202.44	785.5	203.02	785.51	203.47	785.52	212.86	785.55
217.48	785.56	220.87	785.64	222.61	785.59	224.17	785.64	227.37	785.78
231.46	785.98	231.94	785.99	232.12	786	239.96	786.32	243.95	786.6
246.04	786.78	246.68	786.8	250.06	786.92	254.88	787.51	255.97	787.65
256.42	787.79	260.37	788.52	262.74	789.5	266.72	791.25	266.96	791.35
272.89	793.86	274.55	794.56	279.34	795.44	281.61	796	282.11	796.11
288.04	796.72	302.3	798						

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 326.73

INPUT

Description:

Station Elevation Data num= 92

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 226.73

INPUT

Description:

Station Elevation Data num= 103

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

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Buckeye Creek
 REACH: BUCKEYE CREEK RS: 136.73

INPUT

Description:

Station Elevation Data num= 99

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

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432.35 805.7 436.85 809.57 446.05 815.28 447.61 816.26

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1933.09

INPUT

Description:

Station Elevation Data num= 88

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

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

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

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1860

INPUT

Description:

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	796.782	70012	796.64	3.76001	796.565	279999	795.667	360016	794.7
11.56	793.47	21.41	789.21	23.31	788.393	229001	784.51	37.78	782.14
39.89001	781.38	43.59	781.134	373001	781.124	648001	778.85	49.19	776.44
56.5	775.66	70	774.64	83.5	775.798	452002	776.5	86.94	776.54
90.67001	776.59	94.84	779.479	511002	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.

32.29	001	101.5	57.55	50	36.74	.3	.5
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CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1810

INPUT

Description:

Station Elevation Data num= 289

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8042.89	0015	803.862	970001	803.863	470001	803.782	0.45999	802.63

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

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

Manning's n Values num= 4

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

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

Ineffective Flow num= 2

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

BRIDGE

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1785

INPUT

Description:

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

Upstream Deck/Roadway Coordinates

num= 6

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

Upstream Bridge Cross Section Data

Station Elevation Data num= 289

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

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

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

Manning's n Values num= 4

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

Bank Sta: Left Right Coeff Contr. Expan.

73.03	152.62	.3	.5
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Ineffective Flow num= 2

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

Downstream Deck/Roadway Coordinates

num= 6

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

Downstream Bridge Cross Section Data

Station Elevation Data num= 289

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

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

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

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

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

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

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Energy Only

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add Weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1760

INPUT

Description:

Station Elevation Data num= 289

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

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

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

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1733.17

INPUT

Description:

Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	803.18	8000183	803.14	1480011	803.11	990021	803.07	2380005	803.05
2.69	803.03	2940002	803.02	3149994	803.01	4809998	802.93	5100006	802.91
5.52	802.85	1414999	799.29	15.94	798.65	1864001	797.68	1949002	796.99
19.52	796.97	20.37	796.62	221.05	790.86	2320001	791.02	2389999	791.24
24.37	791.42	652002	789.58	2879001	788.46	2896002	788.77	3079001	788.37
32.07	788.01	3239001	787.75	3551001	785.31	3721002	783.97	4210001	780.2
46.37	776.57	51	776.01	76	775	101.61	776.13	102.77	776.94
104.36	779.64	105.72	780.54	117.9	788.58	118.53	789	119.67	788.66
120.8	788.32	122.69	788.42	129.79	788.81	134.94	788.62	139.97	788.43
141.06	788.39	155.63	788.28	155.84	788.28	159.31	790	163.09	791.89
163.57	792.12	165.99	793.32	168.13	793.31	169.81	793.3	203.92	793.67
206.73	793.7	211.66	793.71	214.6	793.74	217.91	793.78	222.06	793.78
224.75	793.8	227.57	793.81	228.62	793.81	236.27	793.83	238.37	793.83
246.26	793.86	247.74	793.86	255.88	793.88	256.55	793.88	264.97	793.91
266.19	793.91	274.69	793.94	283.58	793.97	283.62	793.97	286.49	794
287.28	793.99	292.73	794	292.9	794	293.8	794.01	297.02	794.05
297.31	794.06	300.75	794.12	301.25	794.13	303.52	794.13	304.18	794.15
306.89	794.17	309.58	794.2	310.62	794.23	313.35	794.28	313.81	794.29
314.29	794.31	314.83	794.33	315.43	794.36	318.29	794.43	320.6	794.54
328.68	794.79	332.68	795.01	334.51	795.11	339.38	795.28	341.22	795.39
343.43	795.49	345.94	795.59	346.57	795.61				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.0614	14999	.055	117.9	.06	139.97	.015

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

CROSS SECTION

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RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK

RS: 1595.2

INPUT

Description:

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8085.079987	804.647	209991	803.11	14.16	798.1920	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

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55.08997787.094355.09998	787.0965.17999	784.0280.47998	778.8581.87997	778.31
82.52997	77885.08997	776.43 105.3	774.51 130.62	776.43 131.11 776.76
132.99	778 141.97	784 144.34	785.41 159.36	785.91 159.84 785.91
160.26	785.9 170.62	785.19 171.41	785.33 175.6	786 179.56 786.63
192.97	786.9 195.86	786.93 197.2	787.06 207.65	788.01 207.73 788.02
210.03	788.1 211.52	788.15 219.87	792.3 220.36	792.53 222.04 793.32
269.93	793.83 272.14	793.86 273.62	793.88 274.6	793.89 279.41 793.94
284.9	794 285.26	794 288.41	794.03 291.53	794.06 293.44 794.08
295.16	794.1 296.8	794.12 298.31	794.13 298.93	794.14 299.98 794.15
300.58	794.15 300.98	794.16 301.19	794.16 301.24	794.16 301.99 794.17
312.47	794.27 315.59	794.3 323.9	794.38 328.84	794.43 331.89 794.46
340.1	794.54 343.05	794.56 344.5	794.57 344.66	794.57 347.54 794.59
351.29	794.62 353.36	794.63 356.49	794.66 386.25	795.06 386.5 795.07
386.92	795.07 387.27	795.08 388.89	795.12 390.76	795.11 391.33 795.13
392.15	795.15 393.63	795.15 394.09	795.16 394.57	795.17 396.11 795.17
396.84	795.19 398.43	795.19 399.01	795.2 399.61	795.21 401.23 795.21
401.83	795.23 402.5	795.24 403.18	795.26 403.88	795.27 405.58 795.3
406.31	795.32 406.37	795.32 406.38	795.31 409.8	795.39 410.38 795.4
416.27	795.53 417.43	795.55 417.62	795.55 417.87	795.56 419.37 795.59
421.84	795.63 422.47	795.65 424.8	795.69 425.57	795.72 427.77 795.76
428.67	795.78 429.34	795.8 429.65	795.81 430.35	795.83 431.77 795.86
433.69	795.93 434.87	795.98 435.75	796.02 436.66	796.07 437.92 796.14
439.23	796.23 440.94	796.33 442.57	796.45 443.96	796.56 445.53 796.7
446.98	796.83 448.49	797 450	797.15 453.2	797.53 454.59 797.69
455.53	797.82 456.05	797.89 457.57	798.09 459.07	798.29 460.49 798.49
462.09	798.7 463.44	798.88 465.11	799.11 466.86	799.34 468.13 799.52
469.34	799.68 471.15	799.92 472.29	800.08 474.18	800.33 476.15 800.6
477.2	800.74 478.2	800.87 480.22	801.15 481.1	801.26 481.49 801.32
482.01	801.39 483.24	801.55 484.1	801.66 486.26	801.94 488.53 802.22
489.28	802.32 490	802.4 492.3	802.68 492.95	802.75 495.33 803.02
497.82	803.3 498.35	803.36 498.85	803.41 501.37	803.67 501.8 803.71
504.39	803.97 507.11	804.23 507.41	804.26 507.51	804.26 508.38 804.34
510.28	804.51 510.43	804.53 510.65	804.54 513.46	804.78 514.92 804.9
514.98	804.9 516.44	805.02 516.48	805.02 516.56	805.03 519.5 805.25
519.52	805.25 520.37	805.31 522.13	805.43 522.16	805.43 522.2 805.43
522.21	805.43 522.51	805.45 525.59	805.65 525.67	805.65 525.68 805.65
526.75	805.72 526.78	805.72 526.81	805.72 527.51	805.76 527.63 805.77
531.04	805.96 531.38	805.97 531.4	805.97 531.41	805.98 531.74 805.99
531.86	806			

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

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

CROSS SECTION

130359_SMITH_HECRAS.rep

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1279.24

INPUT

Description:

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	832.093	300018	830.957	089996	829.87	7.77002	829.658	140015	829.49
23.52002	823.828	32001	821.683	1.99002	820.27	32.22	82055.23001		792.59
57.41	79062.33002		784.1664	.02002	783.4268	17001	781.41	72.66	779.36
73.49002	778.8878	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	.0662	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	828.921	410004	828.775	619995	828.44	14.56	825.7916	07999	825.39
18.41	825.07	24	824.3924	67999	824	26.03	823.23	33.12	819.31
45.31	797.87	49.19	790.0149	57001	789.2552	70001	786.8460	04999	781.06
66.31	777.5	68.31	776.4268	32999	776.4195	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

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 1052.99

INPUT

Description:

Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82411.89001	822.5915.27002	82218.17001	821.43	23.59	820.13			
27.11002	819.2528.92999	818	37.97	811.45	44.09	80849.60001	800.33		
58.61002	790.1759.82001	789.2171.61002	780.3676.24002	77877.60001	777.31				
78.66	776.43	103.55	773.91	127.55	776.43	129.35	777.33	130.72	777.98
130.75	778	134.52	781.24	135.01	782	135.45	782.67	142.14	782.8
146.96	783.07	151.63	783.78	160.96	784.9	165.15	784.55	175.65	784.07
179.16	784.06	181	784.06	187.13	786.11	187.91	786.37	190.35	787.18
206.03	792.4	206.21	792.5	206.46	792.62	206.49	792.63	207.86	793.32
208.55	793.33	208.81	793.33	255.1	808.76	288.36	819.85	291.82	821
308.98	821	311.65	821	318.08	818.86	368.43	802.07	392.09	794.19
393.32	793.81	395.92	793.96	399.65	794.17	407.63	794.5	410.61	794.62
412.59	794.71	421.24	795.14	429.23	795.93	429.96	796	430.12	796.01
430.2	796.02	438.72	796.86	440.77	797.07	447.65	798.14	455.45	799.42
458.82	799.96								

Manning's n Values num= 3

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

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

96.56 100 110.74

.3

.5

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK

RS: 952.99

INPUT

Description:

Station Elevation Data		num= 84							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	818	.710022	817.81	.610016	817.559	.650024	812.3723	.37003	803.59
29.31003	800	37.20001	795.3343	2.6001	791.9847	.15002	790	47.19	789.98
58.22	783.56	60.72	781.8664	.96002	778	66.69	776.4390	.71002	773.66
116.66	776.43	120.47	778.57	120.57	778.61	125.02	782	125.93	782.68
127.02	783.7	128.68	783.7	139.29	784.22	142.31	784.58	151.09	784.31
157.71	784.12	161.97	784.12	163.32	784.12	175.92	784.12	181	784.12
184.14	784.14	187.61	784.53	192.54	786	193.74	786.34	197.66	788.62
200.41	790	200.68	790.13	204.85	790.78	207.76	791.22	209.63	791.44
211.21	791.48	214.66	791.52	225.96	791.61	235.93	791.84	240.13	791.86
244.77	791.88	255.33	791.72	265.58	791.54	272.12	791.32	275.01	791.25
288.54	791.06	299.92	791.57	301.63	791.63	302.81	791.66	305.58	791.68
314.1	791.82	316.91	792	322.51	792.35	326.81	792.57	336.29	794
336.73	794.07	337.06	794.1	340.21	794.42	349.29	795.28	350.88	795.34
361.24	795.75	367.14	795.84	370.4	795.94	371.13	796	371.3	796.01
377.04	796.41	379.58	797.09	381.43	797.6	382.08	797.7	385.58	798.11
392.57	797.98	394.3	797.93	395.19	798.23	398.65	799.03	400.86	798.58
403.54	797.92	405.69	798.88	406.06	799.01	413.92	800		

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

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	58.22	127.02		98.39	100		.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	8084.07	007	805.25	14.06	798.69	18.20	796.16	29.19	791.2

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 752.99

INPUT

Description:

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8043.44	0002	803.38	10.92	001	801.08	13.01	999	800
19.72	798.47	31.20	796.67	34.29	999	796.17	43.22	794.92	44.98
46.51	794.49	50.06	794.54	45.00	1	793.39	67.51	791.91	71.29
74.11	791.26	86.59	790.1	86.78	790.08	87.06	790	105.04	784.58
111.78	778.98	113.05	778	115.06	776.43	140.26	773.16	169.58	776.43
172.23	778	172.8	778.4	177.82	781.88	180.97	784	181.41	784.29
188.66	784.4	190.6	784.52	193.9	784.54	201.52	784.41	204.21	784.5
207.96	784.36	217.62	784.25	232.65	784.31	234.2	784.32	240.15	784.35
244.28	786	249.97	788.04	255.64	789.6	257.11	790.03	257.32	790.05
258.82	790.19	271.71	790.97	286.22	791.28	290.14	791.25	303.74	791.2
307.75	791.27	311.87	791.21	326.27	791.16	333.89	791.65	335.95	791.75
336.59	791.85	337.72	792	350.06	793.63	356.3	794.29	359.74	794.61
364.54	794.43	371.68	794.22	372.03	794.26	375.09	794.55	376.37	795.41

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 612.99

INPUT

Description:

Station Elevation Data num= 101

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

Manning's n Values num= 3

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

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

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CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 493.69

INPUT

Description:

Station Elevation Data num= 85

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

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	125.13	.055	194.7	.06

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 415.05

INPUT

Description:

Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	79412.09998	793.5814.39999	793.58	28.31	793.5934.34998	793.54			
45.21997	793.6648.68997	793.62	52.28	793.5957.31998	793.4980.82999	792.91			

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

Manning's n Values num= 3

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

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

CROSS SECTION

RIVER: Meathouse Fork
 REACH: MEATHOUSE FORK RS: 258.95

INPUT

Description:

Station Elevation Data num= 108

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

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

Manning's n Values num= 3

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

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

CROSS SECTION

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

INPUT

Description:

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	7967.190002	795.69	8.72998	795.2910	.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

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

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 391.1 492.83 30 30 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	7966.82	007	795.718	609985	795.2311	33002	795.4413	3.08002	795.43
25.69	795.03	33.44	794.736	95001	794.6437	08002	794.63	37.31	794.63
37.57	794.62	37.83	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	793.83	75.82	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 0 .1 .3

SUMMARY OF MANNING'S N VALUES

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River:Buckeye Creek

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

River:Meathouse Fork

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

River:Middle Island Cr

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

MIDDLE ISLAND CR 20 .06 .04 .06

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

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

River: Meathouse Fork

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

River: Middle Island Cr

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Buckeye Creek

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

River: Meathouse Fork

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

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

River: Middle Island Cr

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

Profile Output Table - Standard Table 1

River W.S. Elev Froude # Chl	Reach Crit W.S. (ft)	E.G. Elev (ft)	River Sta E.G. Slope (ft/ft)	Profile Vel Chnl (ft/s)	Q Total Flow Area (cfs) (sq ft)	Min Ch El Top Width (ft)
Middle Island Cr 792.82 0.37	MIDDLE ISLAND CR 793.73	50 0.001355	PF 1 8.42	16950.00 2862.09	775.59 351.29	
Middle Island Cr 792.70 0.39	MIDDLE ISLAND CR 786.84 793.68	20 0.001459	PF 1 9.06	16950.00 2903.98	775.59 365.97	
Meathouse Fork 795.17 0.25	MEATHOUSE FORK 795.61	1933.09 0.001171	PF 1 5.75	9600.00 2268.15	775.34 376.99	
Meathouse Fork 794.98 0.27	MEATHOUSE FORK 795.51	1860 0.001365	PF 1 6.30	9600.00 1750.77	774.64 320.16	
Meathouse Fork 794.93 0.26	MEATHOUSE FORK 786.11 795.43	1810 0.001277	PF 1 5.96	9600.00 1753.54	775.85 307.97	
Meathouse Fork	MEATHOUSE FORK	1785		Bridge		
Meathouse Fork 794.85	MEATHOUSE FORK 795.35	1760 0.001280	PF 1 5.93	9600.00 1747.54	775.18 276.54	

