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 #: 14-123 (Renewal)

Date Approved: April 14, 2016 **Expires: April 14, 2017**

Issued to: Mark West Liberty Midstream & Resources, LLC via CEC Inc.

POC: Brian R. Tomiczek
Staff Consultant, CEC Inc.

Company Address: 333 Baldwin Rd. Pittsburgh, PA. 15205

Project Address: 218 Swisher Lane, West Union, WV 26456

Firm: 54017C0140C **Lat/Long: 80.687945 W/39.275688 N**

Purpose of development: Land Development (see original permits)

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

George C. Eidel

Date: April 14, 2016

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

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

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

OFFICIAL USE

Postage	$ .48
Certified Fee	3.30
Return Receipt Fee (Endorsement Required)	2.70
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.48

WEST UNION WV
MAR 1
Postmark Here
USPS 26456

#14-123

Sent To: CME Engineering, LP

Street, Apt. No.; or PO Box No.: 975 Georges Station Rd, Suite 100

City, State, ZIP+4: Greensburg, Pa 15601

7013 2250 0001 6914 8155

PS Form 3800, August 2006 — See Reverse for Instructions

Certified Mail Provides:

- A mailing receipt
- A unique identifier for your mailpiece
- A record of delivery kept by the Postal Service for two years

Important Reminders:

- Certified Mail may ONLY be combined with First-Class Mail® or Priority Mail®.
- Certified Mail is *not* available for any class of international mail.
- NO INSURANCE COVERAGE IS PROVIDED with Certified Mail. For valuables, please consider Insured or Registered Mail.
- For an additional fee, a *Return Receipt* may be requested to provide proof of delivery. To obtain Return Receipt service, please complete and attach a Return Receipt (PS Form 3811) to the article and add applicable postage to cover the fee. Endorse mailpiece "Return Receipt Requested". To receive a fee waiver for a duplicate return receipt, a USPS® postmark on your Certified Mail receipt is required.
- For an additional fee, delivery may be restricted to the addressee or addressee's authorized agent. Advise the clerk or mark the mailpiece with the endorsement *"Restricted Delivery"*.
- If a postmark on the Certified Mail receipt is desired, please present the article at the post office for postmarking. If a postmark on the Certified Mail receipt is not needed, detach and affix label with postage and mail.

IMPORTANT: Save this receipt and present it when making an inquiry.

PS Form 3800, August 2006 *(Reverse)* PSN 7530-02-000-9047

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- 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: #14-123

CME Engineering LP
ATT: Mark T Stanley
975 Georges Station Rd, Suite 100
Greensburg, PA 15601

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Ellen Kemp ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Ellen Kemp
C. Date of Delivery 3/10/14

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

MAR 1 2014

3. Service Type
☒ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 8155

PS Form 3811, July 2013 Domestic Return Receipt

UNITED STATES POSTAL SERVICE

PITTSBURGH PA 150
11 MAR '14
PM 1 L

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

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

FILED

2014 MAR 13 PM 12: 30

COUNTY CLERK
DODDRIDGE COUNTY, WV

Ralph Sandora, Jr.
Doddridge Co. Flood Plain MGT
118 East Court St, Room 102
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: #14-123 EXTENSION

Date Approved: 03/08/2016 **Expires: 06/06/2016**

Issued to: MarkWest Liberty Midstream & Resources, LLC POC: Edward J Fink 412-429-2324

Company Address: 333 Baldwin Road
Pittsburgh, PA 15205

Project Address: Sherwood Facility

Firm: **Lat/Long:**

Purpose of development: Extension

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

George C Eidel

Date: 03/08/2016

For additional information regarding this permit, please contact
Doddridge County Floodplain Manager at 304.873.2631, or via email at
doddridgecountyfpm@gmail.com
108 Court Street Ste 1; West Union, WV 26456

Commercial/Industrial Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit has been issued to **MarkWest Liberty Midstream & Resources, LLC**, and is for the approved commercial and/or industrial development project associated with this permit 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: #14-123 ~ MarkWest Liberty Midstream & Resources, LLC ~ Master Plan Extension & Modification

Date Approved: 04/10/2015 **Expires: 04/10/2016**

Issued to: MarkWest via CEC, Inc.

POC: Andrew Gullone
412-429-2324

Company Address: 333 Baldwin Road
Pittsburgh, PA 15205

Project Address: Grant District
Lat/Long: 39.276129N/80.686377W

Purpose of development: Master plan permit # 14-123 extension & modification project. Removal of detention ponds, placement of three underground storage facilities, and administration building construction.

Issued by: Edwin L. "Bo" Wriston, Doddridge County FPM (*or designee*)

Date: 04/10/2015

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

119935

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

PNC BANK, N.A.
Pittsburgh, PA

8-9/430

CHECK DATE 4/1/2016

PAY Fifteen Thousand Five Hundred and 00/100 Dollars

TO Doddridge County Commission

AMOUNT 15,500.00

Security features. Details on back.

AUTHORIZED SIGNATURE

⑈119935⑈ ⑆043000096⑆ 000227240 5⑈

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

119935

Check Date: 4/1/2016

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
03312016	3/31/2016	000000271455	15,500.00			15,500.00
Doddridge County Commission		TOTAL	15,500.00			15,500.00
- Operating Account	39	11261				

FILED
2016 APR 14 AM 8:36
BETTY A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Re-Submit Application
Permit #14-123

PRODUCT DLT141 USE WITH 91500 ENVELOPE

IL & ENVIRONMENTAL CONSULTANTS, INC.

99438

Check Date: 1/29/2014

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
01252014	1/25/2014	000000233375	11,951.00			11,951.00
Doddridge County Commission		TOTAL	11,951.00			11,951.00
Operating Account	11	11261				

Permit # 14-123
Mark West
Sherwood Gas Processing
Master Plan

Doddridge County, West Virginia

DATE: 2014/02/07

RECEIPT NO: 1397

FROM: CIVIL & ENVIRONMENTAL CONSULT **AMOUNT:** $ 11,951.00

ELEVEN THOUSAND NINE HUNDRED FIFTY ONE DOLLARS AND 00 CENTS

FOR: PERMIT # 14-123 MARK WEST
SHERWOOD GAS PROCESSING PLANT MASTER PLAN

00000099438 FP-BUILDING PERMITS 020-318 **TOTAL:** $11,951.00

MEC
CLERK

MICHAEL HEADLEY
SHERIFF &TREASURER

Customer Copy

PRODUCT SSLT141 USE WITH 91500 ENVELOPE

March 1, 2016

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 #14-123
Sherwood Facility Permit Extension Request
Doddridge County, West Virginia
CEC Project 110-811

On behalf of MarkWest Liberty Midstream & Resources, LLC, Civil & Environmental Consultants, Inc. is requesting an extension of Commercial/Industrial Floodplain Development Permit #14-123 associated with the Sherwood Facility located in Doddridge County, West Virginia. The current permit was issued on April 10, 2015 and expires on April 10, 2016. Per our telephone conversation on February 16, 2016, we understand that this request letter will extend the current permit for a period of 90 days, effective immediately after the April 10, 2016 expiry date; and that after the 90 day extension period, any additional work associated with the project will require the submission of a complete application with the full application fee.

Construction operations permitted under the Commercial/Industrial Floodplain Development Permit #14-123 are ongoing and are expected to continue beyond the expiration date (04/10/2016) of the current permit.

Should you have any questions or require additional information do not hesitate to contact us at 412-429-2324.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

David M. Offner
Staff Consultant

Edward J. Fink, P.E., CPESC, CPSWQ
Project Manager

110-811-L-Sherwood Floodplain Permit Ext. Request/P

FILED
2016 MAR -4 AM 11:16
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

March 1, 2016

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 #14-130
Sherwood Sales NGL Pipeline Permit Extension Request
Doddridge County, West Virginia
CEC Project 132-828

On behalf of MarkWest Liberty Midstream & Resources, LLC, Civil & Environmental Consultants, Inc. is requesting an extension of Commercial/Industrial Floodplain Development Permit #14-130 associated with the Sherwood Sales NGL Pipeline located in Doddridge County, West Virginia. The current permit was issued on April 10, 2015 and expires on April 10, 2016. Per our telephone conversation on February 16, 2016, we understand that this request letter will extend the current permit for a period of 90 days, effective immediately after the April 10, 2016 expiry date; and that after the 90 day extension period, any additional work associated with the project will require the submission of a complete application with the full application fee.

Construction operations permitted under the Commercial/Industrial Floodplain Development Permit #14-130 are ongoing and are expected to continue beyond the expiration date (04/10/2016) of the current permit.

Should you have any questions or require additional information do not hesitate to contact us at 412-429-2324.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

David M. Offner
Staff Consultant

Edward J. Fink, P.E., CPESC, CPSWQ
Project Manager

132-828-Sherwood Sales Floodplain Permit Ext. Request/P

FILED
2016 MAR -4 AM 11:16
DELLA ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

March 1, 2016

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 #14-175
Sherwood to Mobley NGL Pipeline Permit Extension Request
Doddridge County, West Virginia
CEC Project 132-782

On behalf of MarkWest Liberty Midstream & Resources, LLC, Civil & Environmental Consultants, Inc. (CEC) is requesting an extension of Commercial/Industrial Floodplain Development Permit #14-175 associated with the Sherwood to Mobley NGL Pipeline located in Doddridge County, West Virginia. The current permit was issued on April 10, 2015 and expires on April 10, 2016. Per our telephone conversation on February 16, 2016, we understand that this request letter will extend the current permit for a period of 90 days, effective immediately after the April 10, 2016 expiry date; and that after the 90 day extension period, any additional work associated with the project will require the submission of a complete application with the full application fee.

Construction operations permitted under the Commercial/Industrial Floodplain Development Permit #14-175 are ongoing and are expected to continue beyond the expiration date (04/10/2016) of the current permit.

Should you have any questions or require additional information do not hesitate to contact us at 412-429-2324.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

David M. Offner
Staff Consultant

Edward J. Fink, P.E., CPESC, CPSWQ
Project Manager

132-782-L-Sherwood to Mobley Floodplain Permit Ext. Request/P

FILED
2016 MAR -4 AM 11:16
BETTY A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

April 4, 2016

FILED
2016 APR 14 AM 8:36
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

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

Dear Mr. Eidel:

Subject: Extension Request
Commercial/Industrial Floodplain Development Permit #14-123
Sherwood Facility Permit Extension
Doddridge County, West Virginia
CEC Project 110-811

On behalf of MarkWest Liberty Midstream & Resources, LLC, Civil & Environmental Consultants, Inc. (CEC) is submitting a request to extend the Commercial/Industrial Floodplain Development Permit (#14-123) associated with the Sherwood Sales NGL Pipeline, located in Doddridge County, West Virginia. The current permit was recently extended for an additional 90 days and expires on June, 6, 2016. Based on our conversation on February 18, 2016, CEC understands that this enclosed Floodplain Permit Application and Application Fee is required to extend the permit for one (1) additional year, presumably to June 6, 2017. Please find enclosed the following:

- Permit Application Fee in the amount of $15,500 (Sherwood); and
- A copy of the Doddridge County Floodplain Development Permit Application (Sherwood)

Should you have any questions or require additional information, do not hesitate to contact us at 412-429-2324.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

EDWARD J. FINK
REGISTERED
18669
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

Brian R. Tomiczek,
Staff Consultant

Edward J. Fink, P.E.
Project Manager

Enclosures

cc: Richard Lowry, MarkWest Liberty Midstream & Resources, LLC

110-811-L-Floodplain Permit-3-30-16/P

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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_____

SECTION 2: PROPOSE DEVELOPMENT (TO BE COMPLETED BY APPLICANT).

IF THE APPLICANT IS NOT A NATURAL PERSON, THE NAME, ADDRESS, AND TELEPHONE NUMBER OF A NATURAL PERSON WHO SHALL BE APPOINTED BY THE APPLICANT TO RECEIVE NOTICE PURSUANT TO ANY PROVISION OF THE CURRENT DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

APPLICANT'S NAME: MarkWest Liberty Midstream & Resources, LLC.

ADDRESS: 218 Swisher Lane, West Union, WV 26456

TELEPHONE NUMBER: (724) 514-4319

BUILDER'S NAME: Anderson Excavating, LLC
ADDRESS: 343 Williams Road, Morgantown, WV 26501
TELEPHONE NUMBER: (304) 983-2296

ENGINEER'S NAME: Civil & Environmental Consultants, Inc; Andrew R. Gullone
ADDRESS: 333 Baldwin Road, Pittsburgh PA, 15205
TELEHONE NUMBER: (412) 429-2324

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Dennis H. Powell
ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) 216 Swisher Lane, West Union, WV 26456
DISTRICT: Grant District
DATE/FROM WHOM PROPERTY PURCHASED: 8/8/1986 From Ila Powell
LAND BOOK DESCRIPTION:
DEED BOOK REFERENCE: DBV 200 Page 532
TAX MAP REFERENCE: Sheet 19 Lot 32
EXISTING BUILDINGS/USES OF PROPERTY: Shed / Farm land
NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY Dennis H. Powell
ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY 216 Swisher Lane, West Union, WV 26456

To avoid delay in processing the application, please provide enough information to easily identify the project location.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVEOPLMENT ACTIVITIES:

[X] Fill [] Mining [] Drilling [] Pipelining
[X] Grading
[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
[] Watercourse Altercation (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)

C. STANDARD SITE PLAN OR SKETCH

1. **SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED.**
2. **IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED:**
   SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION OF THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY.
3. **SIGN AND DATE THE SKETCH.**

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ 2,290,200.00

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

1. NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA OF THE SURFACE TRACT (UP & DOWN STREAM) UPON WHICH THE PROPOSED ACTIVITY WILL OCCUR AND ALL OTHER SURFACE OWNERS UP & DOWN STREAM) WHO OWN PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY (IF ONE HAS BEEN COMPLETED).

NAME: Previously provided
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

1. NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON ANY ADJACENT PROPERTY AT THE TIME THE FLOODPLAIN PERMIT APPLICATION IS FILED AND THE NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN ANY HOME ON ANY PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY.

NAME: Previously provided
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

E. CONFIRMATION FORM

THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

(A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.

(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.

(C) PUBLICATION.

(D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.

(E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT):_____

SIGNATURE:_____ **DATE:**_____

After completing SECTION 2, APPLICANT should submit form to Floodplain Administrator/Manager or his/her representative for review.

SECTION 3: FLOODPLAIN DETERMINATION (to be completed by Floodplain Administrator/Manager or his/her representative)

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel:_____

Dated:_____

[] Is **NOT** located in a Specific Flood Hazard Area (Notify applicant that the application review is complete and **NO FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED**).

[] Is located in Special Flood Hazard Area.

FIRM zone designation_____

100-Year flood elevation is:_____NGVD (MSL)

[] Unavailable

[] The proposed development is located in a floodway.

FBFM Panel No._____ Dated_____

[] See section 4 for additional instructions.

SIGNED_____ DATE_____

SECTION 4: ADDITIONAL INFORMATION REQUIRED (To be completed by Floodplain Administrator/Manager or his/her representative)

The applicant must submit the documents checked below before the application can be processed.

[] A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

[] Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also_____

_____

[] Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).

[] Plans showing the extent of watercourse relocation and/or landform alterations.

[] Top of new fill elevation_____Ft. NGVD (MSL).
For floodproofing structures applicant must attach certification from registered engineer or architect.

[] Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.

[] Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).

[] Other:

_____

_____

_____

SECTION 5: PERMIT DETERMINATION (To be completed by Floodplain Administrator/Manager or his/her representative)

I have determined that the proposed activity **(type is or is not)** in conformance with provisions of the Floodplain Ordinance adopted by the County Commission of Doddridge County on May 21, 2013. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED_____DATE_____

If the Floodplain Administrator/Manager found that the above was not in conformance with the provisions of the Doddridge County Floodplain Ordinance and/or denied that application, the applicant may complete an appealing process below.

APPEALS: Appealed to the County Commission of Doddridge County? [] Yes {} No
Hearing Date:_____
County Commission Decision - Approved [] Yes [] No

CONDITIONS:_____

_____

_____

_____

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by APPLICANT before Certificate of Compliance is issued).

The following information must be provided for project structures. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application).

COMPLETE 1 OR 2 BELOW:

1 Actual (As-Built) Elevation of the top of the lowest floor (including basement or crawl space is_____FT. NGVD (MSL)

2 Actual (As Built) elevation of floodproofing is_____FT. NGVD (MSL)

Note: Any work performed prior to submittal of the above information is at risk of the applicant.

SECTION 7: COMPLIANCE ACTION (To be completed by the Floodplain Administrator/Manager or his/her representative).

The Floodplain Administrator/Manager or his/her representative will complete this section as applicable based on inspection of the project to ensure compliance with the Doddridge County Floodplain Ordinance.

INSPECTIONS:

DATE:_____ **BY:**_____

DEFICIENCIES ? **Y/N**

COMMENTS_____

_____

_____

_____

_____

_____

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by Floodplain Administrator/Manager or his/her representative).

Certificate of Compliance issued: DATE:_____ BY:_____

CERTIFICATE OF COMPLIANCE
FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA
(OWNER MUST RETAIN)

PERMIT NUMBER:_____

PERMIT DATE:_____

PURPOSE –

CONSTRUCTION LOCATION:_____

OWNER'S ADDRESS:_____

_____

_____

THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN ADMINISTRATOR/MANAGER OR HIS/HER AGENT.

COMPLIANCE IS HEREBY CERTIFIED WITH THE REQUIREMENT OF THE FLOODPLAIN ORDINANCE ADOPTED BY THE COUNTY COMMISSION OF DODDRIDGE COUNTY ON MAY 21, 2013.

SIGNED_____DATE_____

The Doddridge Independent

A Weekly Newspaper for the Mutual Benefit of West Union and all of Doddridge County

Union, WV 26456 | Friday, July 18, 2014 | Volume 2 / Issue 21

WA/MarkWest Floodplain Appeal Nixed

e Through n with Crash

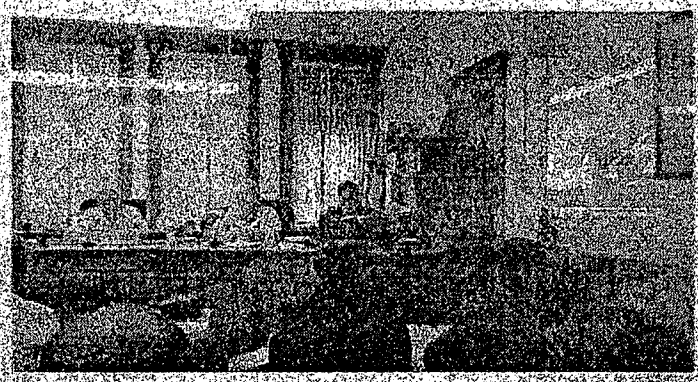
ourtesy of Ben Queen Photography

ed speeding. Dep. Bodkin clocked nd on Route 50.

id and led police back on a pursuit ie chase continued when the SUV ack to Route 50 West. The driver back on Route 50 East and making sing the Harrison County line, the

The County Commission Room was full. As you walked into the room there was a clear division of the two groups. The left side was filled with concerned citizens and folks from the Doddridge County Watershed Association. And on the right were a row of MarkWest employees and engineers as well as attorneys from Steptoe & Johnson, retained by MarkWest. In the center and front of the room were the appellate who filed the appeal with the Floodplain Board. They filed on behalf of the Doddridge County Watershed Association and were being represented by Mirijana Beram, Wayne Woods and their attorney, who was video conferenced in via Skype from California, Mr. David Richardson who is licensed in West Virginia. The appellant attorneys, Jason Foster and Larry Rector of Steptoe & Johnson made their introduction and were seated.

Attorney Don Tennant was on the bench to help the commissioners through the hearing process. The County Commissioners introduced themselves and explained their land and mineral holdings and related that they had no direct financial dealings with MarkWest and could therefore render an impartial decision on the appeal. Next President Sandora asked them to "move forward with your burden of production to prove you are an aggrieved entity under the ordinance". All witnesses were sworn in prior to their testimony.

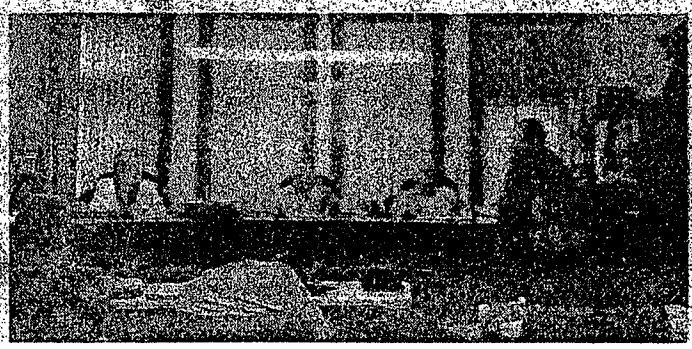


Far left and projected onto the wall, Attorney Richardson "Skyped in" from California to represent the Watershed Association

After several direct questions to the Ms. Beram, one of the representatives of the Watershed Association (DCWA), it seems that she could not make a direct legally founded link to be that representative. The questioning moved on the Mr. Woods who contended that the Doddridge County Watershed Association was in fact legally organized under West Virginia law. Mr. Woods stated that the West Fork Conservation District acts as the fiscal agent for the DCWA in an attempt to prove their validity.

Basic questioning from the MarkWest group revealed that they may not qualify as an aggrieved entity under the Floodplain Ordinance.

Mr Richardson led his questioning to try and prove that the DCWA was an entity recognized by various government agencies and was therefore legitimate under the law. With continued questioning from the MarkWest team, it was becoming harder and harder for the DCWA to prove their point. The questions revealed that the DCWA had no registered charter with the WV Secretary of State, they had no articles of incorporation nor any non-profit status recognized by



Floodplain Manager Bo Wriston being questioned via Skype

various government agencies and was therefore legitimate under the law. With continued questioning from the MarkWest team, it was becoming harder and harder for the DCWA to prove their point. The questions revealed that the DCWA had no registered charter with the WV Secretary of State, they had no articles of incorporation nor any non-profit status recognized by any government agency.

The entire process took well over an hour to bring these matters to light. Showing a real disorganization for presenting materials in a timely fashion and loss of internet causing multiple failures or glitches within the Skype application, the board showed great mercy on the appellate by allowing reconnections and at one point, restating various testimony for the DCWA attorney. Eventually the board resorted to a phone call using a speaker phone option to contact the DCWA attorney.

In an effort to prove their entity status, they ran out of witnesses and began asking if there was anyone in the courtroom that would want to testify on their behalf. After one break, they also wanted to question an engineer from MarkWest, but could not produce a name. Frantically someone tried to call the DCWA attorney with names of MarkWest employees present at the meeting, but he could not be reached. During one of several breaks, some of the engineers for MarkWest failed to return to the hearing as the DCWA attorney then requested their testimony by name.

Mrs. Lora Price was called to testify for the DCWA as someone who was harmed by the possibility of flooding. She could not prove that her property was adjacent to or tied into the same floodplain or property as the MarkWest plant, but noted that sediment deposits from development were filling Sugar Run Creek. She could not prove that she was an aggrieved entity under the ordinance, which did not qualify her testimony in the appeal.

The MarkWest Team proved their case proving that the DCWA was not a qualified aggrieved entity and had no authority to file the appeal with that basis.

After a brief executive session, the Appeals Board came back with a 3-0 decision in favor of the MarkWest Permit.

Civil & Environmental Consultants, Inc.
333 Baldwin Road

Pittsburgh, PA 15205-1751
Phone: (412) 429-2324 · **Toll Free:** (800) 365-2324
Fax: (412) 429-2114

Letter of Transmittal

Date: *10/6/2015* | Job No.: *110-811*

Attention: *Mr. Edwin Wriston*

To:
Doddridge County Floodplain Manager
HC 68 Box
West Union, WV 26456

RE:
CLOMR-F Application

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

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☑ *Application Package*

Copies	Date	No.	Description
1	10/6/2015	1	CLOMR-F Application Package

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

Remarks: *Please complete the section of the application as noted in the letter and return to CEC fro forwarding to DHS-FEMA.*

Copy to: -

Signed: _____
Evan D. Baker

ebaker@cecinc.com. EXT: 1119

Civil & Environmental Consultants, Inc.

October 6, 2015

Mr. Edwin Wriston
Doddridge County Floodplain Manager
HC 68, Box 5
West Union, WV 26456

Dear Mr. Wriston:

Subject: Proposed Sherwood Administration Building and Warehouse
218 Swisher Lane, West Union, WV 26546
Doddridge County, West Virginia
CLOMR-F Application
CEC Project 110-811

Civil & Environmental Consultants, Inc. (CEC) has been hired as a consultant to provide professional surveying services to MarkWest Liberty Midstream & Resources, LLC (MarkWest). MarkWest is requesting a letter from DHS-FEMA that the proposed Administration Building and Warehouse, which will be elevated by the placement of fill, will not be inundated by the base flood.

Please find a copy of the Application package for your approval and signature. Please complete Section A of MT-1 Form 3 Page 1 of 1 and return to Mr. Evan Baker, P.L.S. of CEC. CEC will then forward the completed application to DHS-FEMA.

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

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Evan D. Baker, P.L.S.
Project Manager III

Enclosures

110-811-Sherwood-CLOMR-F Application 10/5/2015/P

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

PROPERTY INFORMATION FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.63 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form may be completed by the property owner, property owner's agent, licensed land surveyor, or registered professional engineer to support a request for a Letter of Map Amendment (LOMA), Conditional Letter of Map Amendment (CLOMA), Letter of Map Revision Based on Fill (LOMR-F), or Conditional Letter of Map Revision Based on Fill (CLOMR-F) for existing or proposed, single or multiple lots/structures. In order to process your request, all information on this form must be completed *in its entirety*, unless stated as optional. **Incomplete submissions will result in processing delays.** Please check the item below that describes your request:

☐ LOMA	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.
☐ CLOMA	A letter from DHS-FEMA stating that a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed.
☐ LOMR-F	A letter from DHS-FEMA stating that an **existing** structure or parcel of land that has been **elevated by fill** would not be inundated by the base flood.
☒ CLOMR-F	A letter from DHS-FEMA stating that a parcel of land or **proposed** structure that will be **elevated by fill** would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed.

Fill is defined as material from any source (including the subject property) placed that raises the ground to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. **Fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in a Special Flood Hazard Area (SFHA) is considered natural grade.**

Has fill been placed on your property to raise ground that was previously below the BFE? ☐ Yes ☒ No If yes, when was fill placed? / month/year

Will fill be placed on your property to raise ground that is below the BFE? ☒ Yes* ☐ No If yes, when will fill be placed? 01/2016 month/year

* If yes, Endangered Species Act (ESA) compliance must be documented to FEMA prior to issuance of the CLOMR-F determination (please refer page 4 to the MT-1 instructions).

1. Street Address of the Property (if request is for multiple structures or units, please attach additional sheet referencing each address and enter street names below):
   218 Swisher Lane, West Union, WV 26456

2. Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed):
   5.758 acre Tract being Tax Parcel 19-31.6 for Doddridge County, WV, also listed as Tract Two of Deed Book Volume, page 457.

3. Are you requesting that a flood zone determination be completed for (check one):
   - ☐ Structures on the property? What are the dates of construction? _____ (MM/YYYY)
   - ☒ A portion of land within the bounds of the property? (A certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are **required**. For the preferred format of metes and bounds descriptions, please refer to the MT-1 Form 1 Instructions.)
   - ☐ The entire legally recorded property?

4. Is this request for a (check one):
   - ☐ Single structure
   - ☐ Single lot
   - ☒ Multiple structures (How many structures are involved in your request? List the number: 2
   - ☐ Multiple lots (How many lots are involved in your request? List the number: _____)

In addition to this form (MT-1 Form 1), please complete the checklist below. **ALL** requests must include one copy of the following:

☒ Copy of the effective FIRM panel on which the structure and/or property location has been accurately plotted (property inadvertently located in the NFIP regulatory floodway will require Section B of MT-1 Form 3)

☐ Copy of the Subdivision Plat Map for the property **(with recordation data and stamp of the Recorder's Office)**

OR

☒ Copy of the Property Deed **(with recordation data and stamp of the Recorder's Office)**, ***accompanied by*** a tax assessor's map or other certified map showing the surveyed location of the property relative to local streets and watercourses. The map should include at least one street intersection that is shown on the FIRM panel.

☒ Form 2 – Elevation Form. If the request is to remove the structure, and an Elevation Certificate has already been completed for this property, it may be submitted in lieu of Form 2. If the request is to remove the entire legally recorded property, or a portion thereof, the lowest lot elevation must be provided on Form 2.

☒ Please include a map scale and North arrow on all maps submitted.

For LOMR-Fs and CLOMR-Fs, the following must be submitted in addition to the items listed above:

☒ Form 3 – Community Acknowledgment Form

For CLOMR-Fs, the following must be submitted in addition to the items listed above:

☒ Documented ESA compliance, which may include a copy of an Incidental Take Permit, an Incidental Take Statement, a "not likely to adversely affect" determination from the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), or an official letter from NMFS or USFWS concurring that the project has "No Effect" on proposed or listed species or designated critical habitat. Please refer to the MT-1 instructions for additional information.

Please do *not* submit original documents. Please retain a copy of all submitted documents for your records.

DHS-FEMA encourages the submission of all required data in a digital format (e.g. scanned documents and images on Compact Disc [CD]). Digital submissions help to further DHS-FEMA's Digital Vision and also may facilitate the processing of your request.

Incomplete submissions will result in processing delays. For additional information regarding this form, including where to obtain the supporting documents listed above, please refer to the MT-1 Form Instructions located at http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm.

Processing Fee (see instructions for appropriate mailing address; or visit http://www.fema.gov/fhm/frm_fees.shtm **for** the most current fee schedule)

Revised fee schedules are published periodically, but no more than once annually, as noted in the **Federal Register**. Please note: single/multiple lot(s)/structure(s) LOMAs are fee exempt. The current review and processing fees are listed below:

Check the fee that applies to your request:

☐ $325 (single lot/structure LOMR-F following a CLOMR-F)

☐ $425 (single lot/structure LOMR-F)

☐ $500 (single lot/structure CLOMA or CLOMR-F)

☐ $700 (multiple lot/structure LOMR-F following a CLOMR-F, or multiple lot/structure CLOMA)

☒ $800 (multiple lot/structure LOMR-F or CLOMR-F)

Please submit the Payment Information Form for remittance of applicable fees. Please make your check or money order payable to:
National Flood Insurance Program.

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

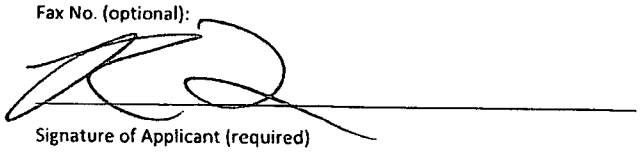
Applicant's Name (required): Rick Lowry

Mailing Address (required): Markwest Liberty Midstream & Resources, LLC 4600 W. Barry Ct. Suite 500 Canonsburg, PA 15317

Daytime Telephone No. (required): 724-416-0520

Fax No. (optional):

E-Mail Address (optional): ☒ By checking here you may receive correspondence electronically at the email address provided): rlowry@markwest.com



Signature of Applicant (required)

Date (required) September 28, 2015

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

ELEVATION FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form must be completed for requests and must be completed and signed by a registered professional engineer or licensed land surveyor. **A DHS - FEMA National Flood Insurance Program (NFIP) Elevation Certificate may be submitted in lieu of this form for single structure requests.**

For requests to remove a structure on natural grade OR on engineered fill from the Special Flood Hazard Area (SFHA), submit the lowest adjacent grade (the lowest ground touching the structure), ***including an attached deck or garage***. For requests to remove an entire parcel of land from the SFHA, provide the lowest lot elevation; or, if the request involves an area described by metes and bounds, provide the lowest elevation within the metes and bounds description. All measurements are to be rounded to nearest tenth of a foot. In order to process your request, all information on this form must be completed ***in its entirety***. **Incomplete submissions will result in processing delays.**

1. NFIP Community Number: 540024 Property Name or Address: 218 Swisher Lane, West Union, WV 26456

2. Are the elevations listed below based on ☐ ***existing*** or ☒ ***proposed*** conditions? (Check one)

3. For the existing or proposed structures listed below, what are the types of construction? (check all that apply)
   ☐ crawl space ☒ slab on grade ☐ basement/enclosure ☐ other (explain)

4. Has DHS - FEMA identified this area as subject to land subsidence or uplift? (see instructions) ☐ Yes ☒ No
   If yes, what is the date of the current re-leveling? / (month/year)

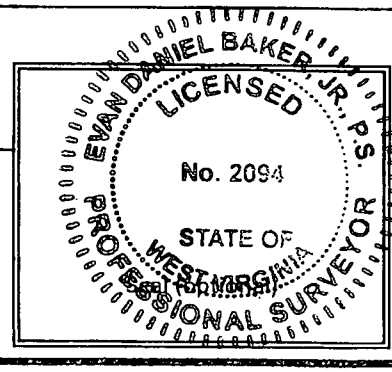
5. What is the elevation datum? ☐ NGVD 29 ☒ NAVD 88 ☐ Other (explain)
   If any of the elevations listed below were computed using a datum different than the datum used for the effective Flood Insurance Rate Map (FIRM) (e.g., NGVD 29 or NAVD 88), what was the conversion factor?
   Local Elevation +/- ft. = FIRM Datum

6. Please provide the Latitude and Longitude of the most upstream edge of the ***structure*** (in decimal degrees to the nearest fifth decimal place):
   Indicate Datum: ☐ WGS84 ☒ NAD83 ☐ NAD27 Lat. 39.27970 Long. 80. 69221
   Please provide the Latitude and Longitude of the most upstream edge of the ***property*** (in decimal degrees to the nearest fifth decimal place):
   Indicate Datum: ☐ WGS84 ☒ NAD83 ☐ NAD27 Lat. 39. 27977 Long. 80. 69253

Address	Lot Number	Block Number	Lowest Lot Elevation*	Lowest Adjacent Grade To Structure	Base Flood Elevation	BFE Source
218 Swisher Lane, West Union WV 26456	31.6	19	811.2	813.0	811.15	HEC-RAS

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Evan D. Baker Jr.	License No.: 2094	Expiration Date: 6/30/2016
Company Name: Civil & Environmental Consultants, Inc.	Telephone No.: 412-429-2324	
Email: ebaker@cecinc.com	Fax No. 412-429-2115	
Signature:	Date: 10/5/2015	



* For requests involving a portion of property, include the lowest ground elevation within the metes and bounds description.
Please note: If the Lowest Adjacent Grade to Structure is the only elevation provided, a determination will be issued for the structure only.

Continued from Page 1.

Address	Lot Number	Block Number	Lowest Lot Elevation*	Lowest Adjacent Grade To Structure	Base Flood Elevation	BFE Source

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name:	License No.:	Expiration Date:
Company Name:	Telephone No.:	
Email:	Fax No.	
Signature:	Date:	

* For requests involving a portion of property, include the lowest ground elevation within the metes and bounds description.
Please note: If the Lowest Adjacent Grade to Structure is the only elevation provided, a determination will be issued for the structure only.

Seal (optional)

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

COMMUNITY ACKNOWLEDGMENT FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.38 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). NOTE: Do not send your completed form to this address.

This form must be completed for requests involving the existing or proposed placement of fill (complete Section A) ***OR*** to provide acknowledgment of this request to remove a property from the SFHA which was previously located within the regulatory floodway (complete Section B).

This form must be completed and signed by the official responsible for floodplain management in the community. **The six digit NFIP community number and the subject property address must appear in the spaces provided below. Incomplete submissions will result in processing delays.** Please refer to the MT-1 instructions for additional information about this form.

Community Number: 540024 Property Name or Address: 218 Swisher Lane, West Union, WV 26456

A. REQUESTS INVOLVING THE PLACEMENT OF FILL

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision Based on Fill (LOMR-F) or Conditional LOMR-F request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a Conditional LOMR-F, will be obtained. For Conditional LOMR-F requests, the applicant has or will document Endangered Species Act (ESA) compliance to FEMA prior to issuance of the Conditional LOMR-F determination. For LOMR-F requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by DHS-FEMA, all analyses and documentation used to make this determination. For LOMR-F requests, we understand that this request is being forwarded to DHS-FEMA for a possible map revision.

Community Comments:

Community Official's Name and Title: (*Please Print or Type*)		Telephone No.:
George Eidel Emergency Manager/Floodplain Manager		304-873-1343
Community Name:	Community Official's Signature (required)	Date:
Doddridge County, WV	George Eidel	Oct. 16, 2015

B. PROPERTY LOCATED WITHIN THE REGULATORY FLOODWAY

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this request for a LOMA. We understand that this request is being forwarded to DHS-FEMA to determine if this property has been inadvertently included in the regulatory floodway. We acknowledge that no fill on this property has been or will be placed within the designated regulatory floodway. We find that the completed or proposed project meets or is designed to meet all of the community floodplain management requirements.

Community Comments:

Community Official's Name and Title: (*Please Print or Type*)		Telephone No.:
George Eidel Emergency Manager/Floodplain Manager		304-873-1343
Community Name:	Community Official's Signature (required):	Date:
Doddridge County, WV.	George Eidel	Oct. 16, 2015

FEDERAL EMERGENCY MANAGEMENT AGENCY

PAYMENT INFORMATION FORM

Community Name:

Project Identifier:

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR FAXED TO THE FAX NUMBER BELOW.

Please make check or money order payable to the National Flood Insurance Program.

Type of Request:

☒ MT-1 application
☐ MT-2 application

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304-4605
Attn.: LOMC Manager

☐ EDR application

FEMA Project Library
847 South Pickett Street
Alexandria, VA 22304-4605
FAX (703) 212-4090

Request No. (if known): _____ **Check No.:** _____ **Amount:** _____

☐ INITIAL FEE* ☐ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☐ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

****Note: Check only if submitting a corrected fee for an ongoing request.**

COMPLETE THIS SECTION *ONLY* IF PAYING BY CREDIT CARD

CARD NUMBER

☐☐☐☐ – ☐☐☐☐ – ☐☐☐☐ – ☐☐☐☐
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

EXP. DATE ☐☐ (Month) – ☐☐ (Year)

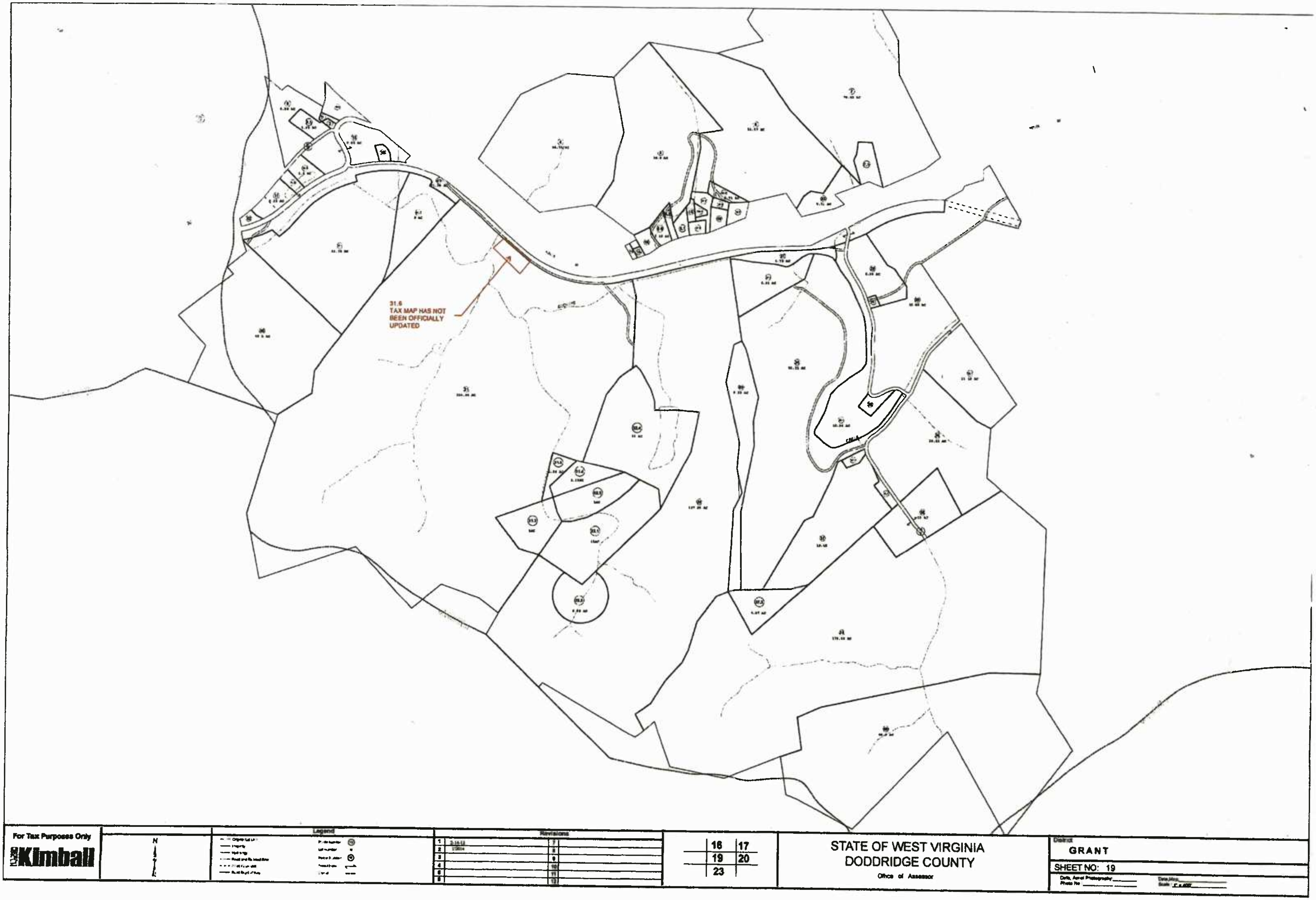
_____ Date

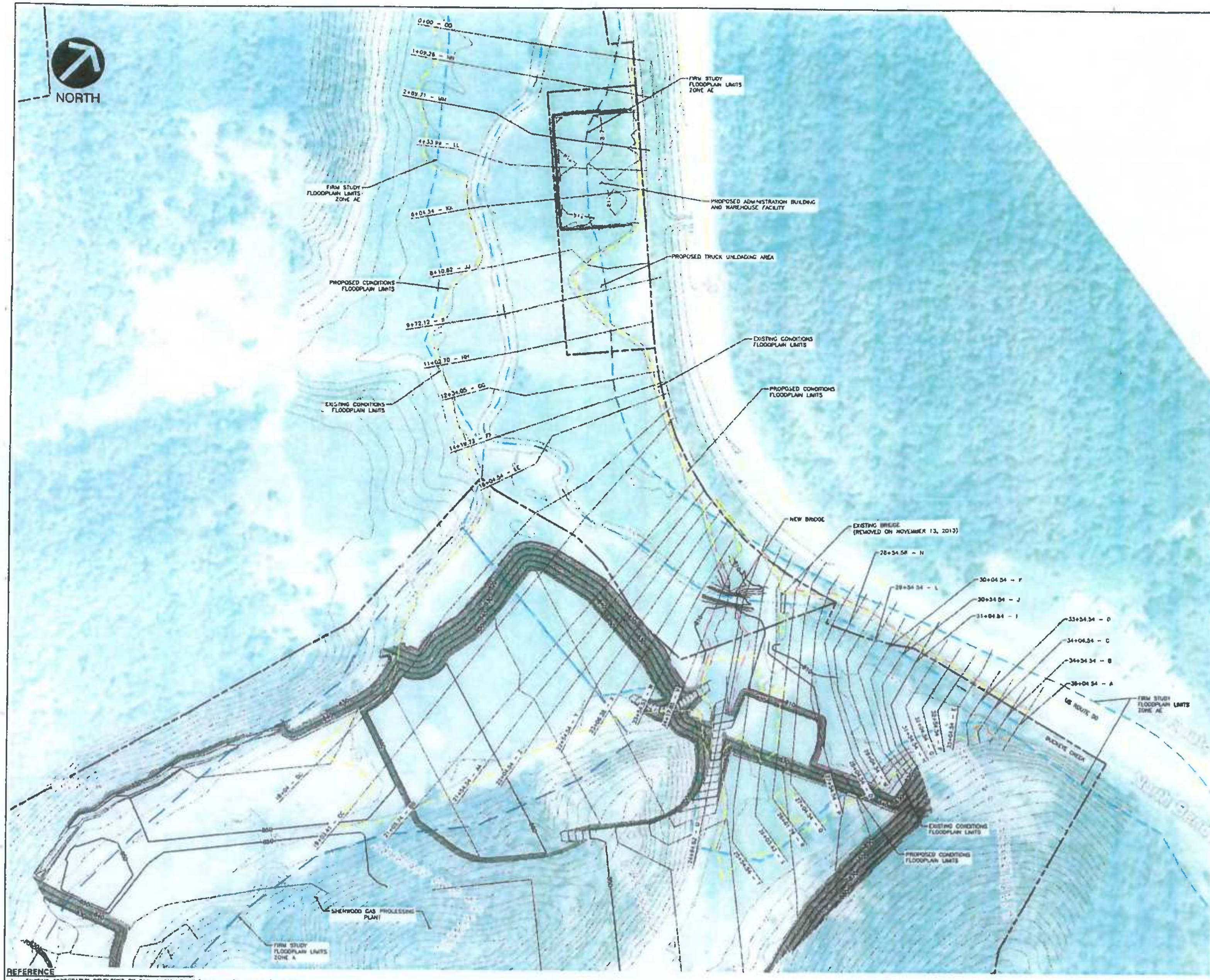
_____ Signature

NAME *(AS IT APPEARS ON CARD)*: _____
(please print or type)

ADDRESS: _____
(for your credit card receipt-please print or type) _____

DAYTIME PHONE: _____


31.6
TAX MAP HAS NOT
BEEN OFFICIALLY
UPDATED
For Tax Purposes Only
Kimball
N
Legend
Revisions
16
17
19
20
23
STATE OF WEST VIRGINIA
DODDRIDGE COUNTY
Office of Assessor
District
GRANT
SHEET NO: 19



LEGEND

- APPROXIMATE STREAM CENTERLINE
- 303+04.54 ~ K — HEC-RAS CROSS SECTION
- 100-YEAR FLOODPLAIN LIMITS, CURRENT CONDITIONS
- 100-YEAR FLOODPLAIN LIMITS, PROPOSED CONDITIONS
- FIRM STUDY FLOODPLAIN LIMITS ZONE AE
- FIRM STUDY FLOODPLAIN LIMITS ZONE A
- PROPERTY LINE
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- 900 — PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR

REFERENCE

1. EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC (CEC) USING CEC SURVEY DATA AND DIGITAL ELEVATION MODELS (USGS 3-METER), 2003 OF THE U.S. GEOLOGICAL SURVEY (USGS) AND WEST VIRGINIA STATEWIDE ADDRESSING & MAPPING BOARD (WVSAMB).
2. STREAM LOCATIONS DELINEATED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC
3. IMAGE PROVIDED BY GOOGLE EARTH :: 2012.

SCALE IN FEET
0 150 300

* HAND SIGNATURE ON FILE

REVISION RECORD

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road - Cincinnati, OH 45242
513-985-0226 · 800-759-5614

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC.
SHERWOOD GAS PROCESSING PLANT
DODDRIDGE COUNTY, WEST VIRGINIA

EXISTING AND FINAL PROPOSED GRADING 100-YEAR FLOODPLAIN MAP

DRAWING NO.: SP01

owners or residents of or on land adversely affected by flooding projections for the proposed development or construction in the Floodplain Area.

Thus, the above definition sets forth the categories of persons or entities that may be aggrieved and appeal as:

A Floodplain Permit Applicant, or

A person or entity that has timely objected to an application for Floodplain Permit and a

(1) surface or mineral owner where development is proposed in the Floodplain;

(2) an adjacent property owner or resident where development is proposed in the Floodplain;

(3) property owners or residents of or on land adversely affected by flooding projections for the proposed development or construction in the Floodplain Area.

Further, "adjacent property" is defined in the Ordinance at Article II Section 2.2.1 as:

> Adjacent Property includes any surface tract, regardless of whether such surface tract is entirely within Doddridge county, so long as a portion of said surface tract is located within Doddridge county, which shares an immediate and common boundary up or down stream to the property that is the subject of the application for Floodplain Permit. Adjacent property also includes all other property that may be affected by flooding.

In addition, "adversely affected" is defined in the Ordinance at Article II Section 2.2.2 as:

> To adversely affect a property the increase in the elevation of the 100-year base flood elevation must be more than 1 foot at any point. Stated conversely, if the effect is that the 100-year flood base flood elevation rises 1 foot or less the property is not "affected". This standard does not apply to the Floodway. If prior permit(s) has/have been approved in the same area of the Floodplain, the above definition would include the cumulative impact to the base flood elevation.

The Doddridge County Floodplain Appeals Board makes the following findings of fact based upon the evidence submitted by oral and documentary evidence and judicial notice as proven to a preponderance of evidence:

1. That no officer or member of the DCWA signed the submitted appeal.

2. That the DCWA is not registered with the West Virginia Secretary of State as a not-for-profit legal entity or an incorporated entity.

3. That the DCWA failed to produce any Articles of Incorporation or By-Laws for its group.

4. That the DCWA failed to proffer into evidence any written authorization such as a resolution from the DCWA authorizing the filing of an appeal with respect to Floodplain Permit #14-123.

5. That none of the DCWA members are:

   (1) surface or mineral owners where the MarkWest development is proposed in the Floodplain;

   (2) adjacent property owner or resident where the MarkWest development is proposed in the Floodplain; or

   (3) property owners or residents of or on land adversely affected by flooding projections for the proposed MarkWest development or construction in the Floodplain Area.

6. That DCWA member Lora Price testified that she lived within an approximate ½ mile from the MarkWest Plant and her property line was a "good bit" closer; however, she testified that her property was not adjacent to the Powell property wherein the MarkWest development is proposed, and failed to prove by a preponderance of evidence that the proposed development would adversely affect her owned property.

7. The DCWA failed to bring forward any expert testimony or reports, such as hydrology or hydraulic studies, to show that Ms. Price's property would be

adversely affected by the proposed MarkWest development. Ms. Price testified that she has seen no such studies.

8. That MarkWest submitted Floodplain Hydraulic Studies by Civil and Environmental Consultants (CEC) that demonstrates by a preponderance of evidence that the proposed development would have no adverse affect on the base flood level. (An increase of 0.31 feet occurs at the section prior to the proposed bridge, and a maximum increase of 0.28-feet at a section prior to the first temporary stockpile), and, that any stockpile complies with the 100 foot set-back requirement in the Ordinance at Section 6.1 H.1.

9. That DCWA failed to meet its burden of proof that the proposed development would adversely affect Ms. Price's property.

After testimony and argument of counsel, the Floodplain Appeals Board voted unanimously and made the legal conclusion that the Doddridge County Watershed Association did not meet the definition of an "Aggrieved Person or Entity" pursuant to Article II 2.2.3 of the Doddridge County Floodplain Ordinance (August 8, 2013) and Article VIII Section 8.1 and thus the appeal as filed dated May 19, 2014 (attached hereto as Exhibit "A") is disallowed.

Doddridge County Floodplain Appeals Board

Ralph Sandora, President

Shirley Williams

Gregory Robinson

Date: May 19, 2014, 2014

To: Doddridge County Floodplain Appeals Board (Shirley Williams, Gregory Robinson & Ralph Sandora), Edwin "Bo", Wriston

Re: Appeal for Floodplain permit 14-123 that was issued to Mark West Liberty Sherwood Processing plant on May 6, 2014

We appeal the decision by the floodplain manager that was issued to Mark West on March 18, 201.4 The floodplain permit was granted by Floodplain Manager, and announced at the County Commission meeting on May 19, 2014 by Mr. Sandora

Our reasons for filing this appeal are as follows:

a. We feel that allowing storage of temporary fill in the floodway will adversely affect the health of our watershed.
b. The hydraulic studies done state that this will be temporary stockpiles of soil in the floodway. The Doddridge County Floodplain Ordinance addresses this issue in Article IV Section 4.1 and also on page 28 thru 30 part E. Fill
c. No adjacent property owners were notified. The ordinance specifically states that adjacent property owners be notified. (see page 3 Section 2.2 Definitions A General # 2)
d. The location of the site is upstream of a municipal water supply. The possibly of pollutants being discharged into the creek may occur. It has already occurred from a well site on this property.
e. Alteration of the floodway will increase the volume and velocity of the water as it heads downstream during flood events. The possibility of water backing up is also high which will affect residents living upstream.
f. We feel that until all investigations are completed, ALL activity related to this Floodplain be stopped.
g. We would like to also state that floodplain permits that have already been issued in this drain field have not been considered as far the cumulative totals for the one foot rule.

Article VIII Section 8.1 states that once an appeal is filed "the floodplain administrator shall immediately issue a STOP WORK ORDER NOTICE that shall remain in effect until resolution of said appeal" (page 42 of the ordinance).

Signed,

Doddridge County Watershed Association

Route 2 Box 210A

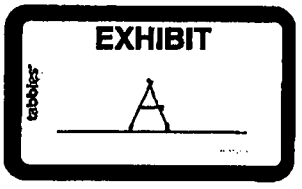
West Union, West Virginia 26456

We also request that we be notified of any correspondence and communication that occurs as a result of this appeal with Mark West or their appointed representatives.

CC:

Attn: Robert E. McHale, P.G.

Manager of Governmental & Regulatory Affairs
MarkWest Energy Partners, L.P.
601 Technology Drive; STE 300
Canonsburg, PA 15317



14-123

FILED

2014 JUL 15 PM 4:01

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

David T. Richardson
Attorney at Law
DTR LAW APC
(Licensed in California, Texas, and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 991-5290
Fax: (619) 522-9260

July 15, 2015

Via Hand Delivery
Doddridge County Commission

RE: Appeal of Floodplain Permit #14-123

Dear Sir or Madam,

Please be advised that I have been retained by the Doddridge County Watershed Association (the "DCWA") in regards to their appeal of the above-referenced floodplain permit (the "Mark West Permit"). As the DCWA made clear in its Notice of Appeal, and as this letter will reiterate, numerous rules and requirements mandated by the Doddridge County Floodplain Ordinance (the "Ordinance") were not followed when the Mark West Permit was issued (i.e., rules and requirements that are directly related to public health, safety, and welfare as well as rules and requirements that are directly related to the protection of Constitutional Due Process Rights of residents of Doddridge County). While there were numerous rules and requirements that were not followed, this letter will identify the more important rules and requirements that were not followed. This letter will also explain why the Doddridge County Commission aka the Doddridge County Floodplain Appeals Board ("DCC") must revoke the Mark West Permit (and also explain why the Mark West Permit is automatically void and should simply be declared as such). Additionally, this letter will explain why Mark West's allegations regarding the DCWA lacking "standing" to appeal the Mark West Permit are incorrect (i.e., the allegations contained in the complaint Mark West filed in its recently dismissed lawsuit against the DCC).

By way of background, I represented the Huff Family in the lawsuit that EQT Production Co. filed against the DCC in regards to the revocation of a certain floodplain permit that had been previously issued to EQT which would have allowed EQT to construct a natural gas well-site in a floodplain situated at the Huff Farm. As you are aware, the Doddridge County Circuit Court ultimately declined to issue an order mandating that the DCC return said permit to EQT. The Court refused to order the return of EQT's permit because the Ordinance was constitutionally defective. Specifically, said ordinance failed to provide adequate Due Process (i.e., notice and an opportunity to be heard) to persons living near the sites of planned floodplain

developments/construction. The Huffs and the Fosters were deprived of Due Process because they did not receive notice of EQT's permit application, did not receive notice of the Floodplain Administrator's issuance of said floodplain permit, and were not afforded an opportunity to object to the application for and issuance of said floodplain permit.

Following the Court's ruling, the DCC amended the Doddridge County Floodplain Ordinance so as to ensure that the Due Process rights of residents living near planned floodplain developments were protected (the Ordinance was also amended so that it was better equipped to deal with the development and construction of large scale natural gas facilities in floodplains and floodways). As you are all well aware, the amendment process was a long and drawn out process that involved numerous revisions as well as numerous comments provided by several interested persons (and several of those comments were provided by myself and my mother-in-law/client, Joye Huff). After a number of months a new Ordinance was enacted by the DCC. This is the Ordinance that governs the Mark West Permit.

As the persons tasked with enacting the present Ordinance, the DCC surely knows that the Ordinance contains specific rules and requirements that was must be followed prior to the issuance of a floodplain permit. The DCC also knows that failure to follow these rules and requirements can have serious repercussions. The most severe and obvious repercussion is inadvertently putting the public health, safety, and welfare by not following the rules and requirements of the Ordinance (e.g., allowing construction in prohibited areas and/or allowing impermissible alterations of the floodway. Another repercussion from the issuance of floodplain permits in violation of the Ordinance is the possibility of significant sanctions from FEMA. One such sanction is suspension from the National Flood Insurance Program, and said suspension would result in Doddridge County and residents of Doddridge County no longer having access to either flood insurance or the federal disaster relief funds typically provided to flood prone areas (i.e., Special Flood Hazard Areas)(note, attached hereto as Exhibit "A" is a news article describing the plight of a small Pennsylvania town that failed to enforce the requirements of its own floodplain ordinance). Obviously, said sanction would have a devastating impact on the residents of Doddridge if it were ever implemented. Moreover, failure to follow the rules and requirements of the Ordinance (especially the ones related to Due Process) may subject Doddridge County to a lawsuit (and as was seen by the EQT v. the DCC/Huff/Foster case, lawsuits can be extremely costly as well as time consuming).

I mention the above for the following purposes: (a) to explain that I do know what I am talking about when it comes to the Ordinance (I spent a year and a half litigating a lawsuit that was solely about the Ordinance, and I then spent several months thereafter participating in the amendment process), (b) to assure the DCC that the DCWA is 100% correct when it states that the Ordinance was not followed when the Mark West Permit was issued, and (c) to make clear that that it is vitally important that the Ordinance's rules and requirements are followed because otherwise the County's residents could be harmed, the County's residents could lose their ability to obtain flood insurance and flood related federal disaster funds, and the County itself could face, yet another, costly lawsuit.

Several rules and requirements were not followed when the above-referenced floodplain permit was issued, but a handful are of particular importance due to public health, safety, and

welfare issues and due to Constitutional Due Process issues. In the interest of not confusing the issue, this letter will focus solely on these violations of the Ordinance (and not the numerous other violations that are not quite as severe).

Before I begin, I would like to say that I have noticed a pattern of the Ordinance's more important rules and requirements being treated as discretionary as opposed to mandatory. There is a reason why these rules and requirements are mandatory...they directly relate to protect people, their property, and their rights (and helps the County and its residents avoid lawsuits). As such, I respectfully request that the DCC and the Floodplain Administrator give consideration to making sure that when a provision in the Ordinance says "shall" that said provision be enforced.

A. Floodway Issues

There are several issues related to the Mark West permit's lack of compliance with the Ordinance's Floodway requirements. These issues are especially troublesome because the Floodway is the most dangerous portion of the floodplain in terms putting the public health, welfare, and safety at risk (i.e., putting people and their homes at risk of increased flooding and/or increased velocity of floodwaters).

The Ordinance describes the Floodway as "present[ing] increased risk to human life and property due to their relatively faster and deeper flowing waters", and the Ordinance mandates that the Floodway "shall be preserved to the greatest extent possible" (see Section 4.1(B), pg. 16 of the Ordinance). FEMA identifies the Floodway as "the stream channel that must remain open to permit passage of" the floodwaters "and anything in" the Floodway "is in the greatest danger during flooding". Basically, Floodways are to be left alone because they are a hazard (see FEMA info regarding "Floodway Analysis" attached hereto as Exhibit B). Additionally, interfering with and/or altering the Floodway can increase flooding. Floodways are used to accommodate flooding (i.e., by allowing the floodwaters to move forward), and if they are blocked by fill or by structures then the floodwaters can accumulate and the point of the blockage and the areas behind causing the height of the floodwaters to increase. Note, I realize that the Floodway sounds like a complicated thing, but it is really rather simple. The Floodway is the dry ground on either side of the normal water level of a creek, river, fork, stream, etc. (attached as Exhibit C is a sketch of a generic Floodway from a different floodplain ordinance).

Note, given the obvious importance of the Floodways and the danger caused by Floodways, it shouldn't come as a surprise that the Ordinance has several rules and requirements as to Floodways. Almost all of which are mandatory and not discretionary.

1. Mark West was required to delineate the Floodway and failed to do so.

Pursuant to the Ordinance, Mark West was required to delineate (i.e., identify) the Floodway in the site plans it submitted with its floodplain permit application (see Ordinance Section 5.4 (D), pg 24) (see attached NFIP map that was part of the Mark West Permit Application that identified the project site as being in an Approximated Area attached hereto as Exhibit "D"). Despite being required to delineate the Floodway(s), Mark West did not do so.

Pursuant to the Ordinance, whenever construction is planned in an Approximated

Floodplain that will be two acres or larger, the applicant must have a licensed engineer delineate (i.e., identify) the Floodway. Here, the development at issue in the Mark West Permit easily exceeds two acres. The site location map shows attached to the Mark West Permit application shows the area of disturbance to be enormous (see attached as Exhibit "E", said site location map), and a very conservative estimate of the area of disturbance is well over 2,000,000 square feet (i.e., at the very least 45 acres). Note, the requirement to delineate the Floodway is mandatory. It is not at the Floodplain Administrator's discretion. As such, Mark West's failure to delineate the floodway means that the Mark West Permit does not comply with the Ordinance. Additionally, the fact that the Floodplain Administrator issued the Mark West Permit without requiring the Floodway to be delineated means the Floodplain Administrator issued the Mark West Permit in violation of the Ordinance.

2. Fill in the Floodway.

Mark West intends to place large amounts of fill in the area identified in the site location map referenced above (i.e., "at various locations on the site")(see attached as exhibit "F" pg. 1 of Mark West's Jan. 2014 hydraulic study re the site). Since Mark West failed to delineate the Floodway as required by the Ordinance, there is no document that states that fill would be placed into the Floodway(s). But if Mark West had delineated the Floodway(s) as required by the Ordinance then it is almost certain that said delineation would show that fill would be (and already had been) placed in the Floodway(s). I say this because the Mark West project filled in two streams and/or tributaries of Buckeye Creek. By filling in the streams and/or tributaries Mark West literally put fill in the Floodways by filling the Floodways along with portions of the streams and/or tributaries. Further, Mark West built bridges over Buckeye Creek and is siting various new developments related to the site directly next to Buckeye Creek (e.g., a truck unloading area comprised of fill directly adjacent to Buckeye Creek). Given the proximity of these structures (and the fill related to them) to Buckeye Creek, it is almost certain fill has gone into the Floodway of Buckeye Creek.

The Ordinance has two main requirements as to the place of fill into a Floodway. One, fill cannot be placed in a floodway unless it has first been demonstrated that the fill will not cause ANY increase in the base flood elevation (i.e., no increase in flooding at all)(see Ordinance Section 6.1 (E), pg. 29). Two, no development shall be permitted in the Floodway where reasonable alternatives exist elsewhere, and Mark West had to demonstrate that there were no other "reasonable alternatives" before it could be issued the floodplain permit (see Ordinance Section 4.1(B)). If Mark West had delineated the Floodway(s) as required by the Ordinance, then it is almost certain that the results would have shown that Mark West was placing (and has already placed) fill in the floodplain without FIRST demonstrating that said fill would not cause ANY increase in the base flood elevation (i.e., the level of the floodwaters). Additionally, Mark West would have been required to demonstrate no other "reasonable alternatives" were available for its project site before the Floodplain Admin could have issued the Mark West Floodplain Permit. More importantly, it defies logic that if there has been filled placed in the Floodplain (especially to the extent that entire streams have been "filled"), that has not been even a slight rise in the Base Flood Elevation (in violation of 6.1(E)).

B. No Contractor Contracts Presented to Floodplain Administrator and None Saved in File.

Pursuant to the Ordinance, Mark West had to present copies of any and all contracts it entered into with any contractors in regards to the work to be done pursuant to the Mark West Floodplain Permit (see Ordinance Section 5.2 (H), pg. 20). Failure to do so within 14 days of the contracts being signed AUTOMATICALLY VOIDS the floodplain permit. Void means no appeal necessary. Void means the no hearing necessary. Void means the floodplain permit ceases to exist.

We know that Mark West hired at least one contractor to do work on the project (see the permit application --- Anderson Excavating). But there are no contractor contracts in the Mark West Permit File as required by the Ordinance (see attached as exhibit "G" Affidavit of Tammy Beamer). As such, the Mark West Floodplain Permit is void (i.e., automatically ceases to exist as if never applied for and issued...non-existent).

The reason why the Ordinance requires proof of the contractor contracts is related to public health, welfare, and safety. Specifically, the purpose of the requirement is to ensure that only licensed professionals are building large scale projects in floodplains. The point is, by ensuring only professionals are allowed to build in the floodplain, you are also presumably ensuring that the quality of work done will be of a professional level, and you will avoid a situation where someone unqualified is building something in a floodplain that is incapable of resisting floodwaters and, in the event of a flood, will break apart, explode, etc. I bring this hope so as to show that this is actually an extremely important provision, and there is a reason why persons who fail to comply with it have their floodplain permits voided.

C. Improper Notice Given to the Community in Violation of Constitutional Due Process Protections and in violation of the Floodplain Ordinance.

Note, the above issue is especially troublesome given the expense and heartache incurred by the parties to the EQT v. Doddridge/Huff/Foster as a result of the EQT floodplain permit that was issued in violation of the Due Process rights of the Huffs and the Fosters. That case ended because the original Ordinance was deemed unconstitutional for failing to provide adequate notice and opportunity to be heard for people like the Huffs and Fosters (i.e., persons who are having to deal with 3rd parties building potentially destructive floodplain projects on or near their property). If the Huffs and Fosters had been giving notice of the application for the EQT floodplain permit and an opportunity to object, then they might have been able to nip the matter in the bud and save everyone the expense and stress of a year and a half of litigation. Additionally, the whole point of amending the Ordinance was to rectify the issues with a lack of Due Process related to floodplain permits.

But all the changes in the world to the Ordinance don't do any good if rules and requirements are added to the Ordinance to provide for Due Process, but are NOT properly enforced.

Failure to Place Permit Info on the DCC Agenda.

The Ordinance requires that the specific information related to a floodplain permit (both

the application for and issuance of a permit) be placed on the DCC Agenda ahead of the DCC meeting at which the announcements will be made as to the floodplain permits (i.e., name of applicant and location of planned project). Last I checked the only info placed on the DCC Agendas related to Floodplain Permits was a generic statement that Floodplain Permits will be heard as Agenda Item No. X. No specific information is provided despite the requirments of the Ordinance and the requirements of Due Process.

Moreover, by failing to place the specific information regarding each floodplain permit on the Agenda, the entire legal advertisement notice process is essentially defeated (especially, when the ads don't run until after the deadline to object or appeal has expired, and I have seen those situations). The problem is, the legal advertisement does not state which date the announcement was made about the floodplain permit (regardless of whether the announcement is to say it was applied for or to say it was issued or denied). So, how is an interested party, like the DCWA, supposed to know when a permit is applied for or granted or denied if there isn't specific information provided on the Agenda? Are they supposed to attend every single DCC Hearing and just in case maybe an announcement will be made about a floodplain permit that matters to them?

In the case of the DCWA, notice regarding the application for the Mark West Permit was not placed on the DCC's Agenda (i.e., all a DCWA member would have seen was the generic statement that Floodplain Permits will be discussed). Further, the legal advertisement for the Mark West Permit Application states that the date that the permit was applied for was February 5, 2014. It also says anyone who wants to comment or object has until 20 days after the permit application was announced at the DCC meeting. Additionally, it says that the deadline to comment or object is February 25, 2014. Obviously, there is something seriously wrong with those dates.

One, in order for this to work, as mandated by the Ordinance, Mark West would have had to have applied for the Floodplain Permit on February 5, 2014, the clerk would have had to put it on the Agenda on February 5, 2014, and the DCC would had to have had a meeting on February 5, 2014 whereat the application was announced. Otherwise, it would be impossible for there to be 20 days for the comment and/or object period post-announcement (i.e., the deadline was February 25, 2014). Putting aside the sheer impossibility of, on the same day, an application being processed, an agenda being printed the same day, and a DCC meeting being held right after to announce the application, there is the obvious and huge problem in that the 5th of February was a Wednesday (and the DCC meets on Tuesday). As such, there could not have been an announcement on the February 5, 2014, and accordingly, the DCWA (and every other interested parties' Due Process rights were violated, and the rules and requirements contained in the Ordinance were violated). Additionally, the newspaper ad did not even run until February 11, 2014 (see attached as Exhibit H copies of all relevant legal ad documents). As such, not only were the DCWA members deprived of proper notice, they were also deprived of their rightful 20 day period to comment and/or object (given there was apparently no announcement at the DCC Meeting until, at the very least, almost a week after the Permit was applied for, at best they had 15 days of notice.

As such, not only was the Ordinance not followed as to the notice requirements, my clients also have a potential Due Process claim that they could bring against the DCC in order to

have the Mark West Floodplain Permit revoked.

The DCWA's Standing to Appeal

In the complaint Mark West filed against Doddridge County after the Stop Work Order was issued following the DCWA's appeal (a Stop Work Order that the Ordinance does not allow to be lifted until after the Appeal is decided...but I digress), Mark West alleged that the DCWA lacked the standing to appeal the Mark West Permit.

Mark West's argument is incorrect. The DCWA has standing to challenge the Mark West Permit. One, the DCWA is a legitimate organization dedicated to protecting the watersheds and water sources of Doddridge County. It was founded years ago in response to a leak and/or dump of chemicals into Buckeye Creek (i.e., the same creek that Mark West is building next to). The DCWA holds regular meetings and government officials regularly come to these meetings to give informational sessions, hold seminars, and discuss watershed related topics (obviously said government officials consider and treat the DCWA as the legitimate organization that it is). Objecting to and appealing a proposed floodplain project for the purposes of protecting the source of drinking water for West Union (i.e., the home of the DCWA and its members) and also protecting the very creek that pollution of which gave rise too the DCWA, is pretty much the definition of germane to the DCWA's purpose. Moreover, there are DCWA members who live very close to the site of the Mark West project, and who may be harmed by the project, and whose interests will be protected by the DCWA's appeal. In short, the DCWA has standing in its own right and also on behalf of its members.

Conclusion

Given the foregoing and given the grievous violation of the Ordinance (i.e., as to the rules and requirements protecting Public Health, Safety, and Welfare and as to the rules and requirements in regards to the violation of the DCWA member's Due Process Rights), the only correct choice is to revoke the Mark West Floodplain Permit and have Mark West resubmit another floodplain permit application that, unlike the one at issue here, actually conforms to the requirements of the Ordinance. The other alternative is to declare the Mark West Floodplain Permit void for failure to provide the Floodplain Administrator with copies of the contractor contracts (which would accomplish the same result). Otherwise, Doddridge County has issued a floodplain permit in violation of its own Ordinance, and as such, opens itself up to FEMA sanctions as well as the possibility of Court action.

Best regards,
/s/

David T. Richardson, Esq.

No Enforcement? No Insurance.

FEMA has sent a strong message to one Northeastern Pennsylvania town — start enforcing flood plain management statutes or lose your right to participate in the National Flood Insurance Program. The borough is now on probationary status as of October 1, 2012.

The reason: the borough is cited with failure to manage floodplain development in accordance with the Borough's floodplain program, and lack of adequate record keeping. That put the borough in a rather dire situation, but that wasn't the only issue facing West Pittston. It was also tasked with finding $2.56 million to cover cleanup costs after Tropical Storm Lee blew into town in 2011.

As recently as two weeks ago, the borough had taken out a loan in that amount. A risky move in itself, for if the borough did not receive federal funding by December 31st, the residents of West Pittston would end up paying.

Consider it an early Christmas gift – the federal government has come up with 75 percent of the borrowed amount, exactly one week after the borough took out the loan.

The borough is yet to be out of the deep end, so to speak. There's the matter of those unenforced statutes to be dealt with, along with that extra 25 percent in monies borrowed. If the borough does not comply with the National Flood Insurance Program guidelines by December 1, the town could be suspended from the program.

The impact of any potential suspension would be significant — there are currently 358 NFIP policies in force in the borough. As it stands, residents are able to still purchase flood insurance during the probationary period, but will now be faced with paying an additional $50 surcharge. Should the borough be suspended, residents will no longer have access to either flood insurance [illegible] deral disaster assistance usually afforded structures within Special Flood F [illegible] ionally, federal law prohibits federal agencies from making grants, loans, or gu [illegible] or construction of structures located in a SFHA.

In a population of just 4,868, tha [illegible]

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Nicholas Morici, spokesperson fc [illegible] ugh's problems stem from not following their own flood plain ordinances. "The Bor [illegible] 59 structures within its Special Flood Hazard Area (SFHA). The most recent inform [illegible] ugh indicates that only slightly over 25% of these structures have received the permits required by the local floodplain ordinance. The Borough is currently working to reach out to the citizens in the floodplain to determine the extent and severity of any violations that may have resulted from work that occurred without the required permit within the SFHA."

Morici says that each community that joins the NFIP is required to adopt a floodplain ordinances that meets

Ex A

or exceeds the minimum NFIP requirements of 44 Code of Federal Regulations, Part 60. "In exchange for adopting and enforcing a floodplain ordinance, the community and its citizens gain access to the benefits of participation in the NFIP: flood insurance, disaster assistance and mitigation grants."

According to Morici, communities are required to enforce their floodplain ordinances, as they do any building codes. (More information about construction in floodplains may be found at the FEMA website.)

West Pittston isn't the only borough with compliance issues. Morici shared with me a nine-page list of communities that have been suspended from the NFIP for failure to enforce their floodplain ordinance, as well as the reason for their suspension. Says Morici: "A number of communities nationwide have enforcement issues." (See Communities Suspended from NFIP.)

So what about the residents? How can they be protected despite their municipality's negligence to enforcement? Morici says there's little FEMA can do. "Although FEMA remains committed to helping the Borough maintain its eligibility for FEMA assistance and programs, FEMA is prohibited from providing flood insurance in a community unless the community enforces floodplain management measures that meet or exceed the minimum NFIP requirements of 44 Code of Federal Regulations, Part 60. "

In other words, no dice.

Related

News and Notes

Sinking Your Risk Management Plan

Found at RIMS: Opportunity

EX A

matter by locating the flood elevation on the ground via an elevation survey. This elevation represents the actual extent of flooding for that particular flood.

Note: Banks, lending institutions and others who must read the FIRM to determine if flood insurance is required must go by the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a request for a map revision or map amendment so the map can be officially changed to reflect the more accurate data (see Unit 4, Section D).

FLOODWAY ANALYSIS

The final step in preparing most riverine flood studies is to produce the floodway analysis, which identifies where encroachment by development will increase flood elevations significantly and worsen flood conditions.

The floodway is the stream channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. FEMA has mapped designated floodways in more than 8,000 communities.

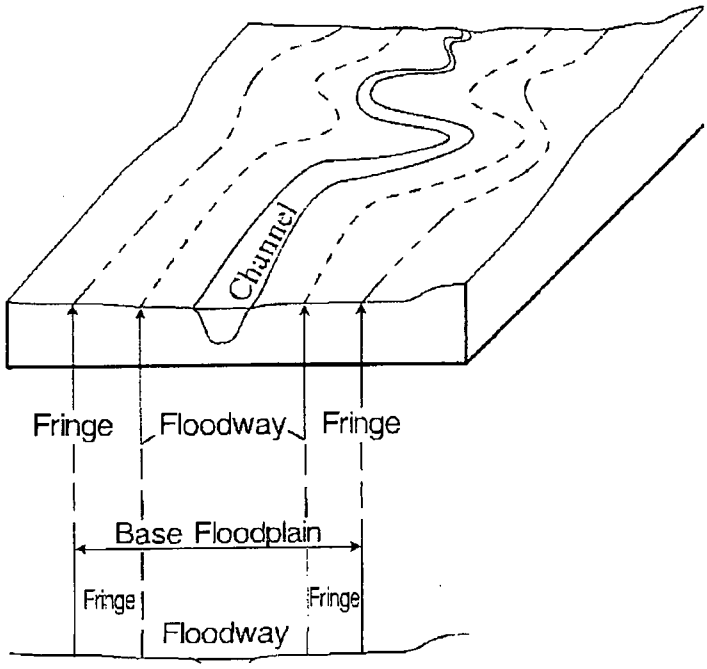


Figure 3-6: Floodway cross section and map

The remainder of the floodplain is called the flood fringe (Figure 3-6), where water may be shallower and slower. The floodway and the flood fringe together comprise the base floodplain or special flood hazard area. On the flood map these areas will be designated as Zone A1-30 or AE. NFIP minimum standards provide that other areas outside the boundaries of the floodway can be developed without further analysis. Consequently, most communities permit development in the flood fringe if the development is elevated or otherwise protected to the base flood level (or any higher state or local standards). Development in the floodway is allowed if it can be demonstrated that no rise in the base flood elevation will occur. It is recommended, however, that

Ex B

floodway development be discouraged or even prohibited because of the hazardous nature of this area.

A floodway analysis determines the boundaries of the floodway using these floodplain management concepts:

- Continued development in the floodplain will likely further obstruct flood flows, which will back water up or divert it to other properties.
- Properties on both sides of a river or stream should be treated equitably. The degree of obstruction permitted now for one should be permitted in the future for the other.
- Property owners should be allowed to develop their land, provided they do not obstruct flood flows, cause damage or create a nuisance to others. (A community may allow development in the flood fringe that cumulatively increases the BFE, but NFIP regulations specify that such total increases cannot exceed one foot at any point along the stream. Some states or communities have more restrictive standards that must be met.)

A floodway analysis is done with a computer program that can make the necessary calculations of the effects of further development. Beginning at both edges of the floodplain, the computer model starts "filling" the floodplain. This "squeezes" the floodwater toward the channel and causes the flood level to rise. At the point where this process reaches a one foot rise, the floodway boundaries are drawn (Figure 3-7).

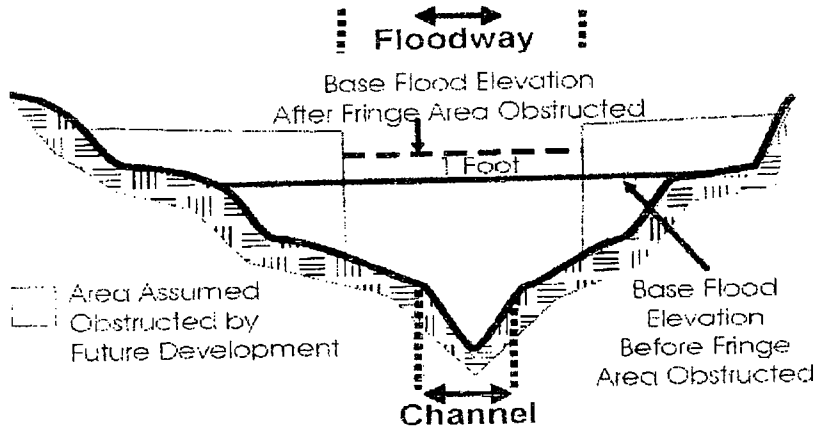


Figure 3-7: Computer floodway analysis

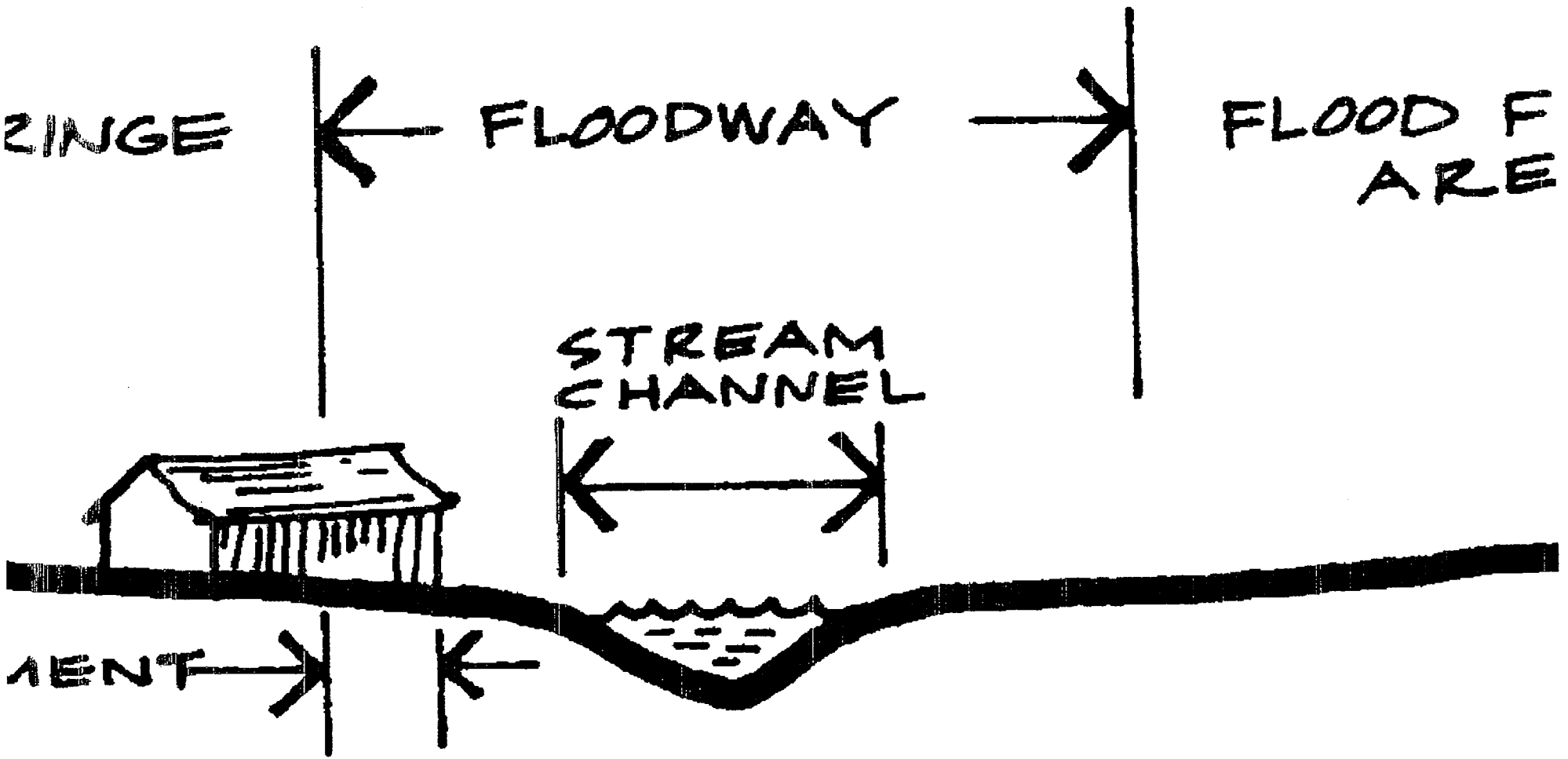
The floodway boundaries at each cross section are transferred to the topographic or contour map that shows the SFHA boundaries. The plotted points are connected to show the floodway and flood fringe on the floodplain map.

Not every cross section will show an exact one-foot rise. Topographic conditions and the need to "smooth out" the floodway line will result in some cross sections having increases of less than one foot.

EB

FLOOD PLAIN

FLOOD HAZARD AREA



DD PLAIN CROSS SE

EXC

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METER

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.

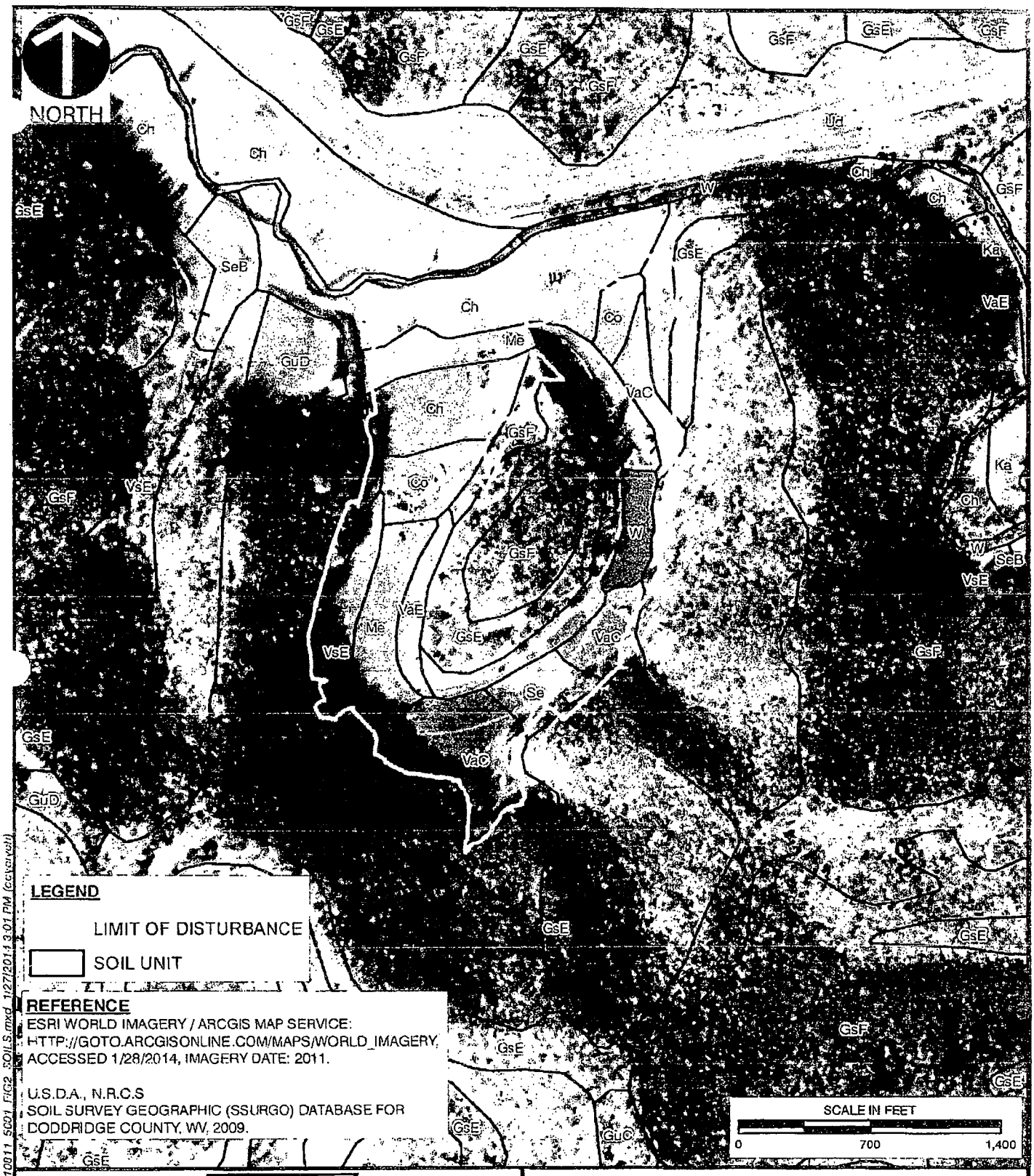
MAP NUMBER
54017C0140C

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

Exh 11



P:\2011\110-811-GIS\mxd\20111108111 SOILS.mxd 1/27/2014 3:01 PM (cclarell)

Civil & Environmental Consultants, Inc.
333 Baldwin Road - Pittsburgh, PA 15205-9072
412-429-2324 · 800-365-2324
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC
SHERWOOD GAS PROCESSING PLANTS 6 &7
DODDRIDGE COUNTY, WV

SOILS MAP

DRAWN BY:	CLC	CHECKED BY:	TGJ	APPROVED BY:		FIGURE NO:	2
DATE:	1/27/2014	SCALE:	1 " = 700 '	PROJECT NO:	110-811.5001		

1.0 INTRODUCTION

1.1 BACKGROUND

MarkWest Liberty Midstream & Resources, LLC (MarkWest) has contracted Civil & Environmental Consultants, Inc. (CEC) to perform a master plan flood study as part of the final buildout of the Sherwood Gas Processing Plant located approximately one-half-mile east of the intersection of U.S. Route 50 and County Route 20 along County Route 50/34 in Doddridge County, West Virginia. The final buildout includes the construction of Plants 6 through 10, de-ethanizers, and substation expansion. A Floodplain Permit was issued on August 28, 2013 to MarkWest for the Sherwood Gas Processing Plants 4 and 5 Expansion. This permit included grading improvements for Plants 1-5, the truck unloading area, an access road with a new bridge from County Road 50/34, and temporary stockpiles. An update to the Floodplain Permit was submitted on December 3, 2013 to include additional temporary stockpiles as part of the construction of the gas processing plants. The original permit is included in Appendix F.

MarkWest now plans to finalize grading as part of the final buildout construction plans. The earthmoving operations will include the removal of the temporary stockpiles adjacent to Buckeye Creek along with fill placement at various locations on the site to accommodate final plant construction. A site location map has been provided in Appendix A. The new Doddridge County Floodplain Application is included in Appendix F.

As part of the previously revised flood study of December 2013, CEC performed an additional survey to acquire more accurate and current topography for the stream, overbanks, and newly constructed bridge between stations 25+54.54 (Section T) and 0+00 (Section OO). The resulting existing surface utilized in the December 2013 flood study is also used in this Master Plan flood study. Water surface elevation increases in this flood study are indicative of the total impact of the proposed final Sherwood Gas Processing Plant development on the existing floodplain.

Ex F

STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO-WIT:

I, Tamela B. "Tammy" Beamer, after first being duly sworn, under oath, state that the following is true and that the following is my personal knowledge and belief, and I further state that if I were called to testify as to the following, I could and would do so competently and truthfully:

1. I am over the age of eighteen (18) years old.
2. I am a resident of Doddridge County, WV.
3. I am not a party to the appeal of Doddridge County Floodplain Permit #14-123.
4. I have no interest(s) (property, personal, financial, or otherwise) related to the project and land that are the subjects of Doddridge County Floodplain Permit #14-123.
5. As far as am I aware, none of my relatives have any interest(s) (property, personal, financial, or otherwise) related to the project and land that are the subjects of Doddridge County Floodplain Permit #14-123.
6. I am not a member of the Doddridge County Watershed Association, and none of my relatives are members of the Doddridge County Watershed Association.
7. On July 11th, 2014, I went to the Doddridge County Courthouse and reviewed Doddridge County's entire permit file related to Doddridge County Floodplain Permit #14-123.
8. I am familiar with what a contractor's contract looks like, and I would recognize one if I saw it.
9. While reviewing Doddridge County's entire permit file related to Doddridge County Floodplain Permit #14-123, I specifically looked to see if there were any contractor's contracts contained in said file.
10. After a thorough review of Doddridge County's entire permit file related Doddridge Floodplain Permit # 14-123 and after reviewing all documents contained in said permit file, I determined that there were not any contractor's contracts in said file.

This is my complete statement.

Dated this 14th of July, 2014.

Tamela B "Tammy" Beamer

Taken, subscribed and sworn before me in the county and state aforesaid this 14th day of July, 2014.

My commission expires: Oct. 5, 2017

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
LINDA R. HAMILTON
HC 66, Box 9
West Union, West Virginia 26456
My Commission Expires Oct. 5

NOTARY PUBLIC

EXG

Commercial/Industrial Floodplain Development Stop Work Order

Doddridge County, WV Floodplain Management

This **Stop Work Order** has been issued to MARKWEST LIBERTY , and is for the previously approved commercial and/or industrial development project associated with this permit that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV. All work in the floodplain and/or floodway must cease and desist until this **Stop Work Order** is lifted in accordance with the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible, and must remain posted while the **Stop Work Order** is in effect.

Permit #: 14-123

Date Issued: 03june2014

Issued to: MarkWest Sherwood Facility **POC: Robert McHale**

Company Address: 218 Swisher Lane; West Union, WV 26456

Project Address: 218 Swisher Lane; West Union, WV 26456

Firm: 54017C0145C **Lat/Long: 80.687945W/39.275688N**

Purpose of development: Master Plan Floodplain Work

Issued by: Edwin L "Bo" Wriston, Doddridge County FPM (*or designee*)

EW

Date: 03 June 14

For additional information regarding this Stop Work Order, 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

#14-123
Mark West Liberty

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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 6/25/14

SECTION 2: PROPOSE DEVELOPMENT (TO BE COMPLETED BY APPLICANT).

IF THE APPLICANT IS NOT A NATURAL PERSON, THE NAME, ADDRESS, AND TELEPHONE NUMBER OF A NATURAL PERSON WHO SHALL BE APPOINTED BY THE APPLICANT TO RECEIVE NOTICE PURSUANT TO ANY PROVISION OF THE CURRENT DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

APPLICANT'S NAME: Mark West Liberty -
ADDRESS: 218 Swisher Lane, West Union, WV 26456
TELEPHONE NUMBER: 724-514-4319

14-123

BUILDER'S NAME: ANDERSON EXCAVATING LLC
ADDRESS: 343 WILLIAMS ROAD, MORGANTOWN, WV 26501
TELEPHONE NUMBER: 304-983-2296

ENGINEER'S NAME: CIVIL & ENVIRONMENTAL CONSULTANTS, INC. · ANDREW GULLONE
ADDRESS: 333 BALDWIN ROAD, PITTSBURGH, PA 15205
TELEHONE NUMBER: 412-429-2324

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) DENNIS H. POWELL

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT)
216 SWISHER LANE, WEST UNION, WV 26456
DISTRICT: GRANT DISTRICT
DATE/FROM WHOM PROPERTY PURCHASED: 8/8/1986 FROM ILA POWELL
LAND BOOK DESCRIPTION:
DEED BOOK REFERENCE: DBV 200 PAGE 532
TAX MAP REFERENCE: SHEET 19 LOT 32
EXISTING BUILDINGS/USES OF PROPERTY: SHED / FARM LAND
NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY DENNY H. POWELL
ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY 216 SWISHER LANE, WEST UNION, WV 26456

To avoid delay in processing the application, please provide enough information to easily identify the project location.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

ACTIVITY

- [✓] New Structure
- [] Addition
- [] Alteration
- [] Relocation
- [✓] Demolition
- [] Manufactured/Mobil Home

STRUCTURAL TYPE

- [] Residential (1 – 4 Family)
- [] Residential (more than 4 Family)
- [] Non-residential (floodproofing)
- [] Combined Use (res. & com.)
- [] Replacement

B. OTHER DEVEOPLMENT ACTIVITIES:

- [✓] Fill
- [] Mining
- [] Drilling
- [] Pipelining
- [✓] Grading
- [] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
- [] Watercourse Altercation (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)

____

C. STANDARD SITE PLAN OR SKETCH

1. **SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED.**
2. **IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED:**
   SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION OF THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY.
3. **SIGN AND DATE THE SKETCH.**

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ 2,290,200.00

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

1. NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA OF THE SURFACE TRACT (UP & DOWN STREAM) UPON WHICH THE PROPOSED ACTIVITY WILL OCCUR AND ALL OTHER SURFACE OWNERS UP & DOWN STREAM) WHO OWN PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY (IF ONE HAS BEEN COMPLETED).

NAME:_____ NAME:_____
ADDRESS:_____ ADDRESS:_____
_____ _____

NAME:_____ NAME:_____
ADDRESS:_____ ADDRESS:_____
_____ _____

1. NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON ANY ADJACENT PROPERTY AT THE TIME THE FLOODPLAIN PERMIT APPLICATION IS FILED AND THE NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN ANY HOME ON ANY PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY.

NAME:_____ NAME:_____
ADDRESS:_____ ADDRESS:_____
_____ _____

NAME:_____ NAME:_____
ADDRESS:_____ ADDRESS:_____
_____ _____

N/A PROPOSED IMPACTS ARE WITHIN SUBJECT PROPERTY

E. CONFIRMATION FORM

THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

(A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.
(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.
(C) PUBLICATION.

(D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.

(E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT): Rick Lowry

SIGNATURE: _____ DATE: 01/29/14

After completing SECTION 2, APPLICANT should submit form to Floodplain Administrator/Manager or his/her representative for review.

SECTION 3: FLOODPLAIN DETERMINATION (to be completed by Floodplain Administrator/Manager or his/her representative)

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 140C

Dated: 10/4/13

[] Is **NOT** located in a Specific Flood Hazard Area (Notify applicant that the application review is complete and **NO FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED**).

[] Is located in Special Flood Hazard Area.

FIRM zone designation _____

100-Year flood elevation is: _____ NGVD (MSL)

[] Unavailable

[] The proposed development is located in a floodway.

FBFM Panel No. _____ Dated _____

[] See section 4 for additional instructions.

SIGNED _____ DATE 4/25/14

SECTION 4: ADDITIONAL INFORMATION REQUIRED (To be completed by Floodplain Administrator/Manager or his/her representative)

The applicant must submit the documents checked below before the application can be processed.

[] A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

[] Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor; (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also_____

_____

[] Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).

[] Plans showing the extent of watercourse relocation and/or landform alterations.

[] Top of new fill elevation_____Ft. NGVD (MSL).
For floodproofing structures applicant must attach certification from registered engineer or architect.

[] Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.

[] Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).

[] Other:

_____

_____

_____

SECTION 5: PERMIT DETERMINATION (To be completed by Floodplain Administrator/Manager or his/her representative)

I have determined that the proposed activity **(type is or is not)** in conformance with provisions of the Floodplain Ordinance adopted by the County Commission of Doddridge County on May 21, 2013. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED_____DATE_____

If the Floodplain Administrator/Manager found that the above was not in conformance with the provisions of the Doddridge County Floodplain Ordinance and/or denied that application, the applicant may complete an appealing process below.

APPEALS: Appealed to the County Commission of Doddridge County? [] Yes {} No
Hearing Date:_____
County Commission Decision - Approved [] Yes [] No

CONDITIONS:_____

_____

_____

_____

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by APPLICANT before Certificate of Compliance is issued).

The following information must be provided for project structures. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application).

COMPLETE 1 OR 2 BELOW:

1 Actual (As-Built) Elevation of the top of the lowest floor (including basement or crawl space is_______________FT. NGVD (MSL)

2 Actual (As Built) elevation of floodproofing is_____________FT. NGVD (MSL)

Note: Any work performed prior to submittal of the above information is at risk of the applicant.