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

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

Profile Output Table - Standard Table 2

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

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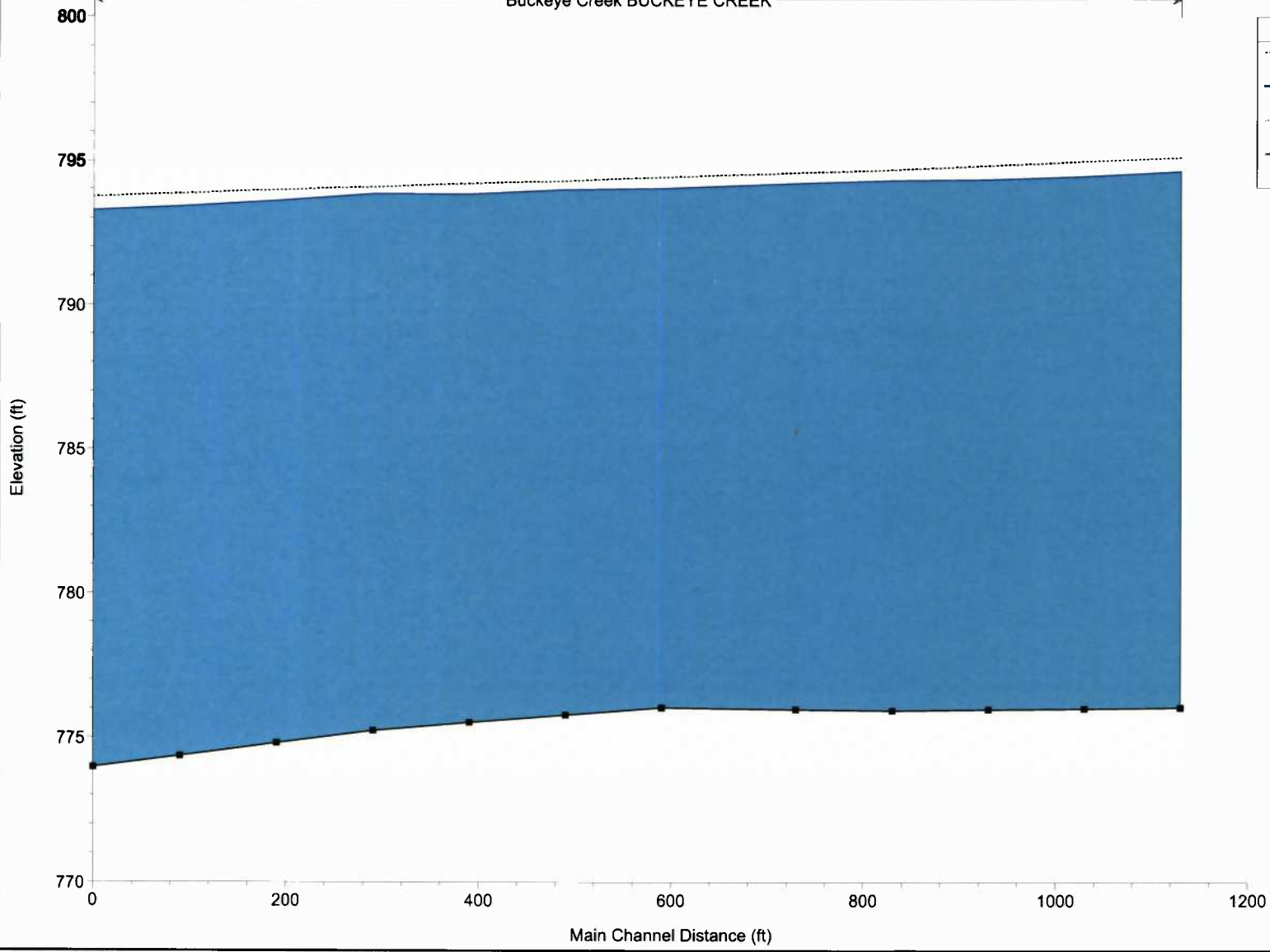
365.97							
Meathouse Fork		MEATHOUSE FORK	1933.09	PF 1		795.61	
795.17	0.44	0.09	0.01	372.67	8103.36	1123.98	
376.99							
Meathouse Fork		MEATHOUSE FORK	1860	PF 1		795.51	
794.98	0.53	0.06	0.01	403.21	7508.32	1688.47	
320.16							
Meathouse Fork		MEATHOUSE FORK	1810	PF 1		795.43	
794.93	0.50	0.01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

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

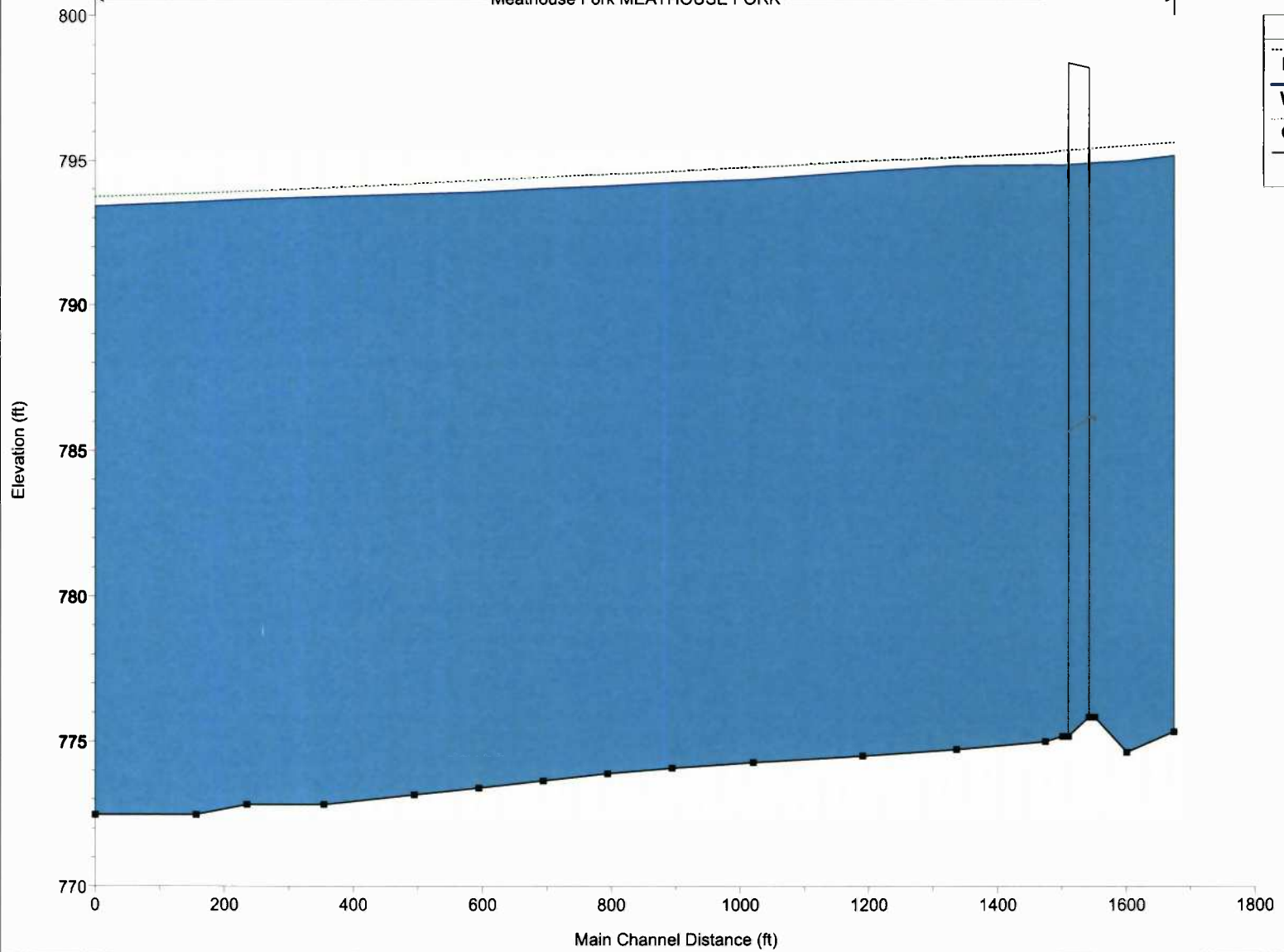
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Buckeye Creek BUCKEYE CREEK



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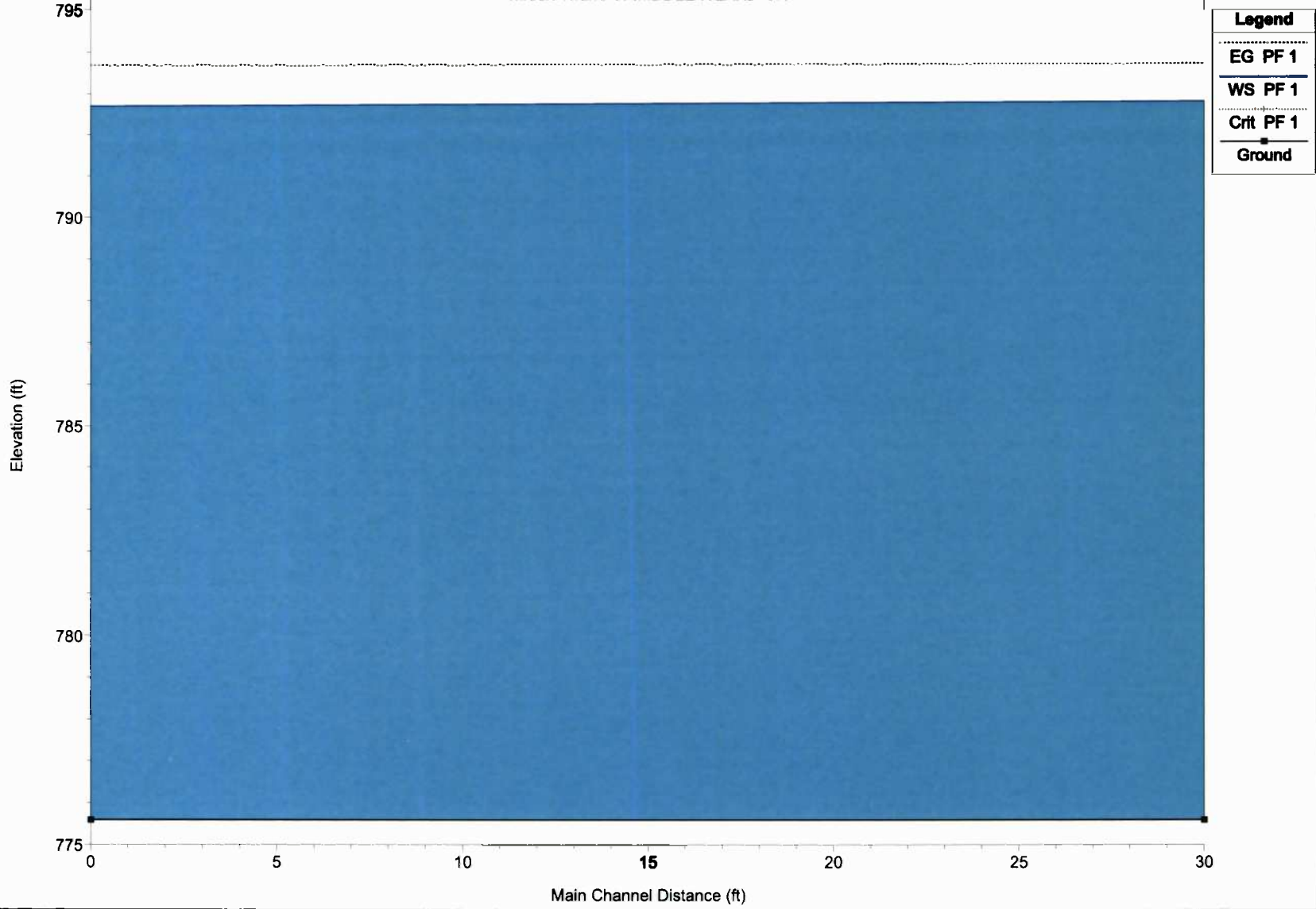
Meathouse Fork MEATHOUSE FORK



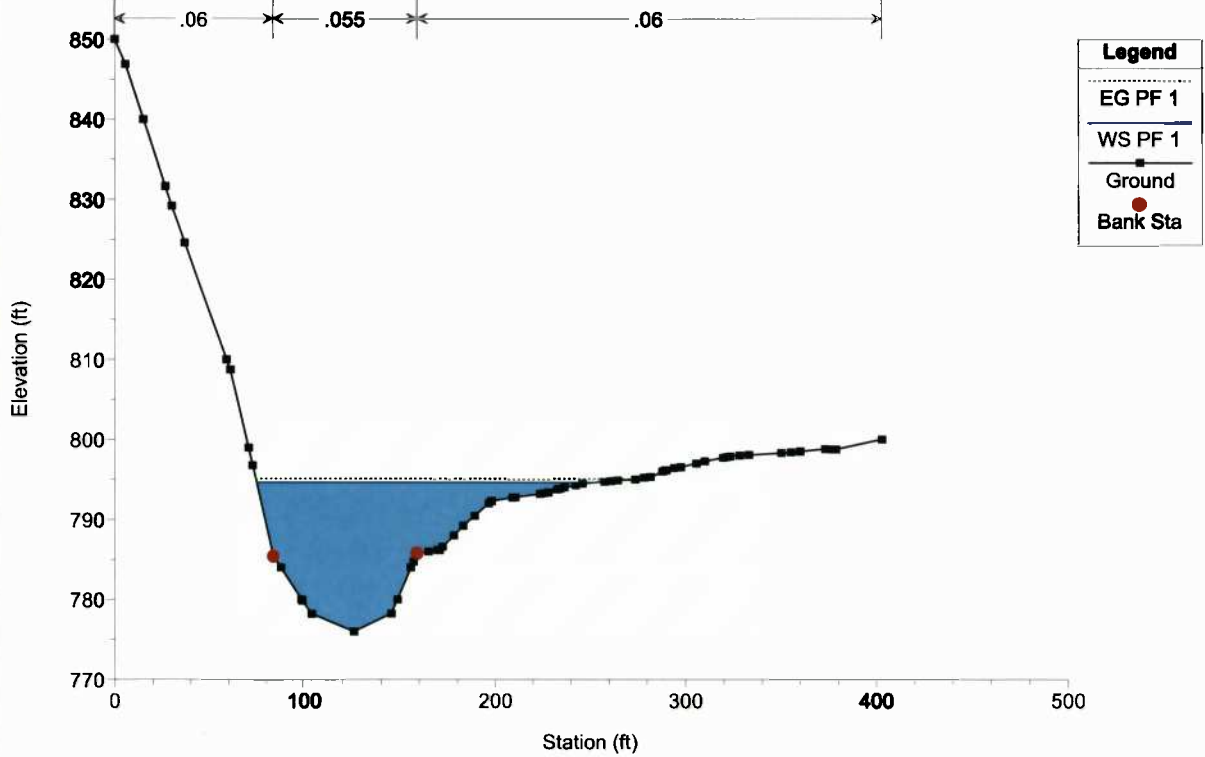
Legend	
EG PF 1	---
WS PF 1	—
Crit PF 1	...
Ground	■

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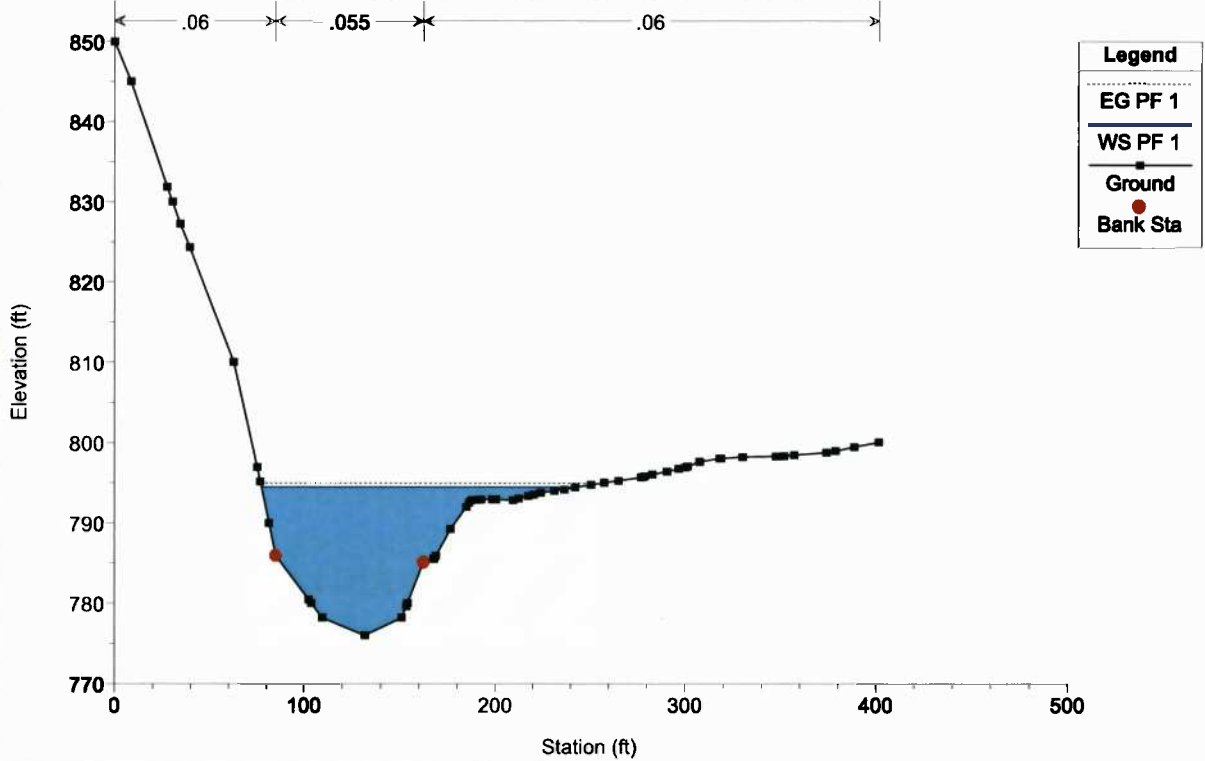
Middle Island Cr MIDDLE ISLAND CR