SECTION 7: COMPLIANCE ACTION (To be completed by the Floodplain Administrator/Manager or his/her representative).

The Floodplain Administrator/Manager or his/her representative will complete this section as applicable based on inspection of the project to ensure compliance with the Doddridge County Floodplain Ordinance.

INSPECTIONS:

DATE:_______________ **BY:**______________________________

DEFICIENCIES ? **Y/N**

COMMENTS____

____

____

____

____

____

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by Floodplain Administrator/Manager or his/her representative).

Certificate of Compliance issued: DATE:__________ BY:______________________________

CERTIFICATE OF COMPLIANCE
FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA
(OWNER MUST RETAIN)

PERMIT NUMBER:_______________

PERMIT DATE:_________________

PURPOSE –

CONSTRUCTION LOCATION:____

OWNER'S ADDRESS:____
____
____

THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN ADMINISTRATOR/MANAGER OR HIS/HER AGENT.

COMPLIANCE IS HEREBY CERTIFIED WITH THE REQUIREMENT OF THE FLOODPLAIN ORDINANCE ADOPTED BY THE COUNTY COMMISSION OF DODDRIDGE COUNTY ON MAY 21, 2013.

SIGNED___________________________________**DATE**____________________

STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO WIT

I, Virginia Nicholson, Editor of THE HERALD RECORD, a weekly newspaper published regularly, in Doddridge County, West Virginia, Do Hereby Certify Upon Oath That the Accompanying Legal Notice Entitled:

Floodplain Permit
Sherwood Plant
14-123

was published in said paper for 2

successive weeks beginning with the issue

of February 11th 2014 and

ending with the issue of

February 18th 2014 and

that said notice contains 189

WORD SPACE at 1115 cents a word

amounts to the sum of $ 21.73

FOR FIRST PUBLICATION, SECOND PUBLICATION IS 75% OF THE FIRST PUBLICATION

$ 16.29

and each publication thereafter

$ 38.02 TOTAL

EDITOR

Virginia Nicholson

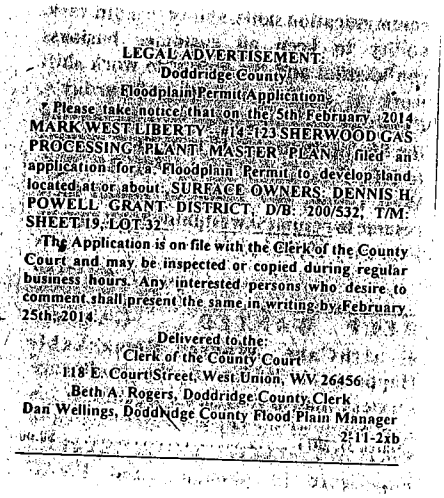
SWORN TO AND SUBSCRIBED

BEFORE ME THIS THE 20th DAY

OF February 2014

NOTARY PUBLIC

Laura J. Adams



LEGAL ADVERTISEMENT
Doddridge County

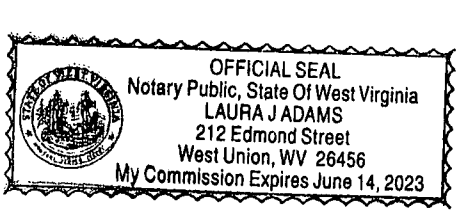
Floodplain Permit Application

Please take notice that on the 5th February, 2014 MARK WEST LIBERTY #14-123 SHERWOOD GAS PROCESSING PLANT MASTER PLAN filed an application for a Floodplain Permit to develop land located at or about: SURFACE OWNERS: DENNIS H. POWELL GRANT DISTRICT, D/B: 200/532, T/M: SHEET 19, LOT 32

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 25th, 2014.

Delivered to the:
Clerk of the County Court
118 E. Court Street, West Union, WV 26456
Beth A. Rogers, Doddridge County Clerk
Dan Wellings, Doddridge County Flood Plain Manager

2t 11-2tb



OFFICIAL SEAL
Notary Public, State Of West Virginia
LAURA J ADAMS
212 Edmond Street
West Union, WV 26456
My Commission Expires June 14, 2023

P. 01

TRANSACTION REPORT

FEB-05-2014 WED 04:01 PM

FOR: DODDRIDGE CO. CLERK 304 873 1840

SEND

DATE	START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
FEB-05	04:00 PM	3048731600	25″	1	FAX TX	OK	866	

TOTAL : 25S PAGES: 1

Legal Advertisement:

Doddridge County

Floodplain Permit Application

Please take notice that on the 5TH February 2014

MARK WEST LIBERTY - # 14 123

SHERWOOD GAS PROCESSING PLANT MASTER PLAN

filed an

application for a Floodplain Permit to develop land located at or

about: **SURFACE OWNERS: DENNIS H POWELL**

GRANT DISTRICT, D/B:200/532, T/M: SHEET 19, LOT 32

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 25th 2014**

Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

Fwd: Sherwood Master Plan Flood Study Wednesday, April 9, 2014 5:34 PM

From: "Ralph Sandora" <ralphsandora@gmail.com>

To: "Lorena Slater" <blslater.4774@yahoo.com>

---------- Forwarded message ----------
From: **Gullone, Andrew** <agullone@cecinc.com>
Date: Wed, Apr 9, 2014 at 10:12 AM
Subject: Sherwood Master Plan Flood Study
To: "Mark Stanley (mark.stanley@cmemgmt.com)" <mark.stanley@cmemgmt.com>, "Ralph Sandora (ralph.sandora@gmail.com)" <ralph.sandora@gmail.com>
Cc: "Celender, Rick" <rcelender@cecinc.com>, Richard Lowry <RLowry@markwest.com>, Robert McHale <RMcHale@markwest.com>

Mark,

Per our conversation, attached is a PDF containing the tables of the water surface elevations upstream of both the existing and proposed bridges. The first two tables demonstrate the backwater effect of each bridge. The third table compares the elevation difference between the backwater effects of the bridges. Based upon the results, the increase in water surface elevation caused by the backwater effects is less than one foot. Please let me know if you have any questions. Thank you for your help.

Andrew R. Gullone, P.E., CPESC/ Project Manager
Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205-1751
Toll-Free: 800-365-2324 · Direct: 412-249-3179 · Fax: 412-429-2114
http://www.cecinc.com
Senior Leadership · Integrated Services · Personal Business Relationships
Celebrating 25 Years ~ 1989-2014

Buckeye Creek
100-Year Water Surface Elevations
Sherwood Gas Processing Plant - Doddridge County, WV
Project: 110-811.5001

Prepared BY: TGJ
Date: 4/9/2014
Checked By: ARS
Date: 09-APR-2014

Existing Bridge			
Section Upstream of Existing Bridge	Section ID	Water Surface Elevation	Water Surface Elevation Difference Between Sections
1st	R	811.37	
			1.60
2nd	Q	812.97	
			0.14
3rd	P	813.11	
			0.03
4th	O	813.14	

Proposed Bridge			
Section Upstream of Proposed Bridge	Section ID	Water Surface Elevation	Water Surface Elevation Difference Between Sections
1st	U	811.73	
			1.57
2nd	T	813.30	
			0.21
3rd	S	813.51	
			0.00
4th	R	813.51	

Summary Table						
Section Upstream of Existing Bridge	Section ID	Water Surface Elevation	Section Upstream of Proposed Bridge	Section ID	Water Surface Elevation	Elevation Difference Upstream of Bridge
1st	R	811.37	1st	U	811.73	0.36
2nd	Q	812.97	2nd	T	813.30	0.33
3rd	P	813.11	3rd	S	813.51	0.40
4th	O	813.14	4th	R	813.51	0.37

DAN WELLINGS, PS
DODDRIDGE CO. FLOODPLAIN MANAGER
118 EAST COURT STREET, ROOM 102
WEST UNION, WV 26456
OFFICE PHONE: (304) 873 - 2631
CELL PHONE: (304) 629 - 7249
E-MAIL: wellingsd8@gmail.com

DATE: 02/04/2014
RE: PROPOSED SHERWOOD GAS PROCESSING PLANT MASTER PLAN
COUNTY ROAD 50/34
DODDRIDGE COUNTY, WEST VIRGINIA
CEC PROJECT 110-811.5001

Dear Mr. Celender,

As the Doddridge County Floodplain Manager I would like to inform Civil & Environmental Consultants, Inc. (CEC) as consultant to provide professional engineering services to MarkWest Liberty Midstream & Resources, LLC (MarkWest) that I have asked another engineering firm to be a consultant for review of materials submitted regarding the efficacy of granting or denying Doddridge County Floodplain Permit Application #14-123.

Said floodplain permit application was prepared by said CEC for said MarkWest's Sherwood Gas Processing Plant Master Plan request for a revised permit to finalize grading of the entire site as part of the construction of the Gas Processing Plants 6 through 10, de-ethanizers, and substation expansion.

Sincerely,

Dan Wellings 02/04/2014

DAN WELLINGS, PS
DODDRIDGE COUNTY FLOODPLAIN MNGR.

Gmail by Google

Edwin Wriston <doddridgecountyfpm@gmail.com>

Stop Work Order Rescinded For Permit # 14-123

1 message

Edwin Wriston <doddridgecountyfpm@gmail.com> Thu, Jun 5, 2014 at 3:32 PM
To: RMcHale@markwest.com
Cc: don@tennantlaw.com, "RalphSandora@gmail.com" <RalphSandora@gmail.com>, brett slater <blslater.4774@yahoo.com>

Robert,

Pursuant to the agreement of Thursday, June 5, 2014 in case 14-C-231-B, the Stop Work Order issued by the Doddridge County Floodplain Manager to Mark West on Tuesday, June 3, 2014 for Permit # 14-123, is hereby officially rescinded. Also pursuant to the agreement, note that no further Stop Work Orders will be issued for this permit before the Doddridge County Floodplain Board of Appeals hearing scheduled for Tuesday, June 17, 2014 at 5:00 PM EST at the Doddridge County Courthouse.

You are hereby free to continue construction on the project in accordance with the Doddridge County Floodplain Ordinance and approved Permit #14-123.

If you have any questions in regards to this issue, please feel free to contact me at your convenience.

Respectfully,

--
Edwin L. "Bo" Wriston, Floodplain Manager
Doddridge County Commission
118 East Court Street
West Union, WV 26456
Work Phone:1-304-873-2631
Mobile Phone: 1-304-629-3735
Fax: 1-304-873-1840
doddridgecountyfpm@gmail.com
www.doddridgecounty.wv.gov

CME
ENGINEERING

814-443-3344
Fax: 814-444-0365

April 23, 2014

Mr. Ralph Sandora & Edwin Wriston
Doddridge County Floodplain Manager
118 East Court Street
West Union, West Virginia 26456

RE: Sherwood 4 and 5 Natural Gas Processing Plant
Mark West Liberty Midstream and Resources, LLC
Doddridge County, West Virginia

Mr. Sandora & Mr. Wriston:

As requested, CME Engineering LP (CME) has reviewed the hydraulic study prepared by Civil & Environmental Consultants (CEC) relating to the Mark West Midstream and Resources, LLC (Mark West) Sherwood 4 and 5 Natural Gas Processing Plant. Mark West proposes to construct temporary stockpiles within the floodplain of Buckeye Creek.

CME finds that the hydraulic study prepared by CEC was performed within standard engineering practice and appears to be in compliance with the Doddridge County Floodplain Ordinance. The study reveals there is a hydraulic jump that occurs at the proposed bridge that causes the water surface elevation of the floodplain to exceed the one foot maximum difference to the existing water surface elevation requirement. This is due to the abrupt elevation change of the creek bottom and the side abutments of the new bridge. These parameters cause the velocity of the floodplain to flow at an increased rate at the bridge. This occurrence of the hydraulic jump results in no further impacts to this location.

Section 7.2.B of the Doddridge County Ordinance states " All permits and plans shall be approved only after it has been determined that the proposed work to be undertaken will be in conformance with the requirements of this Ordinance, State and Federal Laws, Ordinances, and Regulations." It is the responsibility of the permittee (Mark West) to obtain all required permits. Therefore, CME recommends conditional approval of the application pending receipt of any and all required federal or state permits.

CME appreciates the opportunity to assist Doddridge County on this project. Please contact Mark Stanley at (724) 672-4842 or me at (814) 443-3344 if you have any questions.

Sincerely,

Whitney M. Daugherty, CFM
Engineering Technician IV
CME Management LLC
General partner of CME Engineering LP

CC: Mark Stanley, CME
CME File 0875-S010

Permit # 14-123

CME
ENGINEERING

724-672-4800
Fax: 724-672-4801

February 20, 2014

Ralph Sandora
Doddridge County Flood Plain Manager
Doddridge County
118 E. Court Street
West Union, WV 26456

RE: CEC/Mark West Flood Plain Final Plan Application
CME Proposal #021413W

Dear Mr. Sandora:

CME Engineering LP (CME) is pleased to present this proposal to Doddridge County to provide engineering services for the review of the CEC/Mark West Flood Plain Final Plan Application in Doddridge County WV. This proposal includes the following sections:

1.0 Scope of Work
2.0 Schedule
3.0 Cost
4.0 Terms and Conditions

1.0 **Scope of Work**
The work included in this proposal shall result in the review of the CEC/Mark West Flood Plain Final Plan Application. The scope of work CME proposes to perform will include:

1. Conduct a site visit at the Mark West Sherwood facility in Doddridge County to gather information about the site, past history and cumulative impacts to date as well as proposed
2. Review CEC/Mark West Flood Plain Final Plan Application currently on file with Doddridge County.
3. Prepare a letter report addressed to Doddridge County which will provide the results of the floodplain evaluation and our opinion regarding the effects on the floodplain as set forth in the CEC/Mark West application.

This proposal is based upon the following conditions:

1. A copy of the CEC/Mark West Flood Plain Application will be made available by Doddridge County along with associated calculations.

2.0 **Schedule**
CME will schedule and conduct the site visit upon written approval of this proposal. CME will review the provided information listed above within 21 days of receipt of the requested plans by Doddridge County.

Permit # 14-123

TERMS AND CONDITIONS

These TERMS AND CONDITIONS are made part of an agreement between CME Engineering LP (CME), having a place of business at 975 Georges Station Road, Suite 100, Greensburg, PA 15601, and the "CLIENT" identified below.

The CLIENT wishes to retain CME for the purpose of providing services as defined in the attached Proposal or other similar document (hereafter Proposal) and the CLIENT agrees that the work shall be performed in accordance with the following:

1. **Scope of Services.** CME shall provide services as set forth in the Proposal or other similar document attached hereto. All services performed by CME under this Agreement shall be performed in accordance with generally accepted professional practice at the time when, and the place where, the services are rendered. Services not expressly set forth in the Proposal are excluded from the Scope of Services and CME assumes no duty to perform such services. However, CME and CLIENT may make changes to the Scope of Services and associated fees by mutual written agreement. If, in the performance of the services and in the sole opinion of CME, CME encounters unanticipated situations, hazardous materials, pollutants or unsafe working conditions, CME's Scope of Services, compensation and schedule will be reconsidered and this Agreement shall immediately be subject to renegotiation or termination at the option of CME. In the event the Agreement is terminated, CME shall be paid for its fees and charges incurred to the date of such termination, including, if applicable, any additional fees or charges incurred in demobilizing.

2. **Project Schedule.** The work shall be performed in accordance with the schedule set forth in the attached Proposal. However, it is recognized that other contractors may be retained separately by the CLIENT who may provide data or products to be utilized by CME and CME shall have the right to rely upon timely receipt, correctness and completeness of said data or products. CME shall not be responsible for the acts, errors or omissions, or review of work of said third party contractors. CME shall not have the authority to control the work of contractors retained by the CLIENT and shall not be responsible for site safety or work practices of such contractors. CME shall not be held responsible for damages or delays in performance (and the direct or indirect costs or consequences arising from such delays) caused by force majeure or other events beyond the reasonable control of CME.

3. **Payment.** Payment for the services rendered by CME shall be made in accordance with the terms set forth in the Proposal. CME reserves the right to terminate all work, without notice, immediately upon failure of CLIENT to make payment in the full amount of any or all outstanding invoices for this Project or any other Project performed by CME on behalf of the CLIENT or other party related to the CLIENT. Any invoice not paid within thirty (30) days of the invoice issuance date shall be considered overdue and subject to a 1.5% per month interest rate. Any overdue invoice may result in termination of work as set forth above.

4. **CLIENT responsibilities.** The CLIENT, at its own expense, will: (a) Provide all criteria and full information as to the CLIENT's requirements for the work; (b) furnish CME with copies of all data, reports, maps, etc. which the CLIENT may possess which may be of use by CME in the performance of the work; (c) arrange for access to public and private property as required by CME to perform its services; (d) be responsible for locating all underground or covered site utilities, tanks or other structures and for notifying the utility owner; (e) provide a description of activities which were conducted at the site at any time by the CLIENT, or prior to CLIENT, which would involve the name, quantity, location and date of any releases or storage of hazardous substances or pollutants; (f) give prompt notice to CME whenever the CLIENT becomes aware of any circumstance or situation which may affect the timing or scope of CME's services; (g) designate an individual with requisite authority to act as the CLIENT's representative with respect to the services to be rendered under this agreement; (h) to the extent required by law, promptly report all regulated conditions, including, without limitation, the discovery of releases of hazardous substances at the site to the appropriate authorities in accordance with applicable law; (i) assume responsibility for unavoidable damage or alteration to the site caused by CME's services; (j) assume responsibility for personal injuries and property damage caused by CME's interference with subterranean structures such as pipes, tanks and utility lines that are not disclosed or are not accurately disclosed to CME by the CLIENT in advance; (k) assume responsibility for any and all environmental matters including, but not limited to, citations, assessments, fines and penalties.

5. **General Considerations.** (a) Where provided, statements concerning probable costs or cost estimates prepared by CME shall represent their judgment as professionals familiar with the work. However, CME does not guarantee that actual costs will not vary from the cost estimates. (b) All documents prepared and delivered by CME pursuant to this agreement are instruments of service and are not intended or represented to be suitable for any reuse by CLIENT or others. CLIENT shall not reuse said work without the express written consent of CME. Any such reuse shall be at the sole risk of the CLIENT; (c) CME shall perform the services in accordance with generally accepted professional practice, reasonable and without negligence. **CME's SERVICES SHALL NOT BE SUBJECT TO ANY EXPRESS OR IMPLIED WARRANTIES WHATSOEVER BEYOND THOSE EXPRESSED IN THE PROPOSAL;**

(d) any samples and/or materials collected by CME during the course of the work which contain, or are suspected to contain, any substances or constituents hazardous or detrimental to health, safety or the environment as defined by federal, state or local statutes, regulations or ordinances, will remain the property of the CLIENT and will be returned to the CLIENT for proper disposal.

6. **Delegation of Duties.** Neither CME nor the CLIENT shall assign the agreement without the written consent of the other.

7. **Indemnification and Waiver.** (a) The CLIENT hereby agrees to indemnify and hold harmless CME and its subcontractors, consultants, agents, owners, officers, directors, managers and employees from and against any and all claims, damages, losses and expenses, whether direct, indirect or consequential (including but not limited to attorneys' fees and court and arbitration costs), arising out of, resulting from, or alleged to have arisen out of or to have resulted from, the services or work, or the failure to perform services or work, of CME, or any claims against CME arising from the acts, omissions or work of others, except to the extent (percentage of responsibility) that the claims, losses or expenses proximately resulted from the negligent or grossly negligent acts, errors or omissions of CME. (b) Notwithstanding anything else to the contrary herein, the liability of CME under this Agreement (whether by reason or breach of contract, negligent or grossly negligent acts, errors, omissions, tort or otherwise, including under indemnification provisions, if any) shall be limited to the total amount of payments made to CME for services rendered under this Agreement. (c) The CLIENT acknowledges that the amount of CME's compensation provided for under this Agreement has been negotiated and agreed by reason of CME's reliance on the foregoing limitation, indemnification and waiver undertakings of the CLIENT. (d) CME hereby acknowledges that its relationship to CLIENT established under this agreement is one of an Independent Contractor as that term is defined in the law.

8. **Extent of Agreement.** These Terms and Conditions, together with the Proposal, represent the entire and integrated Agreement between the CLIENT and CME and supersede all prior negotiations, representations, or agreements, either written or oral, for this work.

9. **Third Parties.** Nothing herein shall be construed to give any rights or benefits hereunder to any one other than the CLIENT and CME. CME's work product may not be used or relied upon by any other person without CME's express written consent.

10. **Successors and Assigns.** The CLIENT and CME bind themselves and their successors, executors, administrators, assigns and legal representatives to these Terms and Conditions.

Date: 3-4-14

CLIENT: DODDRIDGE CO. COMMISSION

By: Ralph Saunders
Signature

Title CEC - MARKWEST FINAL PLAN REVIEW

Proposal ID: 021413W

Price: $5000.00

Permit #14-123

CME
ENGINEERING

724-672-4800
Fax: 724-672-4801

3.0 **Cost**
CME will perform the work included in this proposal for an **estimated total cost of $5,000**. CME will invoice on a twice per month basis for the work performed the previous billing period. Invoices will be generated on a Time and Material basis and invoices are due and payable upon receipt. Failure to submit payment may result in a stoppage of work. This proposal is valid for a period of 45 days from the date of this proposal.

The cost quoted herein is only for work specifically identified in this proposal. Any work requested by Doddridge County, which is not specifically identified in this proposal, such as additional evaluations or extended work requests will be considered additional and will only be performed upon receipt of authorization from Doddridge County according to the rate schedule in place at the time of request.

4.0 **Terms and Conditions**
The Terms and Conditions under which the work identified in this proposal shall be performed are attached. Acceptance of this proposal, and any future work, constitutes acceptance of the attached Terms and Conditions.

CME appreciates the opportunity to submit this proposal and looks forward to successful completion of this project. If you have any questions regarding this proposal, please feel free to contact me. Thank you.

Respectfully Submitted,
CME Engineering LP, a Pennsylvania limited partnership
By: CME Management LLC, its sole general partner

By:
Mark T. Stanley
Project Director

Attachments

cc: Sean C. Isgan / Michael Walker / Tammy Rusbosin

Sherwood Master Plan - Doddridge County, WV
Opinion of Probable Construction Costs - Construction in the Floodplain
Project #: 110-811.5001
January 2014

Item	Units	Quantity	Unit Cost	Total Cost
Earth Work	CY	750000	$ 3.00	$ 2,250,000.00
Erosion Control Blanket	SY	17400	$ 2.00	$ 34,800.00
Super Silt Fence	LF	1800	$ 3.00	$ 5,400.00
Total	-	-	-	$ 2,290,200.00

Gmail by Google

Dan Wellings <wellingsd8@gmail.com>

MarkWest Sherwood Gas Processing Plant Master Plan DC Floodplain app. - CEC Project #110-811.5001

1 message

Dan Wellings <wellingsd8@gmail.com> Thu, Feb 6, 2014 at 9:16 AM
To: "Celender, Rick" <rcelender@cecinc.com>

Rick,

I need an itemized total cost of construction submitted with all floodplain applications. How did you get $2,290,200.00 submitted on floodplain application?

Dan Wellings, PS
Doddridge County Floodplain Manager

Mark West Plaza Master

#14-123

check for $11,951.00

ACTIVITY

- [x] New Structure
- [ ] Addition
- [ ] Alteration
- [ ] Relocation
- [x] Demolition
- [ ] Manufactured/Mobil Home

STRUCTURAL TYPE

- [ ] Residential (1 – 4 Family)
- [ ] Residential (more than 4 Family)
- [ ] Non-residential (floodproofing)
- [ ] Combined Use (res. & com.)
- [ ] Replacement

B. OTHER DEVEOPLMENT ACTIVITIES:

- [x] Fill [ ] Mining [ ] Drilling [ ] Pipelining
- [x] Grading
- [ ] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
- [ ] Watercourse Altercation (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)

C. STANDARD SITE PLAN OR SKETCH

1. **SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED.**
2. **IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED:**
   SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION OF THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY.
3. **SIGN AND DATE THE SKETCH.**

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ 2,290,200.00 ?

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

Gmail by Google

Dan Wellings <wellingsd8@gmail.com>

MarkWest Sherwood Gas Processing Plant Master Plan DC Floodplain Application

2 messages

Dan Wellings <wellingsd8@gmail.com> Thu, Feb 6, 2014 at 9:07 AM
To: "Sneed, Kevin L" <kevin.l.sneed@wv.gov>

Kevin,

HELP!

I am getting slammed with floodplain applications from the gas industry.
Most are pipelines, access roads, etc., but I have one big project.

MarkWest has a gas processing facility being developed near Sherwood, about 5 miles east of West Union along US Rt. 50.
You can't help but see it from Rt. 50.
They built 2, working on 3rd, new gas processing plants behind a large round hill, "mound" ± 500 feet high. I always got the impression that probably several thousands years ago the stream went behind this "mound" sort of forming a "jug" but eventually cut through the neck of the jug thousands of years later.

Last year they started leveling the "mound" and got a floodplain permit to put temporary stockpiles of earth in the floodplain as part of construction of Plants 4 & 5. The temporary stockpiles are huge and I drew the ire of many area residents for permitting it. Their engineering studies looked good.

The first part of January they submitted a request for additional temporary stockpiles in the floodplain as part of construction. I have hired a third independent engineering firm to review the MarkWest engineering firm's study submitted with the floodplain application prior to granting or denying the permit. I have then scheduled a public meeting as part of the Feb. 18, 2014 commissioners meeting whereby all parties may submit evidence as to why we should grant or deny permit. This really grabbed MarkWest and their engineering firm's attention needless to say. I am awaiting the third engineering firm's conclusions, but do not anticipate any problems. Just covering my bases (ass).

Now, while things are turning, on Friday Jan. 31, 2014, MarkWest submitted another DC floodplain application for the final grading in the floodplain of all this rock & dirt. Their study says they will not exceed the 1 foot of fill rule. I am having the same independent third engineering firm review this study as well prior to granting or denying the permit. We will then have the same type public meeting prior to granting or denying permit.

Needless to say our local "concerned residents", many of whom you have had the pleasure, are "wound tight" and getting more organized all the time. It's quickly becoming nobody's "first rodeo". Charleston area water fiasco hasn't helped.

What LOM's, etc. if any would apply?

I am providing the web link I requested from MarkWest's engineering firm (CEC) to this email. It has each hydraulic study, permit application, etc. available. I know your people are busy too, but I would sure appreciate any advise you could give me. Call if you like.

http://www.cecinc.com/clients/download/110-811/20140127 Doddridge County - Floodstudy

Thanks,

Dan

Sneed, Kevin L <Kevin.L.Sneed@wv.gov> Fri, Feb 7, 2014 at 12:55 PM
To: Dan Wellings <wellingsd8@gmail.com>

Hello Dan, Sounds like your still having fun?

Let me see if I got this straight? They are leveling the mounds of fill dirt and not bringing additional "fill " in? If that is the case I would think it would be like compensatory storage and the study would suffice. However if they are binging in any fill. They will have to do a CLOMA-F. Then a LOMR-F.

Hope this helps.

Kevin L. Sneed, CFM

National Flood Insurance Program Coordinator

WV Floodplain Management Program

State Capitol Complex

1900 Kanawha Blvd., East

Building 1, Room EB-80

Charleston, WV 25305-0360

Phone (304) 957-2571

Cell (304) 545-2864

Fax (304) 558-5813

Our Goal - Effective, Enforceable, Easy, Uniform

And Unobtrusive Floodplain Management

Fwd: Sherwood Master Plan Flood Study Wednesday, April 9, 2014 5:34 PM

From: "Ralph Sandora" <ralphsandora@gmail.com>

To: "Lorena Slater" <blslater.4774@yahoo.com>

Full Headers Printable View

1 Files 72KB Download All

PDF 72KB
Existing and Proposed
Save

< >

---------- Forwarded message ----------
From: **Gullone, Andrew** <agullone@cecinc.com>
Date: Wed, Apr 9, 2014 at 10:12 AM
Subject: Sherwood Master Plan Flood Study
To: "Mark Stanley (mark.stanley@cmemgmt.com)" <mark.stanley@cmemgmt.com>, "Ralph Sandora (ralph.sandora@gmail.com)" <ralph.sandora@gmail.com>
Cc: "Celender, Rick" <rcelender@cecinc.com>, Richard Lowry <RLowry@markwest.com>, Robert McHale <RMcHale@markwest.com>

Mark,

Per our conversation, attached is a PDF containing the tables of the water surface elevations upstream of both the existing and proposed bridges. The first two tables demonstrate the backwater effect of each bridge. The third table compares the elevation difference between the backwater effects of the bridges. Based upon the results, the increase in water surface elevation caused by the backwater effects is less than one foot. Please let me know if you have any questions. Thank you for your help.

Andrew R. Gullone, P.E., CPESC/ Project Manager
Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205-1751
Toll-Free: 800-365-2324 · Direct: 412-249-3179 · Fax: 412-429-2114
http://www.cecinc.com
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United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

January 16, 2014

Ms. Jacqulyn Kester
Civil and Environmental Consultants, Inc.
99 Cambridge Place
Bridgeport, West Virginia 26330

Re: MarkWest Liberty Midstream & Resources, LLC, Sherwood Natural Gas Processing Facility Expansion, Doddridge County, West Virginia

Dear Ms. Kester:

This responds to your request of November 11, 2013, for information regarding the potential occurrence of federally listed threatened and endangered species and their designated critical habitats. MarkWest Liberty Midstream & Resources, LLC (MarkWest) proposes to expand the Sherwood natural gas processing facility in Doddridge County, West Virginia. These comments are provided pursuant to the Endangered Species Act (ESA, 87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

In previous correspondence from you on this project dated July 24, 2012, April 22, 2013, and August 6, 2013, U.S. Fish and Wildlife Service (Service) determined that the federally listed endangered Indiana bat (*Myotis sodalis*) is known to occur within the area and may be affected by the construction and operation of the proposed project. Information to avoid impacts to the Indiana bat is provided below.

Additionally, on October 2, 2013, in the *Federal Register* (78 FR 61045 -61080) the Service proposed the northern long eared bat (*Myotis septentrionalis*) for listing under the ESA. If a decision is made to list this species, potential impacts from this project to this species may need to be addressed if this project is not completed by October 2, 2014. We encourage you to begin incorporating conservation measures to protect these species prior to any potential final listing decisions.

Indiana Bat

The project area is within the range of the Indiana bat and may provide summer foraging and roosting habitats, as well as winter habitat, for this endangered mammal. Indiana bats use caves or mine portals for winter hibernation habitat between November 15 and March 31. Indiana bats may use the proposed site for foraging and roosting between April 1 and November 14. Indiana bat foraging habitat is generally defined as riparian, bottomland, or upland forest, as well as old fields or pastures with scattered trees. Roosting and maternity habitats consist primarily of live or dead hardwood trees which have exfoliating bark that provides space for bats to roost between the bark and the bole of the tree. Tree cavities, crevices, splits, or hollow portions of tree boles and limbs also provide roost sites. In West Virginia, the Service considers all forest habitats containing trees greater than or equal to 5 inches in diameter at breast height to be potentially suitable as summer roosting and foraging habitat for the Indiana bat.

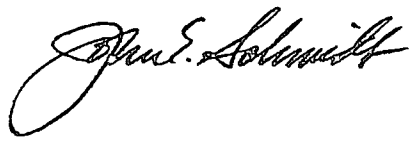
The Service has evaluated the availability of suitable foraging and roosting habitat on the West Virginia landscape relative to the best estimate of the statewide population of Indiana bats. On that basis, we have determined that projects affecting 17 acres or less of suitable forest habitat and that occur more than 5 miles from hibernacula, 5 miles from summer capture sites with no known maternity roosts, and 2.5 miles from maternity roosts are very unlikely to result in direct or indirect impacts to the species. The effects of such projects are considered discountable and the projects, therefore, are not likely to adversely affect the species. Tree removal associated with such projects can occur at any time of year. The proposed project does not pass through any of these buffer zones.

Upon receipt of your November 11, 2013, correspondence, the Service noted that the additional proposed clearing for this project causes the project to exceed the 17-acre forested clearing threshold. The project proposed less than 4.2 acres of clearing in 2012, and an additional 24.26 acres of clearing in 2013, prior to the receipt of the November 11, 2013, correspondence. This is piecemealing, which is not consistent with Federal law. Under Federal law the Service must review a complete and total project. As a result, the Service recommended that any further forest clearing that is proposed for this project be completed seasonally when bats are in hibernation (November 15 to March 31) to avoid direct impacts to Indiana bats.

In electronic correspondence dated January 3, 2014, Will Trimbath of your company confirmed MarkWest's commitment to clear all future project-related timber when bats are in hibernation (November 15 through March 31) and that no caves or portals exist within the proposed project boundary. An estimated 14.8 acres of forest area would be cleared for the next expansion of this project.

As a result of this information, the Service has concluded that the project may affect, but is not likely to adversely affect, any federally listed threatened and endangered species. No biological assessment or further section 7 consultation under the ESA is required with the Service. Should project plans change or amendments be proposed that we have not considered in your proposed action, or if additional information on listed and proposed species becomes available, or if new species become listed or critical habitat is designated, this determination may be reconsidered. If you have any questions regarding this letter, please contact Liz Stout of my staff at (304) 636-6586, Ext. 15, or elizabeth_stout@fws.gov, or at the letterhead address.

Sincerely,



John E. Schmidt
Field Supervisor

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Earl Ray Tomblin
Governor

Frank Jezioro
Director

November 20, 2013

Ms. Jacqulyn Kester
Civil & Environmental Consultants, Inc.
99 Cambridge Place
Bridgeport, WV 26330

Dear Ms. Kester:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Sherwood Natural Gas Processing Facility Expansion project in Doddridge County, WV (Project 110-811.4003).

We have no known records of any RTE species or sensitive habitats within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, extension 2048. Enclosed please find an invoice.

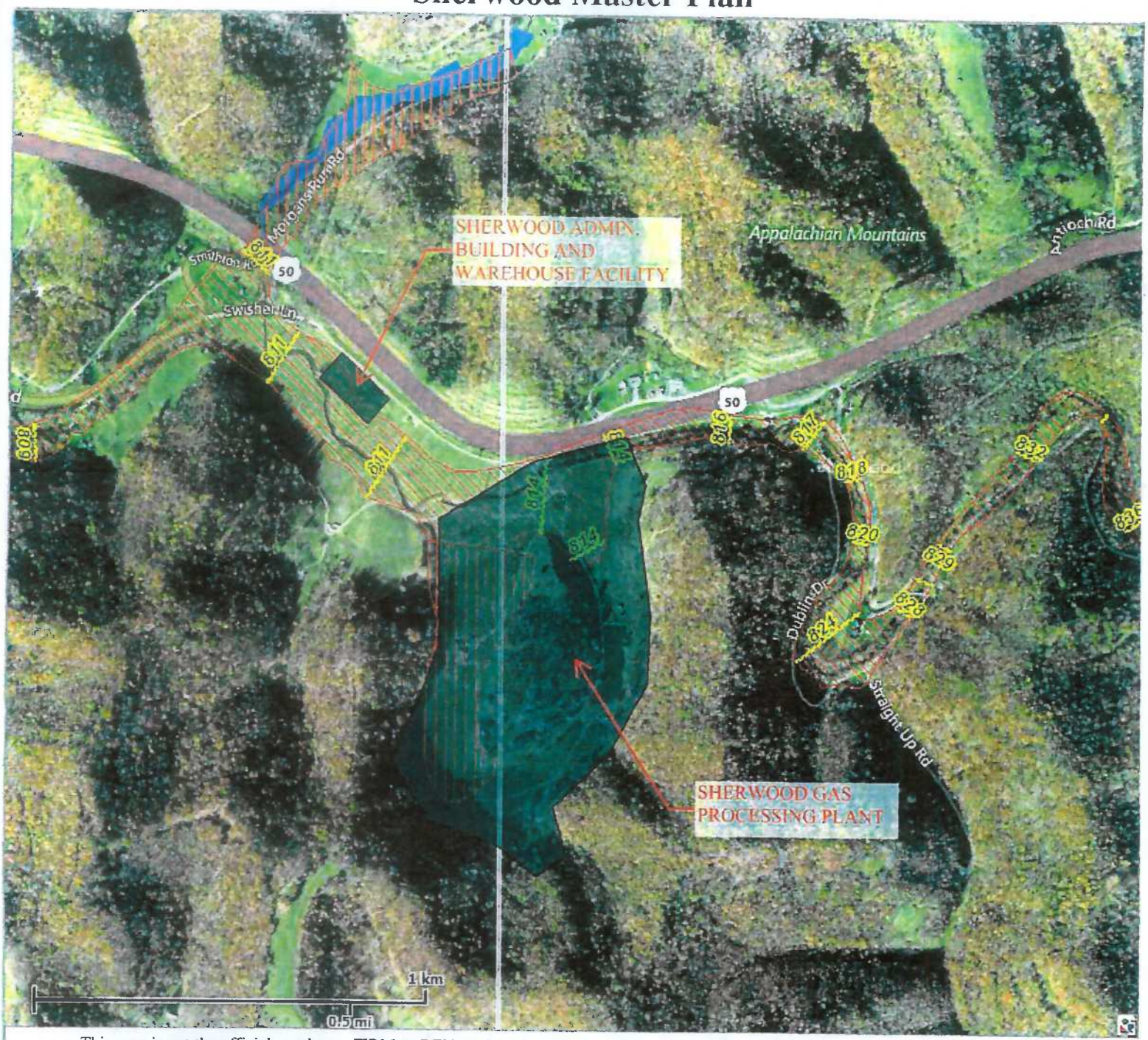
Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

S:\Monthly\Barb\Invoices\CEC.doc

Sherwood Master Plan



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

Map Created on 11/10/2014

Location of the mouse click

Approximate Study (Zone A)

Detailed Study (Zone AE, AH, AO)

Floodway

Flood Water Depth (HEC-RAS)

K—K Cross Section Line

810 Base Flood Elevation Line

DFIRM Panel (Map) Index

User Notes:

Flood Hazard Area:

Advisory Flood Height: N/A

Water Depth: N/A

Elevation: N/A

Location (long, lat):

Location (UTM 17N):

FEMA Issued Flood Map:

Contacts:

CRS Information:

Flood Profile: No Profile

HEC-RAS Model: No Model

Parcel Number:

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 140 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

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

MAP NUMBER
54017C0140C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

DESCRIPTION OF
2.254 ACRES TO BE REMOVED FROM
THE DHS-FEMA 100 YEAR FLOOD ZONE AE
GRANT DISTRICT, COUNTY OF DODDRIDGE,
STATE OF WEST VIRGINIA

All that certain 2.254 acre tract of land situate in the Grant District, County of Doddridge, State of West Virginia, on the waters of Buckeye Creek, being part of the 5.578 acre tract of land now or formerly Markwest Liberty Midstream & Resources, L.L.C. as recorded Deed Book Volume 346, Page 457, tract two, more particularly bounded and described as follows:

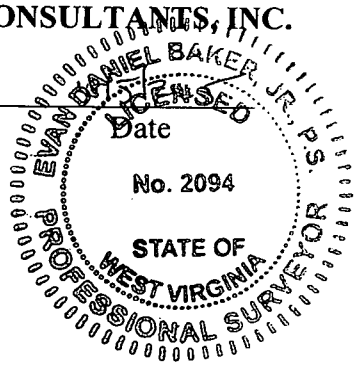
BEGINNING FOR REFERENCE at an iron pipe set at the northwest corner of property of now or formerly Billy D. Carroll, as recorded in Deed Book Volume 140, Page 190, said point also being at the northeast corner of property of now or formerly Markwest Liberty Midstream & Resources, L.L.C. as recorded Deed Book Volume 346, Page 457, tract one, said point also being on the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, as recorded in Deed book Volume 216, Page 166, variable width; thence along the northerly line of land of now or formerly Markwest Liberty Midstream & Resources, L.L.C. and along the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, variable width, the following six (6) courses and distances, viz: thence South 77°19'37" West, 743.13' to an iron pipe set; thence South 55°33'48" West, 40.27' to an iron pipe set; thence South 59°34'48" West, 111.00' to an iron pipe set; thence South 65°43'48" West, 111.00' to an iron pipe set; thence South 67°29'54" West, 34.97' to an iron pipe set; thence North 20°36'12" West, 77.00' to an iron pipe set, said point being on the northerly line of land of now or formerly Dennis H. Powell, as recorded in Deed Book Volume 200, Page 532; thence continuing along the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, variable width, and the northerly line of land of now or formerly Dennis H. Powell the following twelve (12) courses and distances, viz: ; thence South 72°53'48" West, 52.00' to an iron pipe set; thence South 77°41'48" West, 103.00' to an iron pipe set; thence South 81°59'48" West, 103.00' to an iron pipe set; thence South 86°58'48" West, 103.00' to an iron pipe set; thence North 84°41'12" West, 103.00' to an iron pipe set; thence North 81°03'12" West, 103.00' to an iron pipe set; thence North 74°31'12" West, 103.00' to an iron pipe set; thence North 69°06'12" West,103.00' to an iron pipe set; thence North 62°17'12" West,103.00' to an iron pipe set; thence North 57°06'12" West, 103.00' to an iron pipe set; thence North 52°46'12" West, 103.00' to an iron pipe set; thence North 48°29'12" West, 2.54' to an iron pipe set northeast corner of land of now or formerly Markwest Liberty Midstream & Resources, L.L.C., thence along the northerly line of land now or formerly Markwest Liberty Midstream & Resources, L.L.C. and along the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, variable width, North 48°29'12" West, 488.90' to a calculated point; thence through land of now or formerly Markwest Liberty Midstream & Resources, L.L.C., South 41°39'35" West, 12.17' to a calculated point on the existing northerly line of Zone AE, 100 Year

Floodplain, as designated by DHS-FEMA, being the **TRUE PLACE OF BEGINNING**; thence through the land of now or formerly Markwest Liberty Midstream & Resources, L.L.C. and along the revised northerly line of Zone AE, 100 Year Floodplain the following seven (7) courses and distances, viz: South 41°39'35" West, 164.97' to a calculated point; thence South 43°07'01" West, 94.05' to a calculated point; thence North 49°40'08" West, 137.77' to a calculated point; thence North 46°56'15" West, 70.86' to a calculated point; thence North 49°12'34" West, 86.02' to a calculated point; thence North 46°09'20" West, 72.46' to a calculated point; thence North 41°19'27" East, 123.80' to a calculated point; thence North 43°30'49" East, 49.92' to a calculated point; thence North 41°00'07" East, 91.32' to a calculated point on the existing northerly line of Zone AE, 100 Year Floodplain, as designated by DHS-FEMA; thence along the existing northerly line of Zone AE, 100 Year Floodplain, as designated by DHS-FEMA the following seven (7) courses and distances, viz: South 51°56'50" East, 51.09' to a calculated point; thence South 46°20'08" East, 139.37' to a calculated point; thence South 49°13'18" East, 71.32' to a calculated point; thence South 45°27'13" East, 108.09' to a calculated point at the **TRUE PLACE OF BEGINNING**.

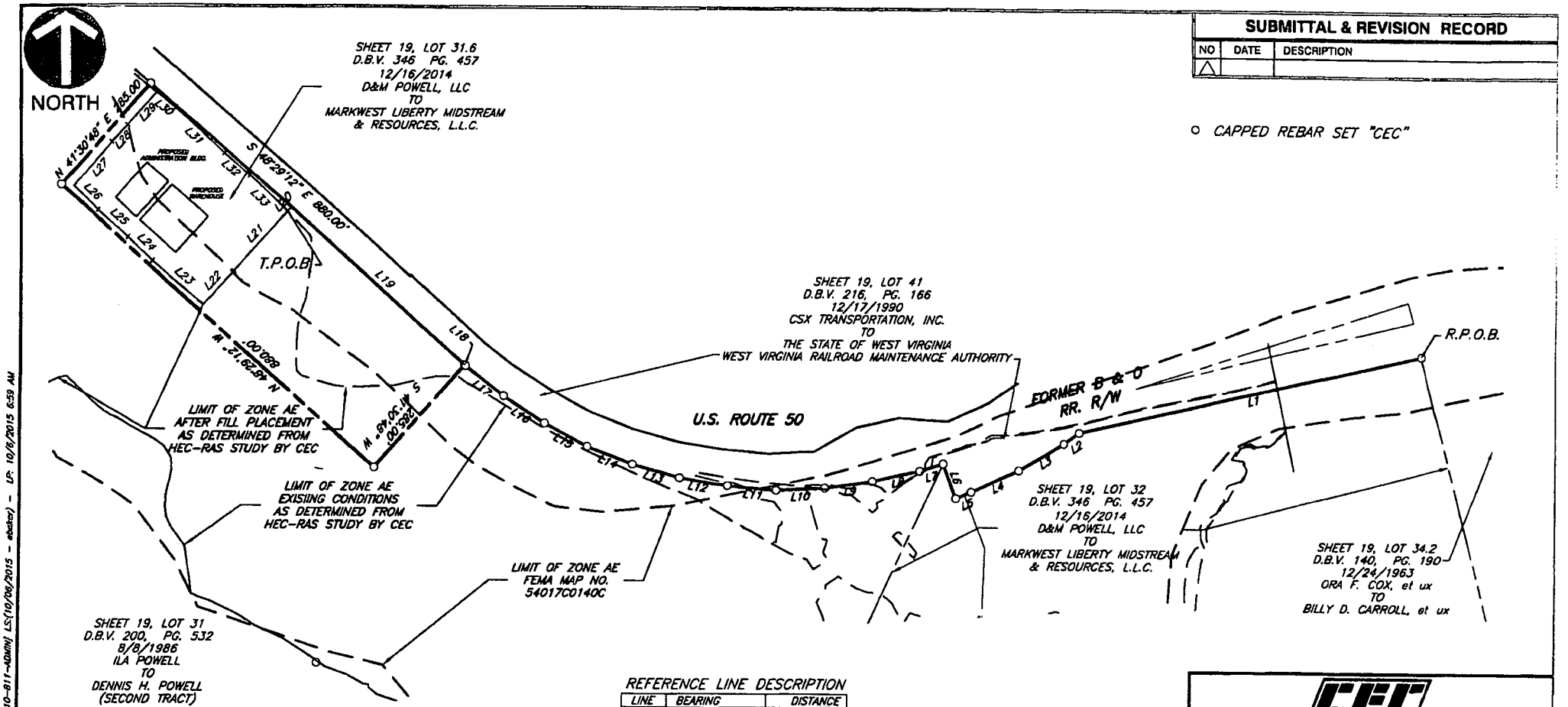
Contains: 98,204.35 Sq. Ft. or 2.254 Acres

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Evan D. Baker, Jr. Date
Registered Surveyor No. 2094



Date Prepared: September 15, 2015
File Name: 110-811 2.254 acre.docx



SUBMITTAL & REVISION RECORD		
NO	DATE	DESCRIPTION
1		

○ CAPPED REBAR SET "CEC"

AREA TO BE REMOVED FROM ZONE AE DESCRIPTION

LINE	BEARING	DISTANCE
L21	S 41°39'35" W	164.97'
L22	S 43°07'01" W	94.05'
L23	N 49°40'08" W	137.77'
L24	N 46°56'15" W	70.86'
L25	N 49°12'34" W	86.02'
L26	N 46°09'20" W	72.46'
L27	N 41°19'27" E	123.80'
L28	N 43°30'49" E	49.92'
L29	N 41°00'07" E	91.32'
L30	S 51°56'50" E	51.09'
L31	S 46°20'08" E	139.37'
L32	S 49°13'18" E	71.32'
L33	S 45°27'13" E	108.09'

REFERENCE LINE DESCRIPTION

LINE	BEARING	DISTANCE
L1	S 77°19'37" W	743.13'
L2	S 55°33'48" W	40.27'
L3	S 59°34'48" W	111.00'
L4	S 65°43'48" W	111.00'
L5	S 67°29'54" W	34.97'
L6	N 20°36'12" W	77.00'
L7	S 72°53'48" W	52.00'
L8	S 77°41'48" W	103.00'
L9	S 81°59'48" W	103.00'
L10	S 86°58'48" W	103.00'
L11	N 84°41'12" W	103.00'
L12	N 81°03'12" W	103.00'
L13	N 74°31'12" W	103.00'
L14	N 69°06'12" W	103.00'
L15	N 62°17'12" W	103.00'
L16	N 57°06'12" W	103.00'
L17	N 52°46'12" W	103.00'
L18	N 48°29'12" W	2.54'
L19	S 48°29'12" E	488.90'
L20	N 41°39'35" E	12.17'

TOTAL AREA TO BE REMOVED FROM ZONE AE
98,204.35 Sq. Ft.
or 2.254 Acres

SCALE IN FEET
0 200 400

EVAN D. BAKER JR.
LICENSED
No. 2094
STATE OF
WEST VIRGINIA
PROFESSIONAL SURVEYOR

EVAN D. BAKER JR.
LICENSED PROFESSIONAL SURVEYOR
NO. 2094

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

EXHIBIT A
2.254 ACRES TO BE REMOVED
FROM ZONE AE
Situate In
GRANT DISTRICT, COUNTY OF DODDRIDGE
STATE OF WEST VIRGINIA
Made For
MARKWEST MIDSTREAM &
LIBERTY RESOURCES, LLC.
SHERWOOD ADMINISTRATION BUILDING

DATE:	9/15/2015	SCALE:	1"=200'
DRAWN BY:	MST	CHECKED BY:	JRB
PROJECT NO:	110-811	APPROVED BY:	EDB

EXHIBIT: A
SHEET 1 OF 1

Gmail by Google

George Eidel <doddridgecountyfpm@gmail.com>

Doddridge County Flood Plain Manager Information

Gullone, Andrew <agullone@cecinc.com> Wed, Oct 7, 2015 at 2:59 PM
To: "Celender, Rick" <rcelender@cecinc.com>, "George C. Eidel (doddridgecountyfpm@gmail.com)" <doddridgecountyfpm@gmail.com>
Cc: Richard Lowry <RLowry@markwest.com>, Kevin Sturgill <ksturgill@markwest.com>

George,

Below is a link to the Sherwood Master Plan Floodplain Study that was submitted on November 24, 2014. Please let me know if you have any questions. Thank you,

http://www.cecinc.com/clients/download/110-811/20151007 Doddridge County - Master Plan Floodstudy

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

Civil & Environmental Consultants, Inc.

333 Baldwin Road · Pittsburgh, PA 15205-1751

Toll-Free: 800-365-2324 · Direct: 412-249-3179 · Fax: 412-429-2114

http://www.cecinc.com

Senior Leadership · Integrated Services · Personal Business Relationships

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From: Celender, Rick
Sent: Wednesday, October 07, 2015 2:42 PM
To: George C. Eidel (doddridgecountyfpm@gmail.com)
Cc: Gullone, Andrew; Richard Lowry; Kevin Sturgill
Subject: RE: Doddridge County Flood Plain Manager Information

[Quoted text hidden]

Gmail by Google

George Eidel <doddridgecountyfpm@gmail.com>

Doddridge County Flood Plain Manager Information

Celender, Rick <rcelender@cecinc.com> Wed, Oct 7, 2015 at 2:41 PM
To: "George C. Eidel (doddridgecountyfpm@gmail.com)" <doddridgecountyfpm@gmail.com>
Cc: "Gullone, Andrew" <agullone@cecinc.com>, Richard Lowry <RLowry@markwest.com>, Kevin Sturgill <ksturgill@markwest.com>

George,

Appended is the approved plan from the current floodplain permit which included the proposed administration building grading. I will give you a call to discuss.

Regards,

Rick

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

Civil & Environmental Consultants, Inc.

333 Baldwin Road · Pittsburgh, PA 15205-1751

Direct: 412-249-2309 · Fax: 412-429-2114

Mobile: 412-760-0136 · http://www.cecinc.com

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From: Baker, Evan
Sent: Wednesday, October 07, 2015 2:32 PM
To: Celender, Rick
Subject: FW: Doddridge County Flood Plain Manager Information

Evan D. Baker, Jr. P.L.S. / Project Manager III

Civil & Environmental Consultants, Inc.

333 Baldwin Road · Pittsburgh, PA 15205-1751

Ph: 412-429-2324 Direct Dial: 412-249-3119

Toll-Free: 800-365-2324 · Fax: 412-429-2114

E-Mail: ebaker@cecinc.com · http://www.cecinc.com

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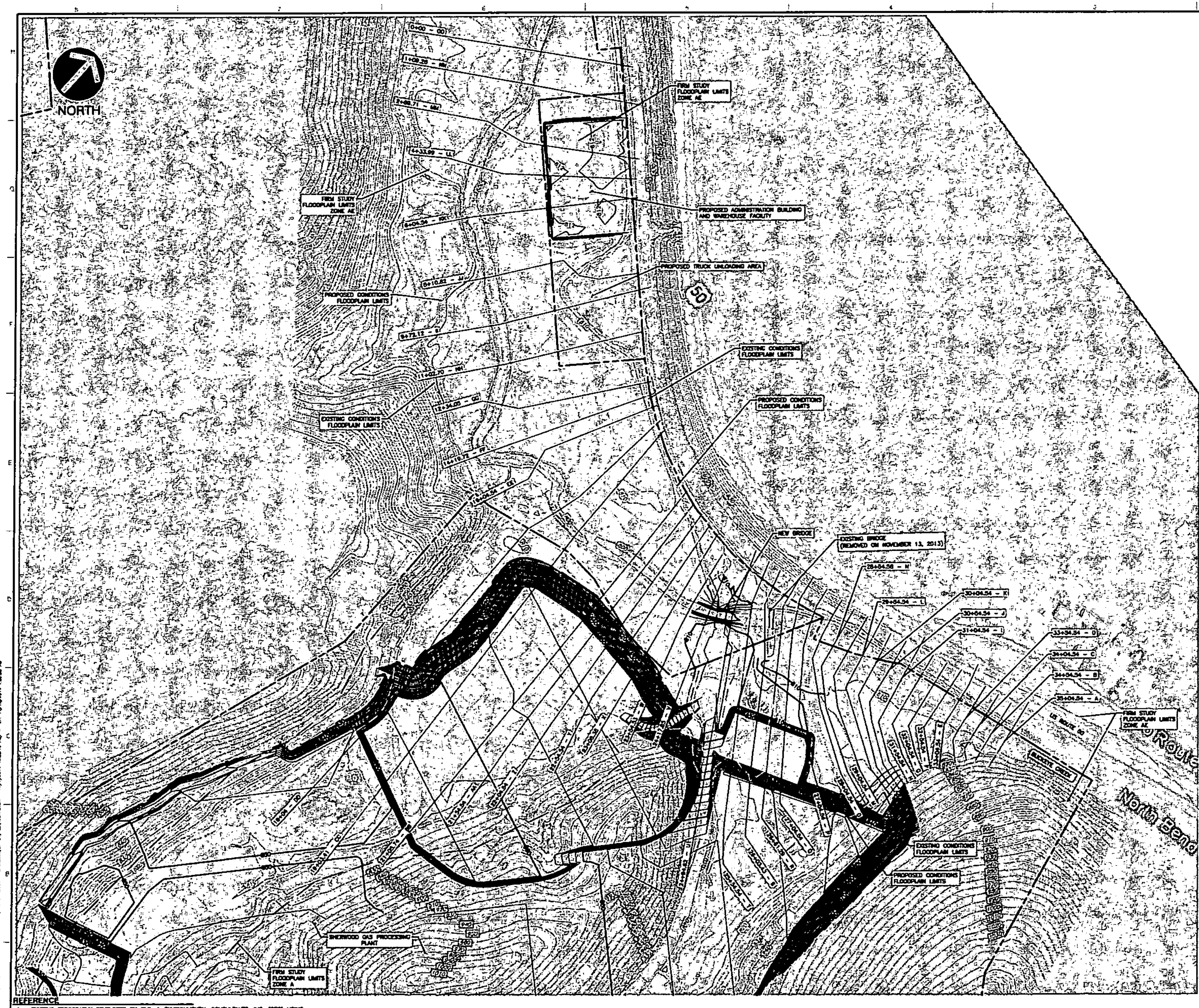
From: George Eidel [mailto:doddridgecountyfpm@gmail.com]
Sent: Wednesday, October 07, 2015 2:30 PM
To: Baker, Evan
Subject: Doddridge County Flood Plain Manager Information

[Quoted text hidden]

110-811.5001-SP-01.pdf
2208K



LEGEND

- APPROXIMATE STREAM CENTERLINE
- 303+04.54 – K: HEC-RAS CROSS SECTION
- 100-YEAR FLOODPLAIN LIMITS, CURRENT CONDITIONS
- 100-YEAR FLOODPLAIN LIMITS, PROPOSED CONDITIONS
- FIRM STUDY FLOODPLAIN LIMITS ZONE AE
- FIRM STUDY FLOODPLAIN LIMITS ZONE A
- PROPERTY LINE
- 900: EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- 900: PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR

REFERENCE

1. EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING CEC SURVEY DATA AND DIGITAL ELEVATION MODELS (USGS 3-METER), 2003 OF THE U.S. GEOLOGICAL SURVEY (USGS) AND WEST VIRGINIA STATEWIDE ADDRESSING & MAPPING BOARD (WVSAMB).
2. STREAM LOCATIONS DELINEATED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3. IMAGE PROVIDED BY GOOGLE EARTH © 2012.

SCALE IN FEET
0 150 300

* HAND SIGNATURE ON FILE

REVISION RECORD

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road - Cincinnati, OH 45242
513-985-0226 · 800-759-5614
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC.
SHERWOOD GAS PROCESSING PLANT
DODDRIDGE COUNTY, WEST VIRGINIA

EXISTING AND FINAL PROPOSED GRADING
100-YEAR FLOODPLAIN MAP

DATE: 1/29/2013
DWG SCALE: 1"=150'
PROJECT NO: 110-811.0001

DRAWING NO.: SP01

Date: May 19, 2014, 2014

To: Doddridge County Floodplain Appeals Board (Shirley Williams, Gregory Robinson & Ralph Sandora), Edwin "Bo", Wriston

Re: Appeal for Floodplain permit 14-123 that was issued to Mark West Liberty Sherwood Processing plant on May 6, 2014

We appeal the decision by the floodplain manager that was issued to Mark West on March 18, 201.4 The floodplain permit was granted by Floodplain Manager, and announced at the County Commission meeting on May 19, 2014 by Mr. Sandora

Our reasons for filing this appeal are as follows:

a. We feel that allowing storage of temporary fill in the floodway will adversely affect the health of our watershed.
b. The hydraulic studies done state that this will be temporary stockpiles of soil in the floodway. The Doddridge County Floodplain Ordinance addresses this issue in Article IV Section 4.1 and also on page 28 thru 30 part E. Fill
c. No adjacent property owners were notified. The ordinance specifically states that adjacent property owners be notified. (see page 3 Section 2.2 Definitions A General # 2)
d. The location of the site is upstream of a municipal water supply. The possibly of pollutants being discharged into the creek may occur. It has already occurred from a well site on this property.
e. Alteration of the floodway will increase the volume and velocity of the water as it heads downstream during flood events. The possibility of water backing up is also high which will affect residents living upstream.
f. We feel that until all investigations are completed, ALL activity related to this Floodplain be stopped.
g. We would like to also state that floodplain permits that have already been issued in this drain field have not been considered as far the cumulative totals for the one foot rule.

Article VIII Section 8.1 states that once an appeal is filed "the floodplain administrator shall immediately issue a STOP WORK ORDER NOTICE that shall remain in effect until resolution of said appeal" (page 42 of the ordinance).

Signed,

Doddridge County Watershed Association

Route 2 Box 210A

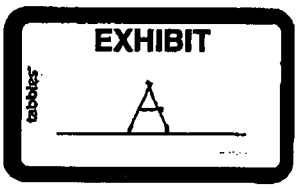
West Union, West Virginia 26456

We also request that we be notified of any correspondence and communication that occurs as a result of this appeal with Mark West or their appointed representatives.

CC:

Attn: Robert E. McHale, P.G.

Manager of Governmental & Regulatory Affairs
MarkWest Energy Partners, L.P.
601 Technology Drive; STE 300
Canonsburg, PA 15317



February 25, 2014

Beth Rogers
Clerk of the County Court
Ralph Sandora
Acting Doddridge County Flood Plain Manager
118 E. Court Street.
West Union, WV 26456

RE: Floodplain Permit Application – Mark West Liberty Sherwood Processing# 14-123

Dear Mr. Sandora:

I would like to affirm as my own the comments submitted by Mirijana Beram:

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is cumulative.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits. This application is for burying crucial head water streams and the filling in wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 404 permitting. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

I would also plead with you and the County Commission to do all you can to protect the citizens and the land of Doddridge County. It is extremely irresponsible, if not criminal, to have a facility of this nature and size upstream of the West Union water supply. I live within a mile of the project site and I fear for my health and safety and that of my neighbors. In addition to the flood plain permit hearing, I request a public hearing on the expansion of the Mark West site in question.
Thank you for your service to the people of our county.

Sincerely,

Linda Ireland

Linda Ireland
993 Black Lick Run
Salem, WV 26426
304-641-3689

facsimile transmittal

To: Beth Rogers/Ralph Sandova & Commissioners Fax: 304 873 1840
From: Jody Mohr Date: 2/24/14
Re: Floodplain Permits #'s 13-103, 14-123 Pages: 3 including cover page
Cc: S. Williams
G. Robinson

☑ Urgent ☐ For review ☐ Please comment ☐ Please reply ☐ Please recycle

Fax confirmation will serve as receipt

Thank you

DATE: 2/24/2014
TO: Clerk of the County Court
118 E. Court St.
West Union, WV 26456
ATT: Beth A. Rogers, Doddridge County Clerk
Ralph Sandora, acting Doddridge County Flood Plain Manager

In regard to: Floodplain Permit Application – Mark West Liberty Sherwood Processing plant 4&5 #13-103
And also: Floodplain Permit Application – Mark West Liberty Sherwood Processing plant 4&5 # 14-123
Please do not approve any permit application for flood plain work from Mark West Sherwood Processing Plant.
● This project already has applications on file with the Army Corp of Engineers and the WVDEP water and waste management division, 401 Permitting. This application is for burying crucial head water streams and the fill of many connecting wetland areas that cascade downhill toward Buckeye Creek. This permitting has NOT been approved yet, and the Army Corp of Engineers and WVDEP 401 permitting will continue to accept public comment on this project, AND ask for a public hearing until March 7, 2014

According to the Doddridge County flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.
If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and needs to be revoked. Please recheck your records as to this issue.
Please refer to:
CELRH-RD-E Public Notice No. LRH-2011-753-OHR James Spence, Army Corps of Engineers (304) 399-5610.
http://www.lrh.usace.army.mil/Missions/Regulatory/PublicNotices/tabid/4125/Article/20772/2011-753-ohr.aspx

Wilma Reip, WVDEP water and waste management, 401 Certification Program 304-926-0440

Thank you for not approving these flood plain permit applications.

Name: Jody Mohr

Address: 2328 Miletus Road, Salem, WV 26426

Phone number: 304-782-4019

February 24, 2014

TO: Beth Rogers, Clerk of the County Court
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application – Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is cumulative.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits. This application is for burying crucial head water streams and the filling in wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 404 permitting. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Jody Mohr

2328 Miletus Road (Doddridge County)

Salem, WV 26426

The Woods'
1585 Broad Run Road
Center Point, WV 26339

FILED
2014 FEB 25 PM 1:
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

CHARLESTON WV 250
24 FEB 2014 PM 2 L

USA FIRST-CLASS FOREVER

Beth Rogers
and
Ralph Sandora, Acting Floodplain Mgr.
118 E Court St
West Union, WV 26456

February 24, 2014

Beth Rogers, Clerk of the County Court
and
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application - Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

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2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is ***cumulative***.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits (*Army Corps. Engineers Public Notice No. LRH-2011-753-OHR*). This application is for burying crucial head water streams and the filling in over 6 acres of wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 401 Certification. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate - NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Christina Woods

Christina Woods
1585 Broad Run Road
Center Point, WV 26339

February 24, 2014

Beth Rogers, Clerk of the County Court
and
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application - Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is ***cumulative***.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits (*Army Corps. Engineers Public Notice No. LRH-2011-753-OHR*). This application is for burying crucial head water streams and the filling in over 6 acres of wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 401 Certification. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

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I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Wayne Woods
1585 Broad Run Road
Center Point, WV 26339

TO: Clerk of the County Court, Beth Rogers
Ralph Sandora acting flood plain manager
Dan Wellings former flood plain manager
118 E. Court St.
West Union, WV 26456
email: doddcoclerk@hotmail.com
RalphSandora@gmail.com
wellingsd8@gmail.com ask for a return receipt whether sending usps mail or email.

Date 3/1/14

IN REGARD TO: #14-123 flood plain application, Mark West Expansion

Please do not approve this application.

- This floodplain handles significant flood waters, allowing waters to spread out during heavy rain preventing flood damage to both upstream and downstream landowners.

- Continued development at this site, resulting in the loss of trees, vegetation, wetlands and headwater streams, will intensify flash flooding. FEMA acknowledges that flash flooding is already a concern in Buckeye Creek, Meathouse Fork, and Middle Island Creek.

- Buckeye Creek is a recreational headwater fishery emptying into Middle Island Creek. Trophy Bass and Muskie, as well as endangered mussels and a diverse aquatic and wildlife population call those creeks home. Detrimental effects have been noted in the last few years including significant erosion, sedimentation, fish with sore lesions, and mussel strandings.

- In this application, Mark West acknowledges there are other options. Please ask them to go back to the drawing board and find solutions that do not obliterate our crucial headwater streams, wetlands, and forests. The loss of all of these will only have detrimental effects on our community and aquatic species.

- If you will not immediately deny this permit, I am requesting a public hearing

Thank you,

Name: Tina Del Prete

Address: 4805 Riggins Run West Union, WV 26456

Phone number: 304-782-2076

Date: 3/1/14

Tina Del Prete

Signature or type your name, indicating this serves as your signature

TO: Clerk of the County Court, Beth Rogers
Ralph Sandora acting flood plain manager
Dan Wellings former flood plain manager
118 E. Court St.
West Union, WV 26456
email: doddcoclerk@hotmail.com
RalphSandora@gmail.com
wellingsd8@gmail.com ask for a return receipt whether sending usps mail or email.

Date 3/1/14

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- If you will not immediately deny this permit, I am requesting a public hearing

Thank you,

Name: LINDA F. PHS

Address: 366 ALLEN RUN WEST UNION WV 26456

Phone number: 304 782 3388

Date: 3/1/14

Linda F. PHS

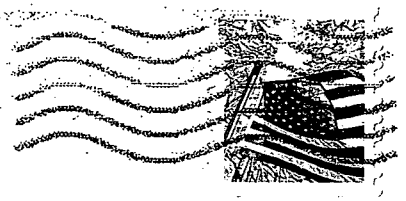
Signature or type your name, indicating this serves as your signature

Mr. J. Douglas Geelhaar
2430 Little Buck Run, Box 154
New Milton, WV 26411-6149

★ SUPPORT OUR TROOPS ★

CHARLESTON WV 250

03 MAR 2014 PM 1 L



Clerk of The Court, Beth Rogers
Ralph Sandora Flood Plain Manager
118 E Court St.
West Union WV. 26456

26456129799

TO: Clerk of the County Court, Beth Rogers
Ralph Sandora acting flood plain manager
Dan Wellings former flood plain manager
118 E. Court St.
West Union, WV 26456
email: doddcoclerk@hotmail.com
RalphSandora@gmail.com
wellingsd8@gmail.com ask for a return receipt whether sending usps mail or email.

Date March 1, 2014

IN REGARD TO: #14-123 flood plain application, Mark West Expansion

Please do not approve this application.

- This floodplain handles significant flood waters, allowing waters to spread out during heavy rain preventing flood damage to both upstream and downstream landowners.

- Continued development at this site, resulting in the loss of trees, vegetation, wetlands and headwater streams, will intensify flash flooding. FEMA acknowledges that flash flooding is already a concern in Buckeye Creek, Meathouse Fork, and Middle Island Creek.

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- If you will not immediately deny this permit, I am requesting a public hearing

Thank you,

Name: J. D Geelhaar

Address: 2430 Little Buck Run. New Martinsville WV. 26411

Phone number: 304-873-2548

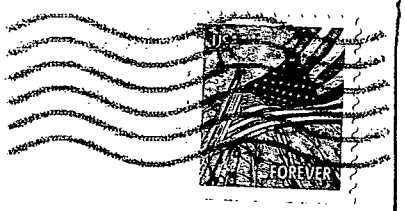
Date: 3-1-14

J. D Geelhaar

Signature or type your name, indicating this serves as your signature

M Beran
615 Riggins Run
West Union WV 26456

CHARLESTON WV 250
24 FEB 2014 PM 2 L



FILED
2014 FEB 25 PM 1:28
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Beth Rogers
Clerk of County
11 & E Court Street
West Union WV

Flood Plain Comments

26456129799

February 24, 2014

TO: Beth Rogers, Clerk of the County Court
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application – Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
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TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Mirijana Beram
615 Riggins Run
West Union, WV 26456

TO: Clerk of the County Court
118 E. Court St.
West Union, WV 26456

ATT: Beth A. Rogers, Doddridge County Clerk
Ralph Sandora,Acting Doddridge County Flood Plain Manager

FROM: Jonette Kirkwood
203 Court St.
West Union, WV 26456

RE: Flood plain Permit Application – Mark West Liberty Sherwood Processing #14-123

Please do not approve this permit application. Our county residents deserve more consideration and more protection from the issues and hazards that are presented here. As a resident of West Union, I am particularly concerned about flooding, my water quality, and the damage to our water processing equipment from increased amounts of silt in the water taken in.

Although some of the facts below have been gathered by the efforts of others, they reflect my thoughts and sentiments as well. I would also like to suggest that you consider the entire long term plan for this site (10 plants) and its impact on the health and safety of the land, streams, wildlife and people of Doddridge County.

Please do not approve this application.

- This floodplain handles significant flood waters, allowing waters to spread out during heavy rain preventing flood damage to both upstream and downstream landowners.
- Continued development at this site, resulting in the loss of trees, vegetation, wetlands and headwater streams, will intensify flash flooding. FEMA acknowledges that flash flooding is already a concern in Buckeye Creek, Meathouse Fork, and Middle Island Creek.
- Buckeye Creek is a recreational headwater fishery emptying into Middle Island Creek. Trophy Bass and Muskie, as well as endangered mussels and a diverse aquatic and wildlife population call those creeks home. Detrimental effects have been noted in the last few years including significant erosion, sedimentation, fish with sore lesions, and mussel strandings.
- In this application, Mark West acknowledges there are other options. Please ask them to go back to the drawing board and find solutions that do not obliterate our crucial headwater streams, wetlands, and forests. The loss of all of these will only have detrimental effects on our community and aquatic species.

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3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is cumulative.
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According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
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TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Jonath Kirkwood

FILED

2014 FEB 25 PM 1:26

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

TO: Clerk of the County Court, Beth Rogers
Ralph Sandora acting flood plain manager
Dan Wellings former flood plain manager
118 E. Court St.
West Union, WV 26456
email: doddcoclerk@hotmail.com
RalphSandora@gmail.com
wellingsd8@gmail.com ask for a return receipt whether sending usps mail or email.

Date: February 24, 2014

IN REGARD TO: #14-123 flood plain application, Mark West Expansion

Please do not approve this application.

- This floodplain handles significant flood waters, allowing waters to spread out during heavy rain preventing flood damage to both upstream and downstream landowners.

- Continued development at this site, resulting in the loss of trees, vegetation, wetlands and headwater streams, will intensify flash flooding. FEMA acknowledges that flash flooding is already a concern in Buckeye Creek, Meathouse Fork, and Middle Island Creek.

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- If you will not immediately deny this permit, I am requesting a public hearing

Thank you,

Name: Louanne Fatora

Address: Smithton Road, West Union, WV 26456

Phone number: 970-389-5451

Louanne Fatora

typed name indicates this serves as my signature

14-123

FILED

2014 JUL 15 PM 4:01

CATHY A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

David T. Richardson
Attorney at Law
DTR LAW APC
(Licensed in California, Texas, and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 991-5290
Fax: (619) 522-9260

July 15, 2015

Via Hand Delivery
Doddridge County Commission

RE: Appeal of Floodplain Permit #14-123

Dear Sir or Madam,

Please be advised that I have been retained by the Doddridge County Watershed Association (the "DCWA") in regards to their appeal of the above-referenced floodplain permit (the "Mark West Permit"). As the DCWA made clear in its Notice of Appeal, and as this letter will reiterate, numerous rules and requirements mandated by the Doddridge County Floodplain Ordinance (the "Ordinance") were not followed when the Mark West Permit was issued (i.e., rules and requirements that are directly related to public health, safety, and welfare as well as rules and requirements that are directly related to the protection of Constitutional Due Process Rights of residents of Doddridge County). While there were numerous rules and requirements that were not followed, this letter will identify the more important rules and requirements that were not followed. This letter will also explain why the Doddridge County Commission aka the Doddridge County Floodplain Appeals Board ("DCC") must revoke the Mark West Permit (and also explain why the Mark West Permit is automatically void and should simply be declared as such). Additionally, this letter will explain why Mark West's allegations regarding the DCWA lacking "standing" to appeal the Mark West Permit are incorrect (i.e., the allegations contained in the complaint Mark West filed in its recently dismissed lawsuit against the DCC).

By way of background, I represented the Huff Family in the lawsuit that EQT Production Co. filed against the DCC in regards to the revocation of a certain floodplain permit that had been previously issued to EQT which would have allowed EQT to construct a natural gas well-site in a floodplain situated at the Huff Farm. As you are aware, the Doddridge County Circuit Court ultimately declined to issue an order mandating that the DCC return said permit to EQT. The Court refused to order the return of EQT's permit because the Ordinance was constitutionally defective. Specifically, said ordinance failed to provide adequate Due Process (i.e., notice and an opportunity to be heard) to persons living near the sites of planned floodplain

developments/construction. The Huffs and the Fosters were deprived of Due Process because they did not receive notice of EQT's permit application, did not receive notice of the Floodplain Administrator's issuance of said floodplain permit, and were not afforded an opportunity to object to the application for and issuance of said floodplain permit.

Following the Court's ruling, the DCC amended the Doddridge County Floodplain Ordinance so as to ensure that the Due Process rights of residents living near planned floodplain developments were protected (the Ordinance was also amended so that it was better equipped to deal with the development and construction of large scale natural gas facilities in floodplains and floodways). As you are all well aware, the amendment process was a long and drawn out process that involved numerous revisions as well as numerous comments provided by several interested persons (and several of those comments were provided by myself and my mother-in-law/client, Joye Huff). After a number of months a new Ordinance was enacted by the DCC. This is the Ordinance that governs the Mark West Permit.

As the persons tasked with enacting the present Ordinance, the DCC surely knows that the Ordinance contains specific rules and requirements that was must be followed prior to the issuance of a floodplain permit. The DCC also knows that failure to follow these rules and requirements can have serious repercussions. The most severe and obvious repercussion is inadvertently putting the public health, safety, and welfare by not following the rules and requirements of the Ordinance (e.g., allowing construction in prohibited areas and/or allowing impermissible alterations of the floodway. Another repercussion from the issuance of floodplain permits in violation of the Ordinance is the possibility of significant sanctions from FEMA. One such sanction is suspension from the National Flood Insurance Program, and said suspension would result in Doddridge County and residents of Doddridge County no longer having access to either flood insurance or the federal disaster relief funds typically provided to flood prone areas (i.e., Special Flood Hazard Areas)(note, attached hereto as Exhibit "A" is a news article describing the plight of a small Pennsylvania town that failed to enforce the requirements of its own floodplain ordinance). Obviously, said sanction would have a devastating impact on the residents of Doddridge if it were ever implemented. Moreover, failure to follow the rules and requirements of the Ordinance (especially the ones related to Due Process) may subject Doddridge County to a lawsuit (and as was seen by the EQT v. the DCC/Huff/Foster case, lawsuits can be extremely costly as well as time consuming).

I mention the above for the following purposes: (a) to explain that I do know what I am talking about when it comes to the Ordinance (I spent a year and a half litigating a lawsuit that was solely about the Ordinance, and I then spent several months thereafter participating in the amendment process), (b) to assure the DCC that the DCWA is 100% correct when it states that the Ordinance was not followed when the Mark West Permit was issued, and (c) to make clear that that it is vitally important that the Ordinance's rules and requirements are followed because otherwise the County's residents could be harmed, the County's residents could lose their ability to obtain flood insurance and flood related federal disaster funds, and the County itself could face, yet another, costly lawsuit.

Several rules and requirements were not followed when the above-referenced floodplain permit was issued, but a handful are of particular importance due to public health, safety, and

welfare issues and due to Constitutional Due Process issues. In the interest of not confusing the issue, this letter will focus solely on these violations of the Ordinance (and not the numerous other violations that are not quite as severe).

Before I begin, I would like to say that I have noticed a pattern of the Ordinance's more important rules and requirements being treated as discretionary as opposed to mandatory. There is a reason why these rules and requirements are mandatory...they directly relate to protect people, their property, and their rights (and helps the County and its residents avoid lawsuits). As such, I respectfully request that the DCC and the Floodplain Administrator give consideration to making sure that when a provision in the Ordinance says "shall" that said provision be enforced.

A. Floodway Issues

There are several issues related to the Mark West permit's lack of compliance with the Ordinance's Floodway requirements. These issues are especially troublesome because the Floodway is the most dangerous portion of the floodplain in terms putting the public health, welfare, and safety at risk (i.e., putting people and their homes at risk of increased flooding and/or increased velocity of floodwaters).

The Ordinance describes the Floodway as "present[ing] increased risk to human life and property due to their relatively faster and deeper flowing waters", and the Ordinance mandates that the Floodway "shall be preserved to the greatest extent possible" (see Section 4.1(B), pg. 16 of the Ordinance). FEMA identifies the Floodway as "the stream channel that must remain open to permit passage of" the floodwaters "and anything in" the Floodway "is in the greatest danger during flooding". Basically, Floodways are to be left alone because they are a hazard (see FEMA info regarding "Floodway Analysis" attached hereto as Exhibit B). Additionally, interfering with and/or altering the Floodway can increase flooding. Floodways are used to accommodate flooding (i.e., by allowing the floodwaters to move forward), and if they are blocked by fill or by structures then the floodwaters can accumulate and the point of the blockage and the areas behind causing the height of the floodwaters to increase. Note, I realize that the Floodway sounds like a complicated thing, but it is really rather simple. The Floodway is the dry ground on either side of the normal water level of a creek, river, fork, stream, etc. (attached as Exhibit C is a sketch of a generic Floodway from a different floodplain ordinance).

Note, given the obvious importance of the Floodways and the danger caused by Floodways, it shouldn't come as a surprise that the Ordinance has several rules and requirements as to Floodways. Almost all of which are mandatory and not discretionary.

1. Mark West was required to delineate the Floodway and failed to do so.

Pursuant to the Ordinance, Mark West was required to delineate (i.e., identify) the Floodway in the site plans it submitted with its floodplain permit application (see Ordinance Section 5.4 (D), pg 24) (see attached NFIP map that was part of the Mark West Permit Application that identified the project site as being in an Approximated Area attached hereto as Exhibit "D"). Despite being required to delineate the Floodway(s), Mark West did not do so.

Pursuant to the Ordinance, whenever construction is planned in an Approximated

Floodplain that will be two acres or larger, the applicant must have a licensed engineer delineate (i.e., identify) the Floodway. Here, the development at issue in the Mark West Permit easily exceeds two acres. The site location map shows attached to the Mark West Permit application shows the area of disturbance to be enormous (see attached as Exhibit "E", said site location map), and a very conservative estimate of the area of disturbance is well over 2,000,000 square feet (i.e., at the very least 45 acres). Note, the requirement to delineate the Floodway is mandatory. It is not at the Floodplain Administrator's discretion. As such, Mark West's failure to delineate the floodway means that the Mark West Permit does not comply with the Ordinance. Additionally, the fact that the Floodplain Administrator issued the Mark West Permit without requiring the Floodway to be delineated means the Floodplain Administrator issued the Mark West Permit in violation of the Ordinance.

2. Fill in the Floodway.

Mark West intends to place large amounts of fill in the area identified in the site location map referenced above (i.e., "at various locations on the site")(see attached as exhibit "F" pg. 1 of Mark West's Jan. 2014 hydraulic study re the site). Since Mark West failed to delineate the Floodway as required by the Ordinance, there is no document that states that fill would be placed into the Floodway(s). But if Mark West had delineated the Floodway(s) as required by the Ordinance then it is almost certain that said delineation would show that fill would be (and already had been) placed in the Floodway(s). I say this because the Mark West project filled in two streams and/or tributaries of Buckeye Creek. By filling in the streams and/or tributaries Mark West literally put fill in the Floodways by filling the Floodways along with portions of the streams and/or tributaries. Further, Mark West built bridges over Buckeye Creek and is siting various new developments related to the site directly next to Buckeye Creek (e.g., a truck unloading area comprised of fill directly adjacent to Buckeye Creek). Given the proximity of these structures (and the fill related to them) to Buckeye Creek, it is almost certain fill has gone into the Floodway of Buckeye Creek.

The Ordinance has two main requirements as to the place of fill into a Floodway. One, fill cannot be placed in a floodway unless it has first been demonstrated that the fill will not cause ANY increase in the base flood elevation (i.e., no increase in flooding at all)(see Ordinance Section 6.1 (E), pg. 29). Two, no development shall be permitted in the Floodway where reasonable alternatives exist elsewhere, and Mark West had to demonstrate that there were no other "reasonable alternatives" before it could be issued the floodplain permit (see Ordinance Section 4.1(B)). If Mark West had delineated the Floodway(s) as required by the Ordinance, then it is almost certain that the results would have shown that Mark West was placing (and has already placed) fill in the floodplain without FIRST demonstrating that said fill would not cause ANY increase in the base flood elevation (i.e., the level of the floodwaters). Additionally, Mark West would have been required to demonstrate no other "reasonable alternatives" were available for its project site before the Floodplain Admin could have issued the Mark West Floodplain Permit. More importantly, it defies logic that if there has been filled placed in the Floodplain (especially to the extent that entire streams have been "filled"), that has not been even a slight rise in the Base Flood Elevation (in violation of 6.1(E)).

B. No Contractor Contracts Presented to Floodplain Administrator and None Saved in File.

Pursuant to the Ordinance, Mark West had to present copies of any and all contracts it entered into with any contractors in regards to the work to be done pursuant to the Mark West Floodplain Permit (see Ordinance Section 5.2 (H), pg. 20). Failure to do so within 14 days of the contracts being signed AUTOMATICALLY VOIDS the floodplain permit. Void means no appeal necessary. Void means the no hearing necessary. Void means the floodplain permit ceases to exist.

We know that Mark West hired at least one contractor to do work on the project (see the permit application --- Anderson Excavating). But there are no contractor contracts in the Mark West Permit File as required by the Ordinance (see attached as exhibit "G" Affidavit of Tammy Beamer). As such, the Mark West Floodplain Permit is void (i.e., automatically ceases to exist as if never applied for and issued...non-existent).

The reason why the Ordinance requires proof of the contractor contracts is related to public health, welfare, and safety. Specifically, the purpose of the requirement is to ensure that only licensed professionals are building large scale projects in floodplains. The point is, by ensuring only professionals are allowed to build in the floodplain, you are also presumably ensuring that the quality of work done will be of a professional level, and you will avoid a situation where someone unqualified is building something in a floodplain that is incapable of resisting floodwaters and, in the event of a flood, will break apart, explode, etc. I bring this hope so as to show that this is actually an extremely important provision, and there is a reason why persons who fail to comply with it have their floodplain permits voided.

C. Improper Notice Given to the Community in Violation of Constitutional Due Process Protections and in violation of the Floodplain Ordinance.

Note, the above issue is especially troublesome given the expense and heartache incurred by the parties to the EQT v. Doddridge/Huff/Foster as a result of the EQT floodplain permit that was issued in violation of the Due Process rights of the Huffs and the Fosters. That case ended because the original Ordinance was deemed unconstitutional for failing to provide adequate notice and opportunity to be heard for people like the Huffs and Fosters (i.e., persons who are having to deal with 3rd parties building potentially destructive floodplain projects on or near their property). If the Huffs and Fosters had been giving notice of the application for the EQT floodplain permit and an opportunity to object, then they might have been able to nip the matter in the bud and save everyone the expense and stress of a year and a half of litigation. Additionally, the whole point of amending the Ordinance was to rectify the issues with a lack of Due Process related to floodplain permits.

But all the changes in the world to the Ordinance don't do any good if rules and requirements are added to the Ordinance to provide for Due Process, but are NOT properly enforced.

Failure to Place Permit Info on the DCC Agenda.

The Ordinance requires that the specific information related to a floodplain permit (both

the application for and issuance of a permit) be placed on the DCC Agenda ahead of the DCC meeting at which the announcements will be made as to the floodplain permits (i.e., name of applicant and location of planned project). Last I checked the only info placed on the DCC Agendas related to Floodplain Permits was a generic statement that Floodplain Permits will be heard as Agenda Item No. X. No specific information is provided despite the requirments of the Ordinance and the requirements of Due Process.

Moreover, by failing to place the specific information regarding each floodplain permit on the Agenda, the entire legal advertisement notice process is essentially defeated (especially, when the ads don't run until after the deadline to object or appeal has expired, and I have seen those situations). The problem is, the legal advertisement does not state which date the announcement was made about the floodplain permit (regardless of whether the announcement is to say it was applied for or to say it was issued or denied). So, how is an interested party, like the DCWA, supposed to know when a permit is applied for or granted or denied if there isn't specific information provided on the Agenda? Are they supposed to attend every single DCC Hearing and just in case maybe an announcement will be made about a floodplain permit that matters to them?

In the case of the DCWA, notice regarding the application for the Mark West Permit was not placed on the DCC's Agenda (i.e., all a DCWA member would have seen was the generic statement that Floodplain Permits will be discussed). Further, the legal advertisement for the Mark West Permit Application states that the date that the permit was applied for was February 5, 2014. It also says anyone who wants to comment or object has until 20 days after the permit application was announced at the DCC meeting. Additionally, it says that the deadline to comment or object is February 25, 2014. Obviously, there is something seriously wrong with those dates.

One, in order for this to work, as mandated by the Ordinance, Mark West would have had to have applied for the Floodplain Permit on February 5, 2014, the clerk would have had to put it on the Agenda on February 5, 2014, and the DCC would had to have had a meeting on February 5, 2014 whereat the application was announced. Otherwise, it would be impossible for there to be 20 days for the comment and/or object period post-announcement (i.e., the deadline was February 25, 2014). Putting aside the sheer impossibility of, on the same day, an application being processed, an agenda being printed the same day, and a DCC meeting being held right after to announce the application, there is the obvious and huge problem in that the 5th of February was a Wednesday (and the DCC meets on Tuesday). As such, there could not have been an announcement on the February 5, 2014, and accordingly, the DCWA (and every other interested parties' Due Process rights were violated, and the rules and requirements contained in the Ordinance were violated). Additionally, the newspaper ad did not even run until February 11, 2014 (see attached as Exhibit H copies of all relevant legal ad documents). As such, not only were the DCWA members deprived of proper notice, they were also deprived of their rightful 20 day period to comment and/or object (given there was apparently no announcement at the DCC Meeting until, at the very least, almost a week after the Permit was applied for, at best they had 15 days of notice.

As such, not only was the Ordinance not followed as to the notice requirements, my clients also have a potential Due Process claim that they could bring against the DCC in order to

have the Mark West Floodplain Permit revoked.

The DCWA's Standing to Appeal

In the complaint Mark West filed against Doddridge County after the Stop Work Order was issued following the DCWA's appeal (a Stop Work Order that the Ordinance does not allow to be lifted until after the Appeal is decided...but I digress), Mark West alleged that the DCWA lacked the standing to appeal the Mark West Permit.

Mark West's argument is incorrect. The DCWA has standing to challenge the Mark West Permit. One, the DCWA is a legitimate organization dedicated to protecting the watersheds and water sources of Doddridge County. It was founded years ago in response to a leak and/or dump of chemicals into Buckeye Creek (i.e., the same creek that Mark West is building next to). The DCWA holds regular meetings and government officials regularly come to these meetings to give informational sessions, hold seminars, and discuss watershed related topics (obviously said government officials consider and treat the DCWA as the legitimate organization that it is). Objecting to and appealing a proposed floodplain project for the purposes of protecting the source of drinking water for West Union (i.e., the home of the DCWA and its members) and also protecting the very creek that pollution of which gave rise too the DCWA, is pretty much the definition of germane to the DCWA's purpose. Moreover, there are DCWA members who live very close to the site of the Mark West project, and who may be harmed by the project, and whose interests will be protected by the DCWA's appeal. In short, the DCWA has standing in its own right and also on behalf of its members.

Conclusion

Given the foregoing and given the grievous violation of the Ordinance (i.e., as to the rules and requirements protecting Public Health, Safety, and Welfare and as to the rules and requirements in regards to the violation of the DCWA member's Due Process Rights), the only correct choice is to revoke the Mark West Floodplain Permit and have Mark West resubmit another floodplain permit application that, unlike the one at issue here, actually conforms to the requirements of the Ordinance. The other alternative is to declare the Mark West Floodplain Permit void for failure to provide the Floodplain Administrator with copies of the contractor contracts (which would accomplish the same result). Otherwise, Doddridge County has issued a floodplain permit in violation of its own Ordinance, and as such, opens itself up to FEMA sanctions as well as the possibility of Court action.

Best regards,
/s/

David T. Richardson, Esq.

Tina DelPrete
4805 Riggins Rd
West Union, WV 26456

To: Beth Rogers County Clerk
Ralph Sandora Acting County Floodplain
Manager

118 E Court St.
West Union, WV 26456

Feb. 24, 2014

To: Beth Rogers, clerk of the County
Ralph Saudara, Acting County Flood Plain Manager
118 E Court St
West Union, WV 26456

In Re: Flood Plain Permit Application -
Mark West Liberty Sherwood Processing #14123

Please do not Approve This permit Application For Mark West Sherwood Processing Plant. My Reasons are listed below

1- No Adjacent Property owners were Notified as provided by the Doddridge Flood Plain ordinance.
2- The premise of This study is based on the study That was submitted with the Dec. 2013 flood plain Application. This Application has Not been Approved yet and you are waiting for further information on it.
3- The flood plain ordinance clearly states That the elevation can not be raised by more than a foot when you Total up the four studies and Applications That Mark West has submitted, the increase exceeds the one

4.- The fill being placed will destroy wetland areas and block streams. Mark West needs permits from The Army Corps of Engineers. They Applied for permits. This Application is for burying critical head water streams And filling of wetland areas

5- Mark West also needs a permit from WVDEP Water and Waste Management division, 401 permitting. This permit would Allow Them To discharge into Buckeye Creek, which is upstream from The West Union Municipal Water Supply. This permit has NOT been issued yet.

According To The Flood Plain ordinance

4.4 C of ordinance

C- Any development And/or use of land shall be permitted PROVIDED That all such uses, Activities And/or development shall be TAKEN In STRICT compliance with the flood proofing And related provisions contained herein and in all other Applicable Federal and State laws, ordinances and regulations

Section 4.5 Alteration or Relocation of a Stream

A- Whenever a developer intends To Alter or Relocate a stream within The flood plain area, The developer shall notify in writing, by Certified Mail, Doddridge County's flood Plain Administrator, The State Coordinating office, and any Adjacent

Communities and any adjacent property owners of all intended Activities PRIOR To The Alteration or Relocation of the Stream. Copies of all required notifications Must be Submitted To The Federal Emergency MANAGEMENT Agency. I Addition PRIOR To ISSUING The local permit, The Flood Plain Administrator Shall Require copies of all Necessary permits From Those governmental Agencies From which Federal or State law Requires approval.

To Reiterate - NO PERMITS have been ISSUED Yet from Federal or State Regulators

IF Any Flood plain permits for This particular project WAS been granted, it would have been granted in Violation of This Flood plain Ordinance and needs To be Revoked. PLEASE Recheck your Records as To This ISSUE

I also Request That a public Meeting be held so That County Residents have an opportunity To voice Their Concerns.

Respectfully Yours,
Tina Wet Pete
4805 Riggins Run
West Union, WV 26456

To Stumpf
4805 Riggins Run
W. Union, W.V. 26456

No Enforcement? No Insurance.

FEMA has sent a strong message to one Northeastern Pennsylvania town — start enforcing flood plain management statutes or lose your right to participate in the National Flood Insurance Program. The borough is now on probationary status as of October 1, 2012.

The reason: the borough is cited with failure to manage floodplain development in accordance with the Borough's floodplain program, and lack of adequate record keeping. That put the borough in a rather dire situation, but that wasn't the only issue facing West Pittston. It was also tasked with finding $2.56 million to cover cleanup costs after Tropical Storm Lee blew into town in 2011.

As recently as two weeks ago, the borough had taken out a loan in that amount. A risky move in itself, for if the borough did not receive federal funding by December 31st, the residents of West Pittston would end up paying.

Consider it an early Christmas gift – the federal government has come up with 75 percent of the borrowed amount, exactly one week after the borough took out the loan.

The borough is yet to be out of the deep end, so to speak. There's the matter of those unenforced statutes to be dealt with, along with that extra 25 percent in monies borrowed. If the borough does not comply with the National Flood Insurance Program guidelines by December 1, the town could be suspended from the program.

The impact of any potential suspension would be significant — there are currently 358 NFIP policies in force in the borough. As it stands, residents are able to still purchase flood insurance during the probationary period, but will now be faced with paying an additional $50 surcharge. Should the borough be suspended, residents will no longer have access to either flood insurance deral disaster assistance usually afforded structures within Special Flood H ionally, federal law prohibits federal agencies from making grants, loans, or gu or construction of structures located in a SFHA.

In a population of just 4,868, tha

Nicholas Morici, spokesperson fc ugh's problems stem from not following their own flood plain ordinances. "The Borc 59 structures within its Special Flood Hazard Area (SFHA). The most recent inform ugh indicates that only slightly over 25% of these structures have received the permits required by the local floodplain ordinance. The Borough is currently working to reach out to the citizens in the floodplain to determine the extent and severity of any violations that may have resulted from work that occurred without the required permit within the SFHA."

Morici says that each community that joins the NFIP is required to adopt a floodplain ordinances that meets

Ex A

or exceeds the minimum NFIP requirements of 44 Code of Federal Regulations, Part 60. "In exchange for adopting and enforcing a floodplain ordinance, the community and its citizens gain access to the benefits of participation in the NFIP: flood insurance, disaster assistance and mitigation grants."

According to Morici, communities are required to enforce their floodplain ordinances, as they do any building codes. (More information about construction in floodplains may be found at the FEMA website.)

West Pittston isn't the only borough with compliance issues. Morici shared with me a nine-page list of communities that have been suspended from the NFIP for failure to enforce their floodplain ordinance, as well as the reason for their suspension. Says Morici: "A number of communities nationwide have enforcement issues." (See Communities Suspended from NFIP.)

So what about the residents? How can they be protected despite their municipality's negligence to enforcement? Morici says there's little FEMA can do. "Although FEMA remains committed to helping the Borough maintain its eligibility for FEMA assistance and programs, FEMA is prohibited from providing flood insurance in a community unless the community enforces floodplain management measures that meet or exceed the minimum NFIP requirements of 44 Code of Federal Regulations, Part 60. "

In other words, no dice.

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Related

News and Notes

Sinking Your Risk Management Plan

Found at RIMS: Opportunity

Risk Notes

Ex A

matter by locating the flood elevation on the ground via an elevation survey. This elevation represents the actual extent of flooding for that particular flood.

Note: Banks, lending institutions and others who must read the FIRM to determine if flood insurance is required must go by the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a request for a map revision or map amendment so the map can be officially changed to reflect the more accurate data (see Unit 4, Section D).

FLOODWAY ANALYSIS

The final step in preparing most riverine flood studies is to produce the floodway analysis, which identifies where encroachment by development will increase flood elevations significantly and worsen flood conditions.

The floodway is the stream channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. FEMA has mapped designated floodways in more than 8,000 communities.

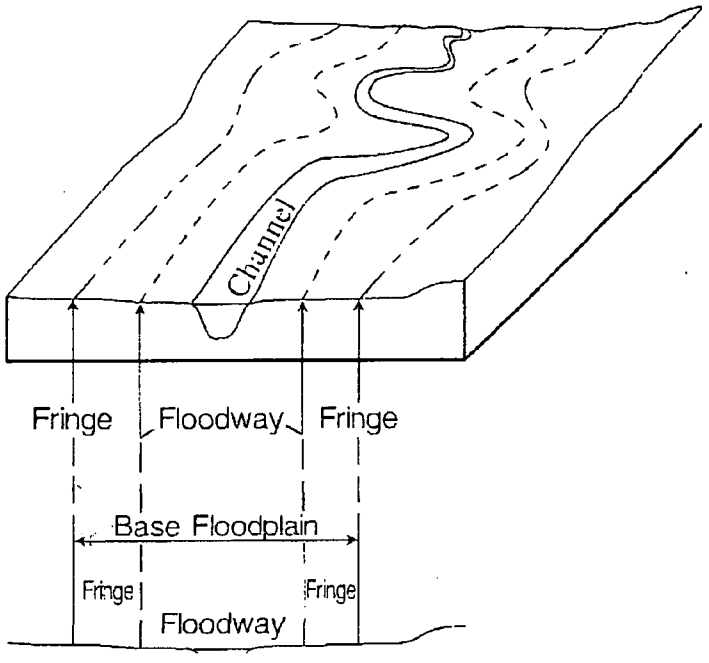


Figure 3-6: Floodway cross section and map

The remainder of the floodplain is called the flood fringe (Figure 3-6), where water may be shallower and slower. The floodway and the flood fringe together comprise the base floodplain or special flood hazard area. On the flood map these areas will be designated as Zone A1-30 or AE. NFIP minimum standards provide that other areas outside the boundaries of the floodway can be developed without further analysis. Consequently, most communities permit development in the flood fringe if the development is elevated or otherwise protected to the base flood level (or any higher state or local standards). Development in the floodway is allowed if it can be demonstrated that no rise in the base flood elevation will occur. It is recommended, however, that

Ex B

floodway development be discouraged or even prohibited because of the hazardous nature of this area.