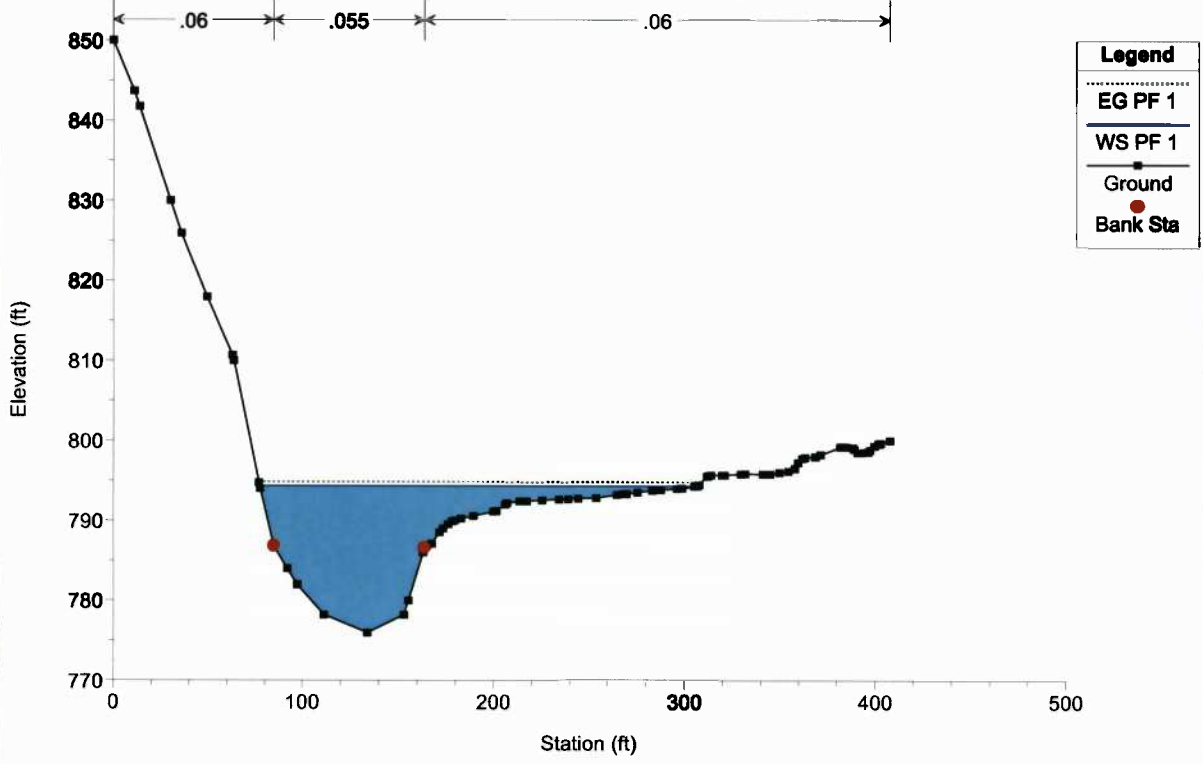
130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
 River = Buckeye Creek Reach = BUCKEYE CREEK RS = 1266.73



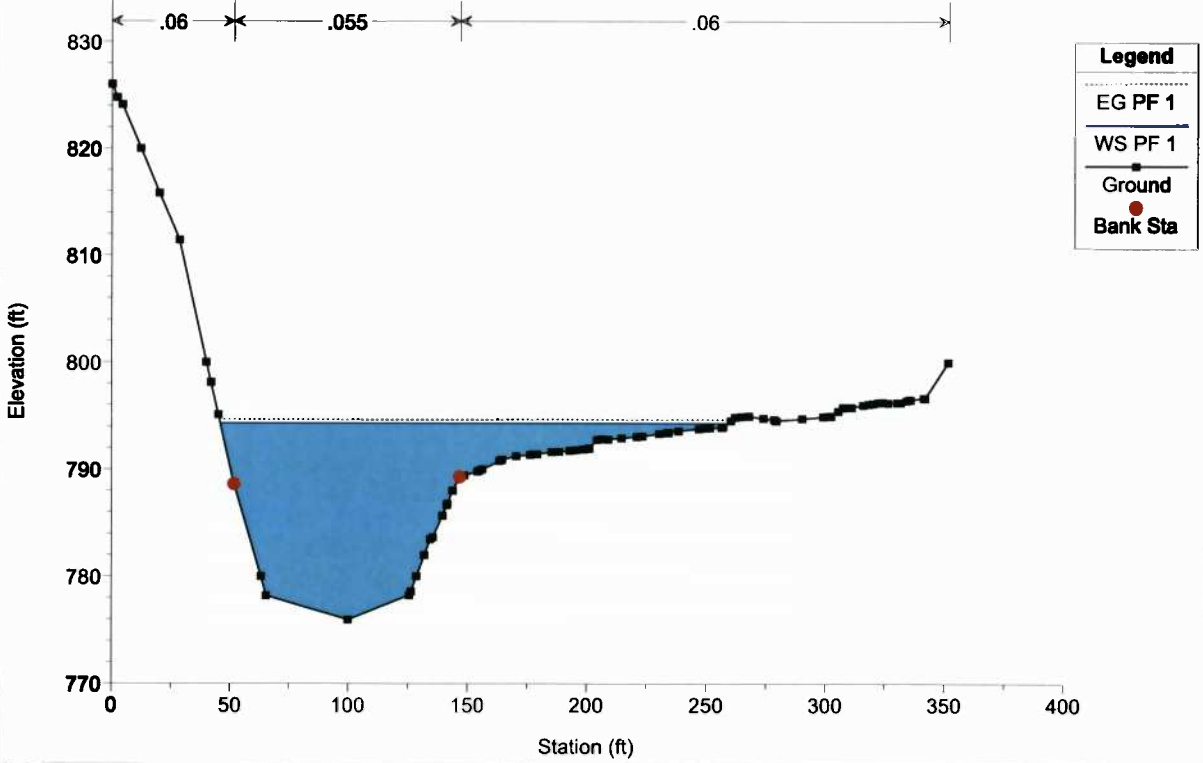
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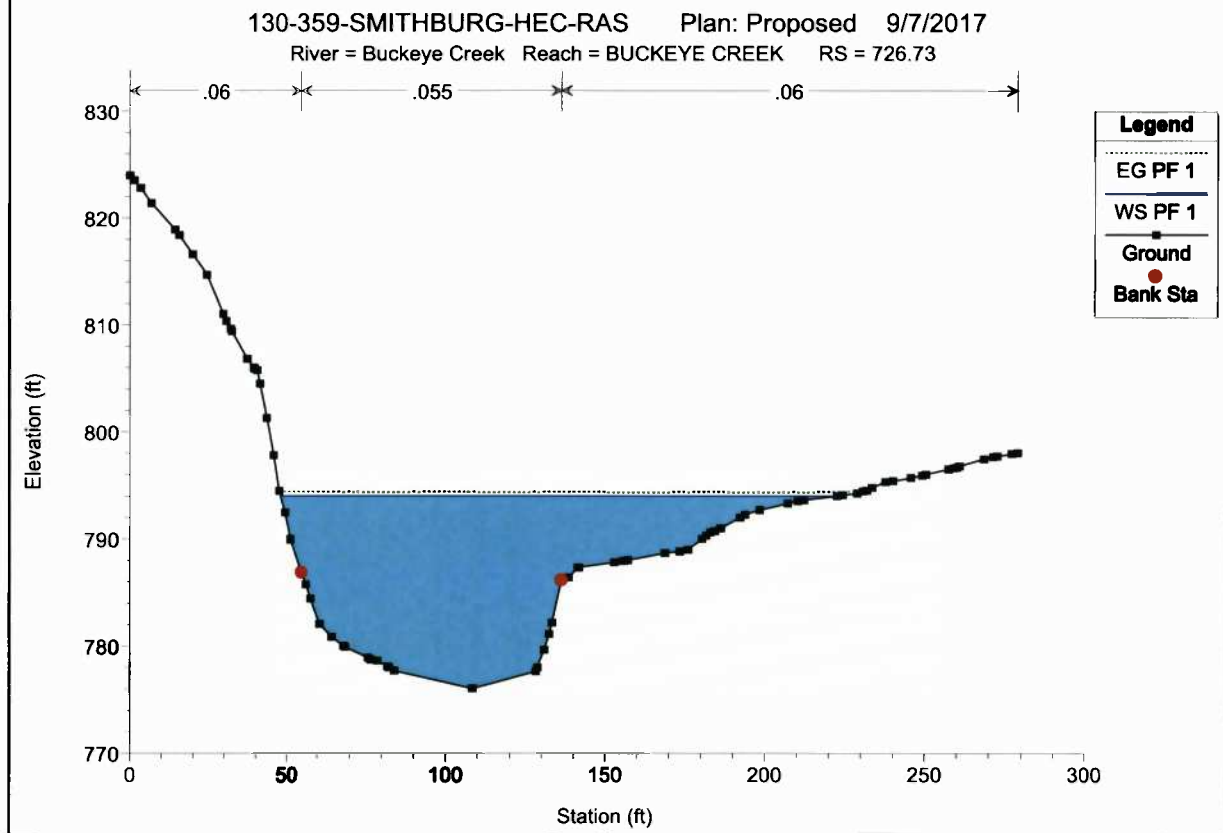
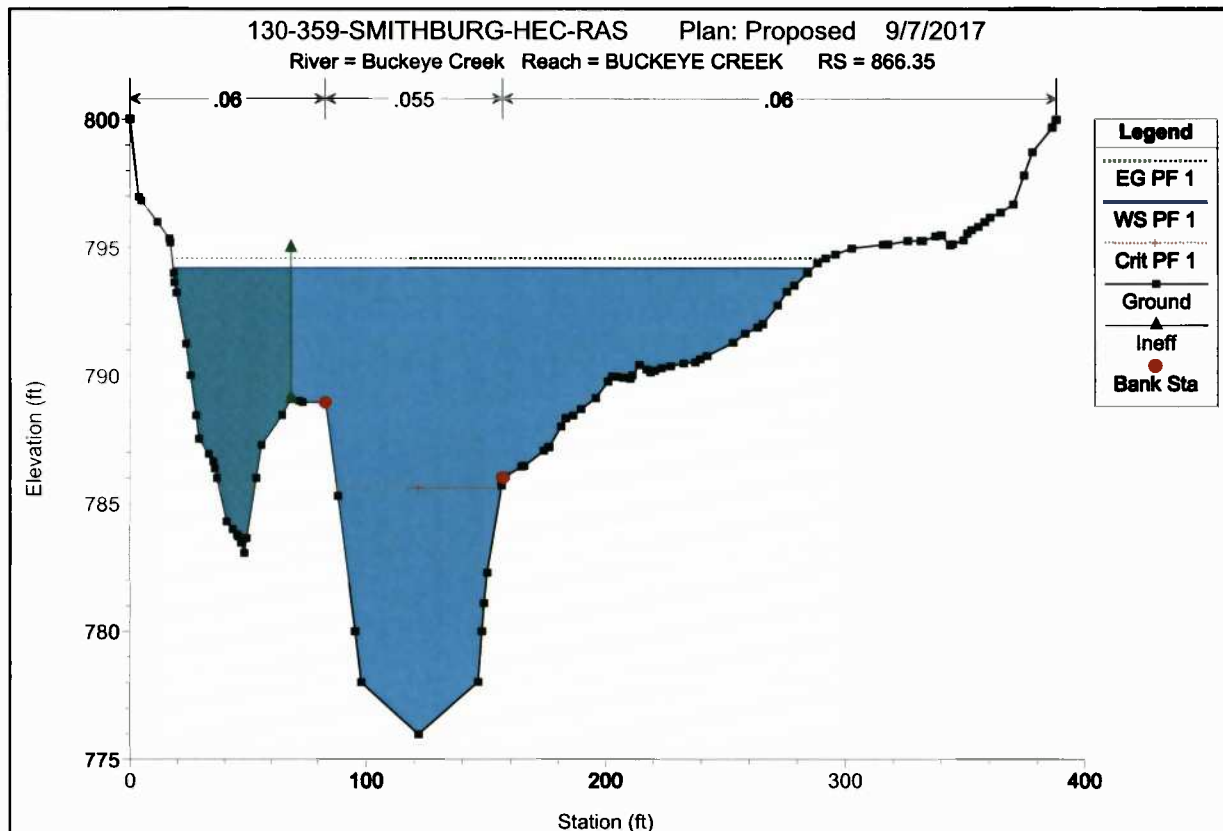


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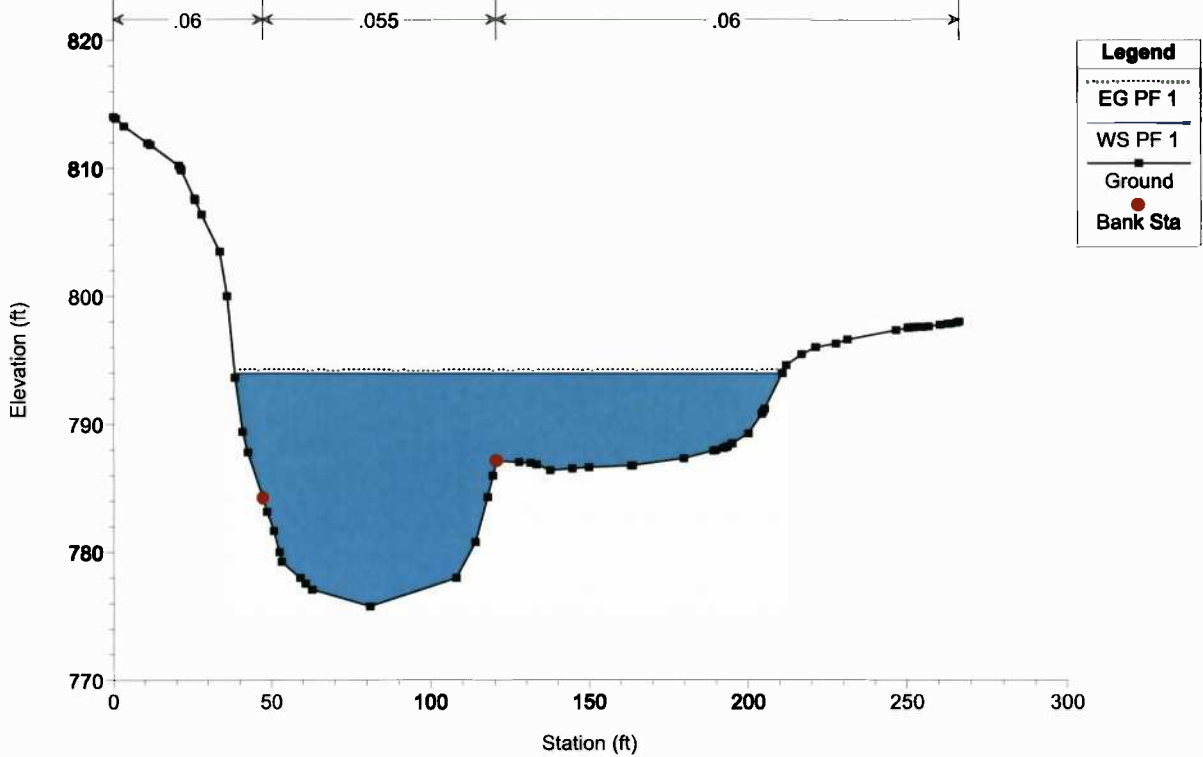