A floodway analysis determines the boundaries of the floodway using these floodplain management concepts:

- Continued development in the floodplain will likely further obstruct flood flows, which will back water up or divert it to other properties.
- Properties on both sides of a river or stream should be treated equitably. The degree of obstruction permitted now for one should be permitted in the future for the other.
- Property owners should be allowed to develop their land, provided they do not obstruct flood flows, cause damage or create a nuisance to others. (A community may allow development in the flood fringe that cumulatively increases the BFE, but NFIP regulations specify that such total increases cannot exceed one foot at any point along the stream. Some states or communities have more restrictive standards that must be met.)

A floodway analysis is done with a computer program that can make the necessary calculations of the effects of further development. Beginning at both edges of the floodplain, the computer model starts "filling" the floodplain. This "squeezes" the floodwater toward the channel and causes the flood level to rise. At the point where this process reaches a one foot rise, the floodway boundaries are drawn (Figure 3-7).

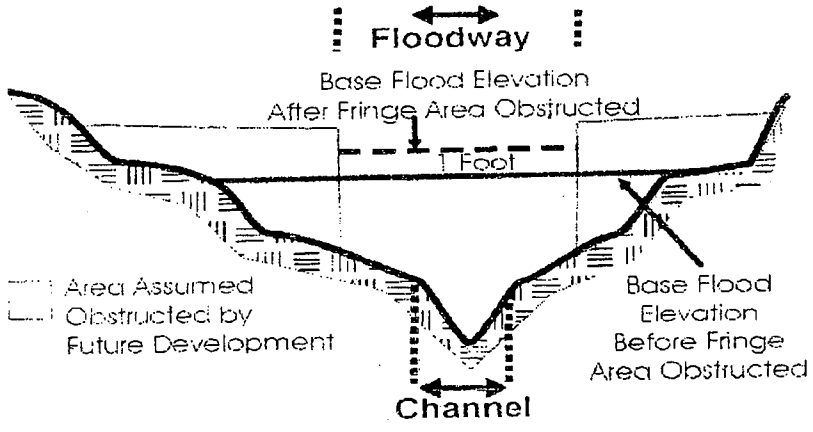


Figure 3-7: Computer floodway analysis

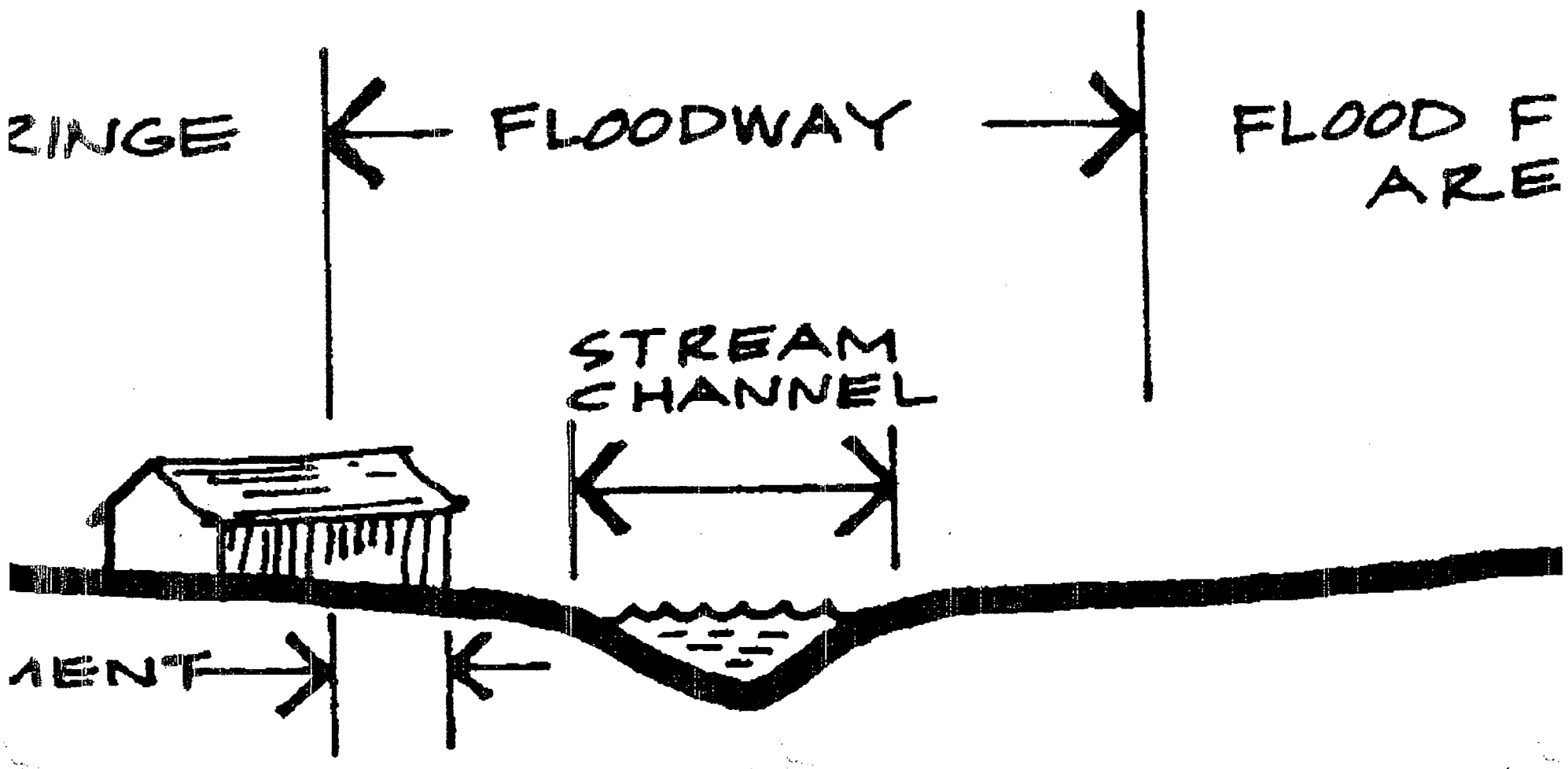
The floodway boundaries at each cross section are transferred to the topographic or contour map that shows the SFHA boundaries. The plotted points are connected to show the floodway and flood fringe on the floodplain map.

Not every cross section will show an exact one-foot rise. Topographic conditions and the need to "smooth out" the floodway line will result in some cross sections having increases of less than one foot.

Ex B

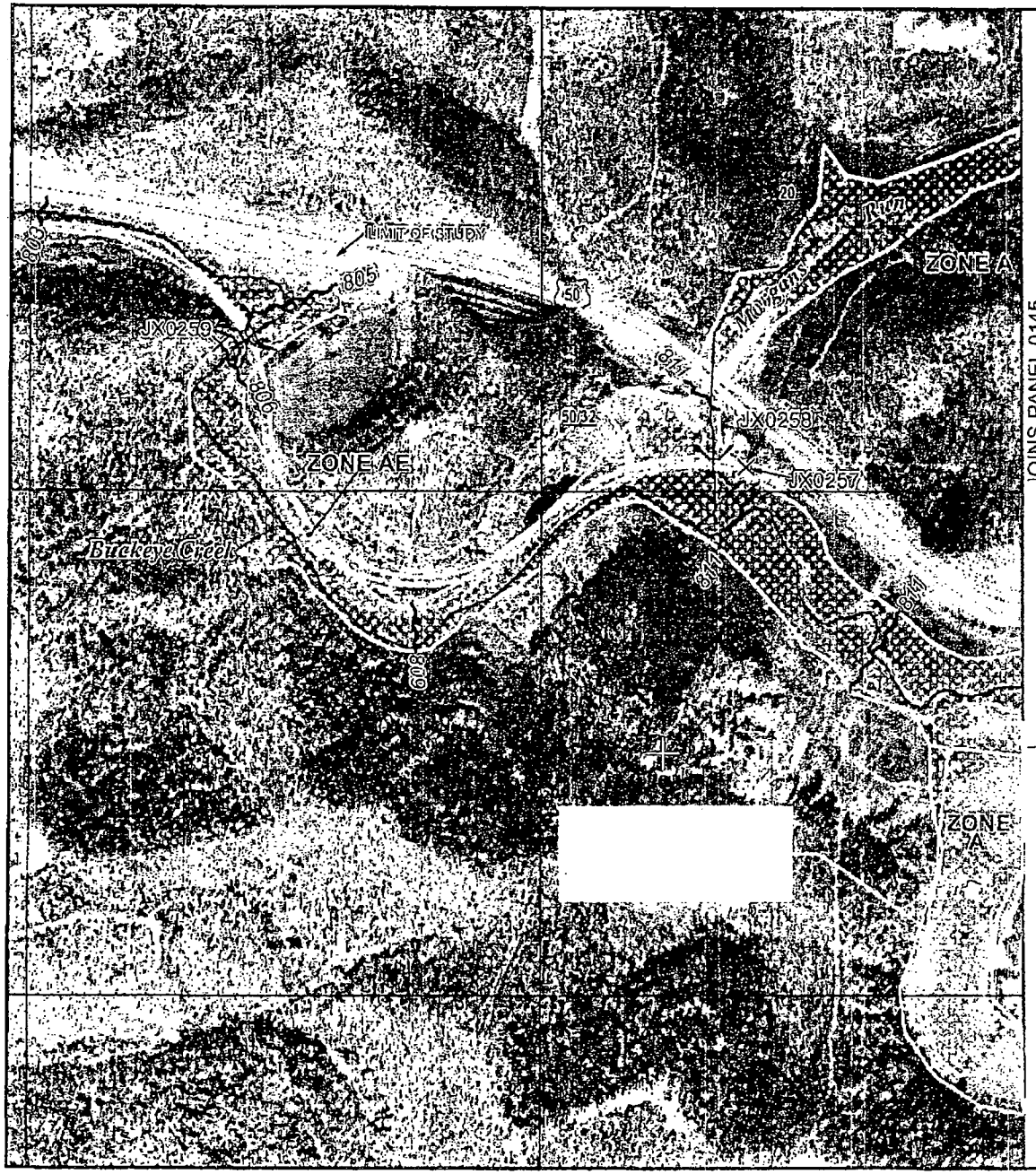
FLOOD PLAIN

FLOOD HAZARD AREA



OD PLAIN CROSS SE

EXC



MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

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.

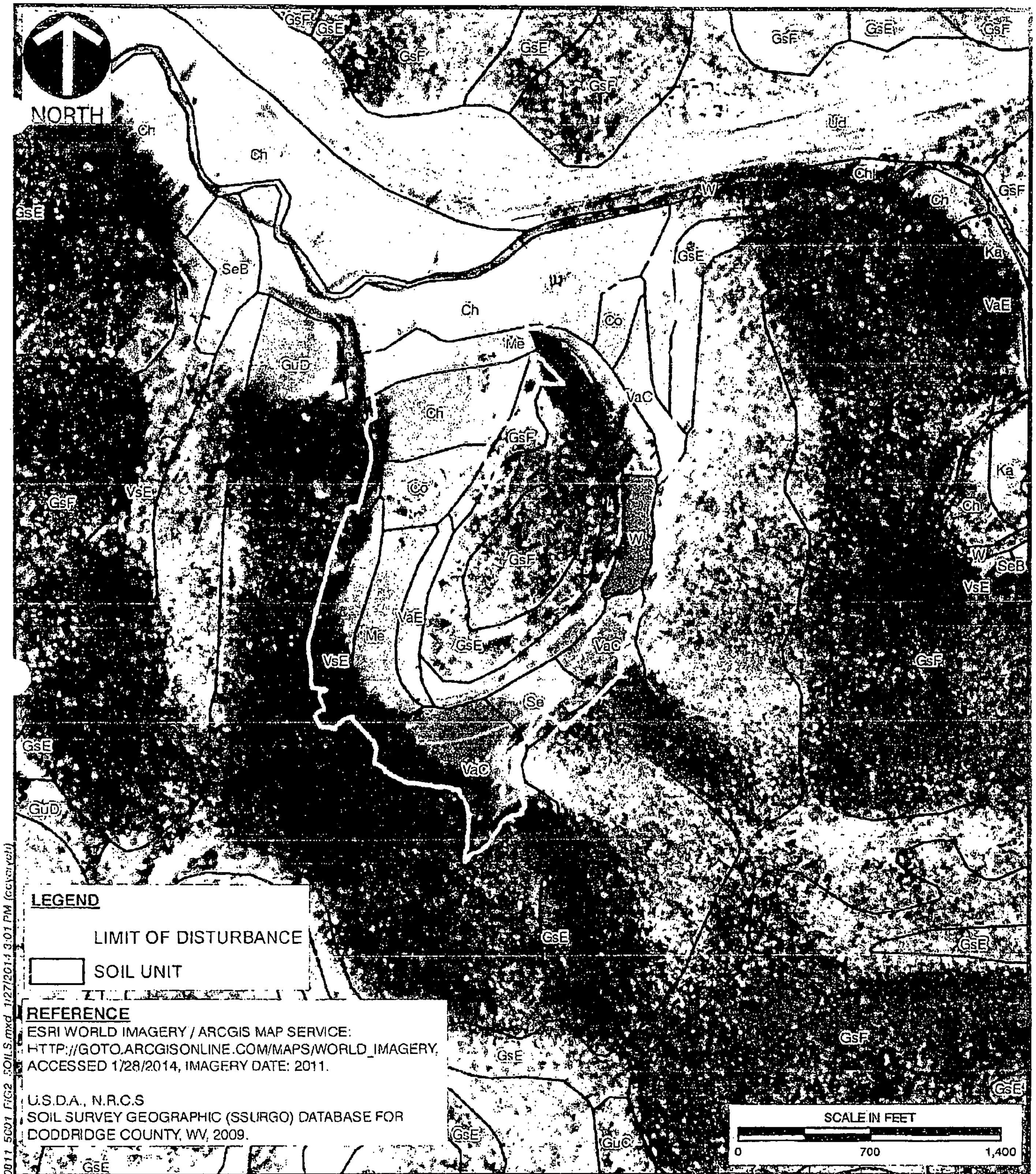
MAP NUMBER
54017C0140C

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

Exhibit 3



CEC

Civil & Environmental Consultants, Inc.

333 Baldwin Road - Pittsburgh, PA 15205-9072

412-429-2324 · 800-365-2324

www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC
SHERWOOD GAS PROCESSING PLANTS 6 &7
DODDRIDGE COUNTY, WV

SOILS MAP E&E

DRAWN BY:	CLC	CHECKED BY:	TGJ	APPROVED BY:		FIGURE NO:
DATE:	1/27/2014	SCALE:	1 " = 700 '	PROJECT NO:	110-811.5001	2

1.0 INTRODUCTION

1.1 BACKGROUND

MarkWest Liberty Midstream & Resources, LLC (MarkWest) has contracted Civil & Environmental Consultants, Inc. (CEC) to perform a master plan flood study as part of the final buildout of the Sherwood Gas Processing Plant located approximately one-half-mile east of the intersection of U.S. Route 50 and County Route 20 along County Route 50/34 in Doddridge County, West Virginia. The final buildout includes the construction of Plants 6 through 10, de-ethanizers, and substation expansion. A Floodplain Permit was issued on August 28, 2013 to MarkWest for the Sherwood Gas Processing Plants 4 and 5 Expansion. This permit included grading improvements for Plants 1-5, the truck unloading area, an access road with a new bridge from County Road 50/34, and temporary stockpiles. An update to the Floodplain Permit was submitted on December 3, 2013 to include additional temporary stockpiles as part of the construction of the gas processing plants. The original permit is included in Appendix F.

MarkWest now plans to finalize grading as part of the final buildout construction plans. The earthmoving operations will include the removal of the temporary stockpiles adjacent to Buckeye Creek along with fill placement at various locations on the site to accommodate final plant construction. A site location map has been provided in Appendix A. The new Doddridge County Floodplain Application is included in Appendix F.

As part of the previously revised flood study of December 2013, CEC performed an additional survey to acquire more accurate and current topography for the stream, overbanks, and newly constructed bridge between stations 25+54.54 (Section T) and 0+00 (Section OO). The resulting existing surface utilized in the December 2013 flood study is also used in this Master Plan flood study. Water surface elevation increases in this flood study are indicative of the total impact of the proposed final Sherwood Gas Processing Plant development on the existing floodplain.

Ex F

STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO-WIT:

I, Tamela B. "Tammy" Beamer, after first being duly sworn, under oath, state that the following is true and that the following is my personal knowledge and belief, and I further state that if I were called to testify as to the following, I could and would do so competently and truthfully:

1. I am over the age of eighteen (18) years old.

2. I am a resident of Doddridge County, WV.

3. I am not a party to the appeal of Doddridge County Floodplain Permit #14-123.

4. I have no interest(s) (property, personal, financial, or otherwise) related to the project and land that are the subjects of Doddridge County Floodplain Permit #14-123.

5. As far as am I aware, none of my relatives have any interest(s) (property, personal, financial, or otherwise) related to the project and land that are the subjects of Doddridge County Floodplain Permit #14-123.

6. I am not a member of the Doddridge County Watershed Association, and none of my relatives are members of the Doddridge County Watershed Association.

7. On July 11th, 2014, I went to the Doddridge County Courthouse and reviewed Doddridge County's entire permit file related to Doddridge County Floodplain Permit #14-123.

8. I am familiar with what a contractor's contract looks like, and I would recognize one if I saw it.

9. While reviewing Doddridge County's entire permit file related to Doddridge County Floodplain Permit #14-123, I specifically looked to see if there were any contractor's contracts contained in said file.

10. After a thorough review of Doddridge County's entire permit file related Doddridge Floodplain Permit # 14-123 and after reviewing all documents contained in said permit file, I determined that there were not any contractor's contracts in said file.

This is my complete statement.

Dated this 14th of July, 2014.

Tamela B "Tammy" Beamer

Taken, subscribed and sworn before me in the county and state aforesaid this 14th day of July, 2014.

My commission expires: _____

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
LINDA R. HAMILTON
HC 66, Box 9
West Union, West Virginia 26456
My Commission Expires Oct. 4

NOTARY PUBLIC

EXG

WV Flood Map

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

Map Created on 7/15/2014

Location of the mouse click

Approximate Study (Zone A)

Detailed Study (Zone AE, AH, AO)

Floodway

Flood Water Depth (HEC-RAS)

Cross Section Line

Base Flood Elevation Line (810)

DFIRM Panel (Map) Index

User Notes:

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 is supported by FEMA, WV NFIP Office, and WV GIS Technical Center (http://www.MapWV.gov/flood)

Flood Hazard Area: Selected site is WITHIN the FEMA 100-year floodplain.

Flood Zone: AE

Advisory Flood Height: About 798 feet

Water Depth: N/A

Elevation: About 798 feet

Location (long, lat): 80.687824 W, 39.277479 N

Location (UTM 17N): (526926, 4347616)

FEMA Issued Flood Map: 54017C0140C

Contacts: Doddridge County

CRS Information: N/A

Flood Profile: 54017_003

HEC-RAS Model: No Model

Parcel Number:

WV Flood Map

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

Map Created on 7/15/2014

Location of the mouse click

Approximate Study (Zone A)

Detailed Study (Zone AE, AH, AO)

Floodway

Flood Water Depth (HEC-RAS)

K—K **Cross Section Line**

810 **Base Flood Elevation Line**

DFIRM Panel (Map) Index

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Contacts: Doddridge County

CRS Information: N/A

Flood Profile: 54017_003

HEC-RAS Model: No Model

Parcel Number:

14-123

FILED

2014 JUL 15 PM 4:01

EDITH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

David T. Richardson
Attorney at Law
DTR LAW APC
(Licensed in California, Texas, and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 991-5290
Fax: (619) 522-9260

July 15, 2015

Via Hand Delivery
Doddridge County Commission

RE: Appeal of Floodplain Permit #14-123

Dear Sir or Madam,

Please be advised that I have been retained by the Doddridge County Watershed Association (the "DCWA") in regards to their appeal of the above-referenced floodplain permit (the "Mark West Permit"). As the DCWA made clear in its Notice of Appeal, and as this letter will reiterate, numerous rules and requirements mandated by the Doddridge County Floodplain Ordinance (the "Ordinance") were not followed when the Mark West Permit was issued (i.e., rules and requirements that are directly related to public health, safety, and welfare as well as rules and requirements that are directly related to the protection of Constitutional Due Process Rights of residents of Doddridge County). While there were numerous rules and requirements that were not followed, this letter will identify the more important rules and requirements that were not followed. This letter will also explain why the Doddridge County Commission aka the Doddridge County Floodplain Appeals Board ("DCC") must revoke the Mark West Permit (and also explain why the Mark West Permit is automatically void and should simply be declared as such). Additionally, this letter will explain why Mark West's allegations regarding the DCWA lacking "standing" to appeal the Mark West Permit are incorrect (i.e., the allegations contained in the complaint Mark West filed in its recently dismissed lawsuit against the DCC).

By way of background, I represented the Huff Family in the lawsuit that EQT Production Co. filed against the DCC in regards to the revocation of a certain floodplain permit that had been previously issued to EQT which would have allowed EQT to construct a natural gas well-site in a floodplain situated at the Huff Farm. As you are aware, the Doddridge County Circuit Court ultimately declined to issue an order mandating that the DCC return said permit to EQT. The Court refused to order the return of EQT's permit because the Ordinance was constitutionally defective. Specifically, said ordinance failed to provide adequate Due Process (i.e., notice and an opportunity to be heard) to persons living near the sites of planned floodplain

developments/construction. The Huffs and the Fosters were deprived of Due Process because they did not receive notice of EQT's permit application, did not receive notice of the Floodplain Administrator's issuance of said floodplain permit, and were not afforded an opportunity to object to the application for and issuance of said floodplain permit.

Following the Court's ruling, the DCC amended the Doddridge County Floodplain Ordinance so as to ensure that the Due Process rights of residents living near planned floodplain developments were protected (the Ordinance was also amended so that it was better equipped to deal with the development and construction of large scale natural gas facilities in floodplains and floodways). As you are all well aware, the amendment process was a long and drawn out process that involved numerous revisions as well as numerous comments provided by several interested persons (and several of those comments were provided by myself and my mother-in-law/client, Joye Huff). After a number of months a new Ordinance was enacted by the DCC. This is the Ordinance that governs the Mark West Permit.

As the persons tasked with enacting the present Ordinance, the DCC surely knows that the Ordinance contains specific rules and requirements that was must be followed prior to the issuance of a floodplain permit. The DCC also knows that failure to follow these rules and requirements can have serious repercussions. The most severe and obvious repercussion is inadvertently putting the public health, safety, and welfare by not following the rules and requirements of the Ordinance (e.g., allowing construction in prohibited areas and/or allowing impermissible alterations of the floodway. Another repercussion from the issuance of floodplain permits in violation of the Ordinance is the possibility of significant sanctions from FEMA. One such sanction is suspension from the National Flood Insurance Program, and said suspension would result in Doddridge County and residents of Doddridge County no longer having access to either flood insurance or the federal disaster relief funds typically provided to flood prone areas (i.e., Special Flood Hazard Areas)(note, attached hereto as Exhibit "A" is a news article describing the plight of a small Pennsylvania town that failed to enforce the requirements of its own floodplain ordinance). Obviously, said sanction would have a devastating impact on the residents of Doddridge if it were ever implemented. Moreover, failure to follow the rules and requirements of the Ordinance (especially the ones related to Due Process) may subject Doddridge County to a lawsuit (and as was seen by the EQT v. the DCC/Huff/Foster case, lawsuits can be extremely costly as well as time consuming).

I mention the above for the following purposes: (a) to explain that I do know what I am talking about when it comes to the Ordinance (I spent a year and a half litigating a lawsuit that was solely about the Ordinance, and I then spent several months thereafter participating in the amendment process), (b) to assure the DCC that the DCWA is 100% correct when it states that the Ordinance was not followed when the Mark West Permit was issued, and (c) to make clear that that it is vitally important that the Ordinance's rules and requirements are followed because otherwise the County's residents could be harmed, the County's residents could lose their ability to obtain flood insurance and flood related federal disaster funds, and the County itself could face, yet another, costly lawsuit.

Several rules and requirements were not followed when the above-referenced floodplain permit was issued, but a handful are of particular importance due to public health, safety, and

welfare issues and due to Constitutional Due Process issues. In the interest of not confusing the issue, this letter will focus solely on these violations of the Ordinance (and not the numerous other violations that are not quite as severe).

Before I begin, I would like to say that I have noticed a pattern of the Ordinance's more important rules and requirements being treated as discretionary as opposed to mandatory. There is a reason why these rules and requirements are mandatory...they directly relate to protect people, their property, and their rights (and helps the County and its residents avoid lawsuits). As such, I respectfully request that the DCC and the Floodplain Administrator give consideration to making sure that when a provision in the Ordinance says "shall" that said provision be enforced.

A. Floodway Issues

There are several issues related to the Mark West permit's lack of compliance with the Ordinance's Floodway requirements. These issues are especially troublesome because the Floodway is the most dangerous portion of the floodplain in terms putting the public health, welfare, and safety at risk (i.e., putting people and their homes at risk of increased flooding and/or increased velocity of floodwaters).

The Ordinance describes the Floodway as "present[ing] increased risk to human life and property due to their relatively faster and deeper flowing waters", and the Ordinance mandates that the Floodway "shall be preserved to the greatest extent possible" (see Section 4.1(B), pg. 16 of the Ordinance). FEMA identifies the Floodway as "the stream channel that must remain open to permit passage of" the floodwaters "and anything in" the Floodway "is in the greatest danger during flooding". Basically, Floodways are to be left alone because they are a hazard (see FEMA info regarding "Floodway Analysis" attached hereto as Exhibit B). Additionally, interfering with and/or altering the Floodway can increase flooding. Floodways are used to accommodate flooding (i.e., by allowing the floodwaters to move forward), and if they are blocked by fill or by structures then the floodwaters can accumulate and the point of the blockage and the areas behind causing the height of the floodwaters to increase. Note, I realize that the Floodway sounds like a complicated thing, but it is really rather simple. The Floodway is the dry ground on either side of the normal water level of a creek, river, fork, stream, etc. (attached as Exhibit C is a sketch of a generic Floodway from a different floodplain ordinance).

Note, given the obvious importance of the Floodways and the danger caused by Floodways, it shouldn't come as a surprise that the Ordinance has several rules and requirements as to Floodways. Almost all of which are mandatory and not discretionary.

1. Mark West was required to delineate the Floodway and failed to do so.

Pursuant to the Ordinance, Mark West was required to delineate (i.e., identify) the Floodway in the site plans it submitted with its floodplain permit application (see Ordinance Section 5.4 (D), pg 24) (see attached NFIP map that was part of the Mark West Permit Application that identified the project site as being in an Approximated Area attached hereto as Exhibit "D"). Despite being required to delineate the Floodway(s), Mark West did not do so.

Pursuant to the Ordinance, whenever construction is planned in an Approximated

Floodplain that will be two acres or larger, the applicant must have a licensed engineer delineate (i.e., identify) the Floodway. Here, the development at issue in the Mark West Permit easily exceeds two acres. The site location map shows attached to the Mark West Permit application shows the area of disturbance to be enormous (see attached as Exhibit "E", said site location map), and a very conservative estimate of the area of disturbance is well over 2,000,000 square feet (i.e., at the very least 45 acres). Note, the requirement to delineate the Floodway is mandatory. It is not at the Floodplain Administrator's discretion. As such, Mark West's failure to delineate the floodway means that the Mark West Permit does not comply with the Ordinance. Additionally, the fact that the Floodplain Administrator issued the Mark West Permit without requiring the Floodway to be delineated means the Floodplain Administrator issued the Mark West Permit in violation of the Ordinance.

2. Fill in the Floodway.

Mark West intends to place large amounts of fill in the area identified in the site location map referenced above (i.e., "at various locations on the site")(see attached as exhibit "F" pg. 1 of Mark West's Jan. 2014 hydraulic study re the site). Since Mark West failed to delineate the Floodway as required by the Ordinance, there is no document that states that fill would be placed into the Floodway(s). But if Mark West had delineated the Floodway(s) as required by the Ordinance then it is almost certain that said delineation would show that fill would be (and already had been) placed in the Floodway(s). I say this because the Mark West project filled in two streams and/or tributaries of Buckeye Creek. By filling in the streams and/or tributaries Mark West literally put fill in the Floodways by filling the Floodways along with portions of the streams and/or tributaries. Further, Mark West built bridges over Buckeye Creek and is siting various new developments related to the site directly next to Buckeye Creek (e.g., a truck unloading area comprised of fill directly adjacent to Buckeye Creek). Given the proximity of these structures (and the fill related to them) to Buckeye Creek, it is almost certain fill has gone into the Floodway of Buckeye Creek.

The Ordinance has two main requirements as to the place of fill into a Floodway. One, fill cannot be placed in a floodway unless it has first been demonstrated that the fill will not cause ANY increase in the base flood elevation (i.e., no increase in flooding at all)(see Ordinance Section 6.1 (E), pg. 29). Two, no development shall be permitted in the Floodway where reasonable alternatives exist elsewhere, and Mark West had to demonstrate that there were no other "reasonable alternatives" before it could be issued the floodplain permit (see Ordinance Section 4.1(B)). If Mark West had delineated the Floodway(s) as required by the Ordinance, then it is almost certain that the results would have shown that Mark West was placing (and has already placed) fill in the floodplain without FIRST demonstrating that said fill would not cause ANY increase in the base flood elevation (i.e., the level of the floodwaters). Additionally, Mark West would have been required to demonstrate no other "reasonable alternatives" were available for its project site before the Floodplain Admin could have issued the Mark West Floodplain Permit. More importantly, it defies logic that if there has been filled placed in the Floodplain (especially to the extent that entire streams have been "filled"), that has not been even a slight rise in the Base Flood Elevation (in violation of 6.1(E)).

B. No Contractor Contracts Presented to Floodplain Administrator and None Saved in File.

Pursuant to the Ordinance, Mark West had to present copies of any and all contracts it entered into with any contractors in regards to the work to be done pursuant to the Mark West Floodplain Permit (see Ordinance Section 5.2 (H), pg. 20). Failure to do so within 14 days of the contracts being signed AUTOMATICALLY VOIDS the floodplain permit. Void means no appeal necessary. Void means the no hearing necessary. Void means the floodplain permit ceases to exist.

We know that Mark West hired at least one contractor to do work on the project (see the permit application --- Anderson Excavating). But there are no contractor contracts in the Mark West Permit File as required by the Ordinance (see attached as exhibit "G" Affidavit of Tammy Beamer). As such, the Mark West Floodplain Permit is void (i.e., automatically ceases to exist as if never applied for and issued...non-existent).

The reason why the Ordinance requires proof of the contractor contracts is related to public health, welfare, and safety. Specifically, the purpose of the requirement is to ensure that only licensed professionals are building large scale projects in floodplains. The point is, by ensuring only professionals are allowed to build in the floodplain, you are also presumably ensuring that the quality of work done will be of a professional level, and you will avoid a situation where someone unqualified is building something in a floodplain that is incapable of resisting floodwaters and, in the event of a flood, will break apart, explode, etc. I bring this hope so as to show that this is actually an extremely important provision, and there is a reason why persons who fail to comply with it have their floodplain permits voided.

C. Improper Notice Given to the Community in Violation of Constitutional Due Process Protections and in violation of the Floodplain Ordinance.

Note, the above issue is especially troublesome given the expense and heartache incurred by the parties to the EQT v. Doddridge/Huff/Foster as a result of the EQT floodplain permit that was issued in violation of the Due Process rights of the Huffs and the Fosters. That case ended because the original Ordinance was deemed unconstitutional for failing to provide adequate notice and opportunity to be heard for people like the Huffs and Fosters (i.e., persons who are having to deal with 3rd parties building potentially destructive floodplain projects on or near their property). If the Huffs and Fosters had been giving notice of the application for the EQT floodplain permit and an opportunity to object, then they might have been able to nip the matter in the bud and save everyone the expense and stress of a year and a half of litigation. Additionally, the whole point of amending the Ordinance was to rectify the issues with a lack of Due Process related to floodplain permits.

But all the changes in the world to the Ordinance don't do any good if rules and requirements are added to the Ordinance to provide for Due Process, but are NOT properly enforced.

Failure to Place Permit Info on the DCC Agenda.

The Ordinance requires that the specific information related to a floodplain permit (both

the application for and issuance of a permit) be placed on the DCC Agenda ahead of the DCC meeting at which the announcements will be made as to the floodplain permits (i.e., name of applicant and location of planned project). Last I checked the only info placed on the DCC Agendas related to Floodplain Permits was a generic statement that Floodplain Permits will be heard as Agenda Item No. X. No specific information is provided despite the requirments of the Ordinance and the requirements of Due Process.

Moreover, by failing to place the specific information regarding each floodplain permit on the Agenda, the entire legal advertisement notice process is essentially defeated (especially, when the ads don't run until after the deadline to object or appeal has expired, and I have seen those situations). The problem is, the legal advertisement does not state which date the announcement was made about the floodplain permit (regardless of whether the announcement is to say it was applied for or to say it was issued or denied). So, how is an interested party, like the DCWA, supposed to know when a permit is applied for or granted or denied if there isn't specific information provided on the Agenda? Are they supposed to attend every single DCC Hearing and just in case maybe an announcement will be made about a floodplain permit that matters to them?

In the case of the DCWA, notice regarding the application for the Mark West Permit was not placed on the DCC's Agenda (i.e., all a DCWA member would have seen was the generic statement that Floodplain Permits will be discussed). Further, the legal advertisement for the Mark West Permit Application states that the date that the permit was applied for was February 5, 2014. It also says anyone who wants to comment or object has until 20 days after the permit application was announced at the DCC meeting. Additionally, it says that the deadline to comment or object is February 25, 2014. Obviously, there is something seriously wrong with those dates.

One, in order for this to work, as mandated by the Ordinance, Mark West would have had to have applied for the Floodplain Permit on February 5, 2014, the clerk would have had to put it on the Agenda on February 5, 2014, and the DCC would had to have had a meeting on February 5, 2014 whereat the application was announced. Otherwise, it would be impossible for there to be 20 days for the comment and/or object period post-announcement (i.e., the deadline was February 25, 2014). Putting aside the sheer impossibility of, on the same day, an application being processed, an agenda being printed the same day, and a DCC meeting being held right after to announce the application, there is the obvious and huge problem in that the 5th of February was a Wednesday (and the DCC meets on Tuesday). As such, there could not have been an announcement on the February 5, 2014, and accordingly, the DCWA (and every other interested parties' Due Process rights were violated, and the rules and requirements contained in the Ordinance were violated). Additionally, the newspaper ad did not even run until February 11, 2014 (see attached as Exhibit H copies of all relevant legal ad documents). As such, not only were the DCWA members deprived of proper notice, they were also deprived of their rightful 20 day period to comment and/or object (given there was apparently no announcement at the DCC Meeting until, at the very least, almost a week after the Permit was applied for, at best they had 15 days of notice.

As such, not only was the Ordinance not followed as to the notice requirements, my clients also have a potential Due Process claim that they could bring against the DCC in order to

have the Mark West Floodplain Permit revoked.

The DCWA's Standing to Appeal

In the complaint Mark West filed against Doddridge County after the Stop Work Order was issued following the DCWA's appeal (a Stop Work Order that the Ordinance does not allow to be lifted until after the Appeal is decided...but I digress), Mark West alleged that the DCWA lacked the standing to appeal the Mark West Permit.

Mark West's argument is incorrect. The DCWA has standing to challenge the Mark West Permit. One, the DCWA is a legitimate organization dedicated to protecting the watersheds and water sources of Doddridge County. It was founded years ago in response to a leak and/or dump of chemicals into Buckeye Creek (i.e., the same creek that Mark West is building next to). The DCWA holds regular meetings and government officials regularly come to these meetings to give informational sessions, hold seminars, and discuss watershed related topics (obviously said government officials consider and treat the DCWA as the legitimate organization that it is). Objecting to and appealing a proposed floodplain project for the purposes of protecting the source of drinking water for West Union (i.e., the home of the DCWA and its members) and also protecting the very creek that pollution of which gave rise too the DCWA, is pretty much the definition of germane to the DCWA's purpose. Moreover, there are DCWA members who live very close to the site of the Mark West project, and who may be harmed by the project, and whose interests will be protected by the DCWA's appeal. In short, the DCWA has standing in its own right and also on behalf of its members.

Conclusion

Given the foregoing and given the grievous violation of the Ordinance (i.e., as to the rules and requirements protecting Public Health, Safety, and Welfare and as to the rules and requirements in regards to the violation of the DCWA member's Due Process Rights), the only correct choice is to revoke the Mark West Floodplain Permit and have Mark West resubmit another floodplain permit application that, unlike the one at issue here, actually conforms to the requirements of the Ordinance. The other alternative is to declare the Mark West Floodplain Permit void for failure to provide the Floodplain Administrator with copies of the contractor contracts (which would accomplish the same result). Otherwise, Doddridge County has issued a floodplain permit in violation of its own Ordinance, and as such, opens itself up to FEMA sanctions as well as the possibility of Court action.

Best regards,
/s/

David T. Richardson, Esq.

Doddridge County
Floodplain Appeals Board
Decision

Permit #14-123

On July 15, 2014 the Doddridge County Commission, sitting as the Doddridge County Floodplain Appeals Board, convened at the Doddridge County Courthouse to hold an evidentiary hearing on an appeal filed in the Doddridge County Watershed Association (hereafter referred to as "DCWA") on Floodplain Permit #14-123 granted to MarkWest Liberty Midstream & Resources, L.L.C. (hereinafter referred to as "MarkWest") on or about March 18, 2014 by the Doddridge County Floodplain Administrator.

The DCWA was represented by legal counsel, David Richardson. The Appellee, MarkWest, was represented by legal counsel from the law firm of Steptoe & Johnson, PLLC, Jason P. Foster and Larry J. Rector.

First, the Floodplain Appeals Board addressed whether, under the Doddridge County Floodplain Ordinance (August 8, 2013 version), the Appellant had legal standing to pursue the appeal.

Article VIII Section 8.1 of the Doddridge County Floodplain Ordinance (revised August 8, 2013) " ... permits a person or entity aggrieved by a decision of the Floodplain Administrator, with respect to the provisions of this Ordinance, it is the right of that person or entity to appeal to the Doddridge County Commission sitting as the Floodplain Appeals Board".

Article II Section 2.2.3 defines "aggrieved person or entity" as:

> With respect to Article VIII herein an "aggrieved person or entity" is a Floodplain Permit Applicant or a person or entity that has timely objected to an application for Floodplain Permit and a surface or mineral owner where development is proposed in the Floodplain an adjacent property owner or resident where development is proposed in the Floodplain, and/or property

CME
ENGINEERING

724-672-4800
Fax: 724-672-4801

February 20, 2014

Ralph Sandora
Doddridge County Flood Plain Manager
Doddridge County
118 E. Court Street
West Union, WV 26456

RE: CEC/Mark West Flood Plain Final Plan Application
CME Proposal #021413W

Dear Mr. Sandora:

CME Engineering LP (CME) is pleased to present this proposal to Doddridge County to provide engineering services for the review of the CEC/Mark West Flood Plain Final Plan Application in Doddridge County WV. This proposal includes the following sections:

1.0 Scope of Work
2.0 Schedule
3.0 Cost
4.0 Terms and Conditions

1.0 **Scope of Work**
The work included in this proposal shall result in the review of the CEC/Mark West Flood Plain Final Plan Application. The scope of work CME proposes to perform will include:

1. Conduct a site visit at the Mark West Sherwood facility in Doddridge County to gather information about the site, past history and cumulative impacts to date as well as proposed
2. Review CEC/Mark West Flood Plain Final Plan Application currently on file with Doddridge County.
3. Prepare a letter report addressed to Doddridge County which will provide the results of the floodplain evaluation and our opinion regarding the effects on the floodplain as set forth in the CEC/Mark West application.

This proposal is based upon the following conditions:

1. A copy of the CEC/Mark West Flood Plain Application will be made available by Doddridge County along with associated calculations.

2.0 **Schedule**
CME will schedule and conduct the site visit upon written approval of this proposal. CME will review the provided information listed above within 21 days of receipt of the requested plans by Doddridge County.

CME
ENGINEERING

724-672-4800
Fax: 724-672-4801

3.0 **Cost**

CME will perform the work included in this proposal for an **estimated total cost of $5,000**. CME will invoice on a twice per month basis for the work performed the previous billing period. Invoices will be generated on a Time and Material basis and invoices are due and payable upon receipt. Failure to submit payment may result in a stoppage of work. This proposal is valid for a period of 45 days from the date of this proposal.

The cost quoted herein is only for work specifically identified in this proposal. Any work requested by Doddridge County, which is not specifically identified in this proposal, such as additional evaluations or extended work requests will be considered additional and will only be performed upon receipt of authorization from Doddridge County according to the rate schedule in place at the time of request.

4.0 **Terms and Conditions**

The Terms and Conditions under which the work identified in this proposal shall be performed are attached. Acceptance of this proposal, and any future work, constitutes acceptance of the attached Terms and Conditions.

CME appreciates the opportunity to submit this proposal and looks forward to successful completion of this project. If you have any questions regarding this proposal, please feel free to contact me. Thank you.

Respectfully Submitted,
CME Engineering LP, a Pennsylvania limited partnership
By: CME Management LLC, its sole general partner

By:

Mark T. Stanley
Project Director

Attachments

cc: Sean C. Isgan / Michael Walker / Tammy Rusbosin

TERMS AND CONDITIONS

These TERMS AND CONDITIONS are made part of an agreement between CME Engineering LP (CME), having a place of business at 975 Georges Station Road, Suite 100, Greensburg, PA 15601, and the "CLIENT" identified below.

The CLIENT wishes to retain CME for the purpose of providing services as defined in the attached Proposal or other similar document (hereafter Proposal) and the CLIENT agrees that the work shall be performed in accordance with the following:

1. **Scope of Services.** CME shall provide services as set forth in the Proposal or other similar document attached hereto. All services performed by CME under this Agreement shall be performed in accordance with generally accepted professional practice at the time when, and the place where, the services are rendered. Services not expressly set forth in the Proposal are excluded from the Scope of Services and CME assumes no duty to perform such services. However, CME and CLIENT may make changes to the Scope of Services and associated fees by mutual written agreement. If, in the performance of the services and in the sole opinion of CME, CME encounters unanticipated situations, hazardous materials, pollutants or unsafe working conditions, CME's Scope of Services, compensation and schedule will be reconsidered and this Agreement shall immediately be subject to renegotiation or termination at the option of CME. In the event the Agreement is terminated, CME shall be paid for its fees and charges incurred to the date of such termination, including, if applicable, any additional fees or charges incurred in demobilizing.

2. **Project Schedule.** The work shall be performed in accordance with the schedule set forth in the attached Proposal. However, it is recognized that other contractors may be retained separately by the CLIENT who may provide data or products to be utilized by CME and CME shall have the right to rely upon timely receipt, correctness and completeness of said data or products. CME shall not be responsible for the acts, errors or omissions, or review of work of said third party contractors. CME shall not have the authority to control the work of contractors retained by the CLIENT and shall not be responsible for site safety or work practices of such contractors. CME shall not be held responsible for damages or delays in performance (and the direct or indirect costs or consequences arising from such delays) caused by force majeure or other events beyond the reasonable control of CME.

3. **Payment.** Payment for the services rendered by CME shall be made in accordance with the terms set forth in the Proposal. CME reserves the right to terminate all work, without notice, immediately upon failure of CLIENT to make payment in the full amount of any or all outstanding invoices for this Project or any other Project performed by CME on behalf of the CLIENT or other party related to the CLIENT. Any invoice not paid within thirty (30) days of the invoice issuance date shall be considered overdue and subject to a 1.5% per month interest rate. Any overdue invoice may result in termination of work as set forth above.

4. **CLIENT responsibilities.** The CLIENT, at its own expense, will: (a) Provide all criteria and full information as to the CLIENT's requirements for the work; (b) furnish CME with copies of all data, reports, maps, etc. which the CLIENT may possess which may be of use by CME in the performance of the work; (c) arrange for access to public and private property as required by CME to perform its services; (d) be responsible for locating all underground or covered site utilities, tanks or other structures and for notifying the utility owner; (e) provide a description of activities which were conducted at the site at any time by the CLIENT, or prior to CLIENT, which would involve the name, quantity, location and date of any releases or storage of hazardous substances or pollutants; (f) give prompt notice to CME whenever the CLIENT becomes aware of any circumstance or situation which may affect the timing or scope of CME's services; (g) designate an individual with requisite authority to act as the CLIENT's representative with respect to the services to be rendered under this agreement; (h) to the extent required by law, promptly report all regulated conditions, including, without limitation, the discovery of releases of hazardous substances at the site to the appropriate authorities in accordance with applicable law; (i) assume responsibility for unavoidable damage or alteration to the site caused by CME's services; (j) assume responsibility for personal injuries and property damage caused by CME's interference with subterranean structures such as pipes, tanks and utility lines that are not disclosed or are not accurately disclosed to CME by the CLIENT in advance; (k) assume responsibility for any and all environmental matters including, but not limited to, citations, assessments, fines and penalties.

5. **General Considerations.** (a) Where provided, statements concerning probable costs or cost estimates prepared by CME shall represent their judgment as professionals familiar with the work. However, CME does not guarantee that actual costs will not vary from the cost estimates. (b) All documents prepared and delivered by CME pursuant to this agreement are instruments of service and are not intended or represented to be suitable for any reuse by CLIENT or others. CLIENT shall not reuse said work without the express written consent of CME. Any such reuse shall be at the sole risk of the CLIENT; (c) CME shall perform the services in accordance with generally accepted professional practice, reasonable and without negligence. **CME's SERVICES SHALL NOT BE SUBJECT TO ANY EXPRESS OR IMPLIED WARRANTIES WHATSOEVER BEYOND THOSE EXPRESSED IN THE PROPOSAL;**

(d) any samples and/or materials collected by CME during the course of the work which contain, or are suspected to contain, any substances or constituents hazardous or detrimental to health, safety or the environment as defined by federal, state or local statutes, regulations or ordinances, will remain the property of the CLIENT and will be returned to the CLIENT for proper disposal.

6. **Delegation of Duties.** Neither CME nor the CLIENT shall assign the agreement without the written consent of the other.

7. **Indemnification and Waiver.** (a) The CLIENT hereby agrees to indemnify and hold harmless CME and its subcontractors, consultants, agents, owners, officers, directors, managers and employees from and against any and all claims, damages, losses and expenses, whether direct, indirect or consequential (including but not limited to attorneys' fees and court and arbitration costs), arising out of, resulting from, or alleged to have arisen out of or to have resulted from, the services or work, or the failure to perform services or work, of CME, or any claims against CME arising from the acts, omissions or work of others, except to the extent (percentage of responsibility) that the claims, losses or expenses proximately resulted from the negligent or grossly negligent acts, errors or omissions of CME. (b) Notwithstanding anything else to the contrary herein, the liability of CME under this Agreement (whether by reason or breach of contract, negligent or grossly negligent acts, errors, omissions, tort or otherwise, including under indemnification provisions, if any) shall be limited to the total amount of payments made to CME for services rendered under this Agreement. (c) The CLIENT acknowledges that the amount of CME's compensation provided for under this Agreement has been negotiated and agreed by reason of CME's reliance on the foregoing limitation, indemnification and waiver undertakings of the CLIENT. (d) CME hereby acknowledges that its relationship to CLIENT established under this agreement is one of an Independent Contractor as that term is defined in the law.

8. **Extent of Agreement.** These Terms and Conditions, together with the Proposal, represent the entire and integrated Agreement between the CLIENT and CME and supersede all prior negotiations, representations, or agreements, either written or oral, for this work.

9. **Third Parties.** Nothing herein shall be construed to give any rights or benefits hereunder to any one other than the CLIENT and CME. CME's work product may not be used or relied upon by any other person without CME's express written consent.

10. **Successors and Assigns.** The CLIENT and CME bind themselves and their successors, executors, administrators, assigns and legal representatives to these Terms and Conditions.

Date: 2-28-14

CLIENT: DODDRIDGE CO. COMMISSION

By: Ralph Saunders
Signature

Title CEC - MARKWEST FINAL PLAN REVIEW

Proposal ID: 021413W

Price: $5000.00

#14-123
Sherwood Gas
Processing Plant
Master Plan

HYDRAULIC STUDY OF BUCKEYE CREEK

SHERWOOD GAS PROCESSING PLANT MASTER PLAN
DODDRIDGE COUNTY, WEST VIRGINIA

Prepared for:

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PITTSBURGH, PENNSYLVANIA

CEC Project 110-811.5001

January 2014

Civil & Environmental Consultants, Inc.

Pittsburgh

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

Civil & Environmental Consultants, Inc.

January 29, 2014

Mr. Daniel Wellings, PS
Doddridge County Floodplain Manager
HC 68, Box 5
West Union, WV 26456

Dear Mr. Wellings:

Subject: Proposed Sherwood Gas Processing Plant Master Plan
County Road 50/34
Doddridge County, West Virginia
CEC Project 110-811.5001

Civil & Environmental Consultants, Inc. (CEC) was hired as a consultant to provide professional engineering services to MarkWest Liberty Midstream & Resources, LLC (MarkWest). MarkWest is planning to finalize the Sherwood Gas Processing Plant Master Plan grading.