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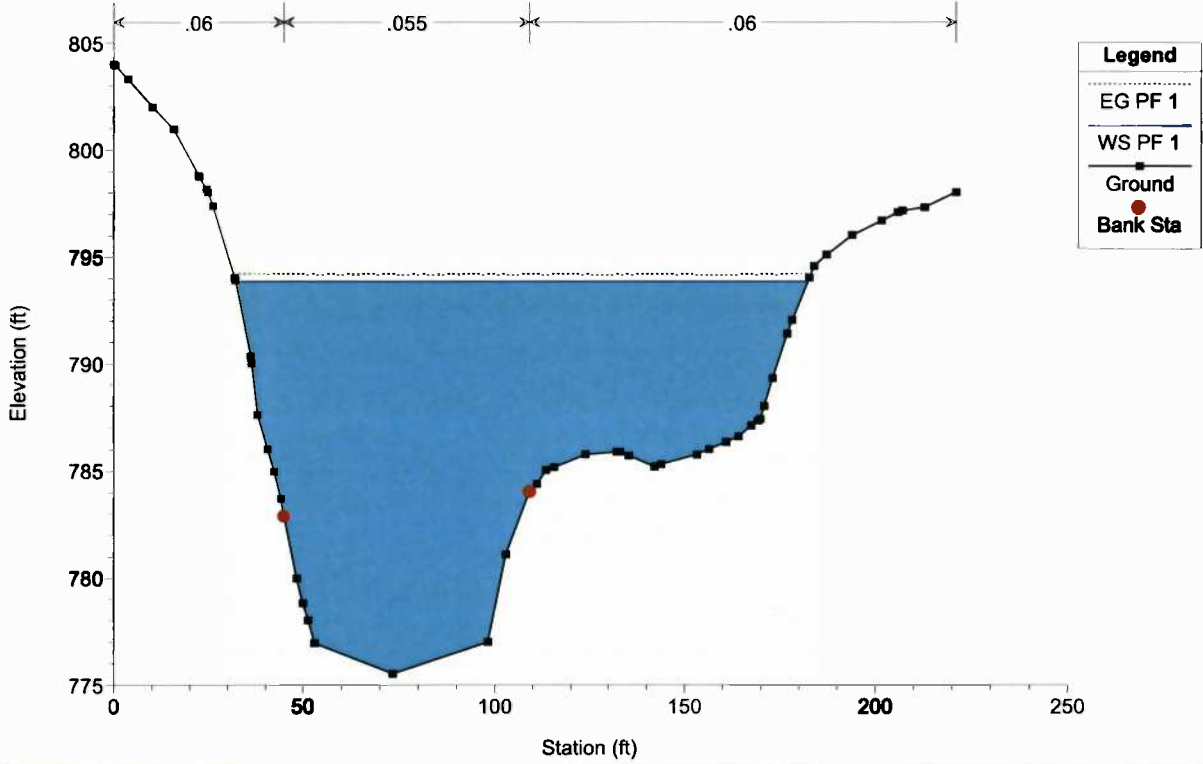




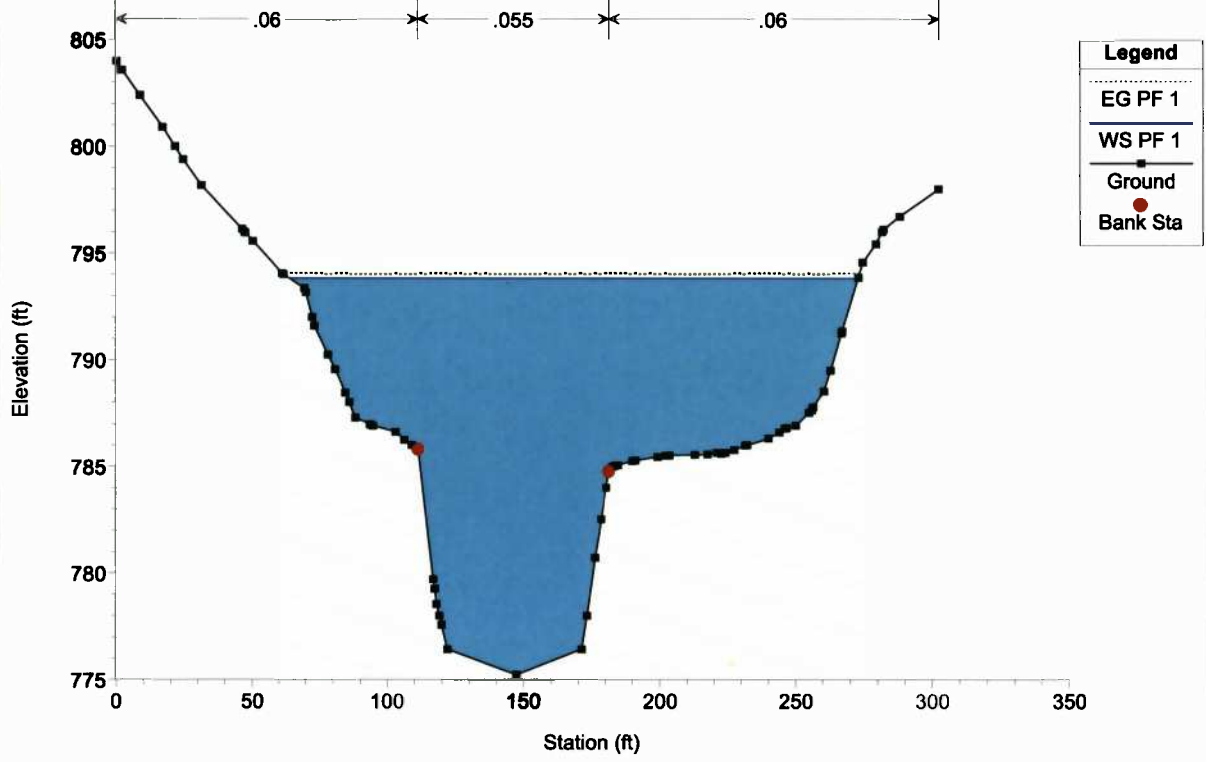
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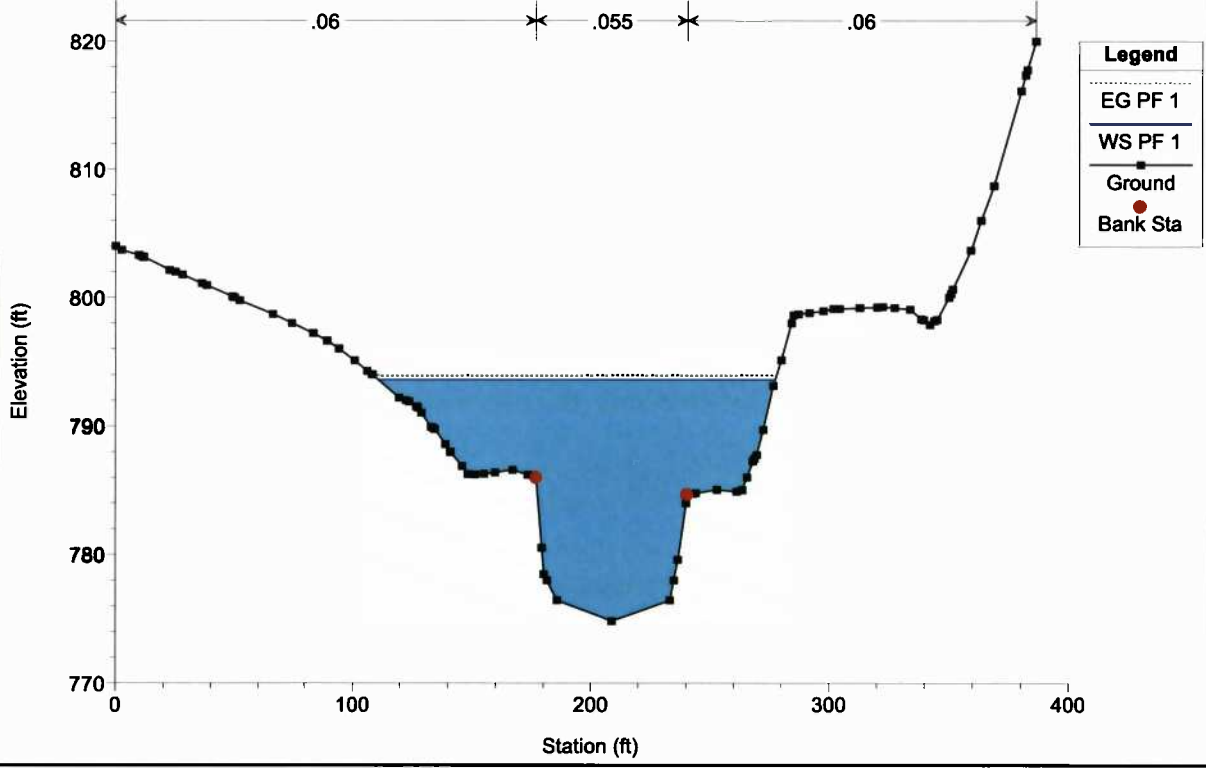
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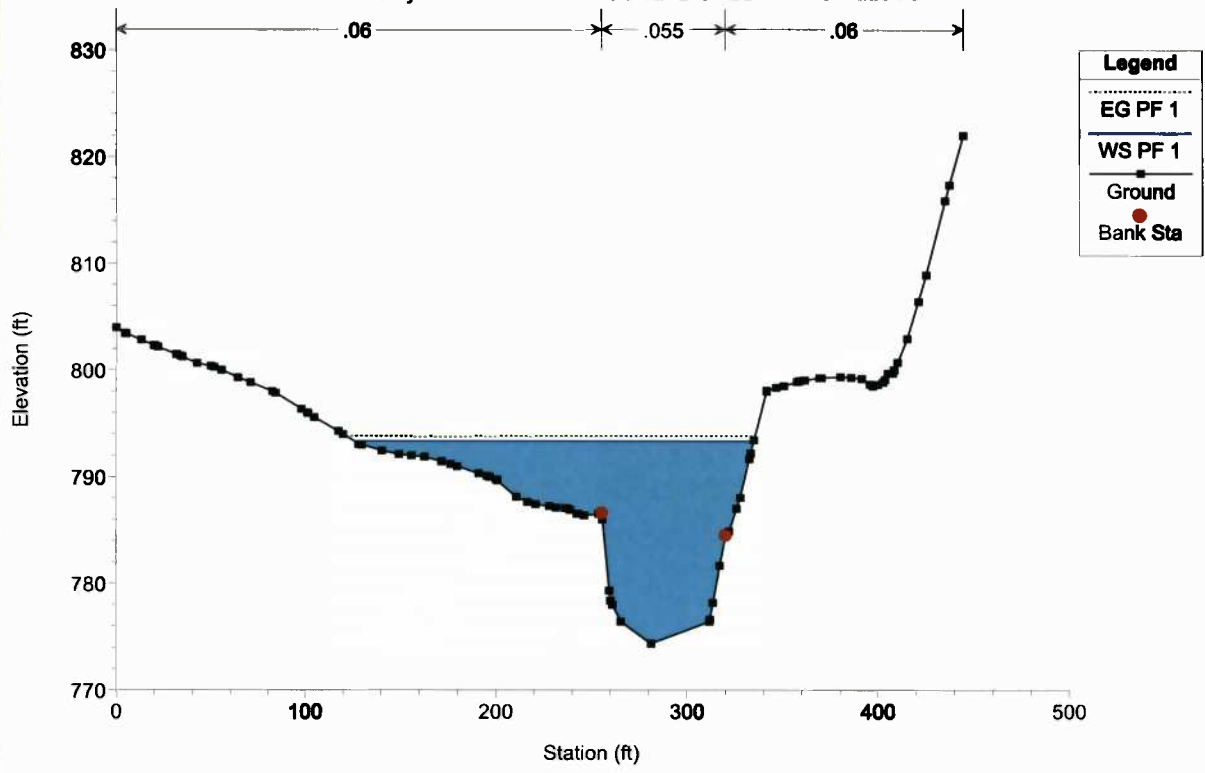
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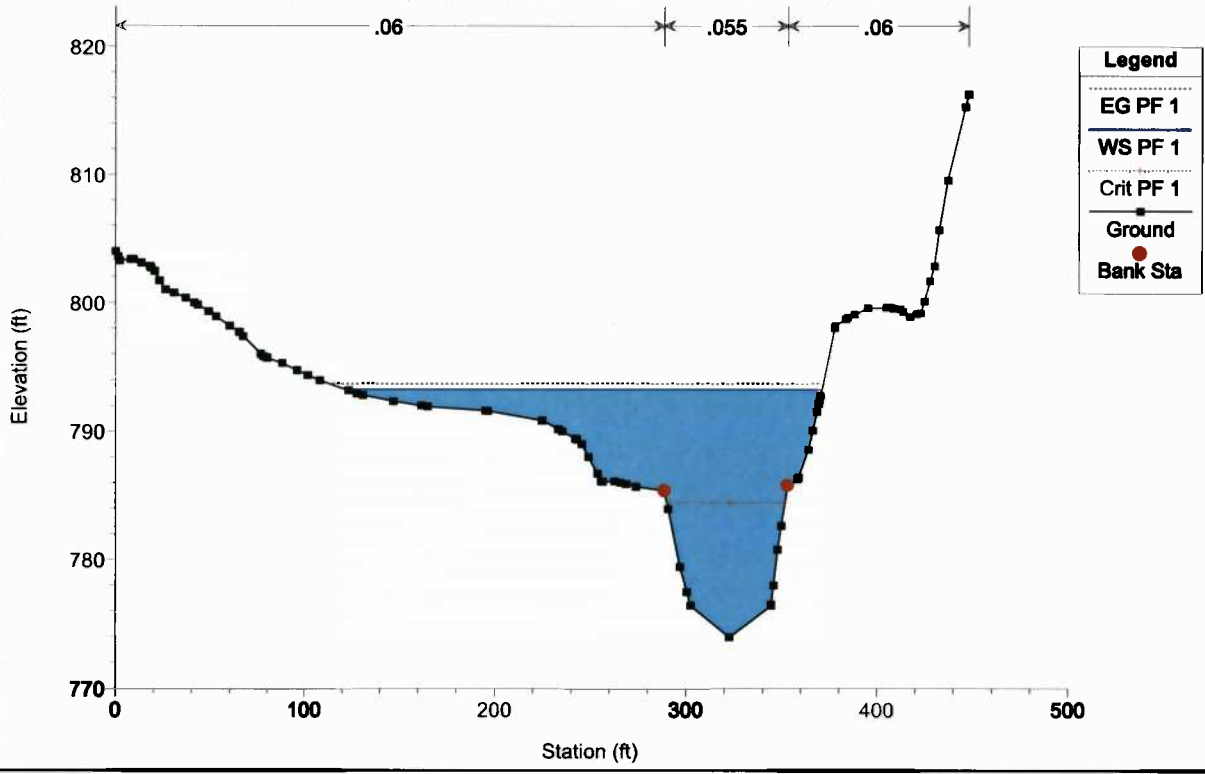
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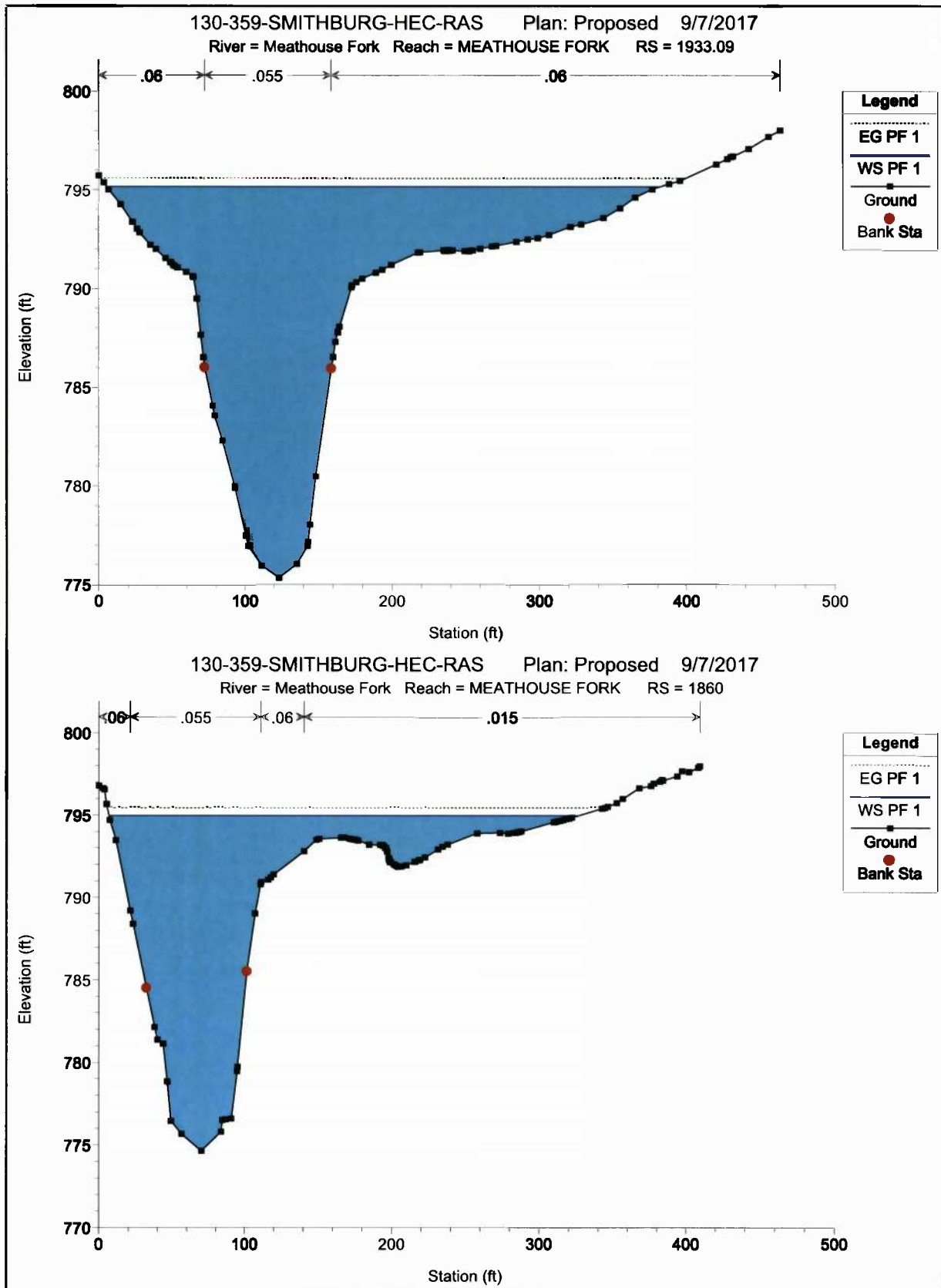


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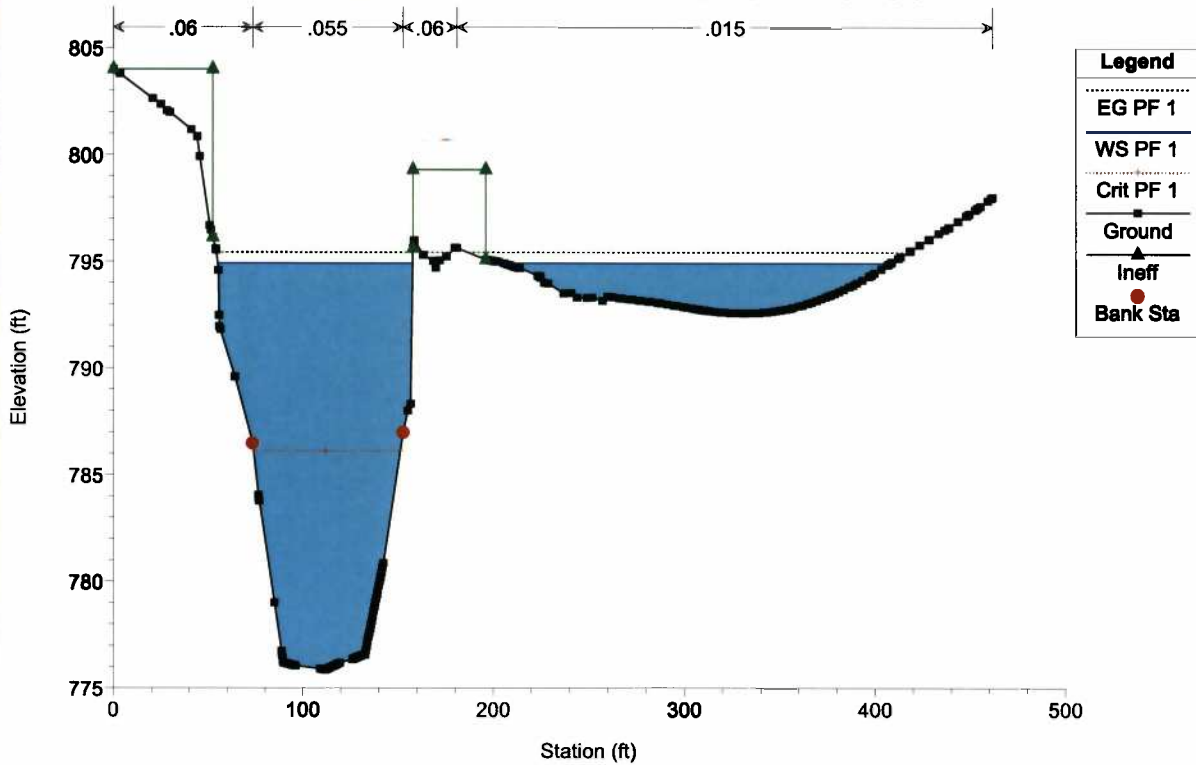


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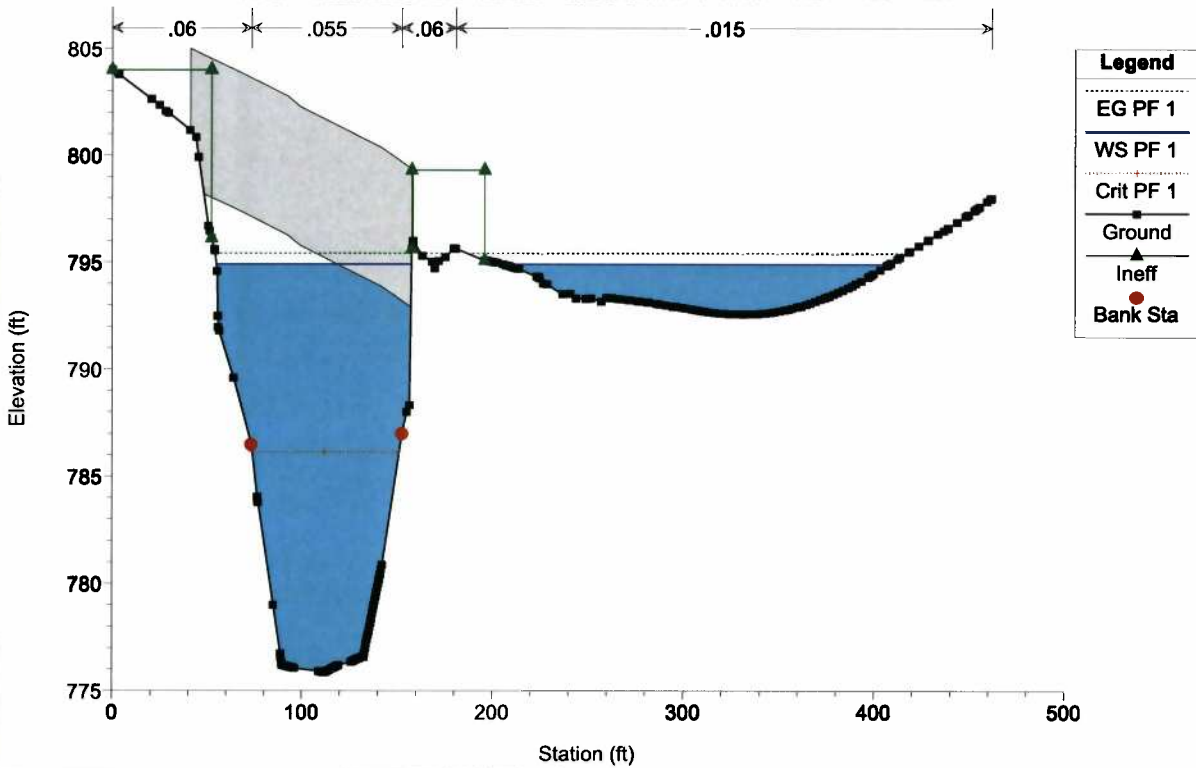




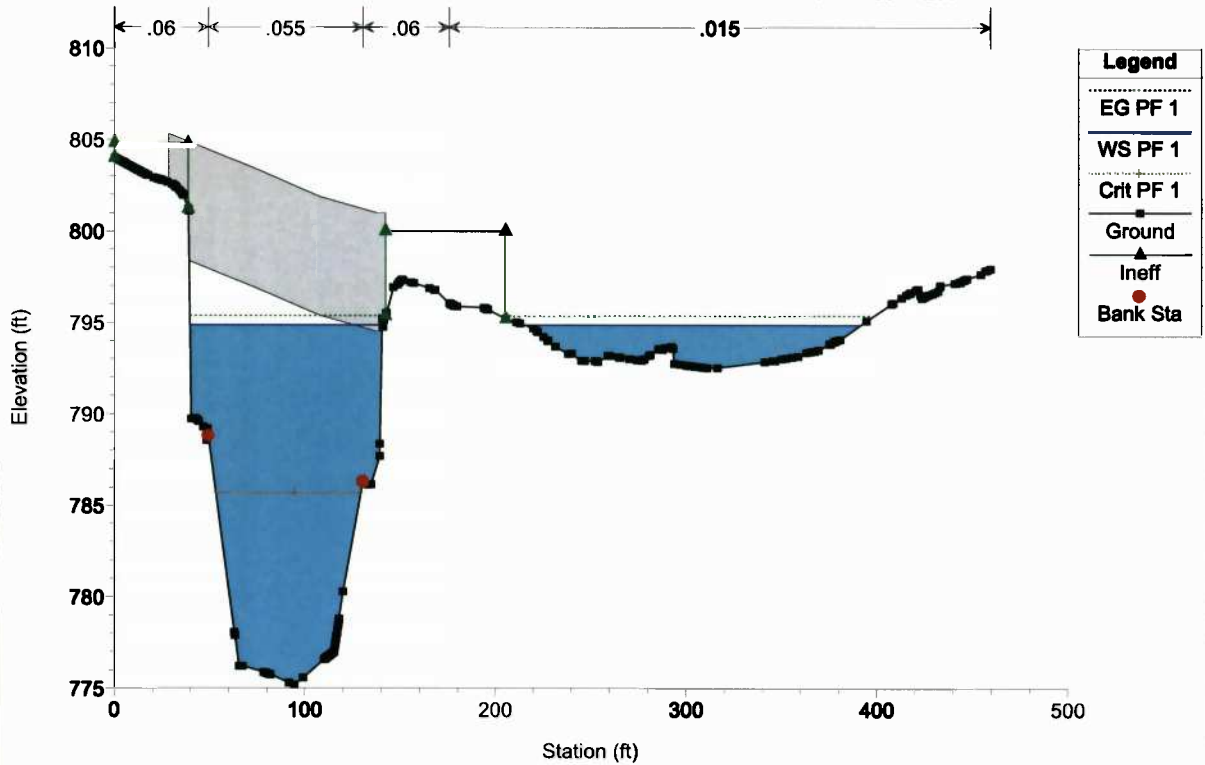
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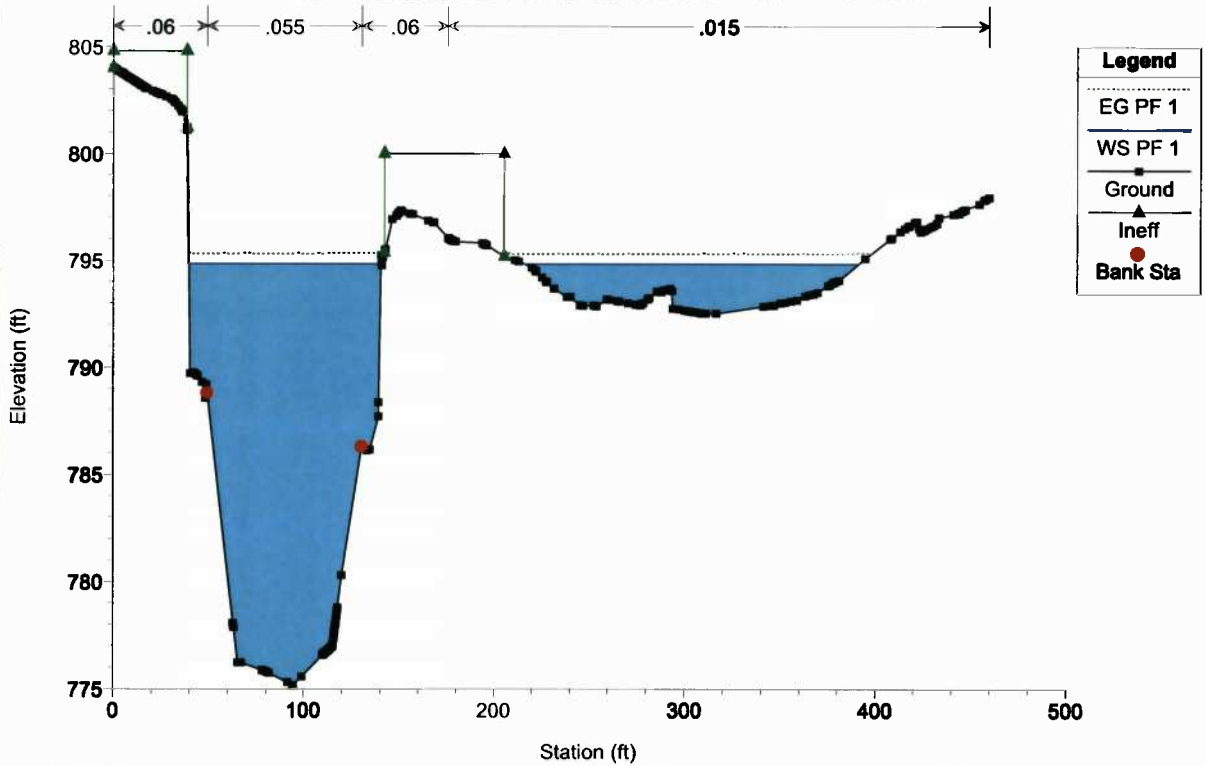
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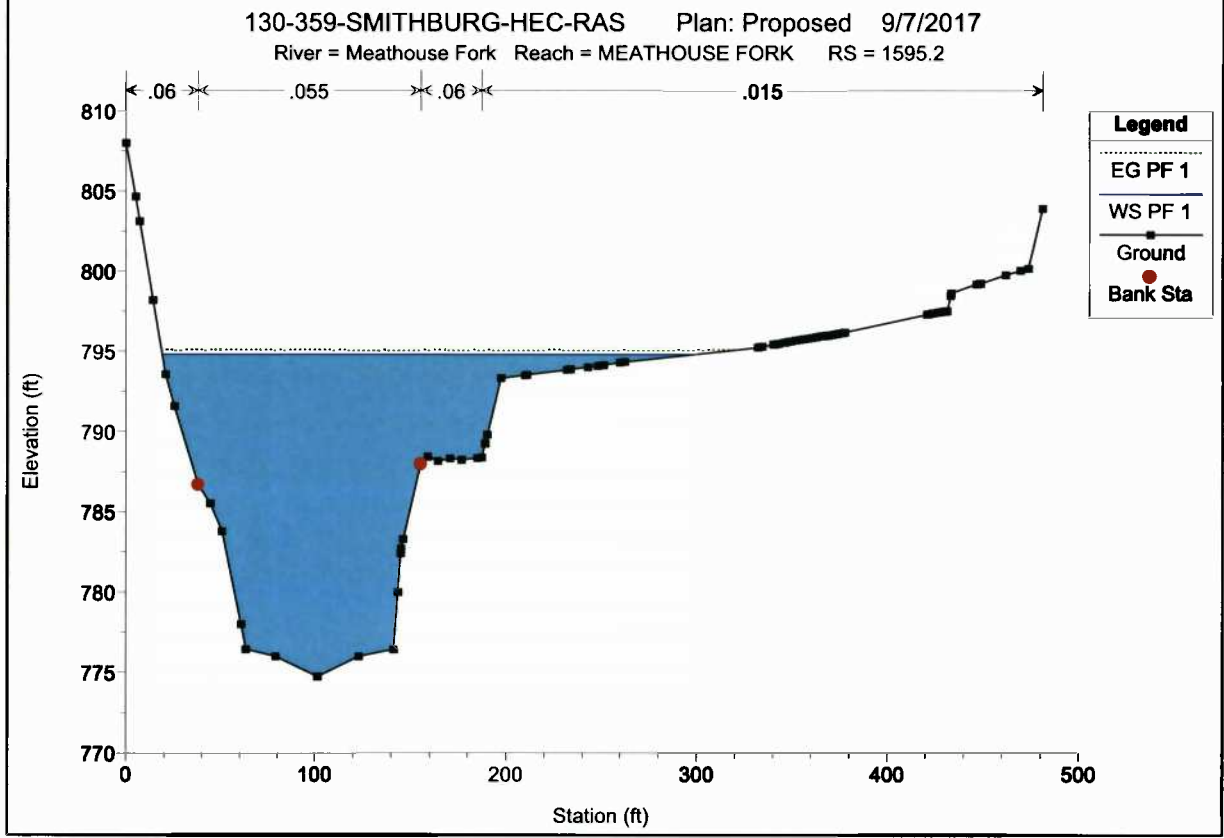
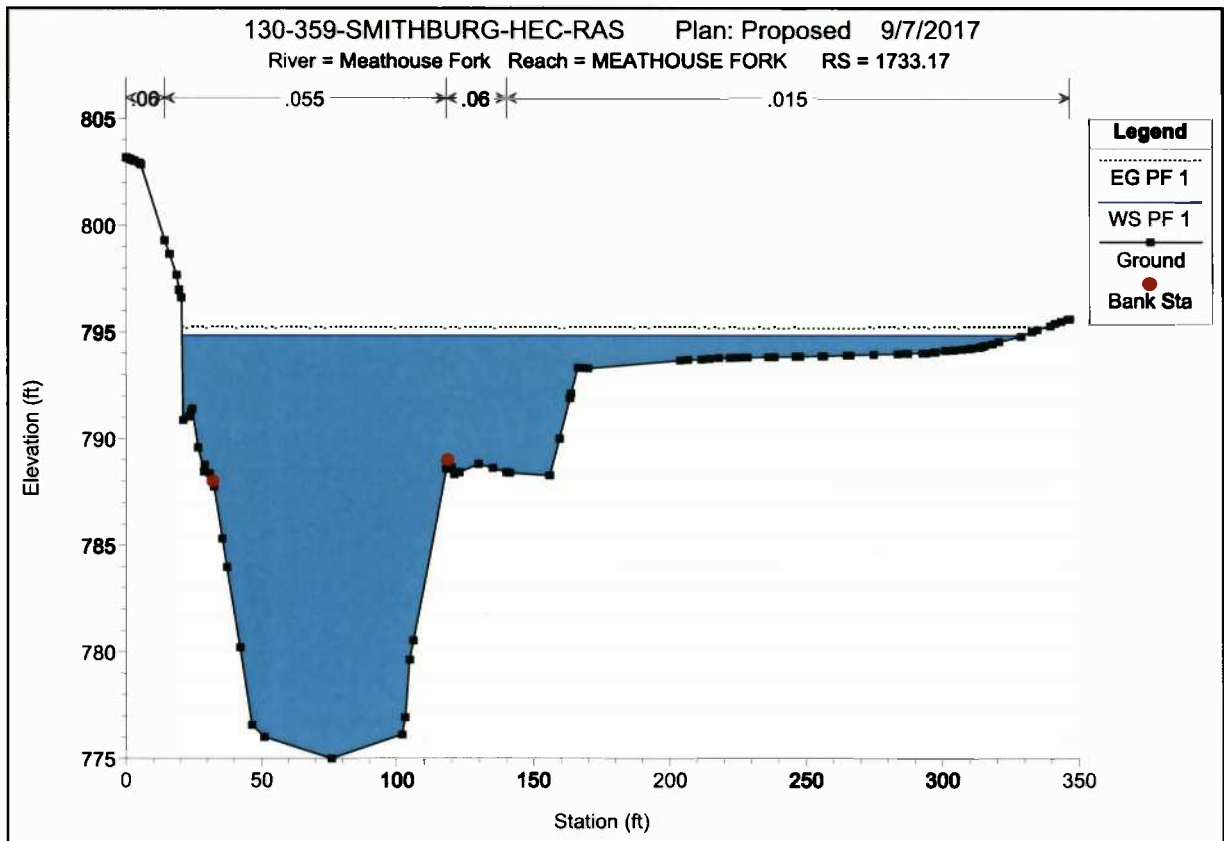