MarkWest was issued a Floodplain Permit on August 28, 2013 for the Sherwood Gas Processing Plants 4 and 5 Expansion. An updated Floodplain Permit application was submitted on December 3, 2013 to include additional temporary stockpiles needed for the construction of the gas processing plants. MarkWest now plans to finalize grading of the entire site as part of the construction of the Gas Processing Plants 6 through 10, de-ethanizers, and substation expansion. On behalf of MarkWest, CEC is requesting a revised permit for the Sherwood Gas Processing Plant Master Plan.

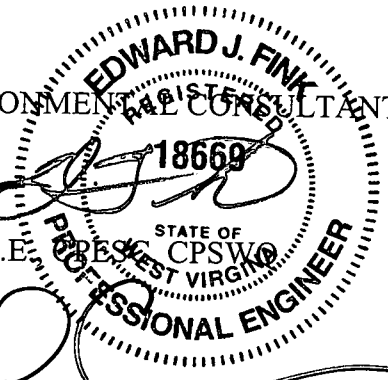
CEC conducted a flood study to demonstrate the impact that the final plant grading will have on the existing floodplain for the 100-year storm event. Based on the analysis, CEC does not anticipate any significant increase to the floodwater elevation caused by this construction, and no properties aside from the subject property of Dennis H. Powell's will be impacted. The existing BFE at river station 24+94.62 is 810.75 feet and is proposed to increase 0.75 feet to 811.50 feet. This location is where the greatest increase in flood elevation would be expected to occur, which is immediately upstream of the new bridge and approximately at the midway point along the proposed final grading. CEC is providing the stamped, signed engineer's seal stating that the final plant grading should not increase the floodplain area or raise flood elevations within the federal allowable limit of increase of one foot.

As part of the previously revised flood study of December 2013, CEC performed an additional survey to acquire more accurate and current topography for the stream, overbanks, and newly constructed bridge between stations 25+54.54 (Section T) and 0+00 (Section OO). The resulting existing surface utilized in the December 2013 flood study is also used in this Master Plan flood study. Water surface elevation increases in this flood study are indicative of the total impact of the proposed final Sherwood Gas Processing Plant development on the existing floodplain.

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

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.



Edward J. Fink, P.E., CPESC, CPSWQ
Project Manager

Richard P. Celender, C.E.T., CPESC, CPSWQ
Principal

HYDRAULIC STUDY OF BUCKEYE CREEK

SHERWOOD GAS PROCESSING PLANT MASTER PLAN
DODDRIDGE COUNTY, WEST VIRGINIA

Prepared for:

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PITTSBURGH, PENNSYLVANIA

CEC Project 110-811.5001

January 2014

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 BACKGROUND

MarkWest Liberty Midstream & Resources, LLC (MarkWest) has contracted Civil & Environmental Consultants, Inc. (CEC) to perform a master plan flood study as part of the final buildout of the Sherwood Gas Processing Plant located approximately one-half-mile east of the intersection of U.S. Route 50 and County Route 20 along County Route 50/34 in Doddridge County, West Virginia. The final buildout includes the construction of Plants 6 through 10, de-ethanizers, and substation expansion. A Floodplain Permit was issued on August 28, 2013 to MarkWest for the Sherwood Gas Processing Plants 4 and 5 Expansion. This permit included grading improvements for Plants 1-5, the truck unloading area, an access road with a new bridge from County Road 50/34, and temporary stockpiles. An update to the Floodplain Permit was submitted on December 3, 2013 to include additional temporary stockpiles as part of the construction of the gas processing plants. The original permit is included in Appendix F.

MarkWest now plans to finalize grading as part of the final buildout construction plans. The earthmoving operations will include the removal of the temporary stockpiles adjacent to Buckeye Creek along with fill placement at various locations on the site to accommodate final plant construction. A site location map has been provided in Appendix A. The new Doddridge County Floodplain Application is included in Appendix F.

As part of the previously revised flood study of December 2013, CEC performed an additional survey to acquire more accurate and current topography for the stream, overbanks, and newly constructed bridge between stations 25+54.54 (Section T) and 0+00 (Section OO). The resulting existing surface utilized in the December 2013 flood study is also used in this Master Plan flood study. Water surface elevation increases in this flood study are indicative of the total impact of the proposed final Sherwood Gas Processing Plant development on the existing floodplain.

1.2 PURPOSE

The purpose of this study is to perform a Hydrologic and Hydraulic (H&H) analysis of the existing 100-year floodplain of Buckeye Creek and estimate the effect on the floodplain by the final grading of the Sherwood Gas Processing Plant. The H&H analysis will be used to compare the existing and proposed 100-year floodplain water surface elevations (WSEs) of Buckeye Creek upstream and downstream of the proposed grading. This comparison will show the theoretical impacts, if any, of the proposed grading along the study area of the creek as it relates to the 100-year floodplain WSEs.

1.3 SCOPE OF SERVICES

CEC has performed this H&H analysis of the existing and proposed conditions along a portion of Buckeye Creek upstream and downstream of the proposed grading improvements for the 100-year floodplain WSEs. The following scope of services was performed in order to achieve the above-stated purpose:

- Additional topographic information was collected by CEC to supplement the available topographic digital elevation models (DEM, USGS 3-meter) provided by West Virginia Statewide Addressing and Mapping Board (WVSAMB). It included:
    - New bridge survey elevations;
    - Topographic survey of the access road from County Route 50/34; and
    - Topographic survey of existing grade at various locations along the reach.
- Performance of hydraulic analyses utilizing the Hydrologic Engineering Center River Analysis System (HEC-RAS) program to perform a detailed backwater analysis of Buckeye Creek for the existing and proposed conditions during the 100-year, 24-hour storm event. The study included:
    - Development of an appropriate number of stream cross-sections for use in the HEC-RAS model;
    - Development of a model of the existing terrain and floodplain, which was used as a baseline;

- Development of a floodplain that delineated the boundary of the 100-year flood in Buckeye Creek under existing conditions; and
- Development of a floodplain plan that delineated the boundary of the 100-year flood in Buckeye Creek under proposed conditions that includes all final grading.

- Preparation of this hydraulic analysis report that summarizes our calculations and findings.

1.4 AUTHORIZATION

This study was performed as authorized by MarkWest.

1.5 STANDARD OF CARE

The services provided by CEC were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the civil engineering profession practicing contemporaneously under similar conditions in the locality of the project. No warranty, express or implied, is made.

2.0 HYDROLOGIC ANALYSIS

2.1 METHODOLOGY

The Federal Emergency Management Agency (FEMA) conducted a Flood Insurance Study (FIS) for Doddridge County, West Virginia, October 4, 2011. According to this study, Buckeye Creek discharges 5,150 cubic feet per second (cfs) at its upstream confluence with Long Run during the 100-year, 24-hour storm event. The FEMA FIS is included in Appendix B.

In order to maintain conditions similar to the FIS, the discharge of 5,150 cfs and the known water surface elevation of 811 were used during the hydraulic analysis, as described in Section 4. The FEMA Flood Insurance Rate Map is provided in Appendix B.

3.0 HYDRAULIC ANALYSIS

The U.S. Army Corps of Engineers HEC-RAS computer software was utilized to analyze the hydraulic capacity and project water surface elevations (WSEs) along Buckeye Creek during the 100-year, 24-hour design storm evaluations. The Buckeye Creek study area boundary extends from approximately 2,460 feet downstream of the bridge location to approximately 1,045 feet upstream of the bridge location. A map of the cross section locations utilized for the hydraulic analysis is located in Appendix D.

3.1 EXISTING CONDITIONS

A HEC-RAS model for the existing conditions was created using as-built survey information collected by CEC, DEM data, and the FEMA FIS for Doddridge County, WV dated October 4, 2011.

As part of the previously revised flood study of December 2013, CEC performed an additional survey to acquire more accurate and current topography for the stream, overbanks, and newly constructed bridge between stations 25+54.54 (Section T) and 0+00 (Section OO). The resulting existing surface utilized in the December 2013 flood study is also used in this Master Plan flood study.

The HEC-RAS input and output data for the model is provided in Appendix C. The map in Appendix D also shows the estimated lateral extent of the floodplain resulting from the 100-year, 24-hour design storm.

Included in Appendix E is the HEC-RAS summary table for the estimated water surface elevations in Buckeye Creek resulting from the 100-year, 24-hour design storm at each analyzed cross-section based on the existing conditions.

3.2 PROPOSED CONDITIONS

The HEC-RAS model for the proposed conditions was developed by revising the Buckeye Creek cross-sections to include the proposed final grading. The finish grade elevations are shown on the map in Appendix D. The proposed grading is located between cross-sections H (31+54.54) and EE (16+04.54).

The HEC-RAS input and output data for the proposed conditions model are provided in Appendix C. The HEC-RAS summary table for proposed conditions for each cross section is summarized in the hydraulic calculations in Appendix E. In addition, a summary table for the comparison of the 100-year existing and proposed water surface elevations is located at the end of Appendix E.

4.0 CONCLUSIONS

The following conclusions are presented based on the results of engineering analyses using the HEC-RAS model.

4.1 EXISTING CONDITIONS

The existing conditions, as previously described, were evaluated to estimate the WSEs in the area of the final Sherwood Gas Processing Plant Master Plan grading. The water surface elevation at Station 24+94.62, one cross section upstream of the bridge, is 810.75 feet, based on the HEC-RAS existing conditions model. Appendix E contains a summary table of the HEC-RAS results. Also provided are graphical results of the HEC-RAS analysis for the 100-year design storm at numerous sections along Buckeye Creek. Based on these analyses, the following conclusions were developed:

- The 100-year, 24-hour design storm will not overtop the bridge at Station 24+60.04; and
- The 100-year, 24-hour design storm will inundate approximately 53 acres, as shown in Drawing SP01 in Appendix D.

4.2 PROPOSED CONDITIONS

The proposed HEC-RAS model was setup to analyze the hydraulic impacts of the final Sherwood Gas Processing Plant proposed grading on Buckeye Creek. The water surface elevation at Station 24+94.62, one cross section upstream of the bridge, is 811.50 feet. Appendix E contains a summary table of the HEC-RAS results for Buckeye Creek considering the proposed final grading. Also provided are graphical results of the HEC-RAS analysis for the 100-year design storm at numerous sections along Buckeye Creek. The section locations are shown in drawing SP01 in Appendix D.

Based on these analyses, the following conclusions were developed:

- The 100-year, 24-hour design storm will not overtop the bridge at Station 24+60.04;
- The 100-year, 24-hour design storm will inundate approximately 37 acres as shown on Drawing SP01 in Appendix D;
- The 100-year, 24-hour design storm will increase the flood elevation a maximum of 0.75 feet at Station 24+94.62, one section upstream of the bridge; and
- The water surface elevation increase at Station 35+04.54, approximately 315 feet downstream from the subject property line, is 0.17 feet.

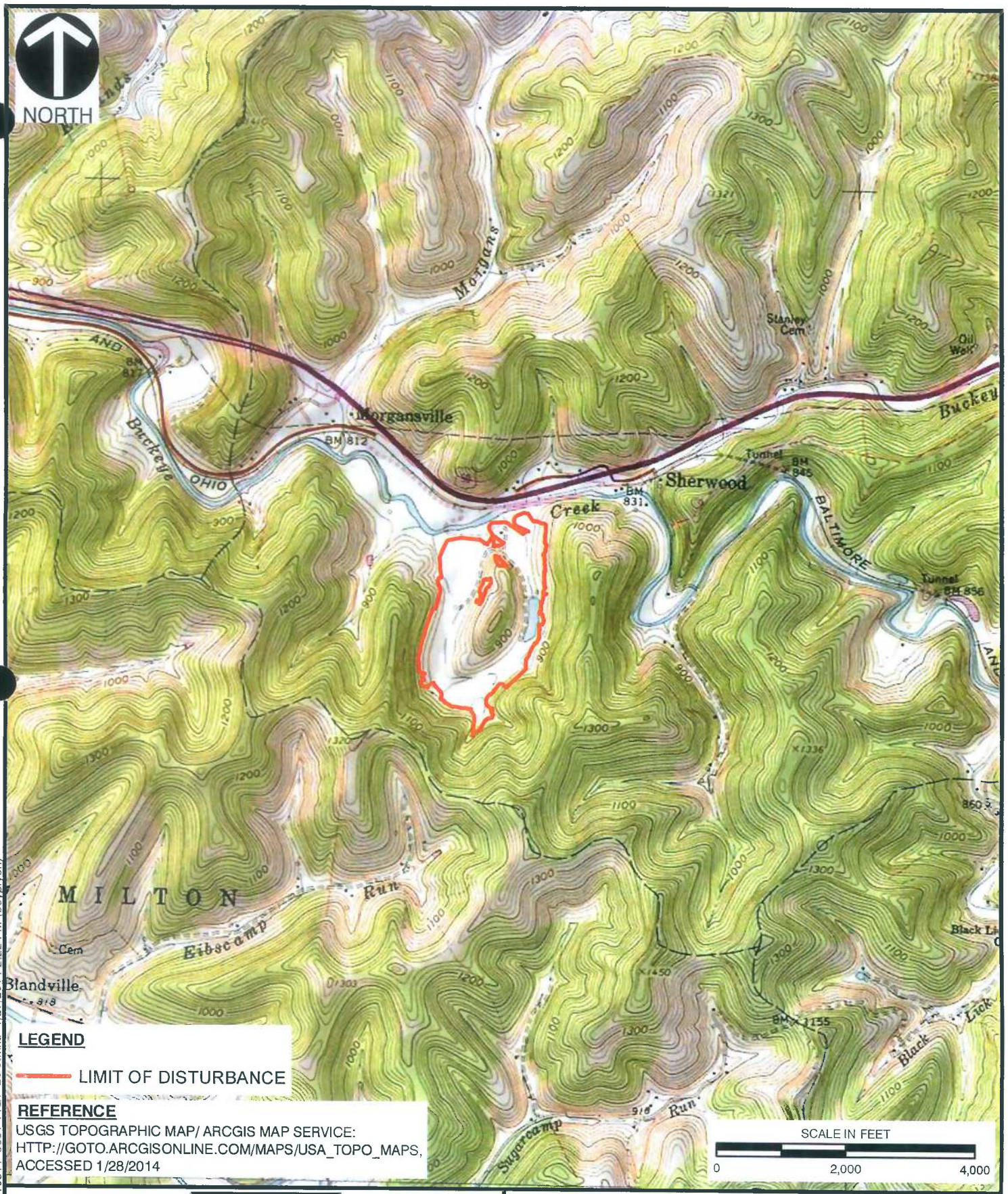
4.3 SUMMARY

The hydraulic analysis was prepared to provide a comparison between the post-development floodplain conditions along Buckeye Creek and the existing conditions.

The Sherwood Gas Processing Plant Master Plan grading will increase the flood elevation by a maximum of 0.75 feet. This increase is within the federal allowable limit of increase of one (1) foot and should not pose any additional flooding hazard to properties adjacent to Buckeye Creek within the study area.

APPENDIX A

SITE LOCATION AND SOILS MAPS



LEGEND

LIMIT OF DISTURBANCE

REFERENCE

USGS TOPOGRAPHIC MAP/ ARCGIS MAP SERVICE: HTTP://GOTO.ARCGISONLINE.COM/MAPS/USA_TOPO_MAPS, ACCESSED 1/28/2014

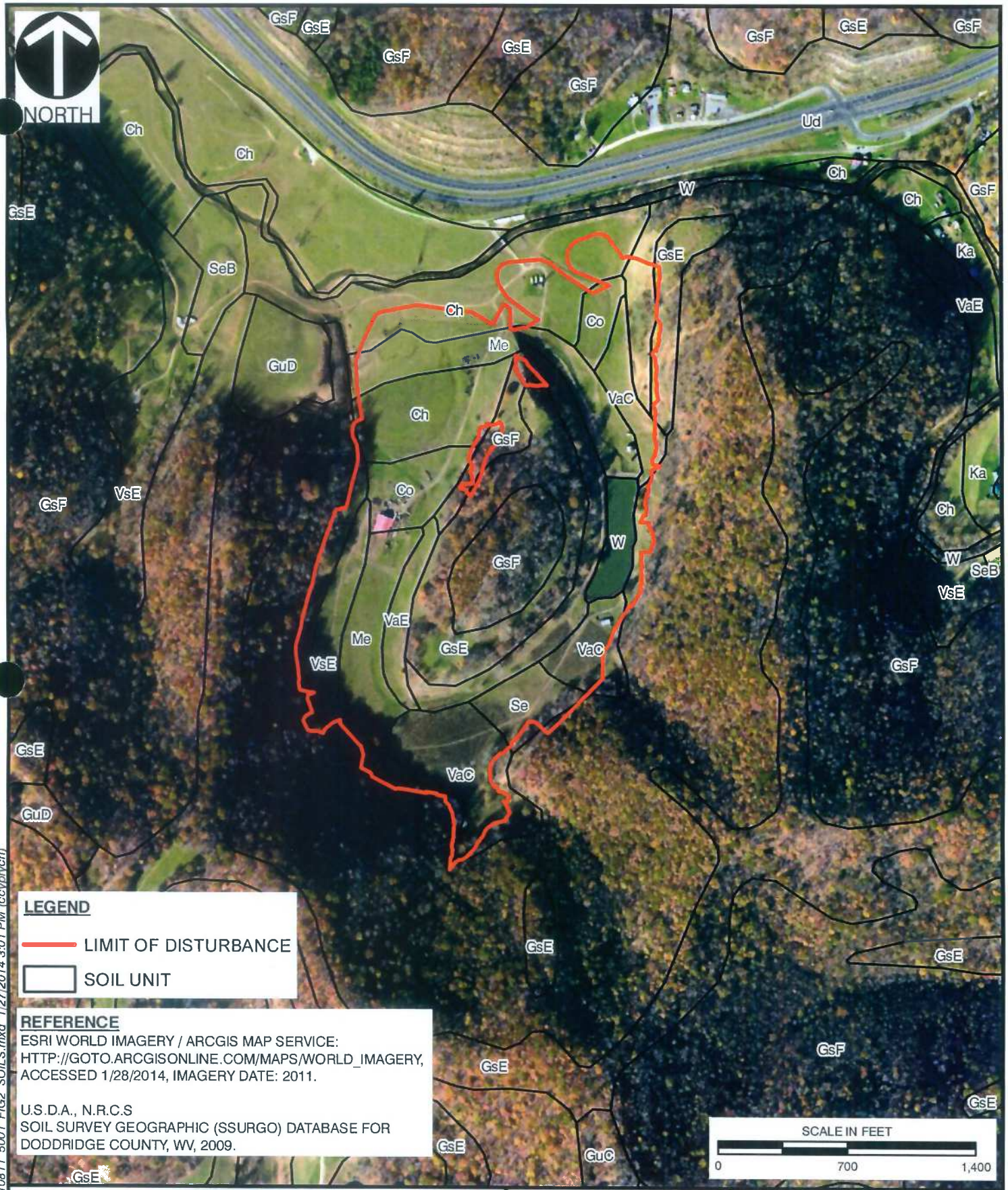
Civil & Environmental Consultants, Inc.
333 Baldwin Road - Pittsburgh, PA 15205-9072
412-429-2324 · 800-365-2324
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC
SHERWOOD GAS PROCESSING PLANTS 6 &7
DODDRIDGE COUNTY, WV

SITE LOCATION MAP

DRAWN BY:	CLC	CHECKED BY:	TGJ	APPROVED BY:		FIGURE NO:	1
DATE:	1/27/2014	SCALE:	1 " = 2,000 '	PROJECT NO:	110-811.5001		

P:\2011\110-811\-GIS\mxd\110811 5001 FIG1 LOC.mxd 1/27/2014 2:22 PM (ccyonych)



LEGEND

LIMIT OF DISTURBANCE

SOIL UNIT

REFERENCE

ESRI WORLD IMAGERY / ARCGIS MAP SERVICE: HTTP://GOTO.ARCGISONLINE.COM/MAPS/WORLD_IMAGERY, ACCESSED 1/28/2014, IMAGERY DATE: 2011.

U.S.D.A., N.R.C.S
SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR DODDRIDGE COUNTY, WV, 2009.

SCALE IN FEET

0 700 1,400

P:\2011\110-811-GIS\mxd\110811 5001 FIG2 SOILS.mxd 1/27/2014 3:01 PM (ccyprych)

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MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC
SHERWOOD GAS PROCESSING PLANTS 6 &7
DODDRIDGE COUNTY, WV

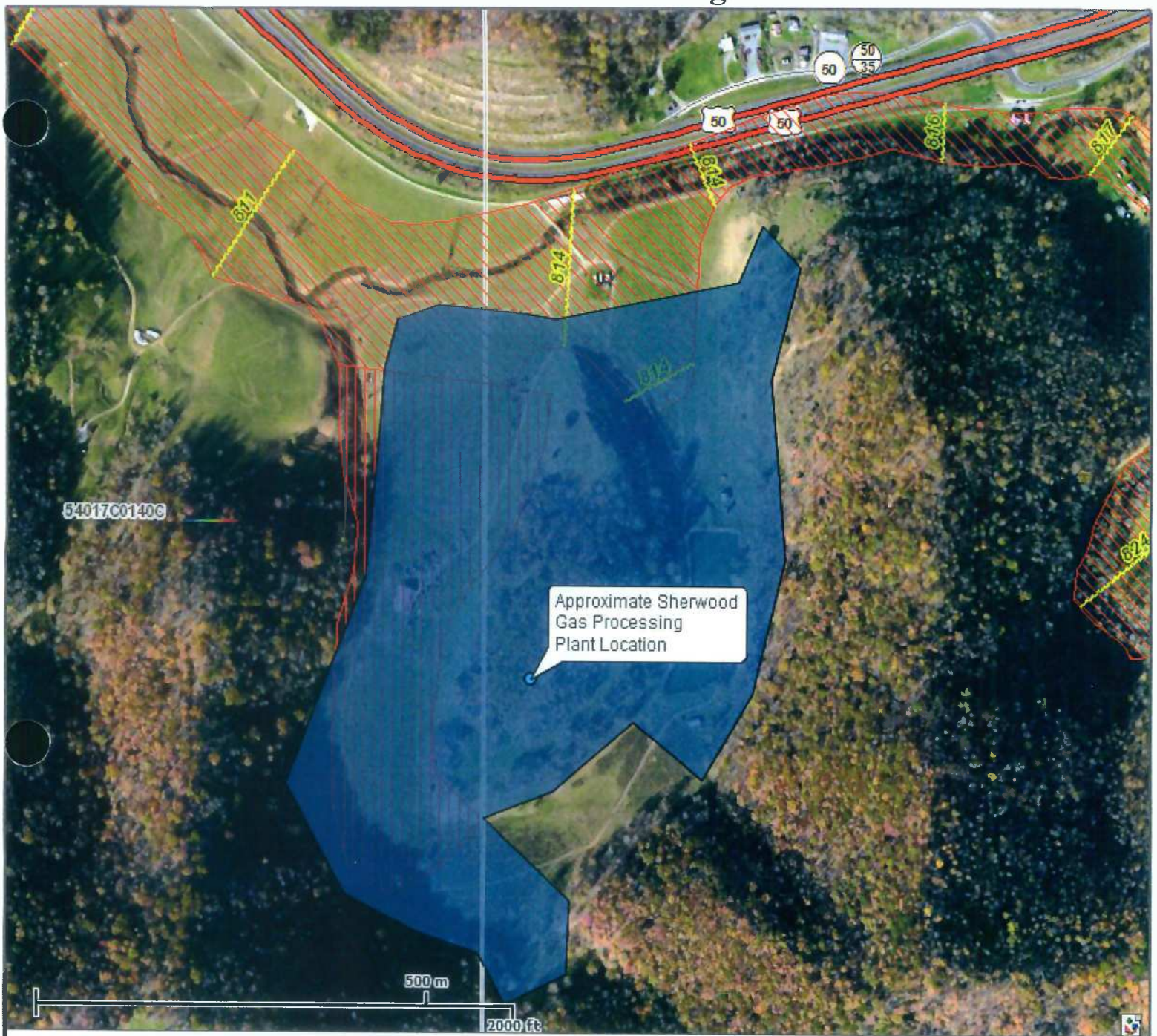
SOILS MAP

DRAWN BY:	CLC	CHECKED BY:	TGJ	APPROVED BY:		FIGURE NO:	2
DATE:	1/27/2014	SCALE:	1 " = 700 '	PROJECT NO:	110-811.5001		

APPENDIX B

FEMA FLOOD INFORMATION STUDY AND RATE MAP

Sherwood Gas Processing Plant



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

Map Created on 1/24/2014

Location of the mouse click

Approximate Study (Zone A)

Detailed Study (Zone AE, AH, AO)

Floodway

Flood Water Depth (HEC-RAS)

K—K **Cross Section Line**

810 **Base Flood Elevation Line**

DFIRM Panel (Map) Index

User Notes:

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 is supported by FEMA, WV NFIP Office, and WV GIS Technical Center

Flood Hazard Area: Selected site is **WITHIN** the FEMA 100-year floodplain.

Flood Zone: A

Advisory Flood Height:

Water Depth:

Elevation:

Location (long, lat): 80.687945 W, 39.275688 N

Location (UTM 17N):

FEMA Issued Flood Map: 54017C0140C

Contacts: Doddridge County

CRS Information: No CRS information available

Flood Profile: No Profile

HEC-RAS Model: No Model

Parcel Number:

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0145C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 145 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0145	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
54017C0145C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

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

NATIONAL FLOOD INSURANCE PROGRAM

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

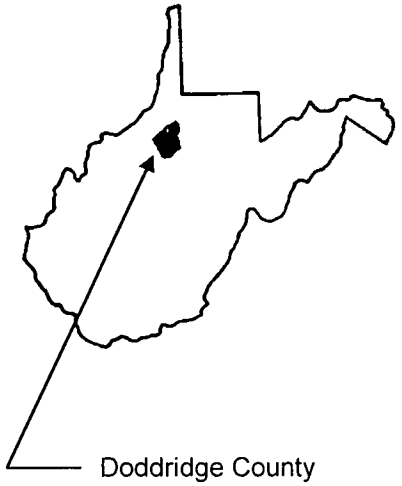
Federal Emergency Management Agency

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

FLOOD INSURANCE STUDY

DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
WEST UNION, TOWN OF	540025
DODDRIDGE COUNTY (UNINCORPORATED AREAS)	540024



Effective: October 4, 2011

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
54017CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

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

Initial Countywide FIS Effective Date: March 18, 1991

Flood Insurance Study Revised: October 4, 2011

TABLE OF CONTENTS – Volume 1 – *October 4, 2011*

TABLE OF CONTENTS – Volume 1 – *October 4, 2011*

FIGURES

TABLES

EXHIBITS

FLOOD INSURANCE STUDY
DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

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

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

1.2 Authority and Acknowledgments

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

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

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

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

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

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

1.3 Coordination

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

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

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

2.0 AREA STUDIED

2.1 Scope of Study

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

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

Table 1 – Areas Studied by Detailed Methods

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

Table 1 – Areas Studied by Detailed Methods - continued

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

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

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

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

2.2 Community Description

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

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

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

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

2.3 Principal Flood Problems

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

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

2.4 Flood Protection Measures

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

3.0 ENGINEERING METHODS

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

3.1 Hydrologic Analyses

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

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

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

Table 2 – Summary of Discharges

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

Table 2 – Summary of Discharges

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

3.2 Hydraulic Analyses

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

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

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

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

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

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

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

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

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

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

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

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

3.3 Vertical Datum

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

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

Table 3 – Vertical Datum Conversion Values

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

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

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

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

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

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

4.1 Floodplain Boundaries

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

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

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

4.2 Floodways

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

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

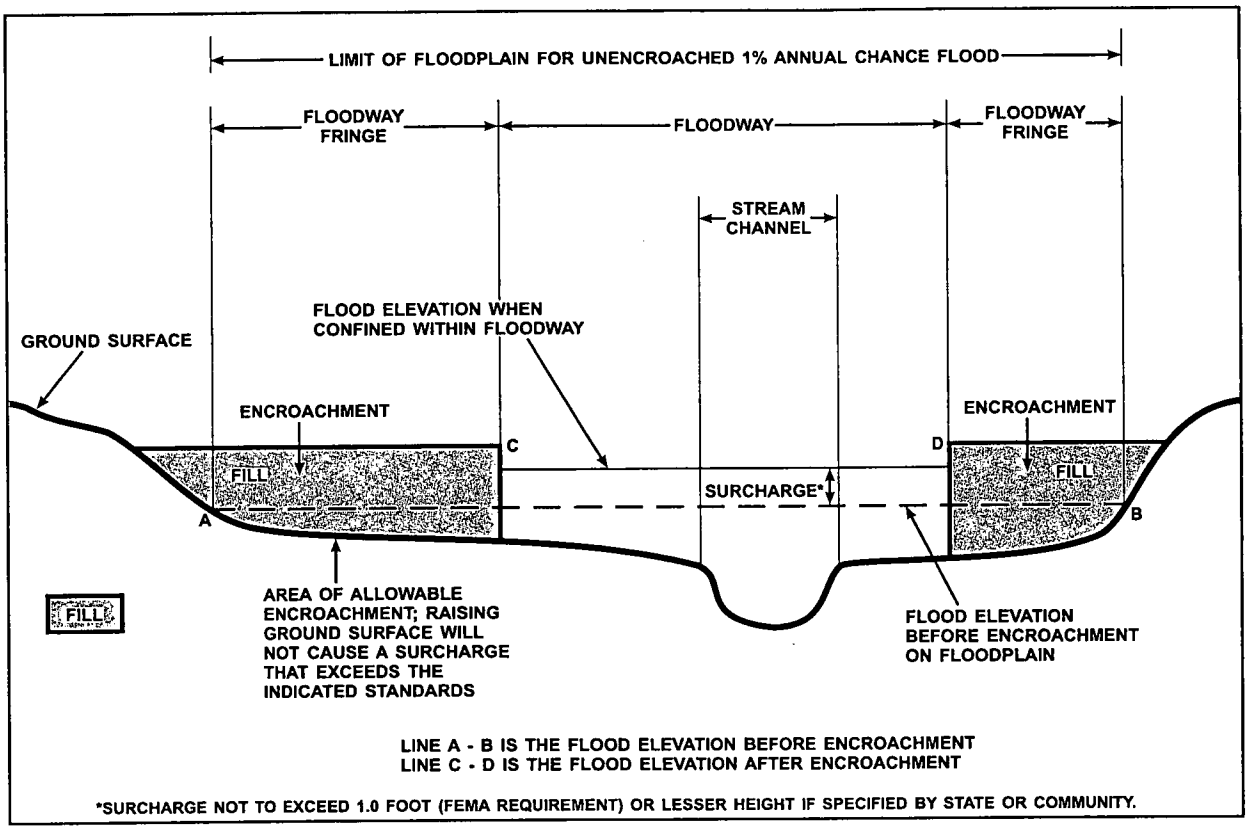


Figure 1 - Floodway Schematic

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

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

Zone AH

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

Zone AO

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

Zone AR

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

Zone A99

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

Zone V

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

Zone VE

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

Zone X

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

Zone X (Future Base Flood)

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

Zone D

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

6.0 FLOOD INSURANCE RATE MAP

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

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

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

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

COMMUNITY NAME	INITIAL NFIP MAP DATE	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	INITIAL FIRM DATE
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 H

7.0 OTHER STUDIES

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

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

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

8.0 LOCATION OF DATA

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

9.0 BIBLIOGRAPHY AND REFERENCES

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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.

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

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

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

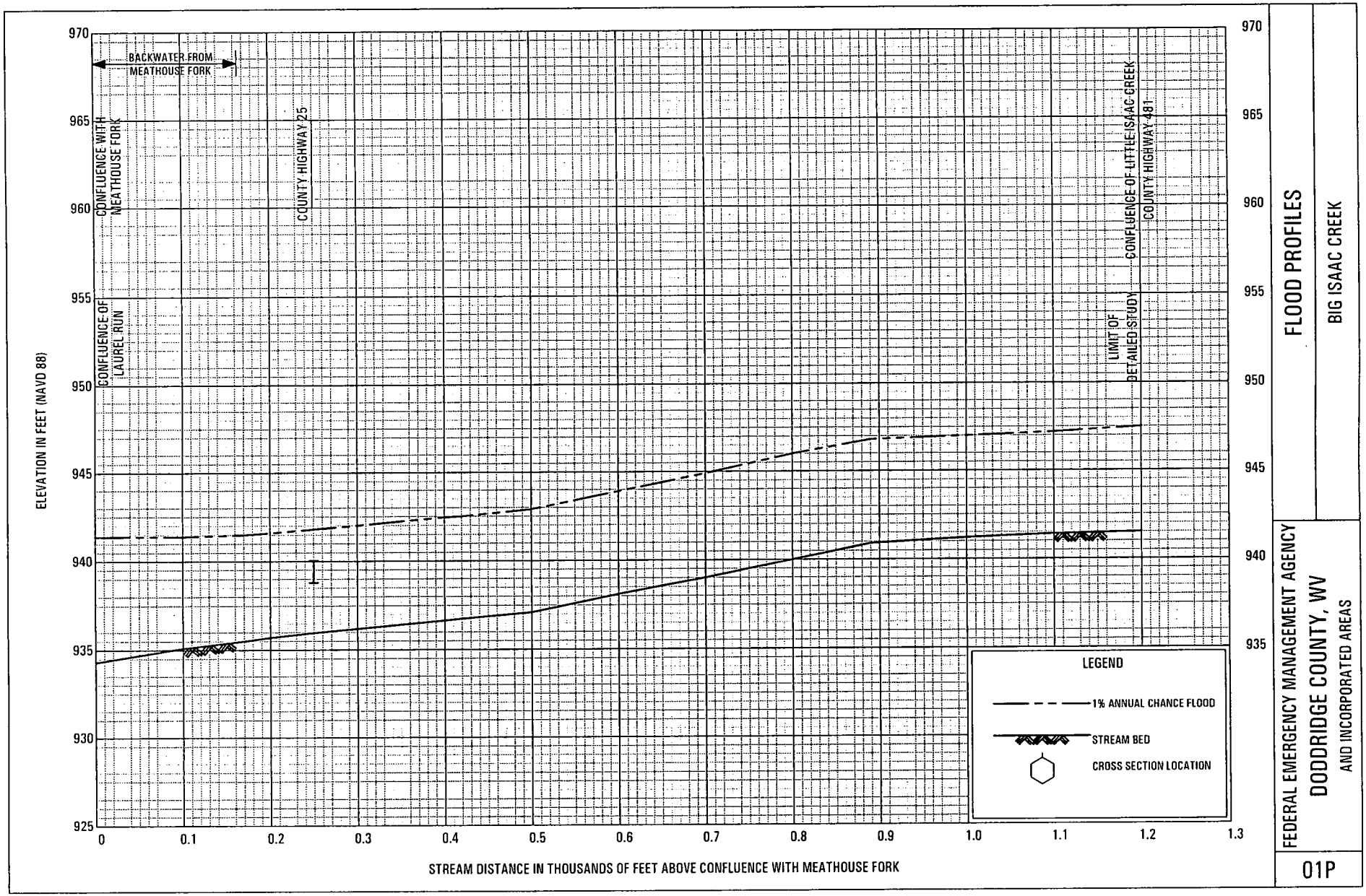
10. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Tyler County, West Virginia, Washington, D. C., November 4, 1988.

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

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

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

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



FLOOD PROFILES

BIG ISAAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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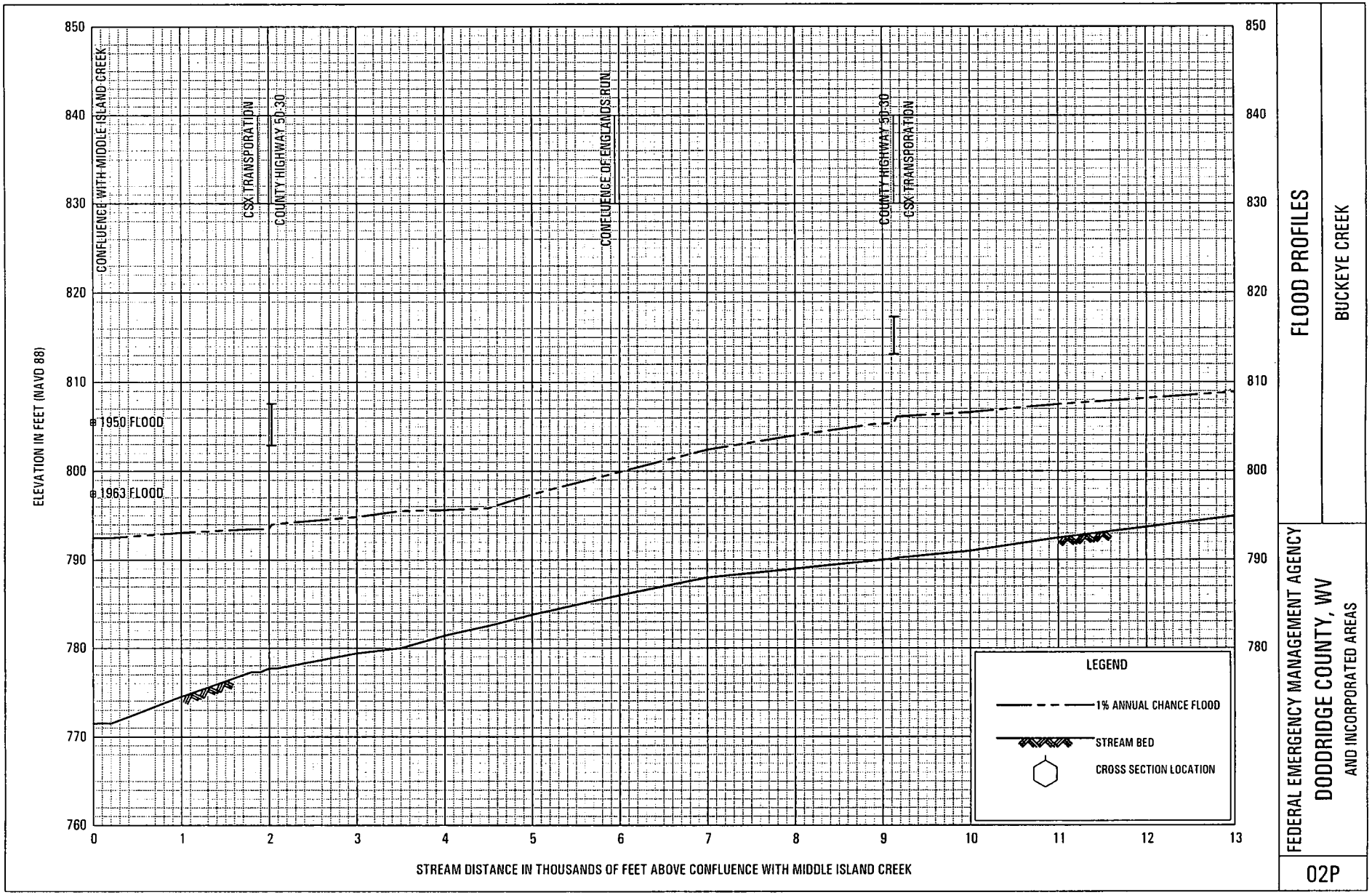

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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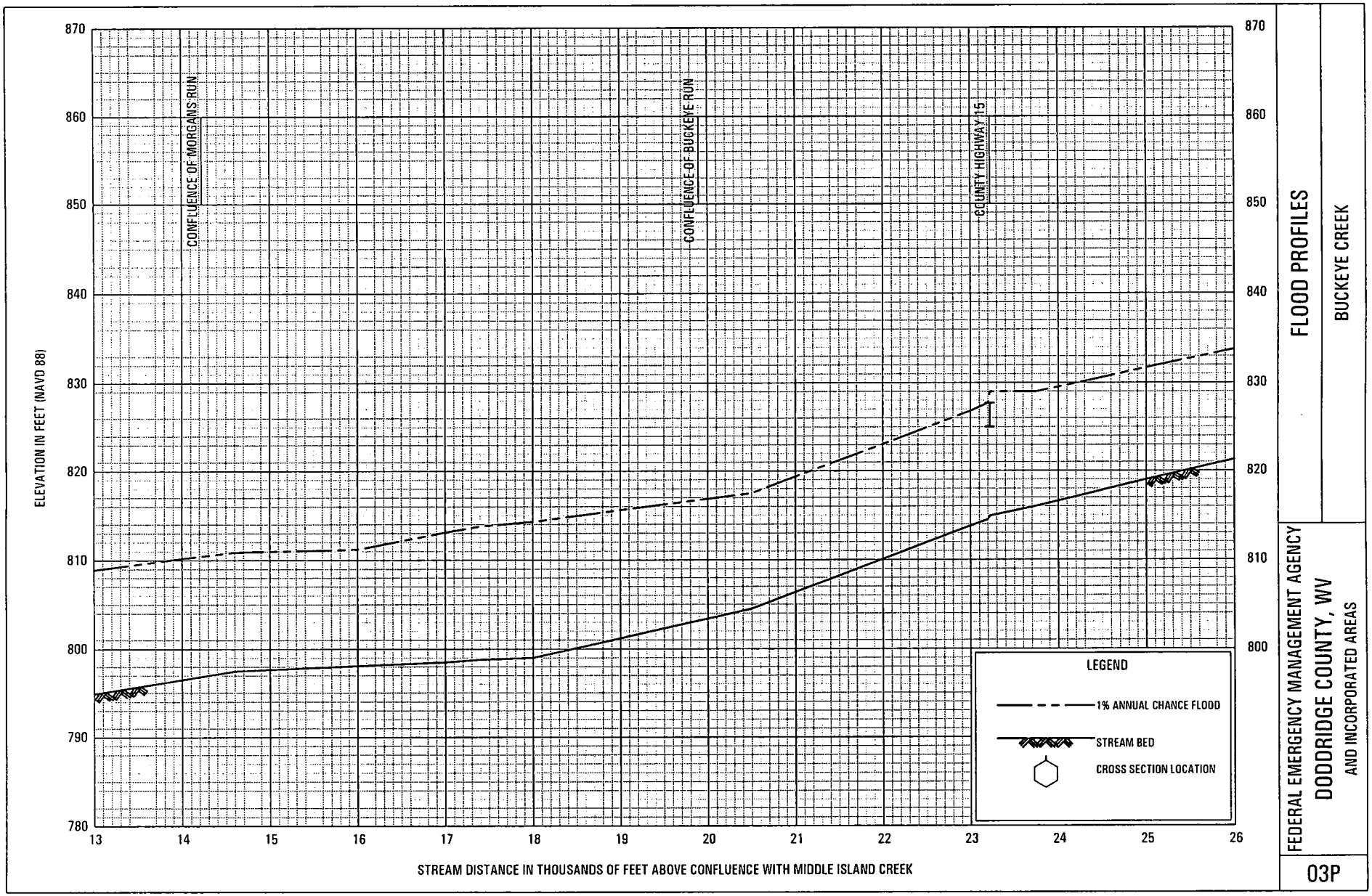

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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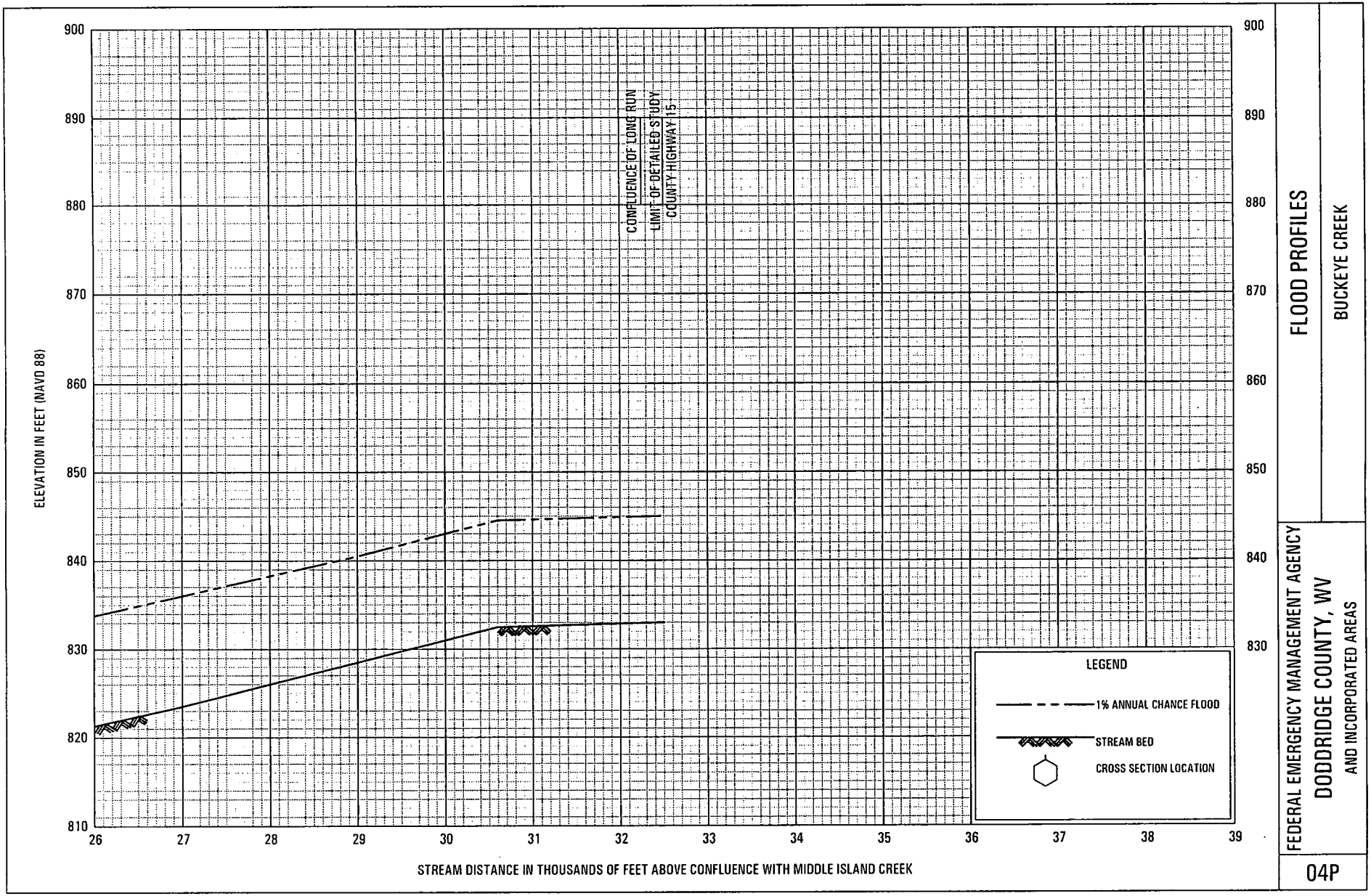

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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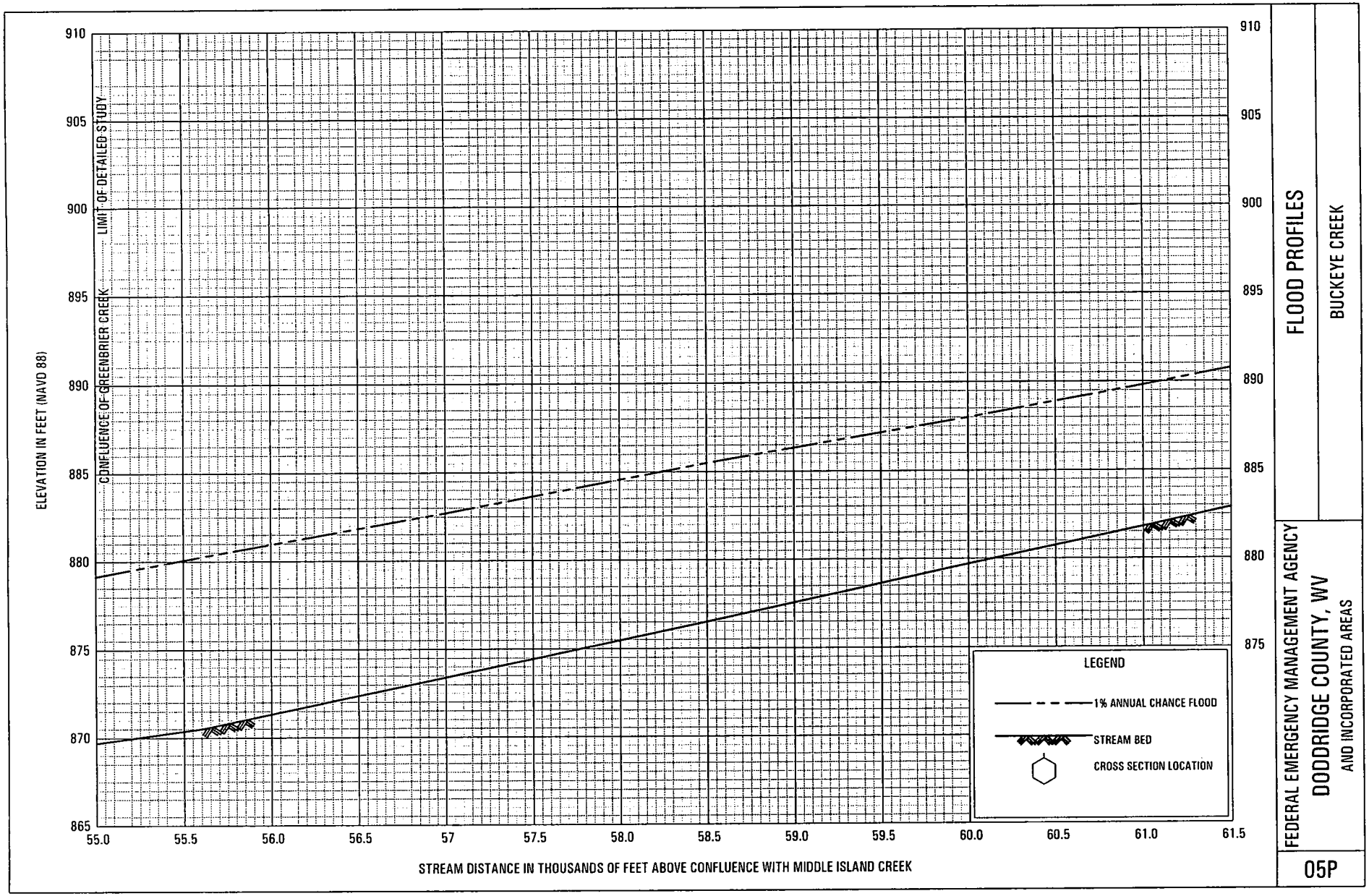