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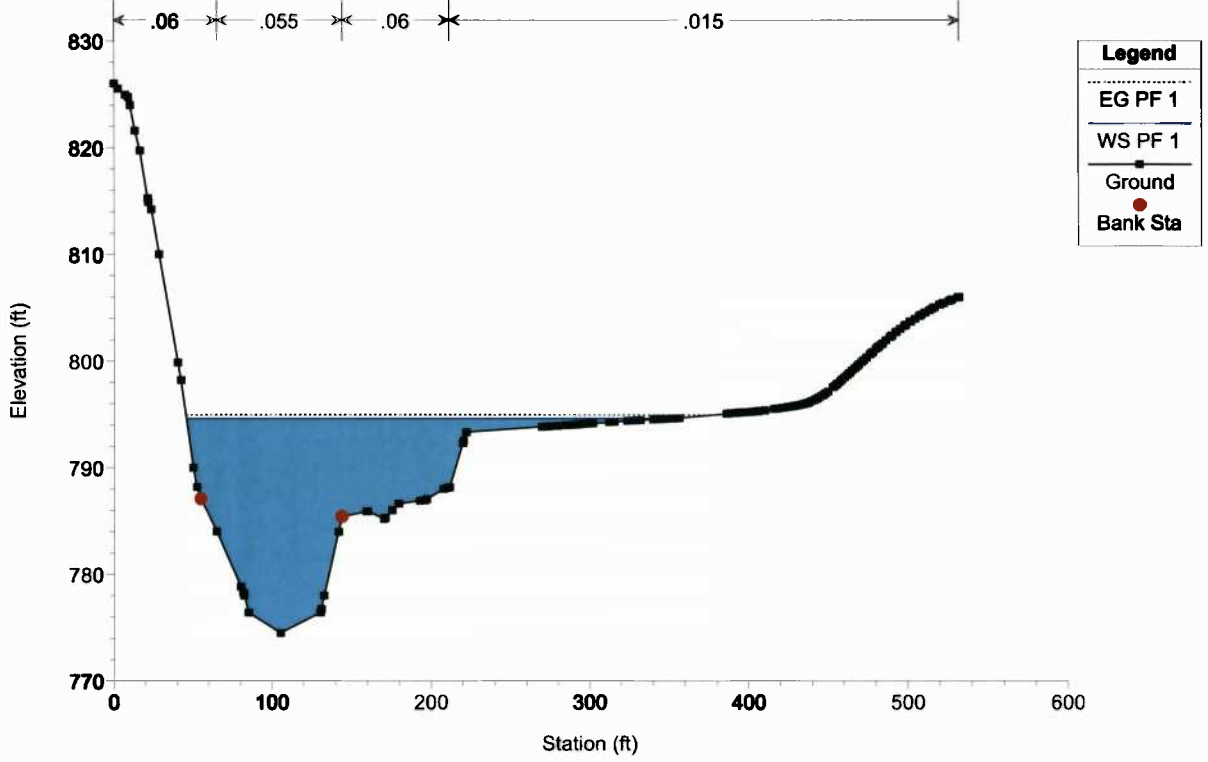


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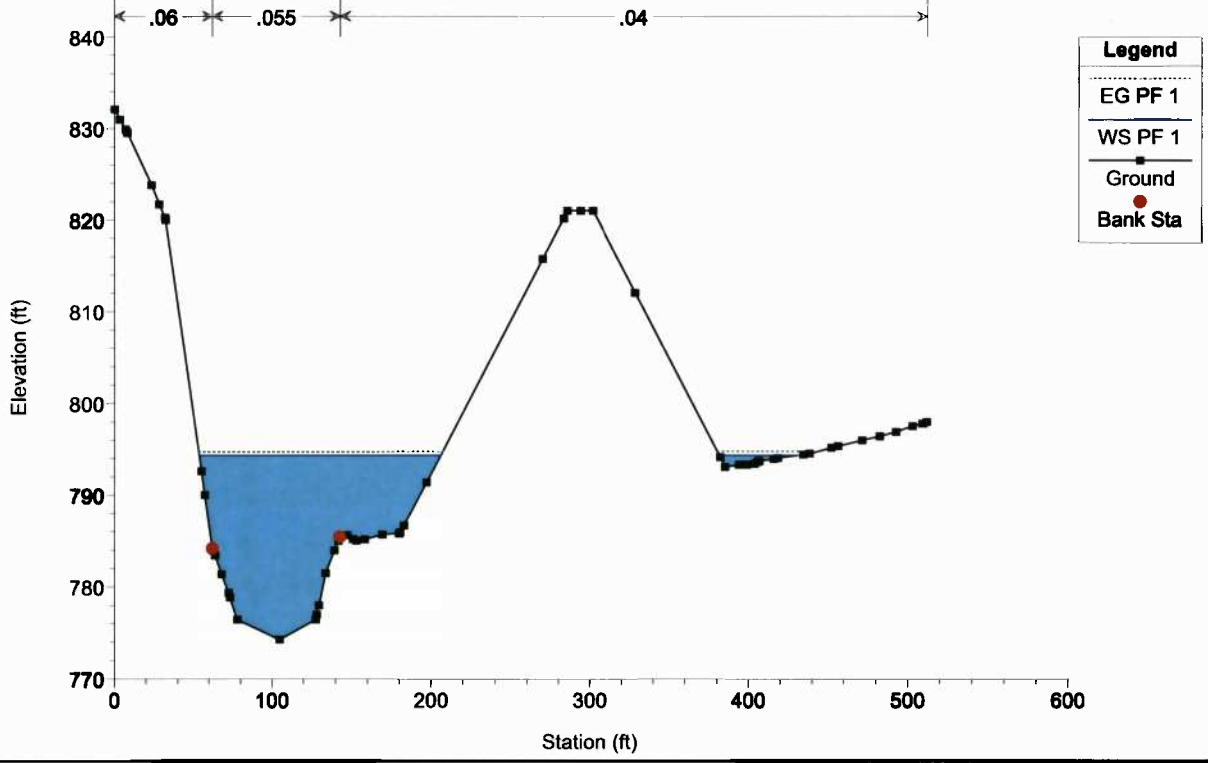




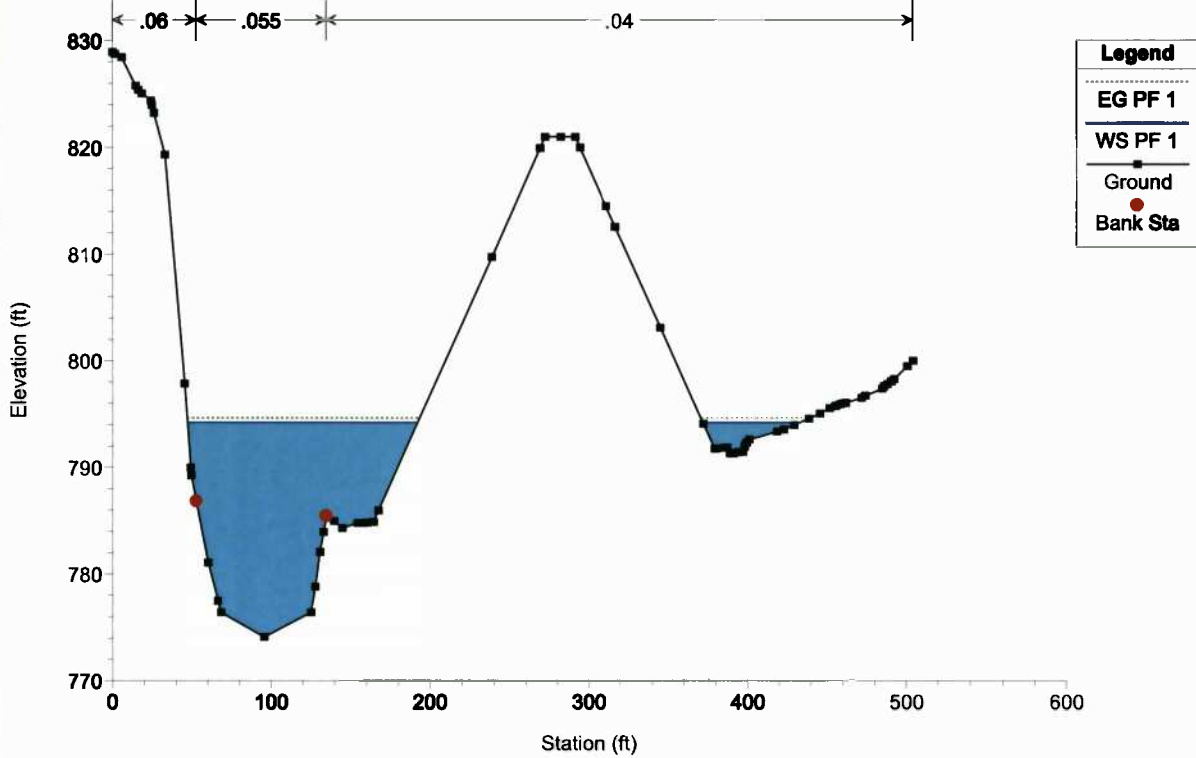
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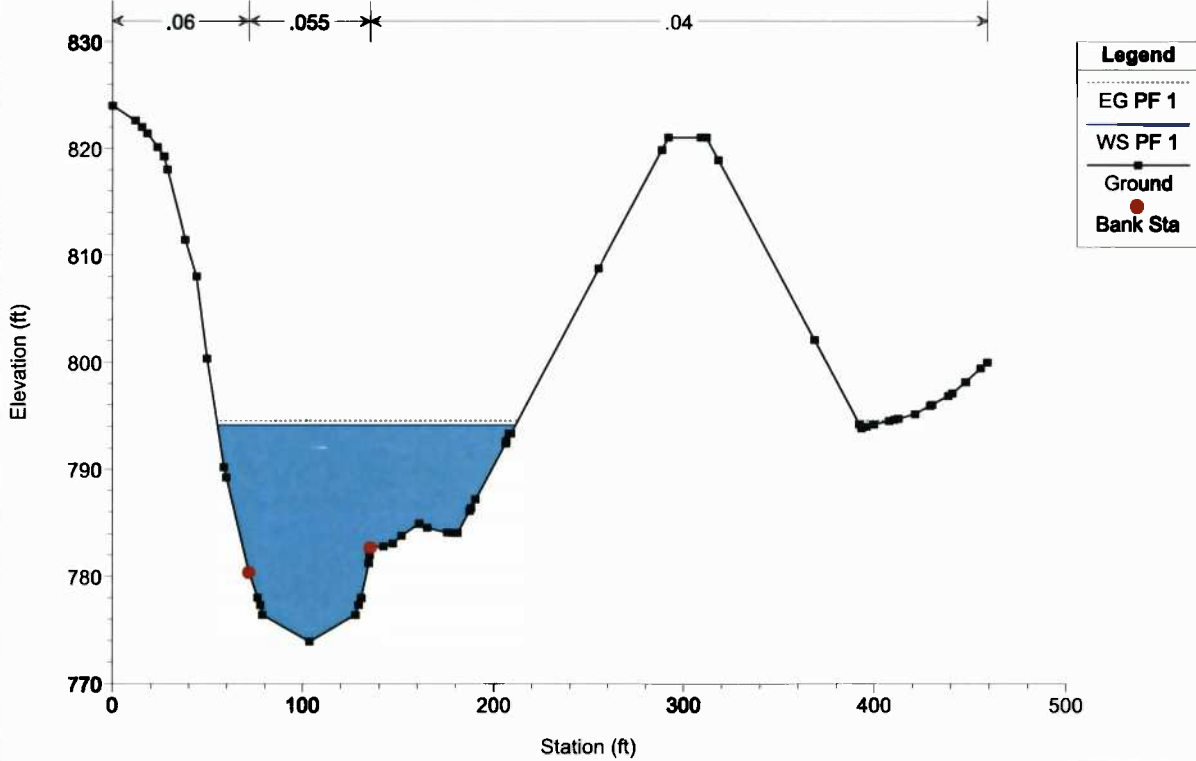
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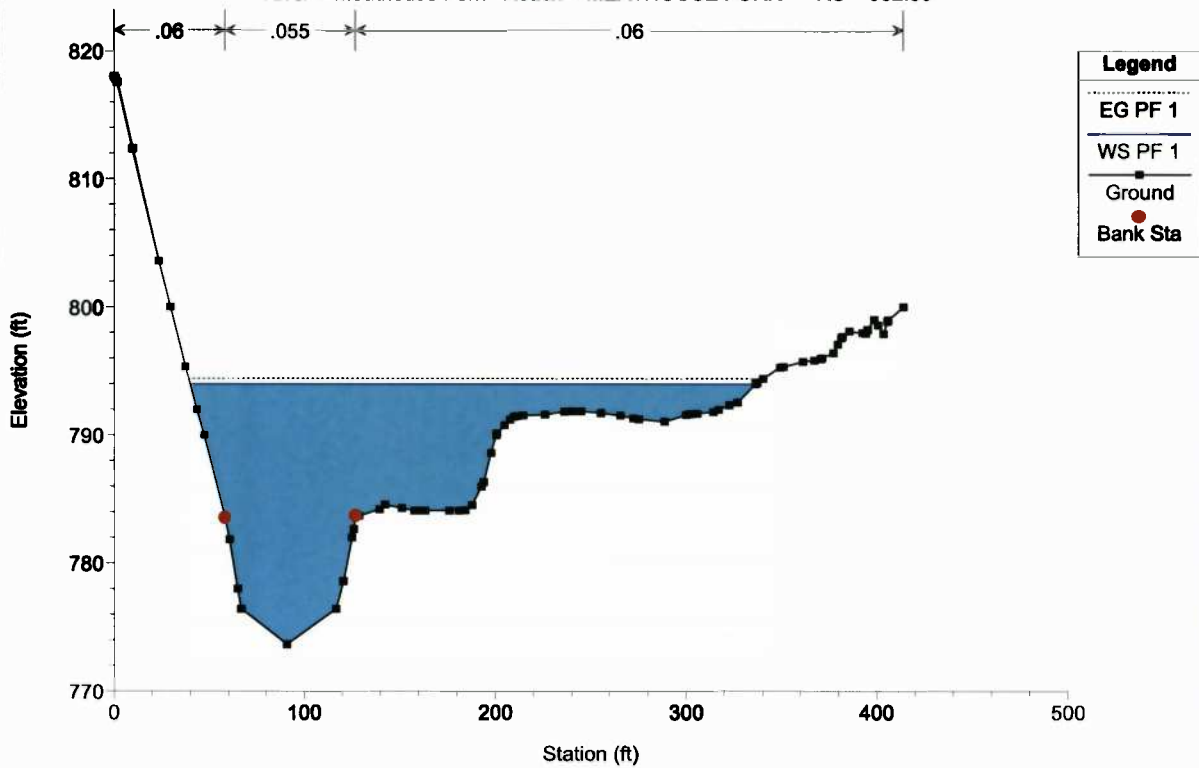
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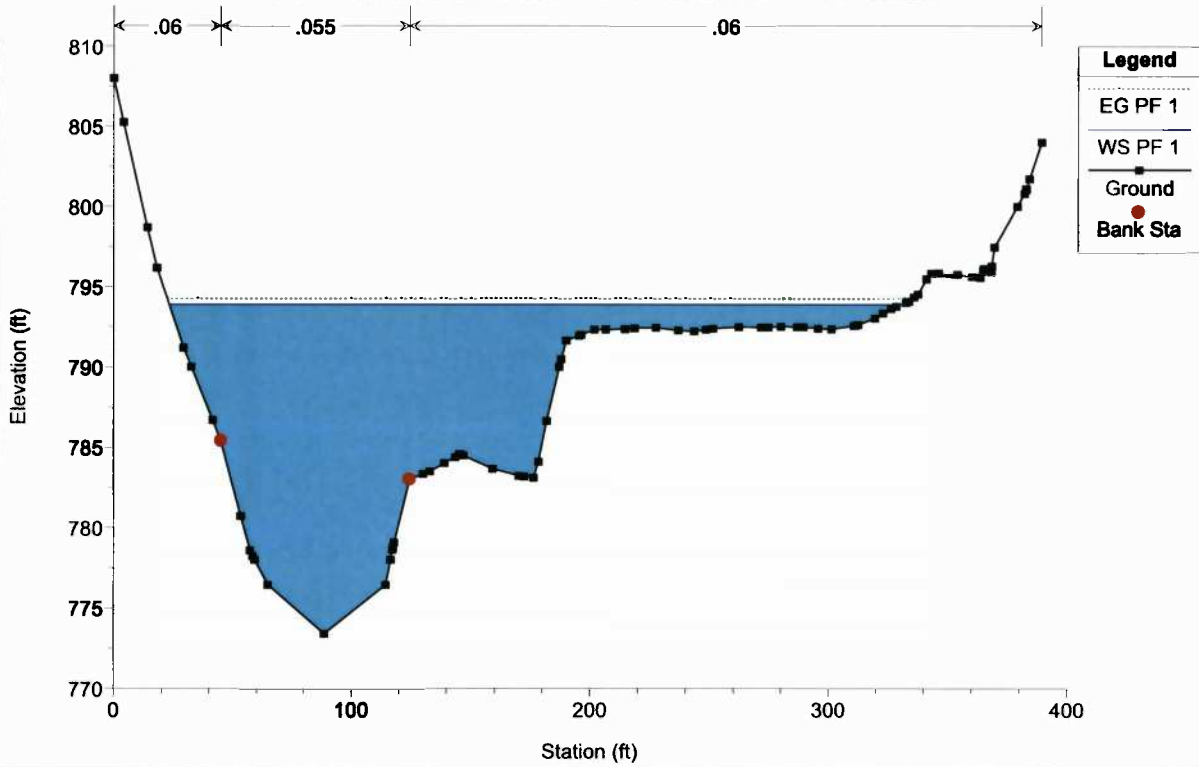
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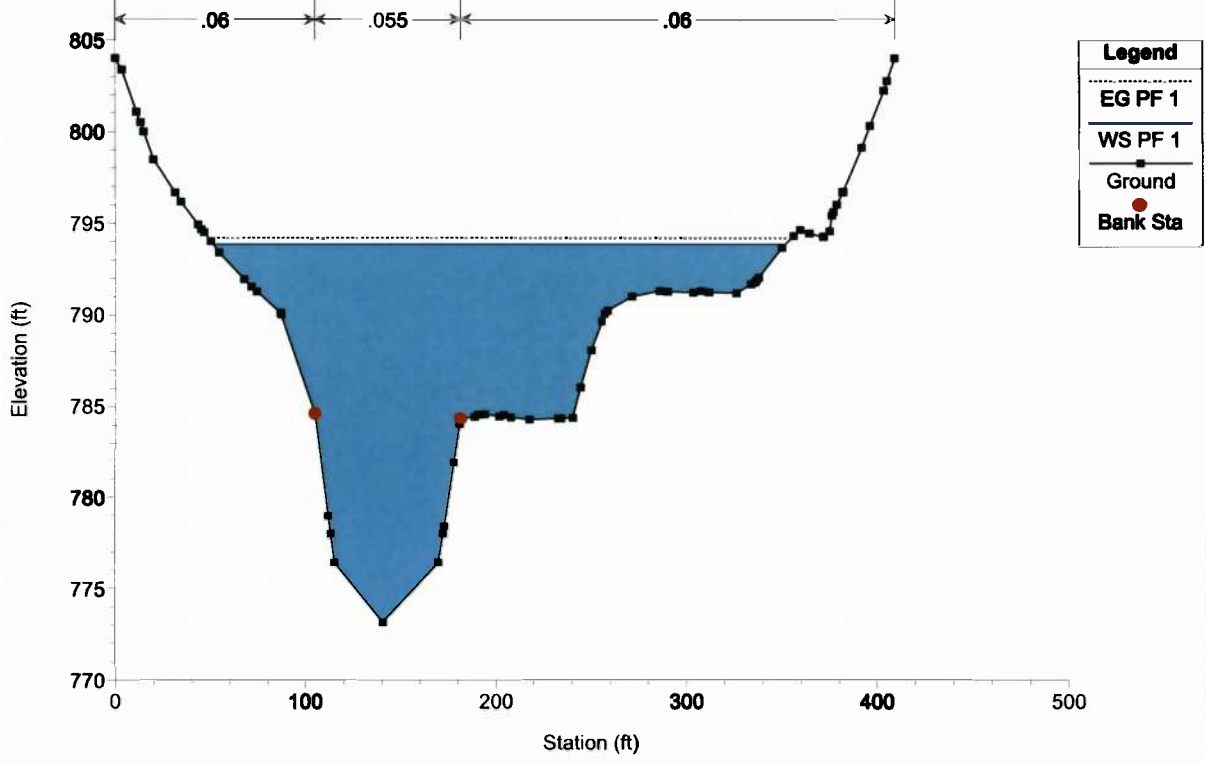
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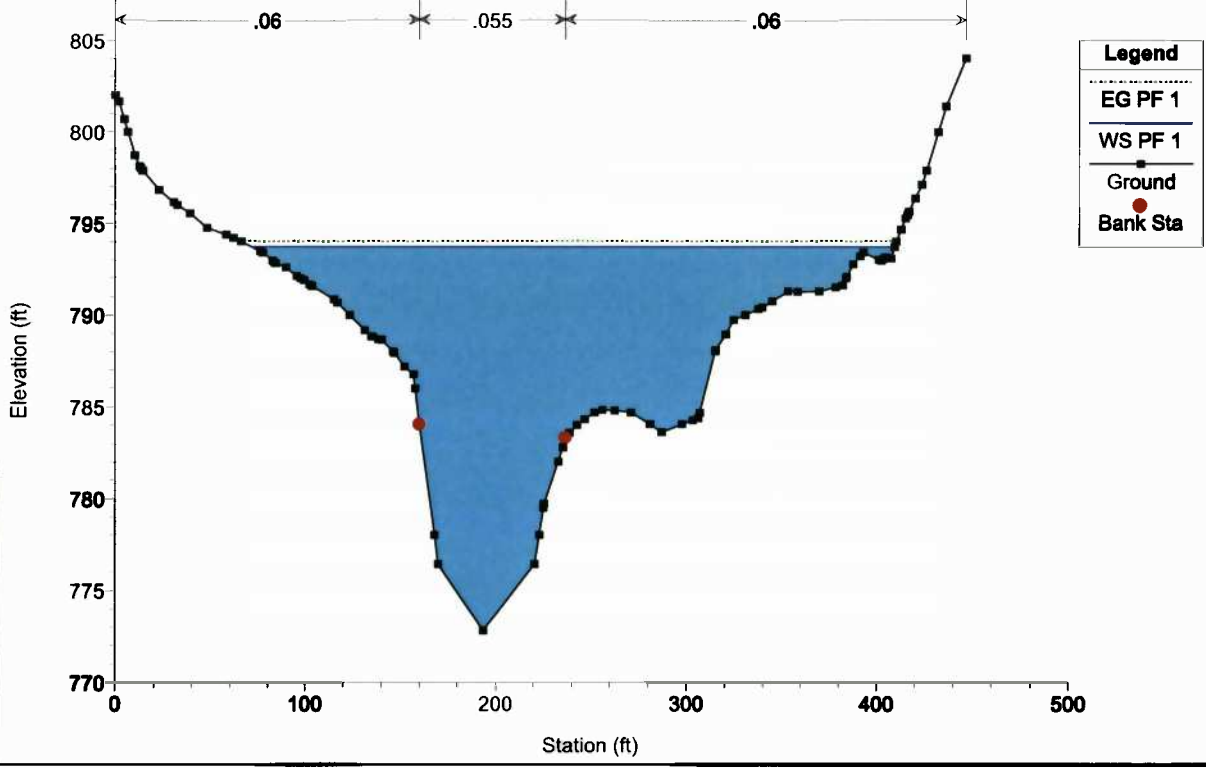
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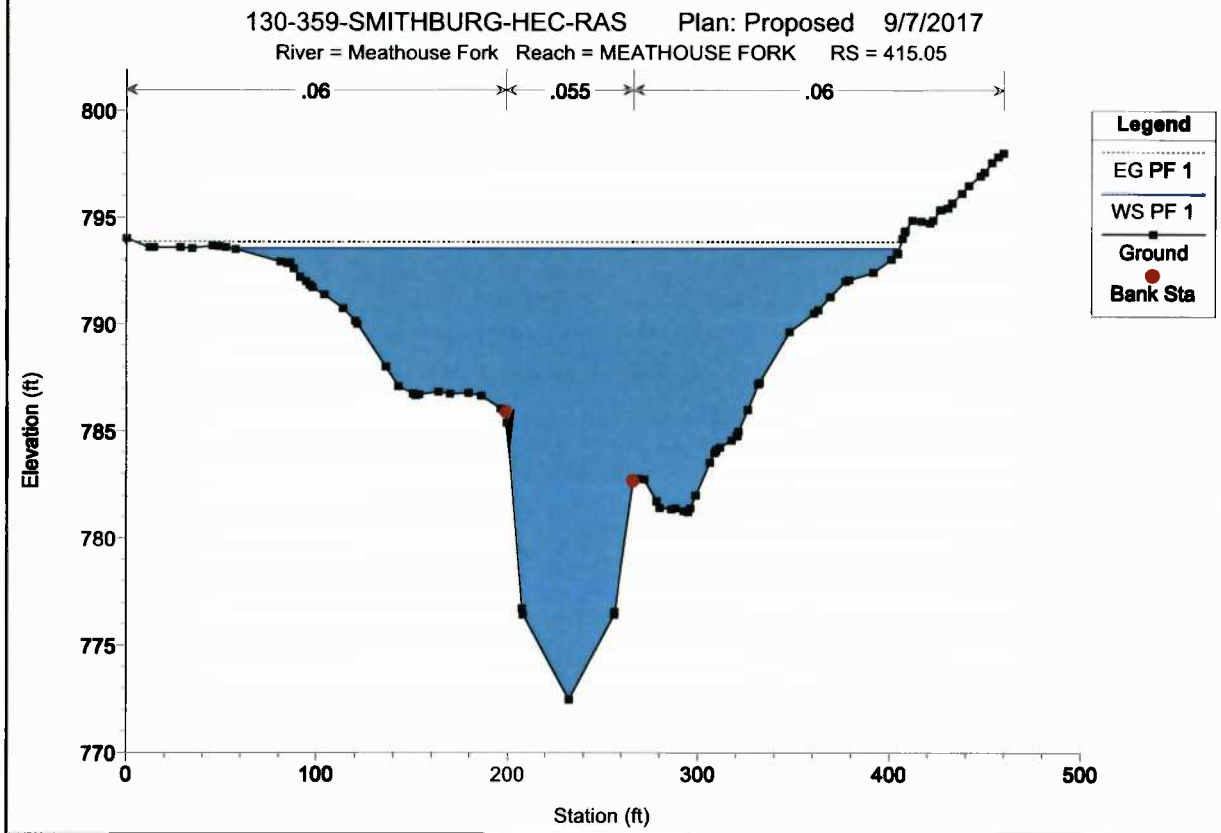
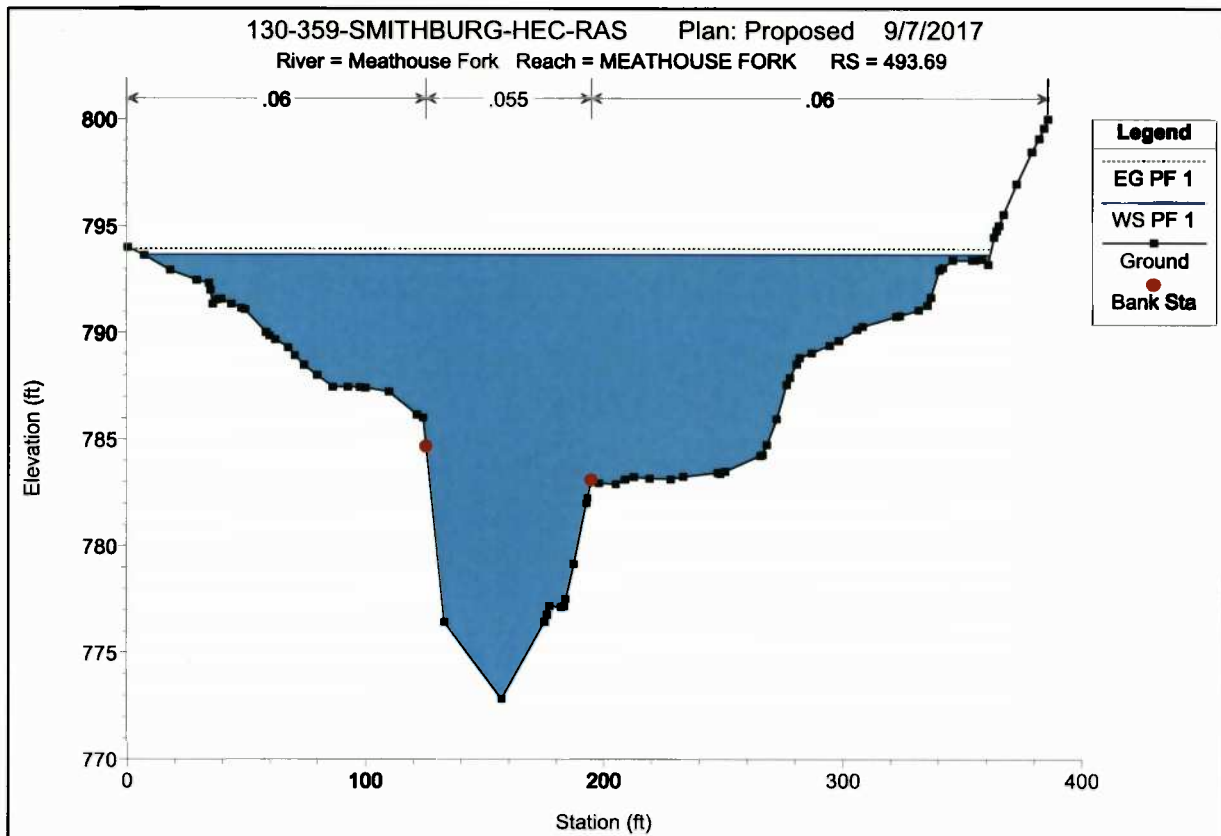