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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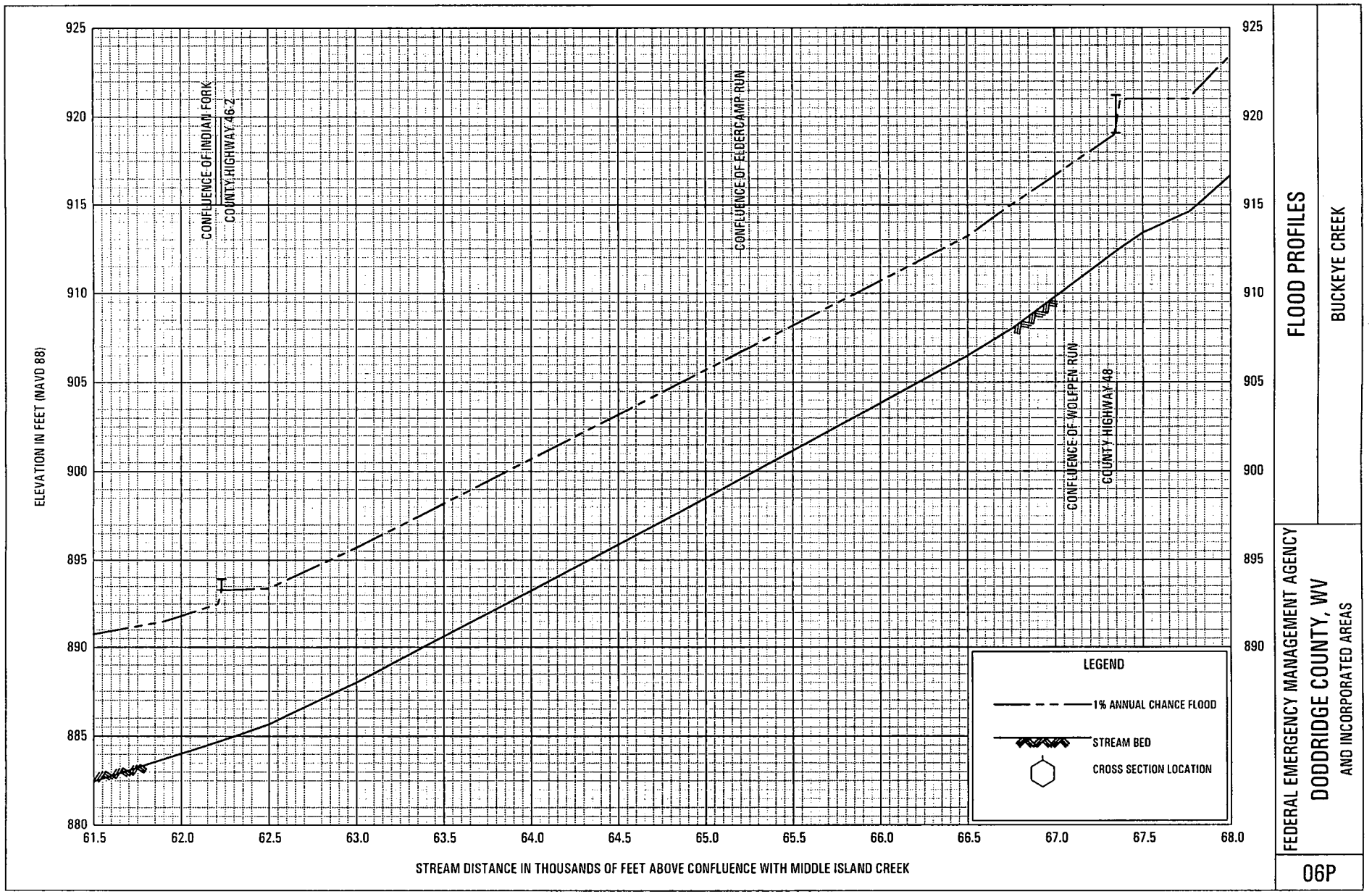

FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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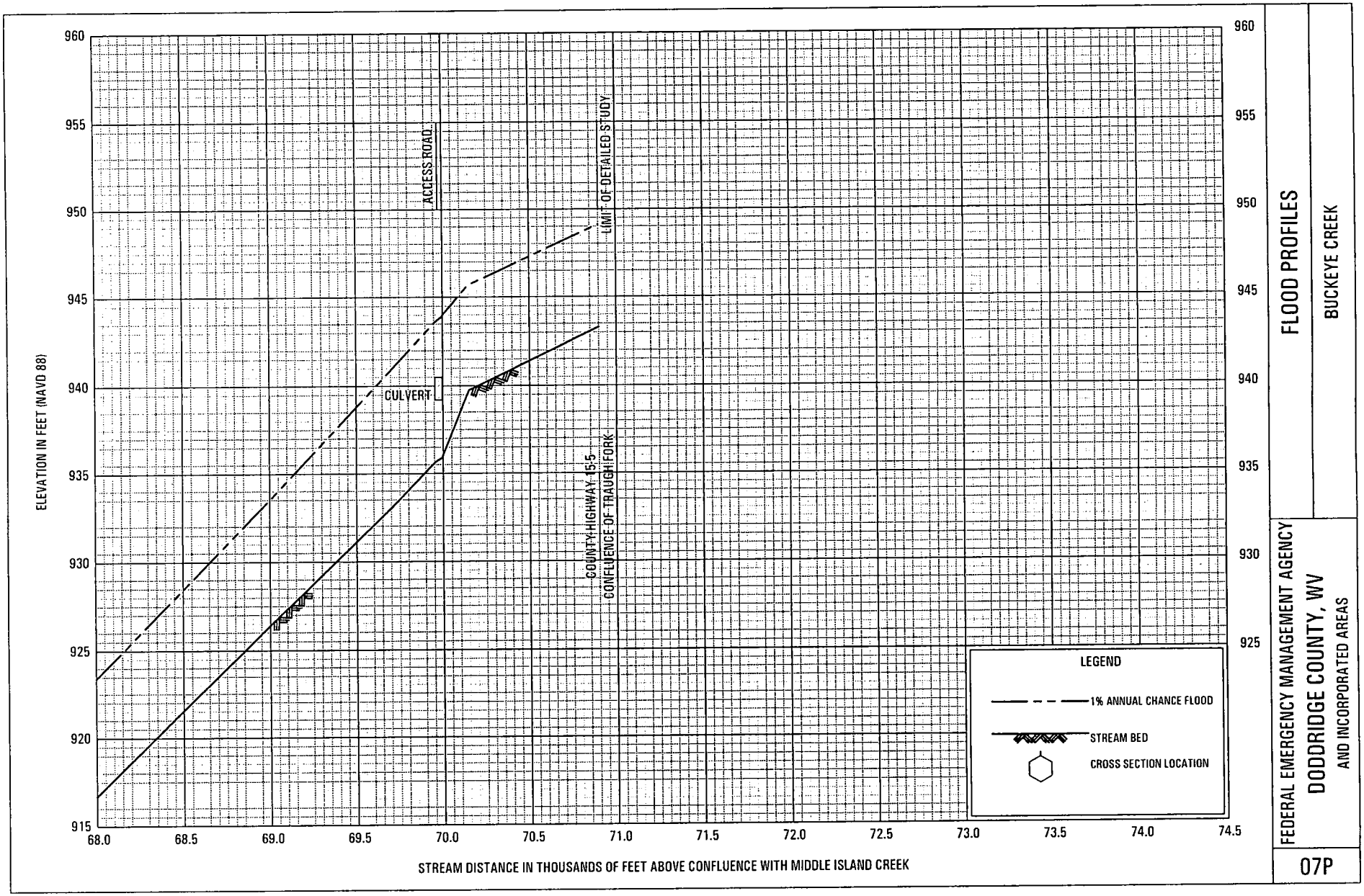


FLOOD PROFILES

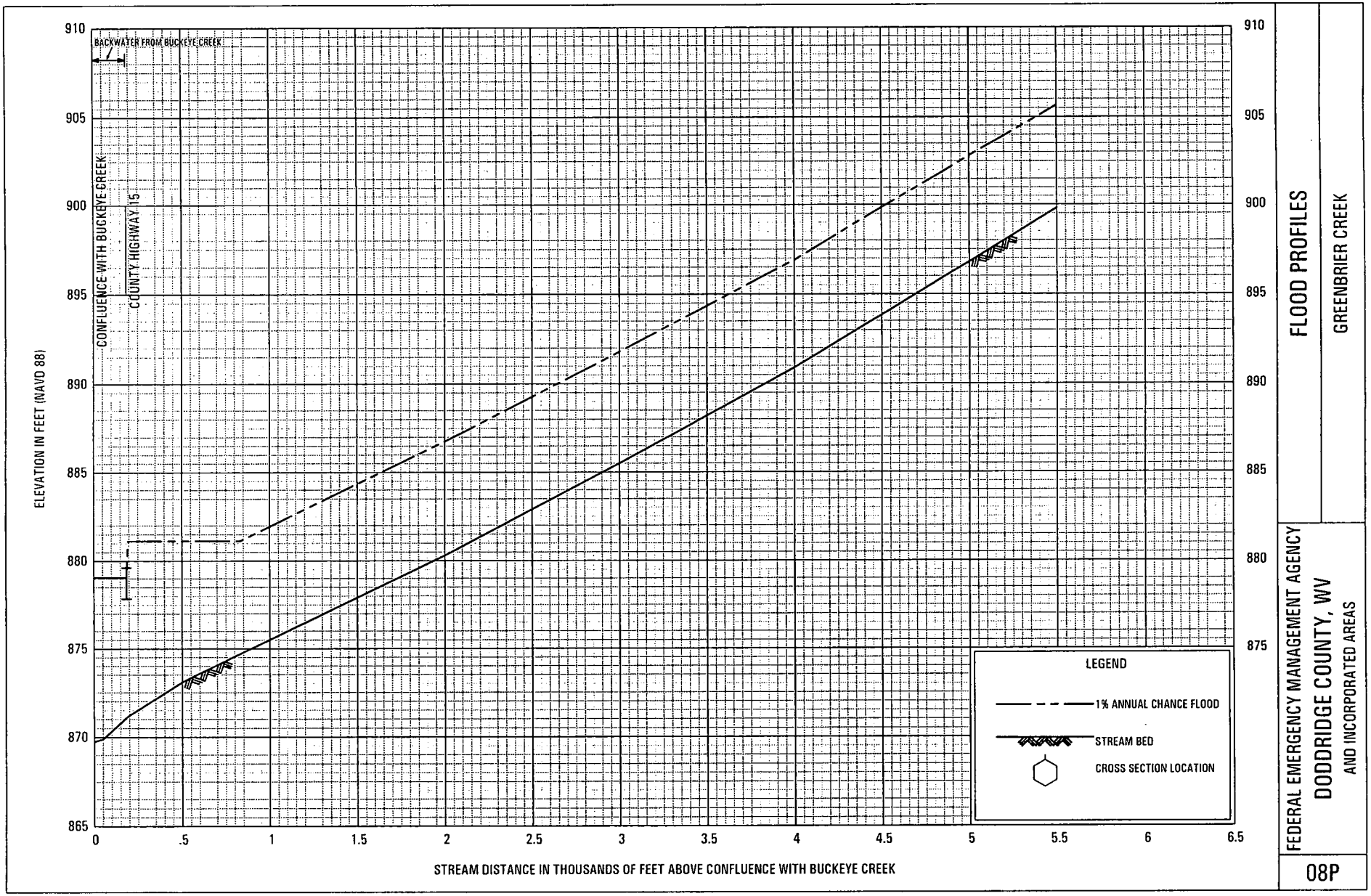
BUCKEYE CREEK

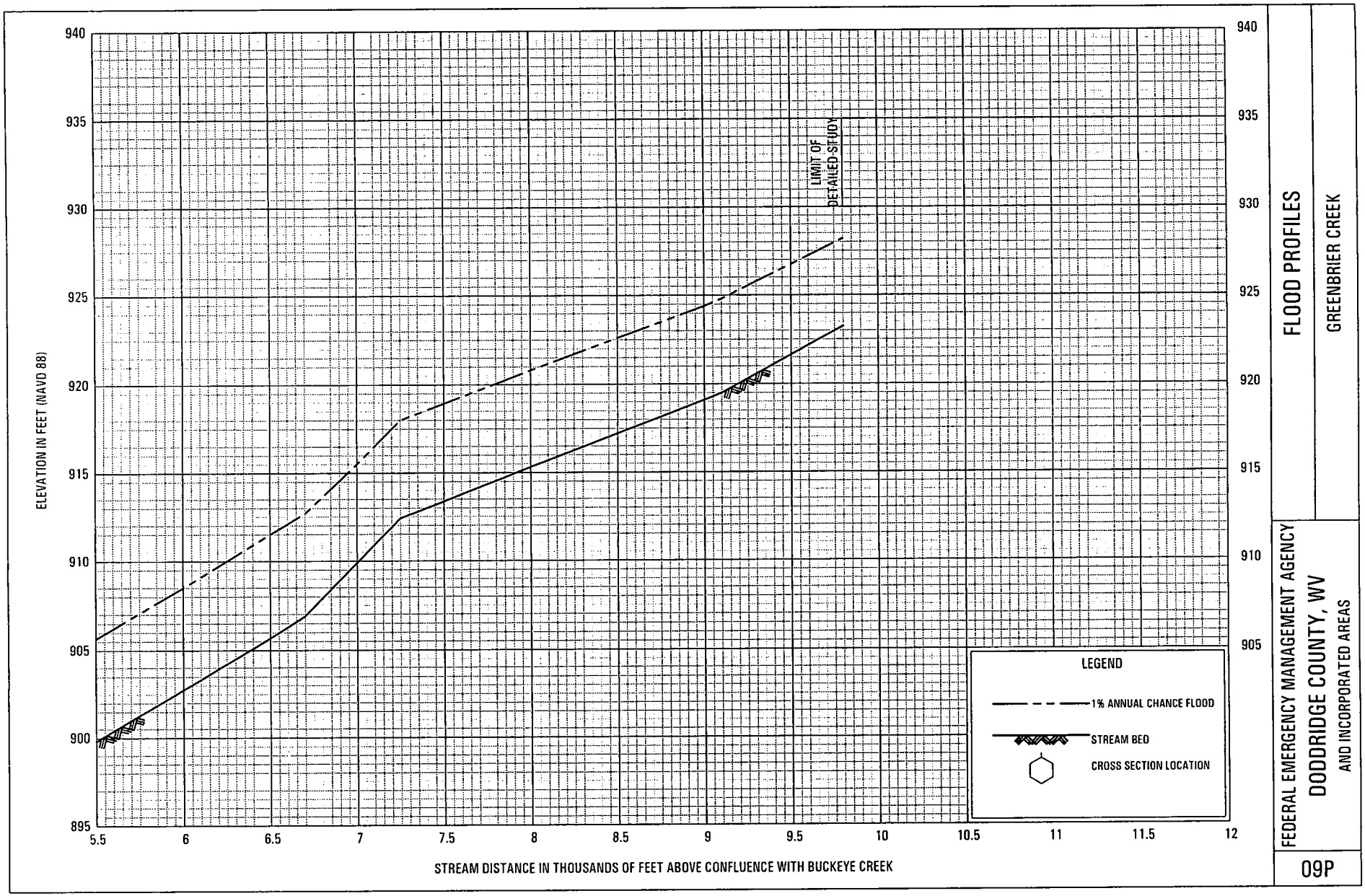
FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

07P


BACKWATER FROM BUCKEYE CREEK
CONFLUENCE WITH BUCKEYE CREEK
COUNTY HIGHWAY 15
ELEVATION IN FEET (NAVD 88)
910
905
900
895
890
885
880
875
870
865
0
.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH BUCKEYE CREEK
LEGEND
1% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
FLOOD PROFILES
GREENBRIER CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS
08P



FLOOD PROFILES

GREENBRIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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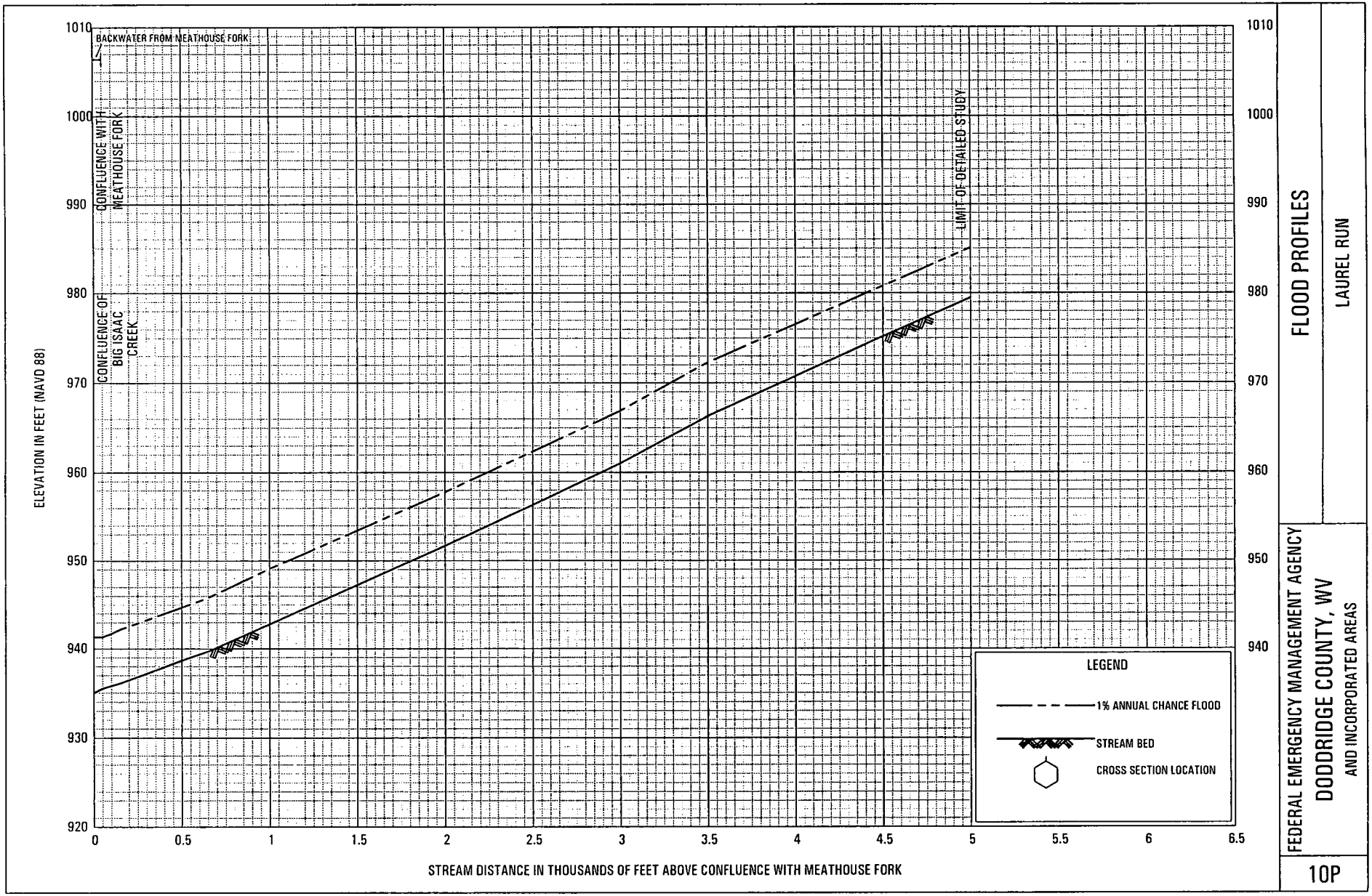

FLOOD PROFILES

LAUREL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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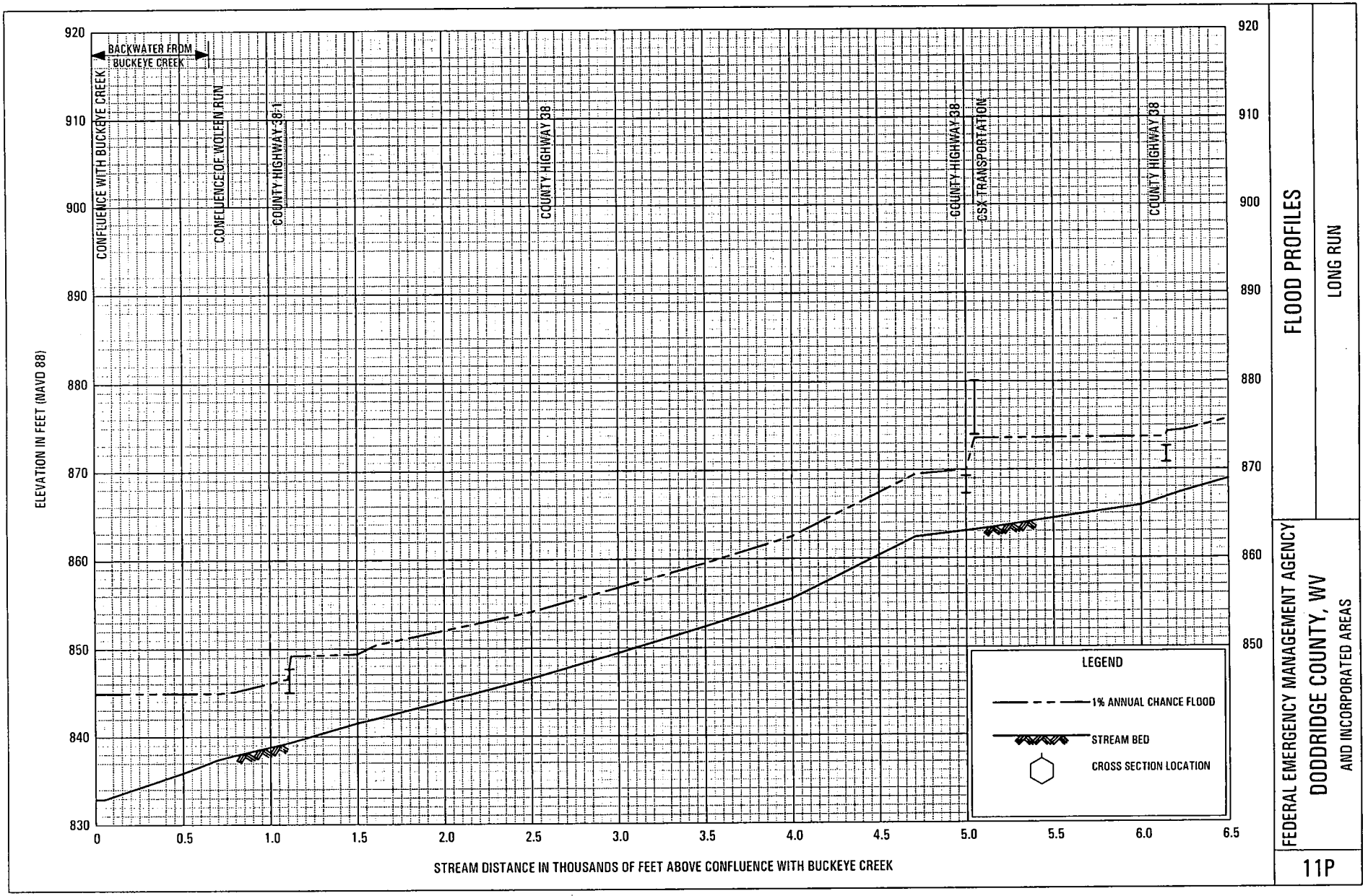

FLOOD PROFILES

LONG RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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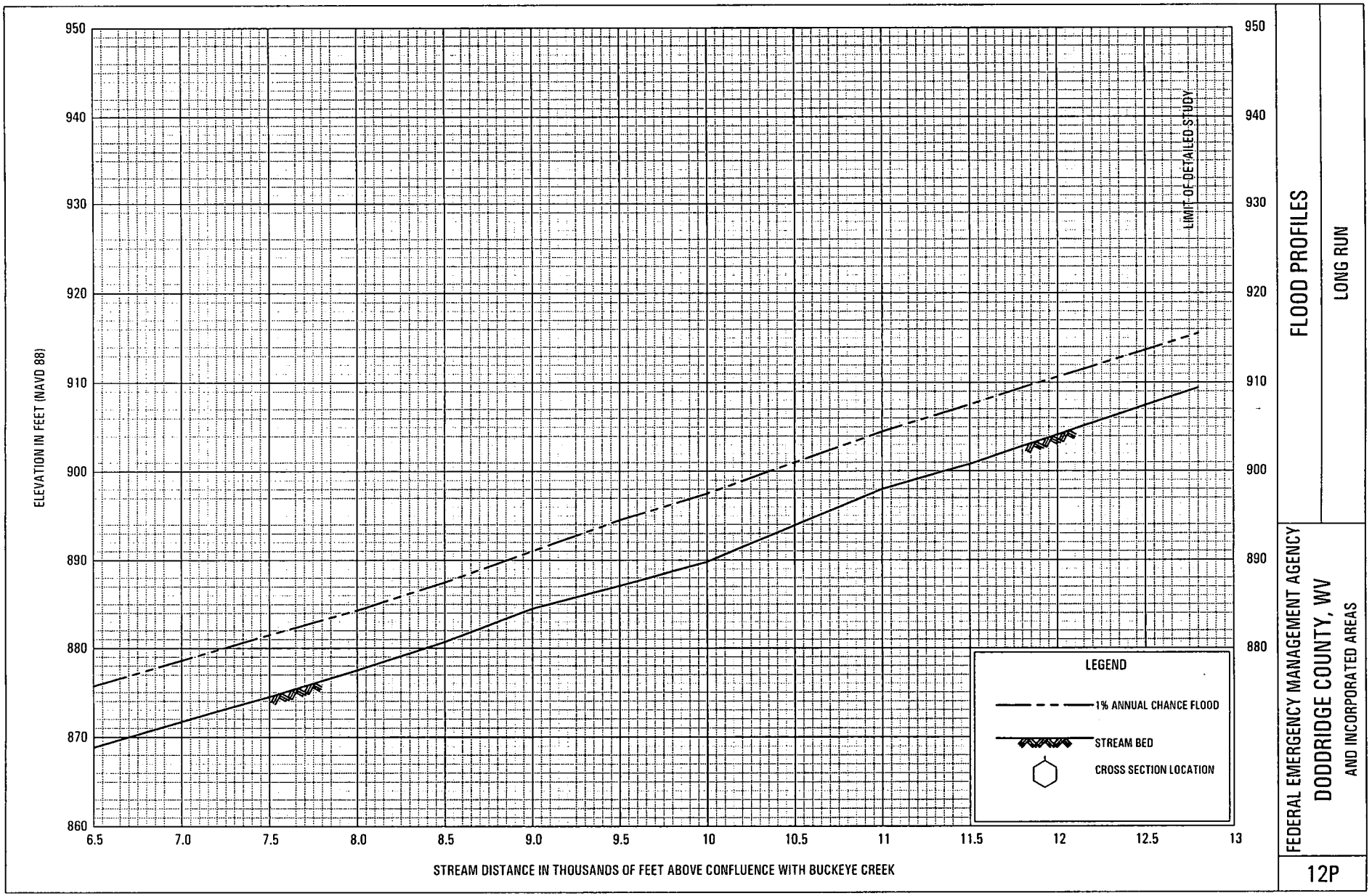

FLOOD PROFILES

LONG RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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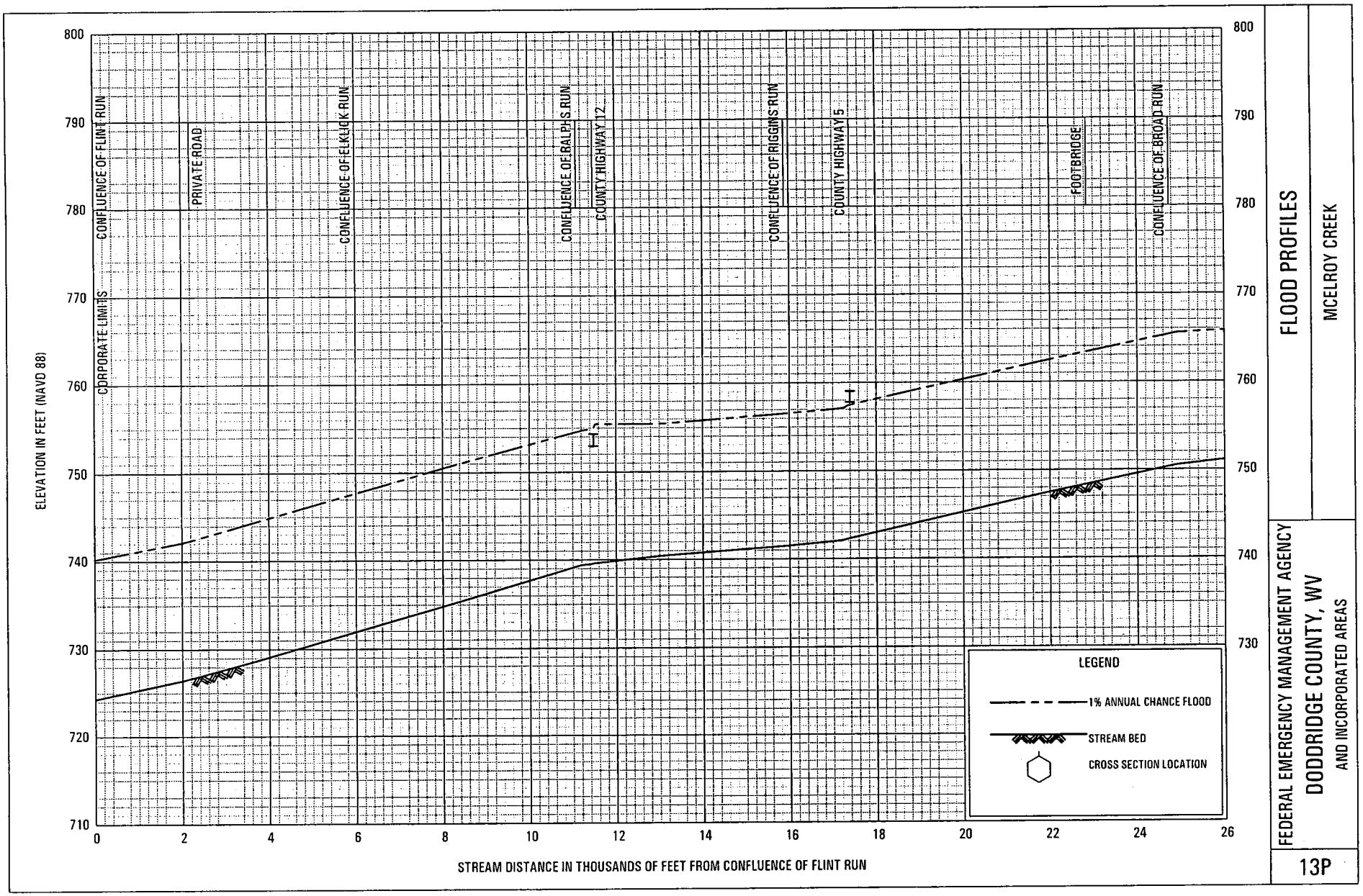

FLOOD PROFILES

MCELROY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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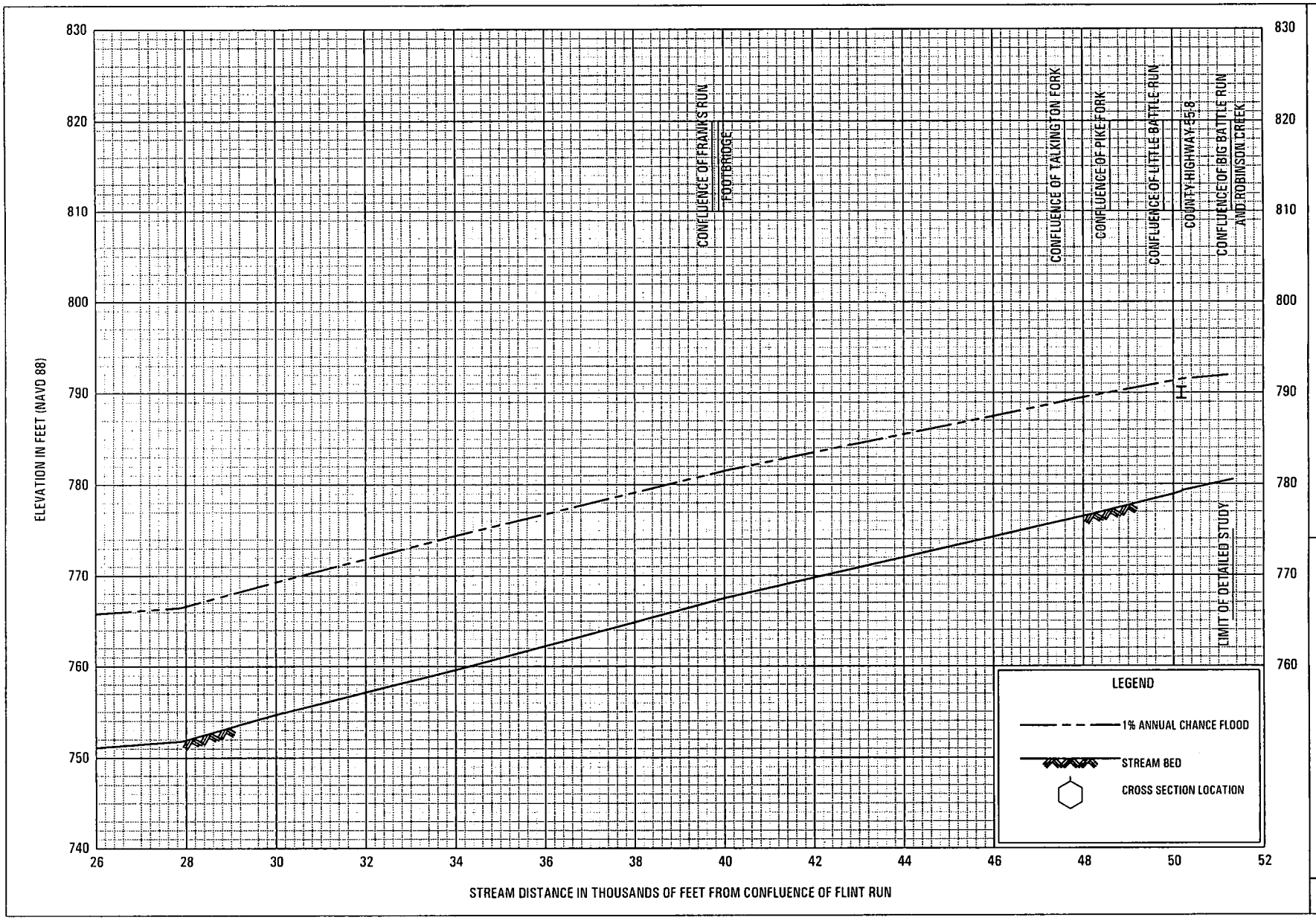


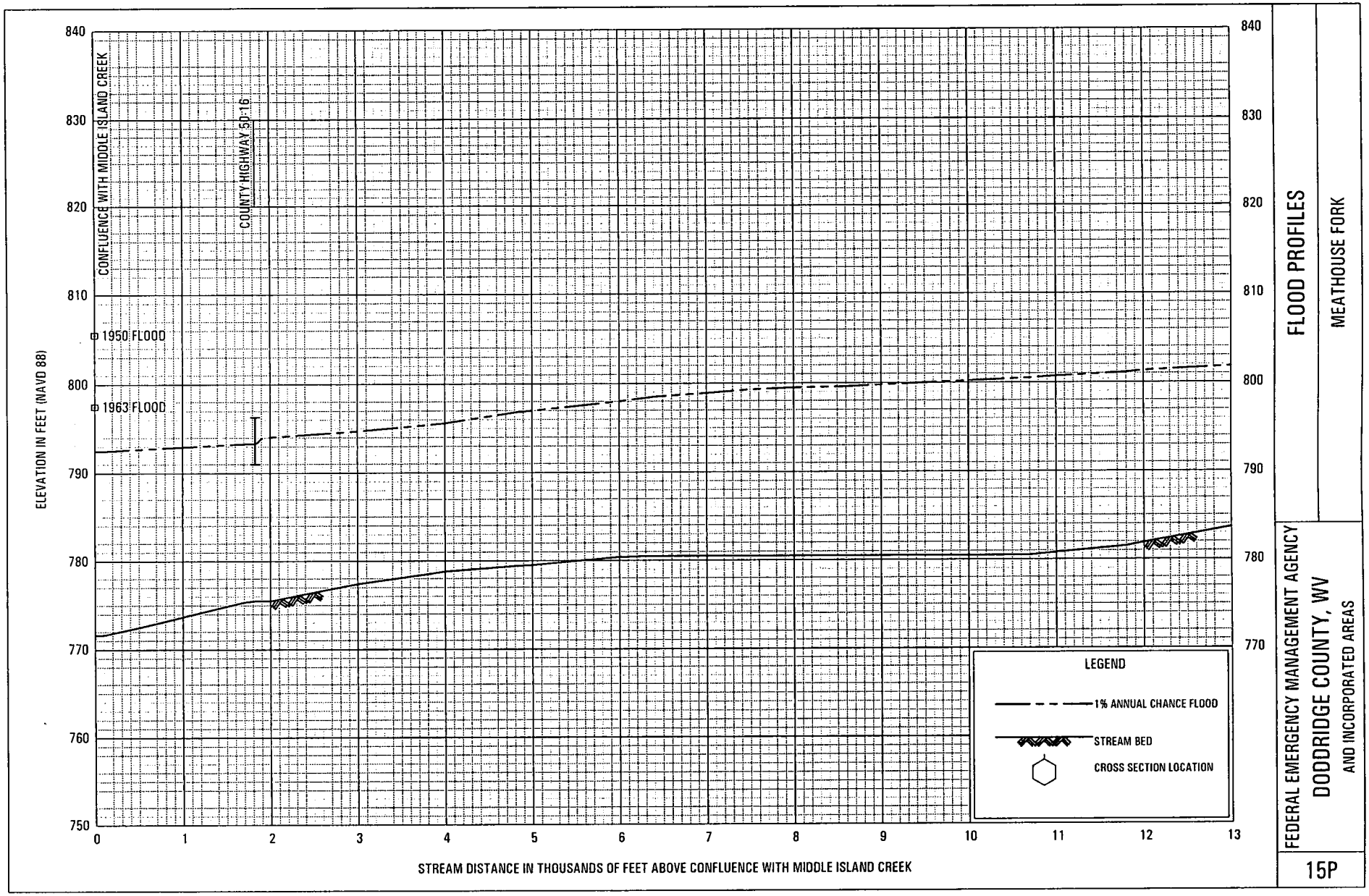
FLOOD PROFILES

MCELROY CREEK

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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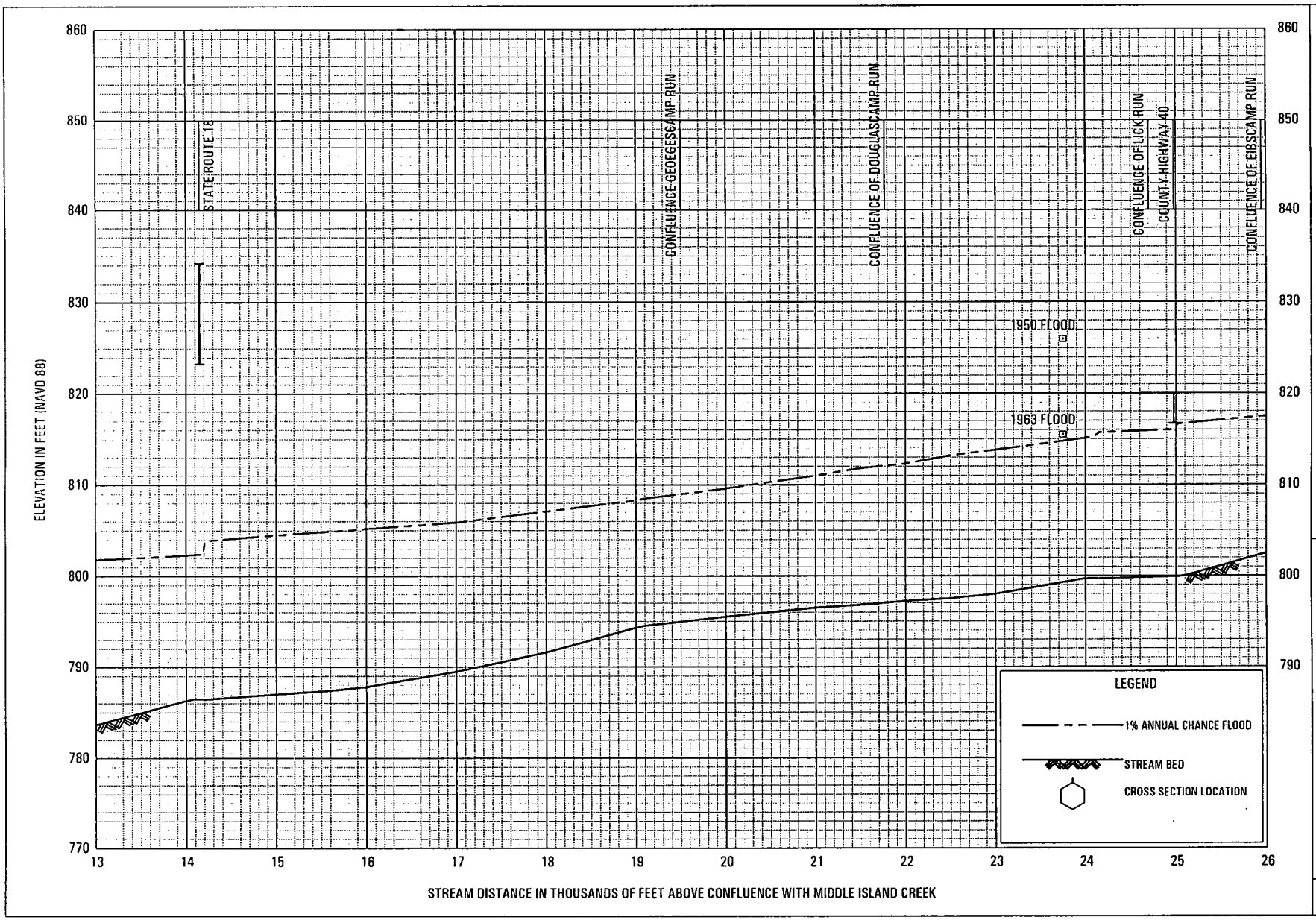

FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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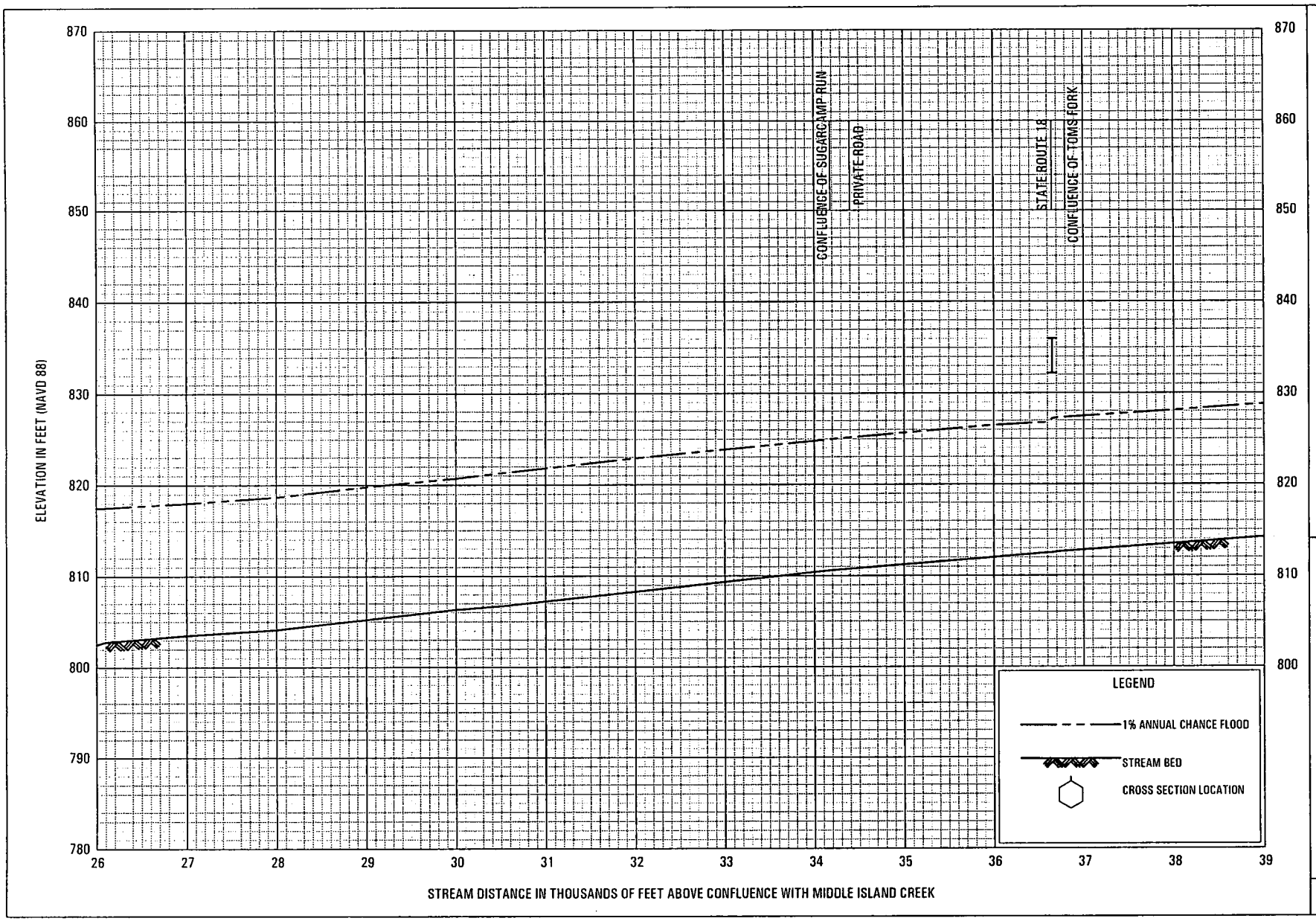