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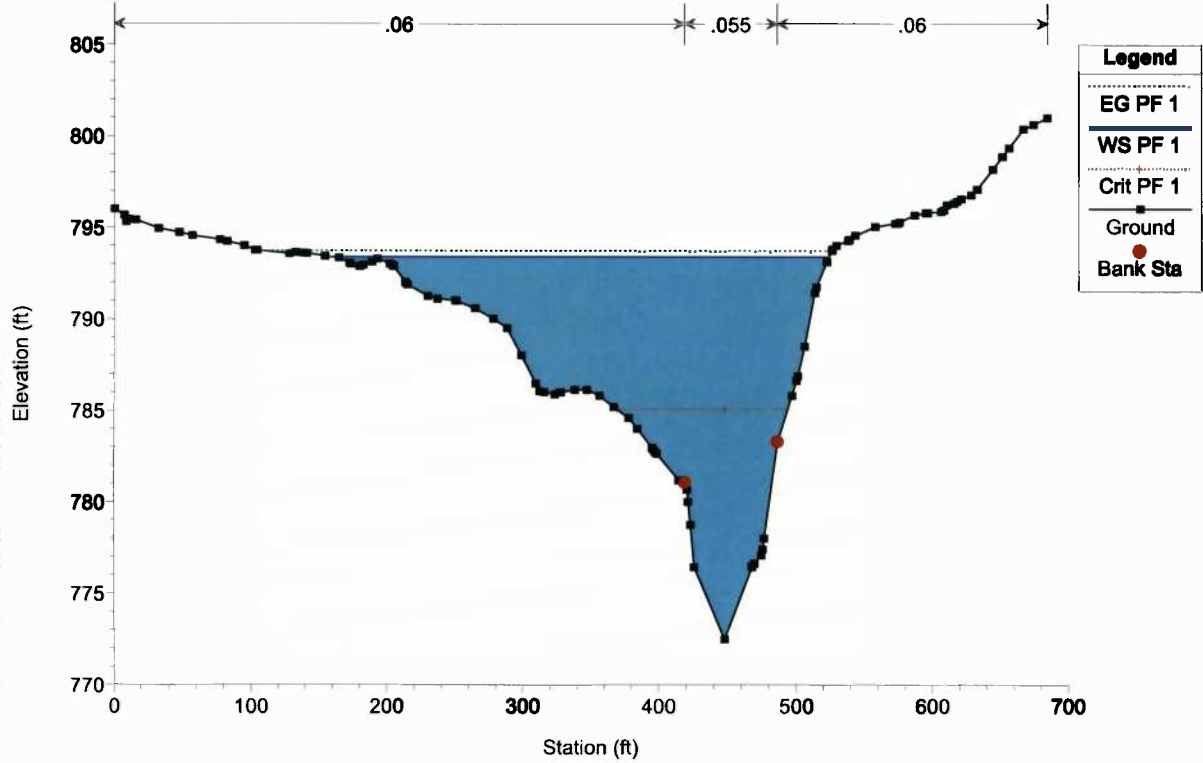


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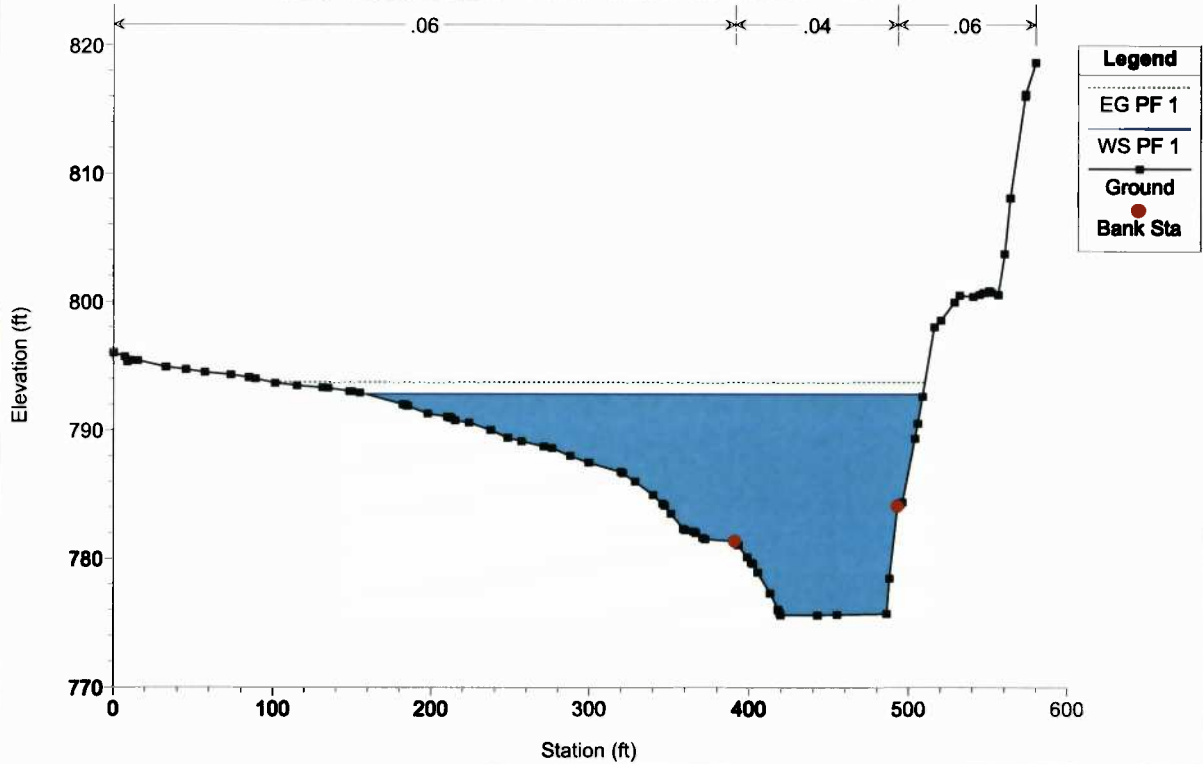




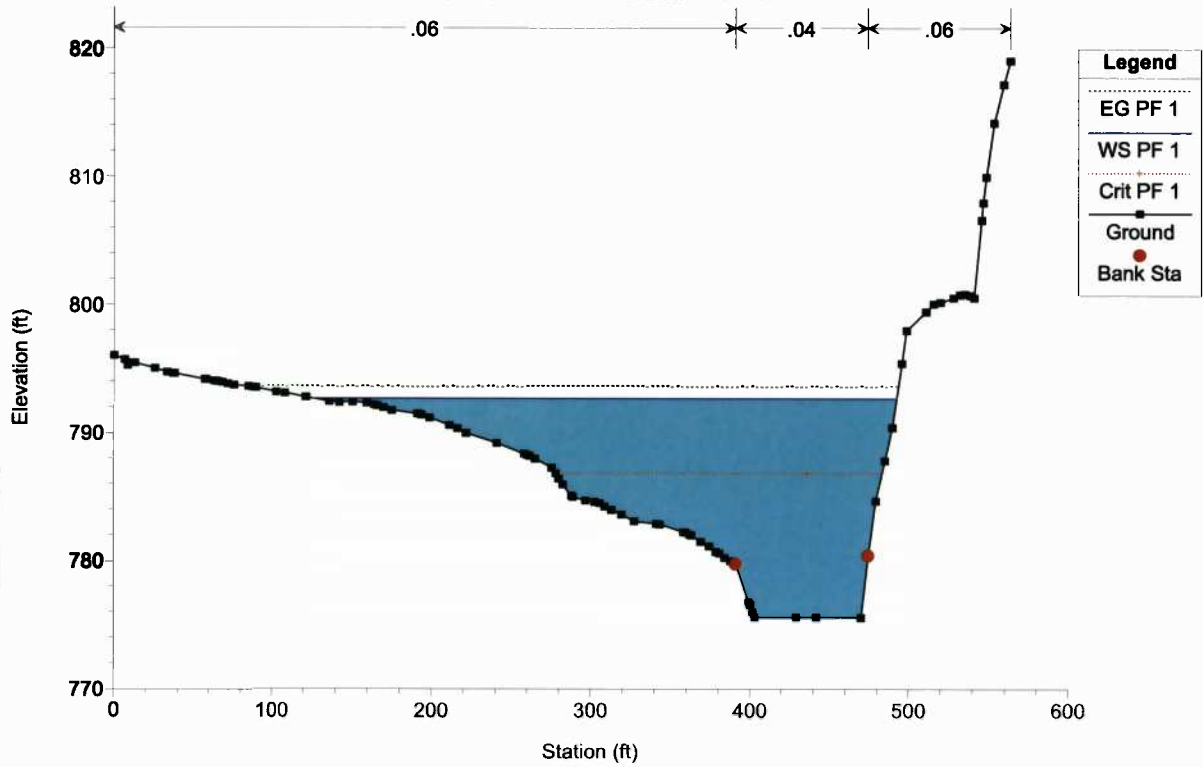
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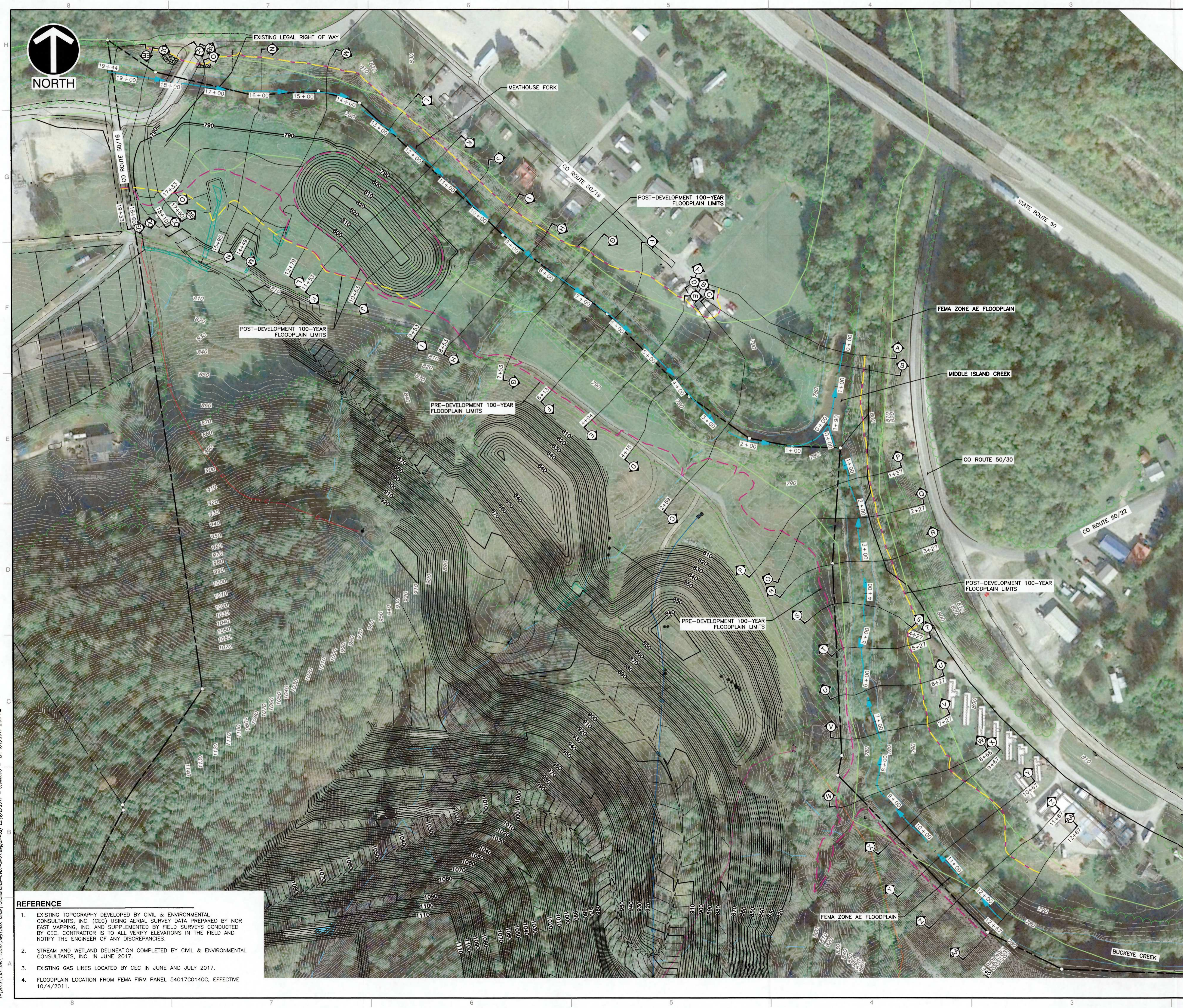


130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
 River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 50



130-359-SMITHBURG-HEC-RAS Plan: Proposed 9/7/2017
River = Middle Island Cr Reach = MIDDLE ISLAND CR RS = 20

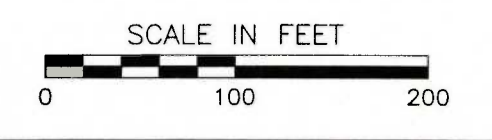




LEGEND

- 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 INTERMITTENT STREAM
- — — EXISTING PERENNIAL STREAM
- — — EXISTING WETLAND

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



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/ARG
DWG SCALE:	1"=100'	CHECKED BY:	ARG
PROJECT NO.:	130-350-0209	APPROVED BY:	ARG
APPROVED BY HAND SIGNATURE ON FILE			*RPC

DRAWING NO.: **SP02**

P:\2017\130-350-0209\130-350-0209-0101-SP02.dwg (9/8/2017 - 9:08:57 AM) - LP: 9/8/2017 2:09 PM

Appendix E

APPENDIX E

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

HEC-RAS Plan: Existing Profile: PF 1

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vol Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch.
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	793.88	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	794.64	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	298.86	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	493.89	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	2648.22	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	178.80	0.26
Buckeye Creek	BUCKEYE CREEK	1166.73	PF 1	7350.00	776.00	794.47		794.99	0.001361	5.92	1412.83	168.32	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	968.73	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	785.80	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	219.34	0.25
Buckeye Creek	BUCKEYE CREEK	136.73	PF 1	7350.00	773.97	793.26	784.45	793.73	0.001366	5.93	1636.13	249.62	0.26

HEC-RAS Plan: proposed Profile: PF 1

River	Reach	River Sta	Profile	E.G. Elev. (ft)	W.S. Elev. (ft)	Vel Head (ft)	Frcin Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Middle Island Cr	MIDDLE ISLAND CR	50	PF 1	793.73	792.82	0.91	0.04	0.01	3041.65	13703.07	205.28	351.29
Middle Island Cr	MIDDLE ISLAND CR	20	PF 1	793.68	792.70	0.98			4049.32	12620.27	280.41	365.97
Meathouse Fork	MEATHOUSE FORK	1933.09	PF 1	795.61	795.17	0.44	0.09	0.01	372.67	8103.36	1123.98	376.99
Meathouse Fork	MEATHOUSE FORK	1860	PF 1	795.51	794.98	0.53	0.06	0.01	403.21	7508.32	1688.47	320.16
Meathouse Fork	MEATHOUSE FORK	1810	PF 1	795.43	794.93	0.50	0.01	0.00	237.40	7790.11	1572.49	307.97
Meathouse Fork	MEATHOUSE FORK	1785	Bridge									
Meathouse Fork	MEATHOUSE FORK	1760	PF 1	795.35	794.85	0.50	0.03	0.05	100.36	7945.66	1553.99	276.54
Meathouse Fork	MEATHOUSE FORK	1733.17	PF 1	795.27	794.86	0.41	0.12	0.04	117.11	7761.31	1721.59	309.33
Meathouse Fork	MEATHOUSE FORK	1595.2	PF 1	795.11	794.82	0.29	0.12	0.01	135.39	8680.20	784.41	280.77
Meathouse Fork	MEATHOUSE FORK	1449.39	PF 1	794.98	794.63	0.36	0.18	0.02	73.70	7425.85	2100.46	307.10
Meathouse Fork	MEATHOUSE FORK	1279.24	PF 1	794.79	794.35	0.44	0.13	0.01	78.17	7571.59	1950.24	202.29
Meathouse Fork	MEATHOUSE FORK	1152.99	PF 1	794.65	794.24	0.41	0.10	0.00	38.98	7666.23	1894.79	206.27
Meathouse Fork	MEATHOUSE FORK	1052.99	PF 1	794.55	794.12	0.43	0.11	0.01	299.35	6449.94	2850.71	162.51
Meathouse Fork	MEATHOUSE FORK	952.99	PF 1	794.43	794.02	0.41	0.11	0.00	214.25	7035.05	2349.70	296.86
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	601.89	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

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 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