FLOOD PROFILES

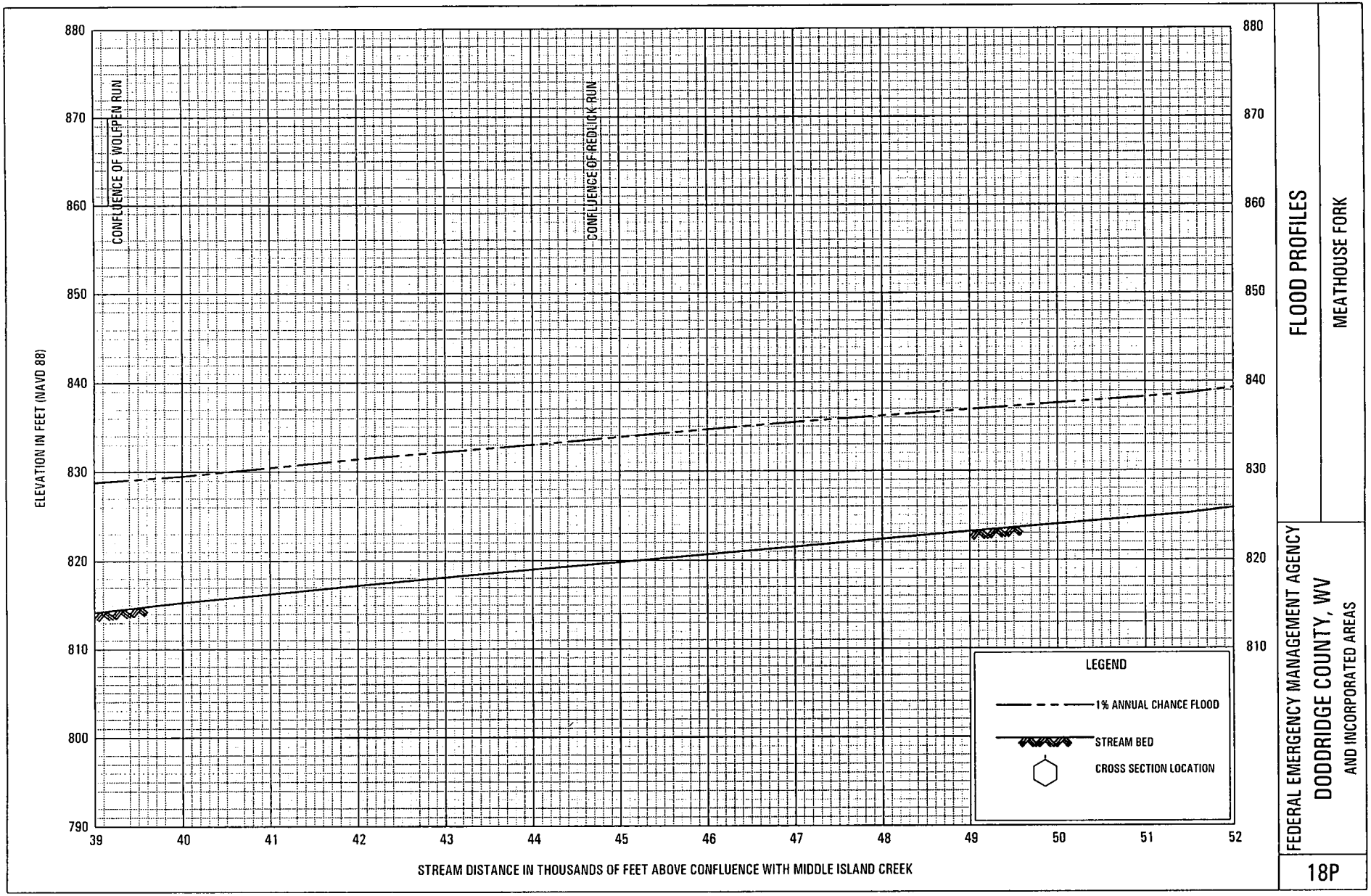
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

17P



FLOOD PROFILES

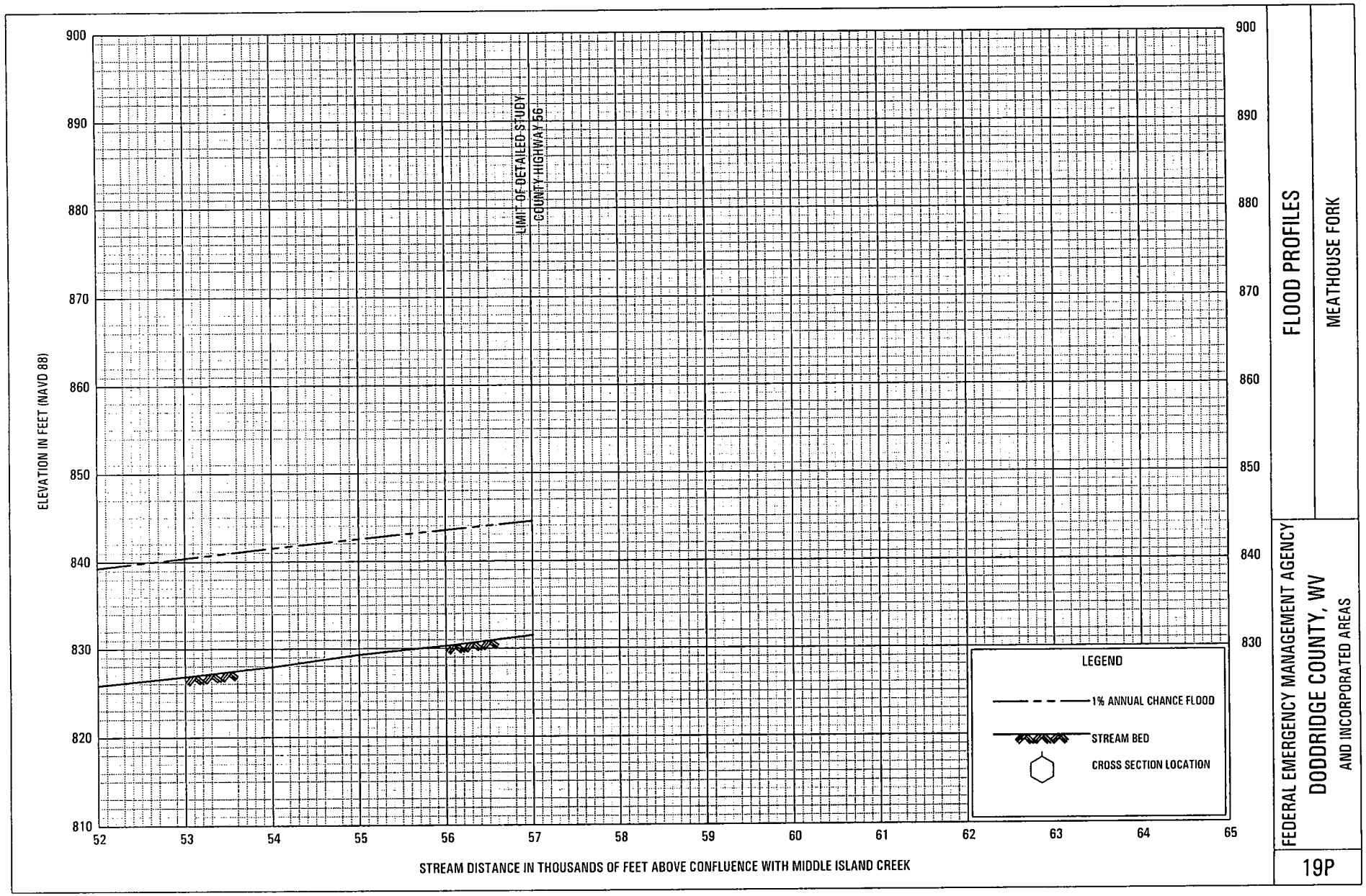
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

18P



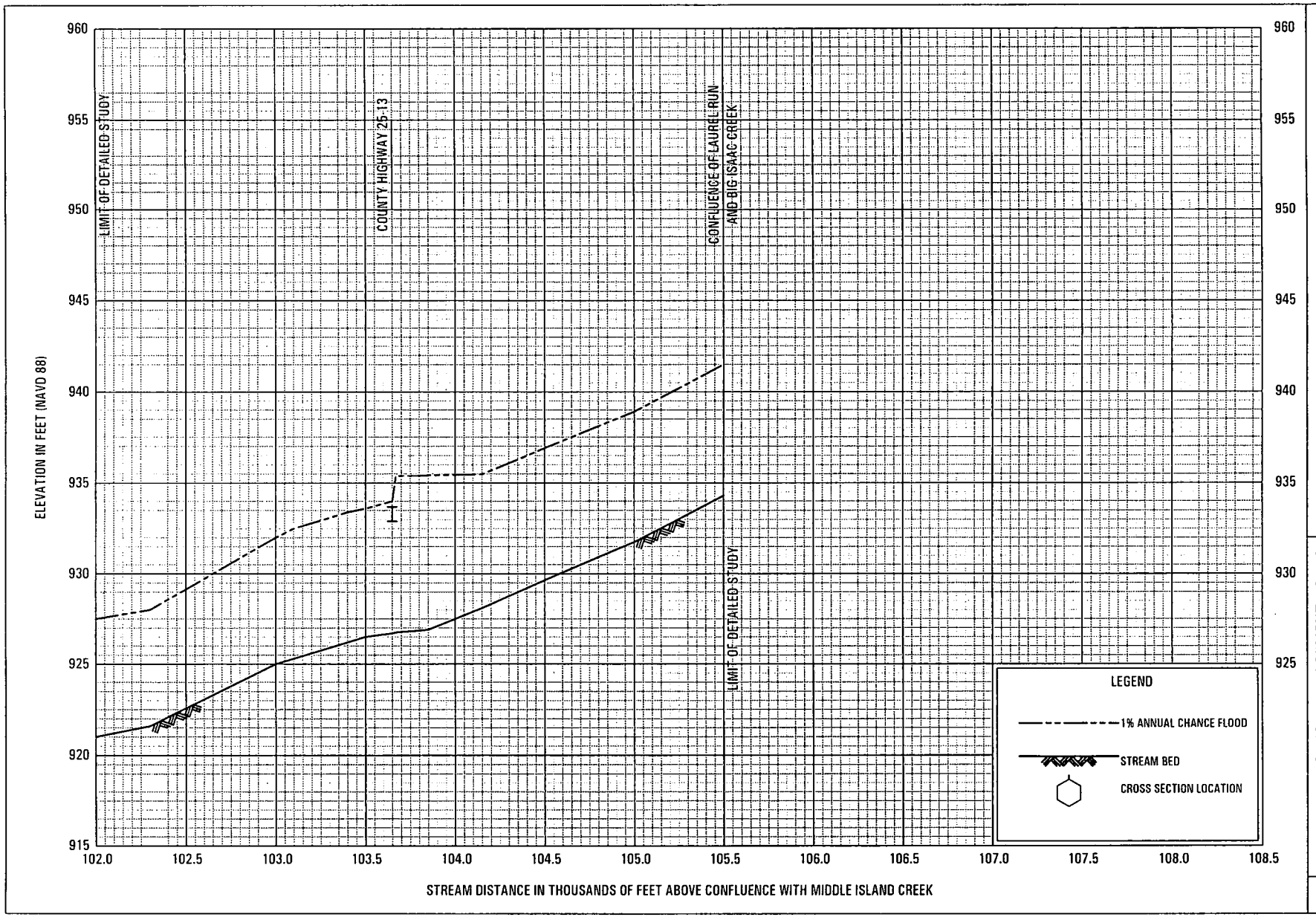
FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



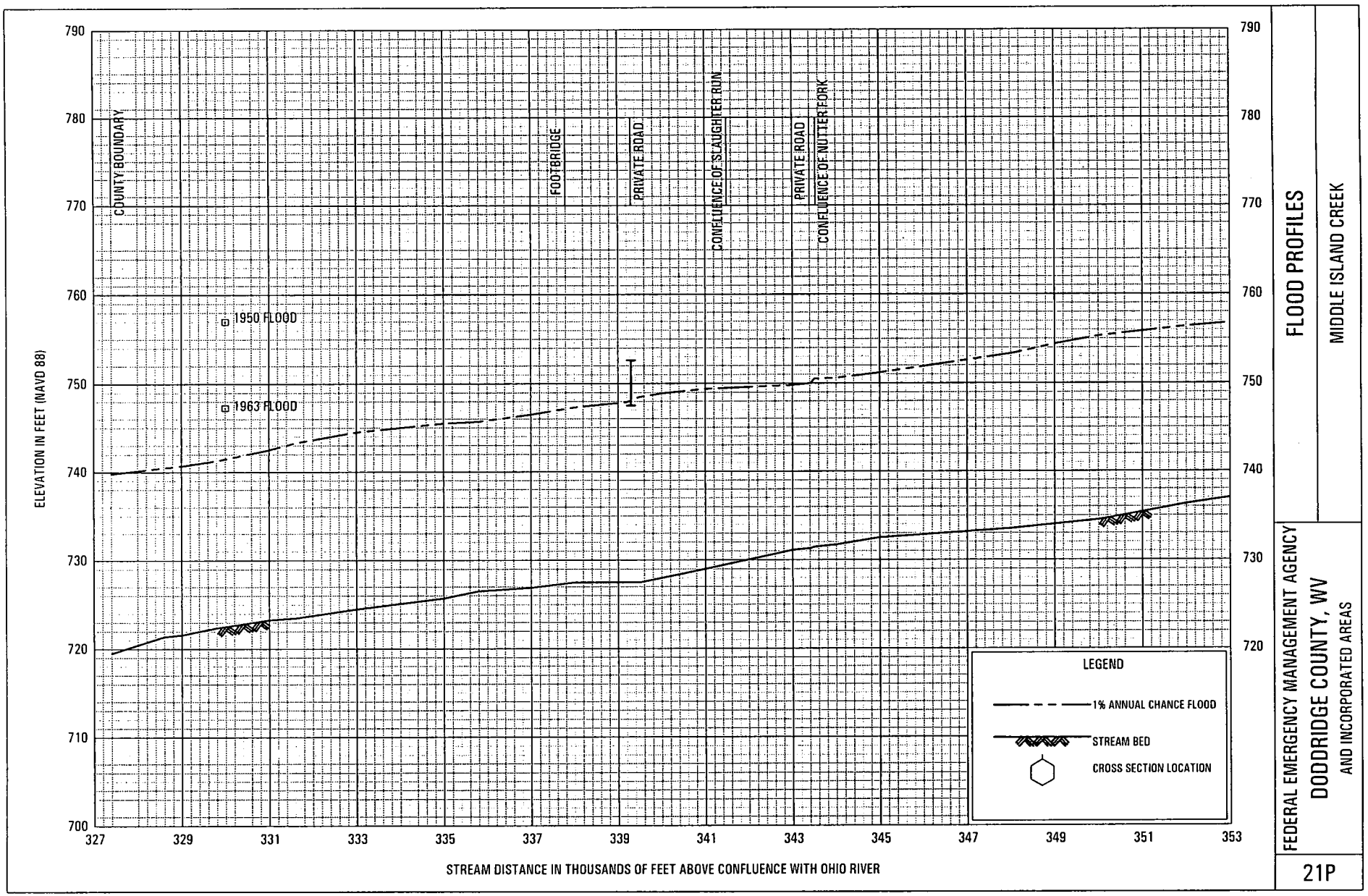
FLOOD PROFILES

MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



FLOOD PROFILES

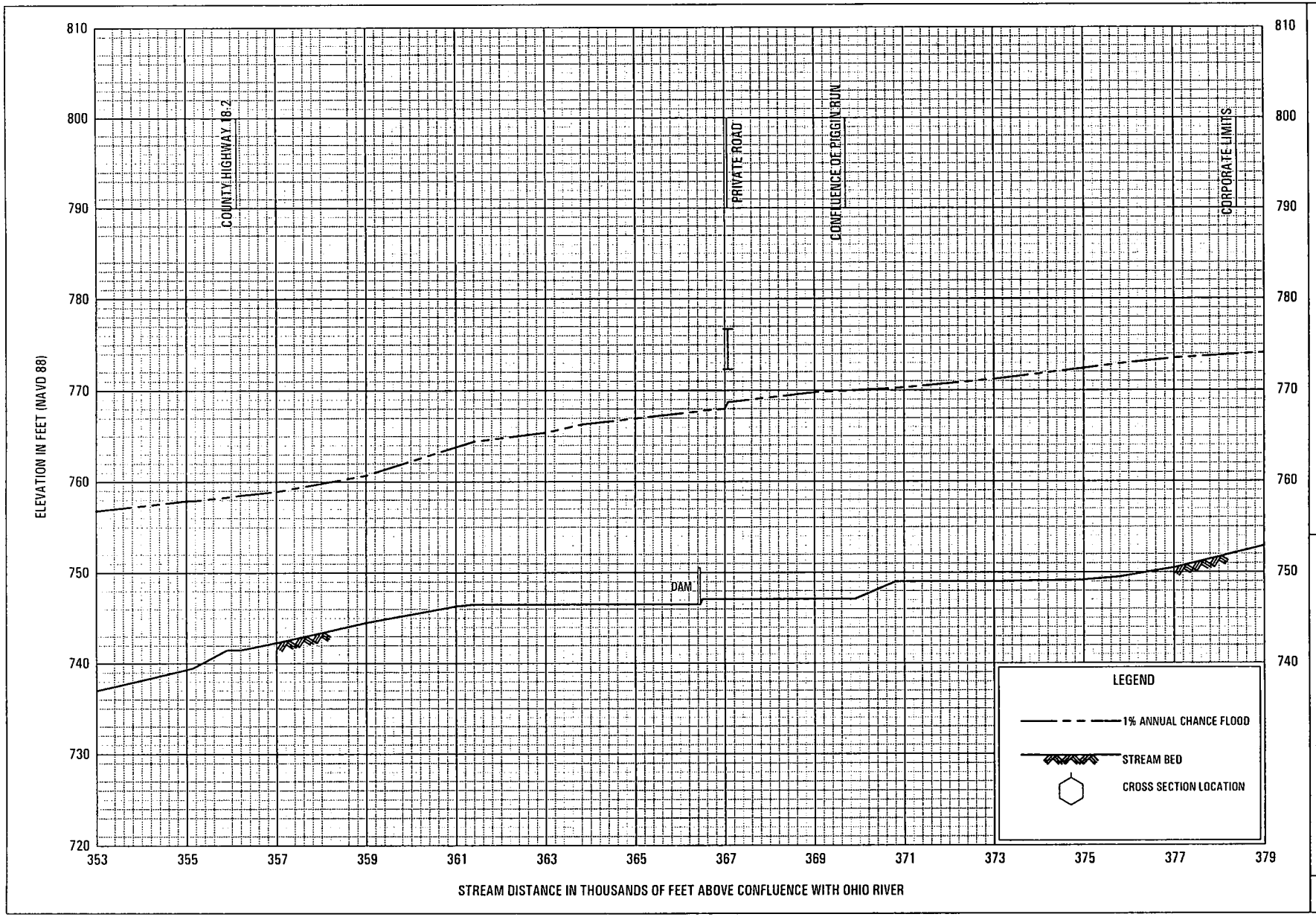
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

21P



FLOOD PROFILES

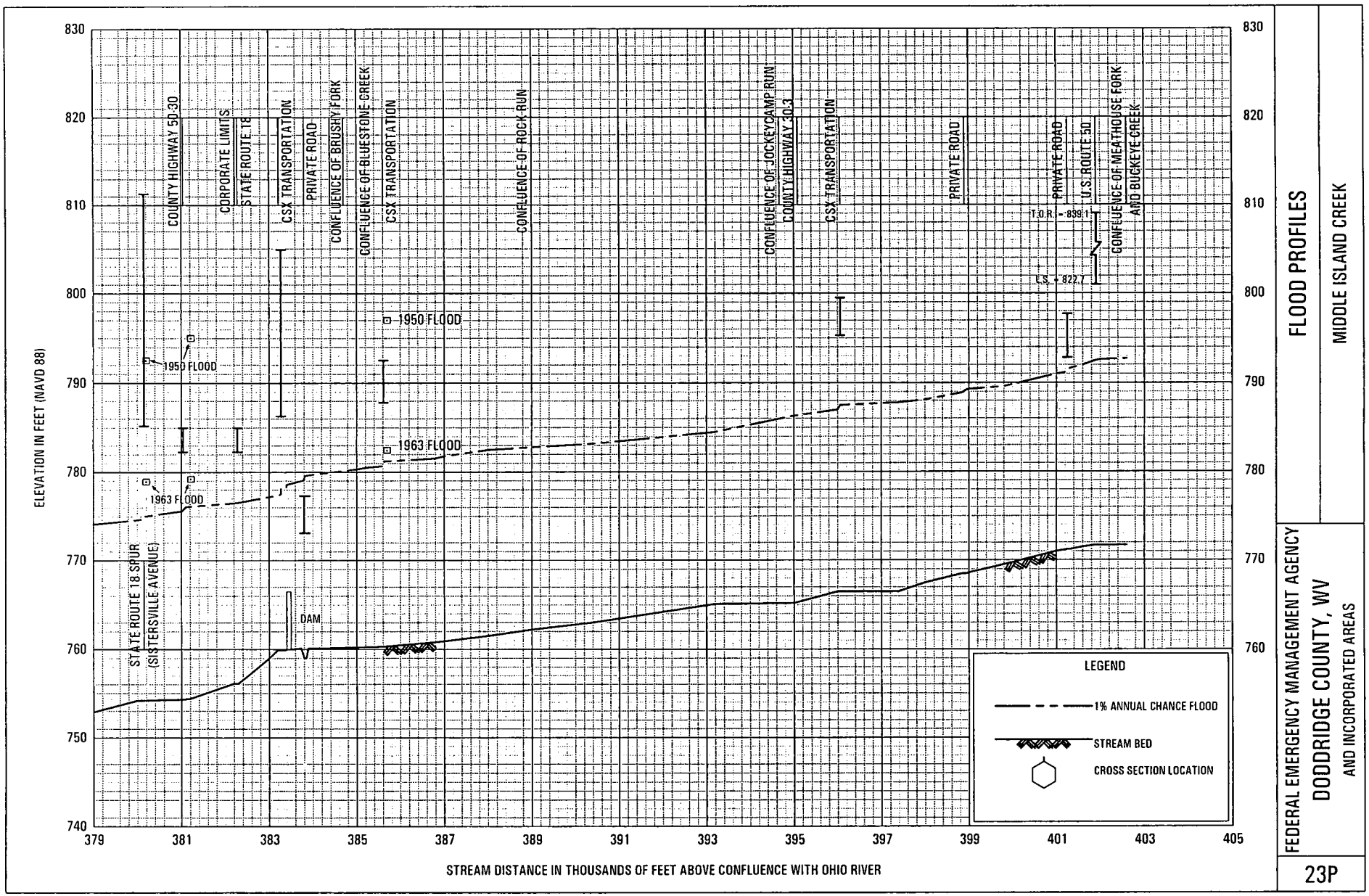
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

22P



FLOOD PROFILES

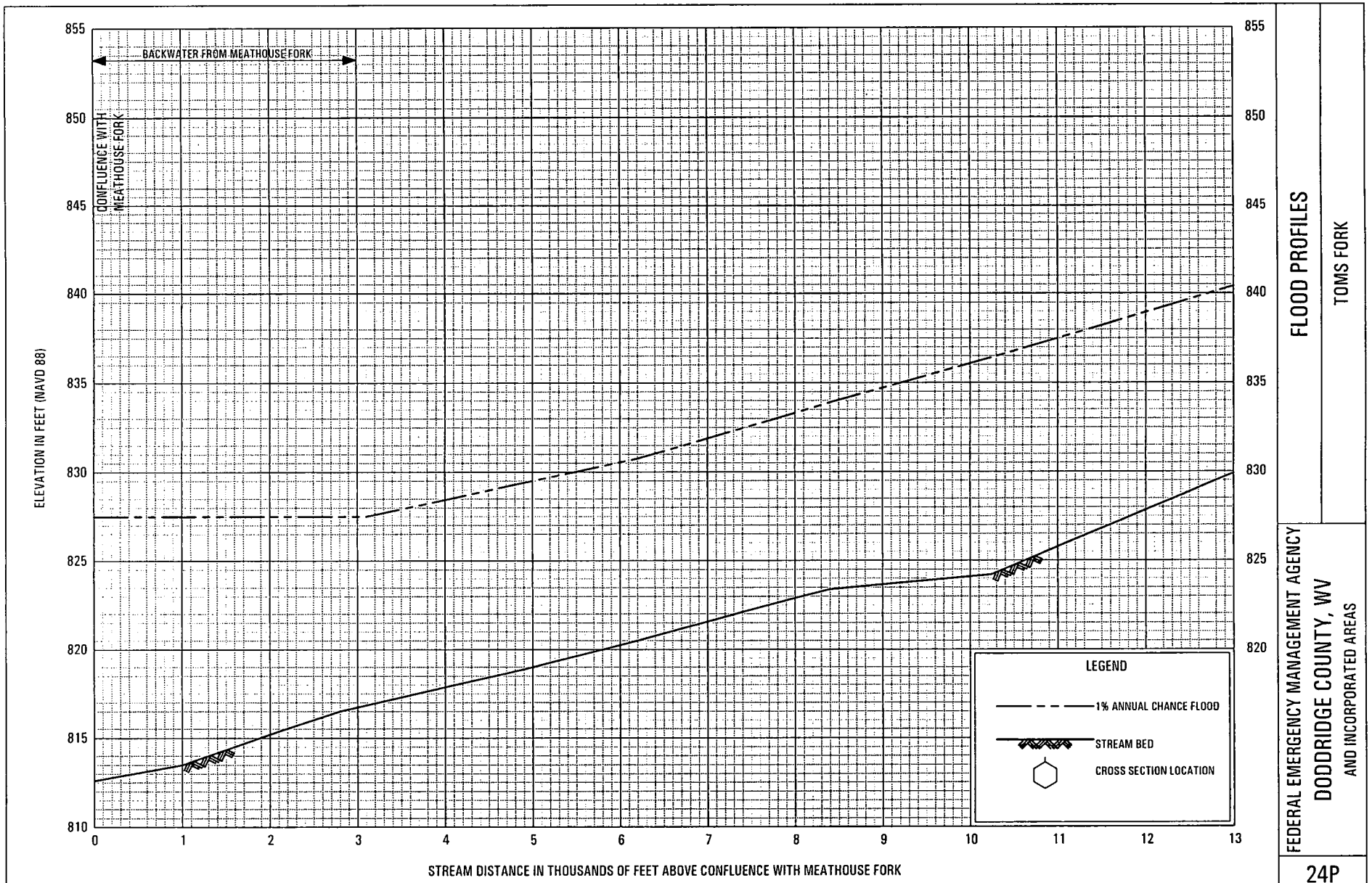
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

23P



FLOOD PROFILES

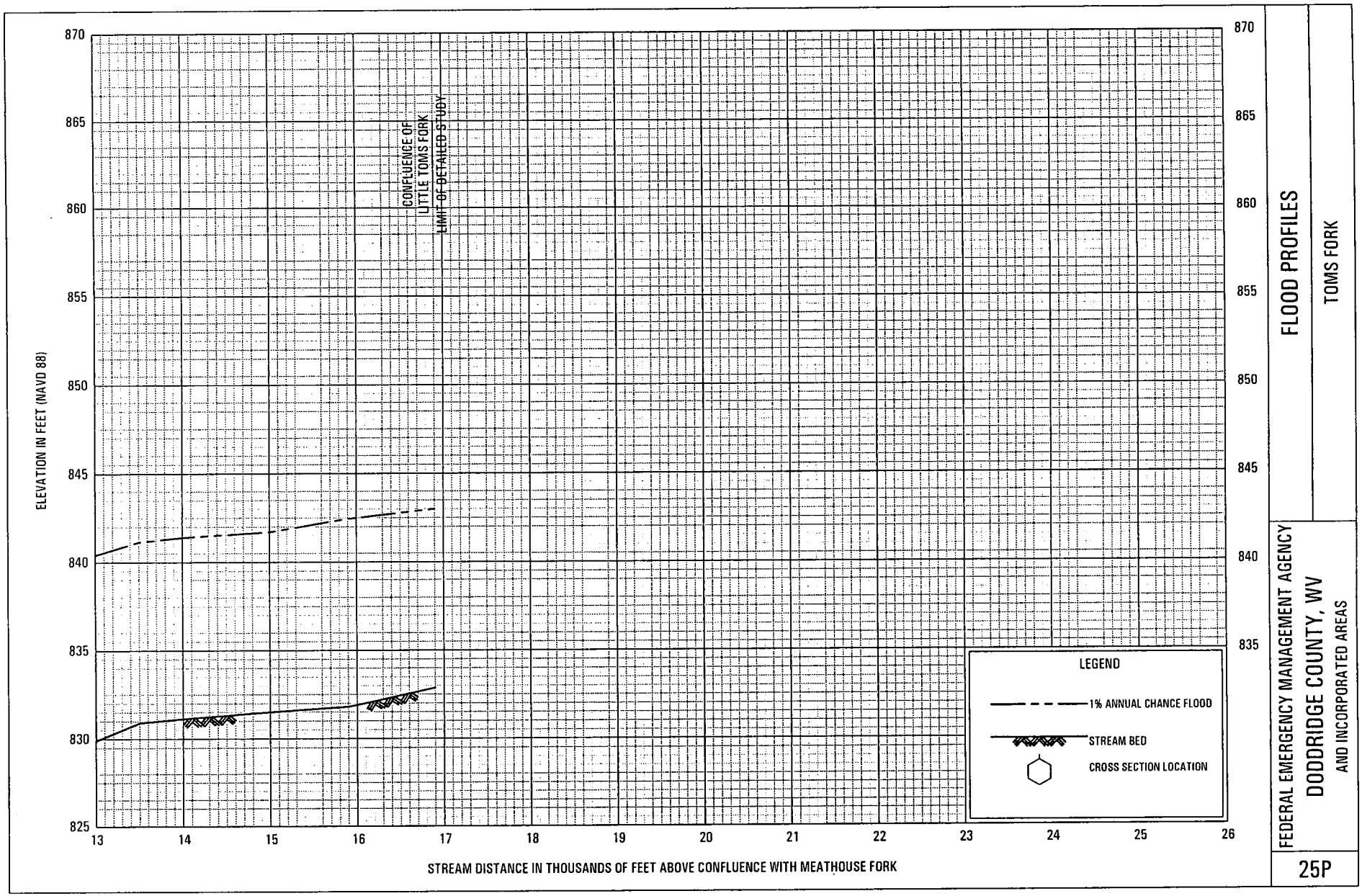
TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

24P



FLOOD PROFILES

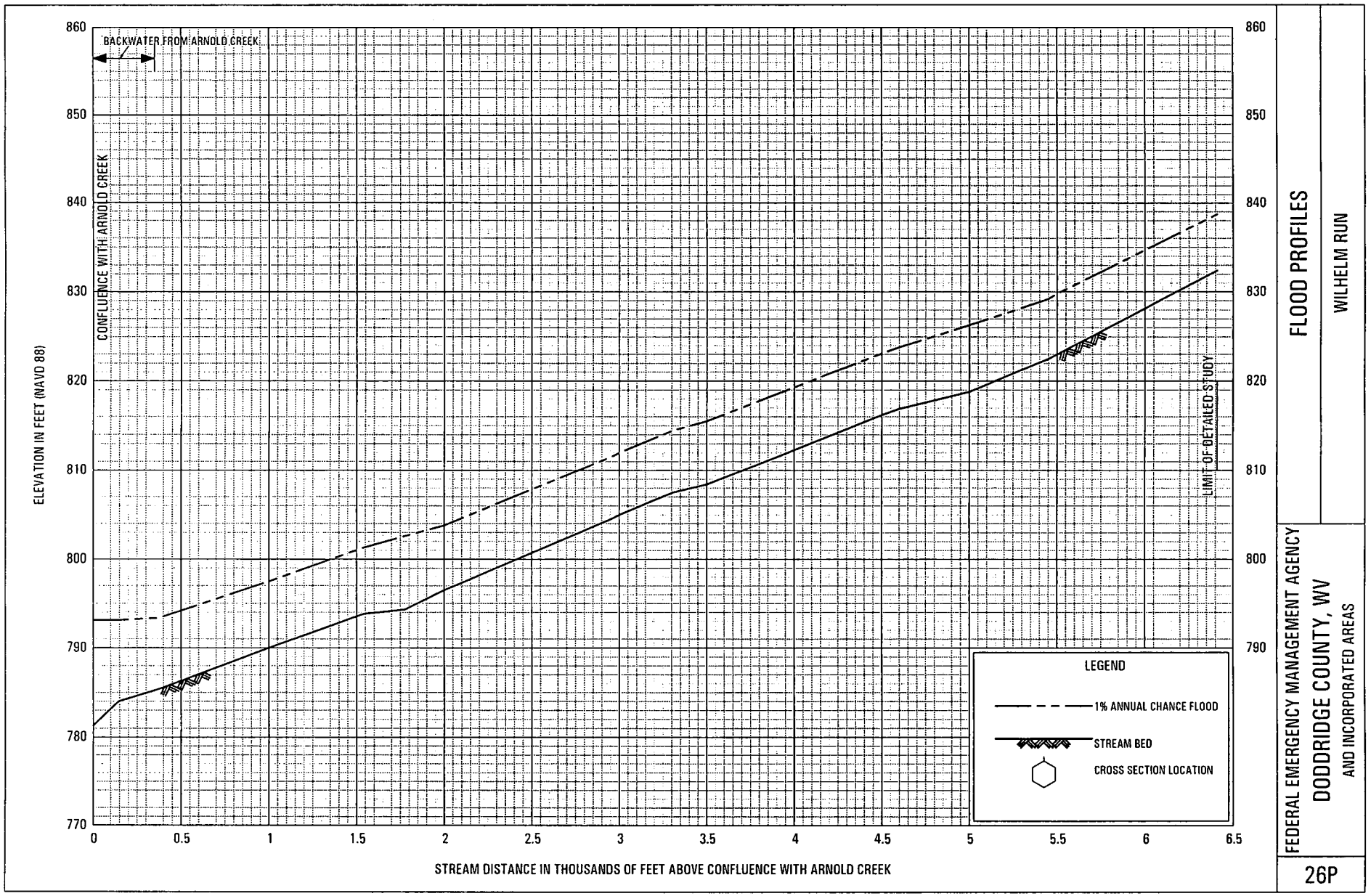
TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

25P



FLOOD PROFILES

WILHELM RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

26P

APPENDIX C

HYDRAULIC CALCULATIONS FOR EXISTING AND PROPOSED CONDITIONS

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street PREPARED BY: TGJ 1/24/2014
Davis, California CHECKED BY: AG 26-JAN-2014

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

****

PROJECT DATA
Project Title: 110-811_Sherwood FB HH
Project File : 110-811_SherwoFBHH.prj
Run Date and Time: 1/24/2014 9:12:01 AM

Project in English units

Project Description:
MarkWest Liberty Midstream & Resources, LLC
CEC #110-811
4600 J. Barry Ct., Suite 500
Canonsburg, PA 15317

January 2014

Sherwood Gas Processing Plant - Full
Buildout - Flood Study
Construction in a Floodway Study for Approval of final
grading.

FEMA Zones A, AE, and X from the Doddridge County Indiana FIS
Study shown on FEMA FIRM Panel # 54017C0080 B, effective October 4,
2011.

CEC Engineering Team:
Principal: Rick Celender, C.E.T., CPESC,
CPSWQ
Project Manager: Andy Gullone, P.E., CPESC
Hydraulic Modelers: Tim
Johnston
Reviewers: Andy Gullone, Rick Celender

Model Creation:
Existing
(Pre-project): CEC Created Model File, "110-811_Sherwood FB HH," Plan File,
"110-811_Existing 01-23-2014."
Proposed (Post-project): CEC Created Model
File, "110-811_Sherwood FB HH," Plan File, "110-811_Proposed
1-23-2014."
Geometry file created in HEC-RAS.
Steady flow file created from
Doddridge County FIS, October 4, 2011.

Data Sources:
Geometry - Surface
created from West Virginia Statewide Addressing and Mapping Board DEM blended with field topo survey of the bridge, existing access road from County Route 50/34, and various locations along the reach.
Flow - Total Buckeye Creek
100-year flow = 5,150 CFS.
Downstream Boundary - Known Water Surface Elevation
= 811. Approximate stream distance of 3,504 feet on profile.

****

PLAN DATA

Plan Title: 110-811_Existing 01-23-2014
Plan File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.p03

Geometry Title: 110-811_Existing 01-23-2014
Geometry File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.g04

Flow Title : 110-811_100Year
Flow File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.f01

Plan Description:
Existing Geometry, 100-year storm, subcritical analysis

Plan Summary Information:

Number of:	Cross Sections	= 41	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: 110-811_100Year
Flow File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.f01

Flow Data (cfs)

River	Reach	RS	100-Year
Buckeye Creek	Buckeye Creek	3504.54	5150

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Buckeye Creek	Buckeye Creek	100-Year		Known WS = 811

GEOMETRY DATA

Geometry Title: 110-811_Existing 01-23-2014
Geometry File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.g04

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3504.54

INPUT
Description: A
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	838.81	-98.96	838.29	-98.75	838.18	-98.4	838	-96.95	837.26
-96.1	836.83	-95.4	836.48	-94.48	836	-93.69	835.59	-92.75	835.1
-91.68	834.54	-90.65	834	-89.58	833.44	-88.38	832.81	-87.57	832.38
-86.84	832	-85.95	831.54	-85.41	831.26	-84.5	830.79	-83.05	830.02
-83.01	830	-81.27	829.11	-79.1	828	-79.08	827.99	-79.07	827.99
-77.37	827.11	-75.99	826.41	-75.64	826.23	-75.18	826	-74.04	825.4
-73.22	824.97	-72.55	824.62	-71.39	824	-70.83	823.7	-70.35	823.45
-69.1	822.78	-67.62	822	-67.26	821.81	-67.01	821.68	-65.6	820.94
-64.29	820.25	-64.09	820.15	-63.81	820	-62.65	819.38	-61.84	818.95
-61.13	818.57	-60.06	818	-60.02	817.91	-59.96	817.79	-59.91	817.69
-59.87	817.59	-59.83	817.5	-59.8	817.43	-59.77	817.35	-59.73	817.28
-59.7	817.21	-59.67	817.15	-59.65	817.09	-59.62	817.04	-59.6	816.99
-59.58	816.94	-59.56	816.89	-59.54	816.85	-59.46	816.69	-59.15	815.06
-47.25	813.56	-46	813.25	-45.85	813.22	-44.79	812.96	-43.56	812.66
-42.3	812.35	-41.93	812.27	-41.36	808.97	-40.43	808	-40.31	808
-40.27	808	-40.22	808	-40.14	808	-38.54	807.48	-34.04	806
-33.41	805.89	-32.05	805.65	-25.82	804.54	-22.76	804.44	-19.68	804.44
-19.3	804.44	-14.73	804.44	-5.05	804.44	0	804.44	.9	804.44
5.75	804.44	15.3	804.44	16.43	804.44	19.72	804.44	21.76	804.67
25.81	806	28.84	806.95	32.2	808	35.74	808.98	39.4	810
43.29	811.02	47.05	812	49.55	812.68	54.41	814	56.85	814.55
63.18	816	63.21	816	63.24	816	63.62	816.01	63.71	816
63.73	816	63.9	816	64.26	816	66.98	816	71.15	816
79.48	816	89.67	816	95.77	816	97.03	816	99.05	816
101.29	816	101.88	816	102.53	816	103.1	816.19	110.92	818
112.97	819.63	113.44	820	115.04	821.27	116.39	822	119.11	823.46
119.51	824	120.78	825.71	121	826	121.65	826.89	122.64	828
123.43	828.89	124.41	830	125.72	831.48	126.18	832	126.52	832.39
127.95	834	129.37	835.19	130.09	835.93	132.25	835.95	133.34	836
134.36	836.19	136.69	836.42						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.05	-41.93	.035	49.55	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-41.93	49.55	50	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.99	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	6.43	719.27	3.14
E.G. Slope (ft/ft)	0.001940	Area (sq ft)	6.43	719.27	3.14
Q Total (cfs)	5150.00	Flow (cfs)	6.80	5140.19	3.02
Top Width (ft)	104.98	Top Width (ft)	8.69	91.48	4.81
Vel Total (ft/s)	7.07	Avg. Vel. (ft/s)	1.06	7.15	0.96
Max Chl Dpth (ft)	9.55	Hydr. Depth (ft)	0.74	7.86	0.65
Conv. Total (cfs)	116922.3	Conv. (cfs)	154.3	116699.5	68.5
Length Wtd. (ft)	50.00	Wetted Per. (ft)	8.87	96.27	4.98
Min Ch El (ft)	804.44	Shear (lb/sq ft)	0.09	0.90	0.08
Alpha	1.02	Stream Power (lb/ft s)	136.69	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	133.66	54.08	65.65
C & E Loss (ft)	0.03	Cum SA (acres)	39.42	5.07	14.34

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3454.54

INPUT
Description: B
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-106.13	826.76	-105.83	826.61	-105.52	826.46	-104.57	826	-104.45	825.95
-104.42	825.93	-103.35	825.44	-102.97	825.27	-102.28	824.95	-101.55	824.59
-101.24	824.44	-100.37	824	-100.19	823.91	-99.27	823.46	-98.9	823.29
-98.27	822.98	-97.55	822.65	-97.23	822.49	-96.16	822	-96.15	821.99
-96.14	821.99	-94.96	821.48	-94.61	821.32	-93.85	820.99	-93.19	820.71
-92.79	820.53	-91.86	820.13	-91.79	820.1	-91.59	820	-90.51	819.47
-90.04	819.26	-89.22	818.86	-88.25	818.41	-87.98	818.28	-87.37	818

-87.36	818	-87.35	818	-87.19	817.14	-86.99	814.66	-83.41	814.33
-78.27	814.15	-64.45	812.92	-42.91	811.21	-42.79	809.16	-42.41	809.13
-42.01	809.09	-41.6	809.06	-41.18	809.02	-40.66	808.97	-40.11	808.93
-39.53	808.88	-37.2	808.63	-36.6	808.56	-35.97	808.48	-35.28	808.4
-32.94	808.07	-32.49	808	-31.34	807.77	-31	807.7	-29.05	807.31
-28.01	807.09	-26.05	806.67	-25.06	806.46	-22.96	806	-22.17	805.82
-21.82	805.74	-19.4	805.19	-17.82	804.84	-16.67	804.58	-14.08	804.38
-13.68	804.38	-6.61	804.38	0	804.38	17.4	804.38	17.52	804.38
23.35	805.7	24.35	806	28.89	807.47	30.57	808	37.14	809.7
38.3	810	39.73	810.36	46.16	812	52.62	813.62	54.12	814
61.82	815.78	62.8	816	62.86	816	62.93	816	62.98	816
63.03	816	63.08	816	63.12	816	63.16	816	63.2	816
63.43	816	72.23	816	72.53	816	77.56	816	88.82	816
92.29	816	92.47	816	93.12	816	93.64	816	96.03	816
98.64	816	99.53	816	101.36	816	103.41	816	105.44	816
108.77	817.27	110.92	818	112.2	819.74	112.38	820	113.85	822
113.85	822.01	115.45	823.6	115.85	824	116.26	824.42	117.85	826
118.35	826.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-106.13	.05	-42.79	.035	30.57	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-42.79	30.57	52	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.55	Reach Len. (ft)	52.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	34.61	576.00	60.01
E.G. Slope (ft/ft)	0.002635	Area (sq ft)	34.61	576.00	60.01
Q Total (cfs)	5150.00	Flow (cfs)	57.11	4916.65	176.24
Top Width (ft)	123.86	Top Width (ft)	28.73	73.36	21.77
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)	1.65	8.54	2.94
Max Chl Dpth (ft)	9.17	Hydr. Depth (ft)	1.20	7.85	2.76
Conv. Total (cfs)	100326.6	Conv. (cfs)	1112.5	95780.7	3433.4
Length Wtd. (ft)	50.03	Wetted Per. (ft)	30.76	74.31	22.47
Min Ch El (ft)	804.38	Shear (lb/sq ft)	0.19	1.28	0.44
Alpha	1.18	Stream Power (lb/ft s)	118.35	0.00	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	133.64	53.34	65.61
C & E Loss (ft)	0.02	Cum SA (acres)	39.40	4.97	14.33

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3404.54

INPUT
Description: C
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.31	819.94	-130.16	819.85	-127.95	818.4	-127.34	818	-124.36	816.46
-123.5	816	-122.92	815.91	-122.44	815.86	-122.09	815.81	-121.89	815.78
-121.74	815.75	-121.45	815.71	-121.31	815.69	-121.19	815.68	-121.09	815.66
-121	815.65	-120.93	815.64	-120.86	815.64	-120.81	815.63	-120.78	815.51
-118.73	815.9	-118.62	815.92	-118.37	815.95	-117.79	815.59	-115.95	814.65
-112.35	813.89	-102.14	815.26	-94.41	813.55	-93.69	813.6	-93.3	813.59
-91.7	813.84	-89.86	814.09	-85.86	814.99	-84.7	814.77	-82.96	814.52
-77.51	814.54	-69.06	813.8	-67.38	813.67	-52.48	812.03	-42.72	810.75
-39.01	809.99	-38.2	809.83	-38.11	809.8	-37.46	809.6	-37.3	809.57
-37.12	809.53	-36.94	809.5	-36.74	809.46	-36.53	809.42	-35.73	809.24
-35.55	809.2	-35.23	809.14	-34.89	809.07	-34.51	809	-34.1	808.92
-33.65	808.83	-33.15	808.73	-32.59	808.62	-31.98	808.5	-31.02	808.31
-30.29	808.16	-29.54	808	-29.5	808	-28.02	807.66	-20.74	806
-15	804.51	-12.96	804.32	-3.54	804.32	0	804.32	4.45	804.32
15.59	804.32	24.88	805.99	24.9	806	29.51	807.42	31.4	808
35.16	808.93	39.43	810	41.01	810.41	47.1	812	50.37	812.89
54.45	814	59.19	815.18	62.48	816	62.51	816	62.55	816
62.56	816	63.15	816	63.19	816	63.22	816	63.23	816
63.24	816	63.25	816	63.26	816	63.27	816	63.28	816
73.18	816	75.76	816	76.08	816	82.98	816	89.81	816
92.74	816	96.15	815.99	98.06	815.99	99.09	815.99	104.95	816
110.42	817.6	111.76	818	112.3	818.75	113.18	820	113.8	820.86
114.59	822	115.75	823.64	116.01	824	117.38	825.93	117.43	826
117.52	826.13	118.81	828	119.32	828.72	120.21	830	120.39	830.24

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.31	.05	-39.01	.035	31.4	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-39.01	31.4	55	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.16	Reach Len. (ft)	55.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	33.35	523.80	52.42
E.G. Slope (ft/ft)	0.003423	Area (sq ft)	33.35	523.80	52.42
Q Total (cfs)	5150.00	Flow (cfs)	72.36	4907.82	169.82
Top Width (ft)	114.07	Top Width (ft)	23.71	70.41	19.95
Vel Total (ft/s)	8.45	Avg. Vel. (ft/s)	2.17	9.37	3.24

* Max Chl Dpth (ft)	* 8.84	* Hydr. Depth (ft)	* 1.41	* 7.44	* 2.63	*		
* Conv. Total (cfs)	* 88022.2	* Conv. (cfs)	* 1236.7	* 83883.0	* 2902.5	*		
* Length Wtd. (ft)	* 50.21	* Wetted Per. (ft)	* 23.93	* 71.50	* 20.61	*		
* Min Ch El (ft)	* 804.32	* Shear (lb/sq ft)	* 0.30	* 1.57	* 0.54	*		
* Alpha	* 1.18	* Stream Power (lb/ft s)	* 120.39	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.15	* Cum Volume (acre-ft)	* 133.60	* 52.71	* 65.55	*		
* C & E Loss (ft)	* 0.09	* Cum SA (acres)	* 39.37	* 4.89	* 14.30	*		

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3354.54

INPUT
Description: D
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-161.95	820.72	-159	819.1	-154.74	817.2	-151.93	815.9	-147.17	813.71
-145.77	813.06	-126.21	812.54	-124.87	812.51	-123.36	812.51	-123.07	812.53
-122.06	812.55	-122.03	812.53	-115.94	812.57	-115.14	812.59	-114.95	812.57
-103.12	812.35	-88.28	812.14	-82.76	812.08	-54.87	809.98	-52.64	809.81
-41.07	809.2	-39.11	809.06	-36.85	808.62	-36.78	808.61	-36.71	808.61
-36.64	808.6	-36.56	808.59	-36.14	808.54	-35.65	808.48	-35.49	808.45
-35.3	808.43	-35.09	808.4	-34.83	808.36	-34.53	808.32	-34.16	808.27
-33.7	808.2	-33.12	808.12	-32.28	808.01	-32.21	808	-31.45	807.84
-22.89	806	-21.17	805.62	-18.11	804.96	-15.26	804.34	-13.7	804.25
-13.63	804.25	-13.6	804.25	-13.5	804.25	-.57	804.25	0	804.25
4.84	804.25	8.21	804.25	16.71	804.25	17.49	804.25	26.48	806
31.46	807.35	33.9	808	38.76	809.37	40.95	810	46.89	811.73
47.8	812	48.18	812.11	54.65	814	57.78	814.8	62.56	816
62.6	816	62.66	816	62.67	816	62.73	816	62.74	816
62.91	816	63.02	816	63.12	816	63.22	816	63.3	816
63.38	816	63.45	816	63.52	816	63.58	816	63.63	816
63.69	816	63.74	816	63.78	816	63.83	816	64.54	816
66.78	816.01	67.1	816.01	67.7	816.01	68.02	816.01	68.26	816.01
71.84	816.01	73.95	816.01	74.22	816.01	85.96	816	89.03	815.99
91.01	815.98	96.63	815.95	100.33	815.97	106.93	816	112.68	817.78
113.29	818	113.56	818.18	115.15	820	116.54	821.58	116.9	822
118.58	823.91	118.65	824	118.98	824.38	119.3	824.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-161.95	.05	-36.56	.035	33.9	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.56	33.9	35	50	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

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* E.G. Elev (ft)	* 814.22	* Element	* Left OB	* Channel *

Right OB									
Vel Head (ft)	1.00	Wt. n-Val.	0.050	0.035	0.050				
W.S. Elev (ft)	813.22	Reach Len. (ft)	35.00	50.00	50.00				
Crit W.S. (ft)		Flow Area (sq ft)	176.59	553.65	47.62				
E.G. Slope (ft/ft)	0.002550	Area (sq ft)	176.59	553.65	47.62				
Q Total (cfs)	5150.00	Flow (cfs)	363.85	4653.49	132.66				
Top Width (ft)	198.11	Top Width (ft)	109.56	70.46	18.09				
Vel Total (ft/s)	6.62	Avg. Vel. (ft/s)	2.06	8.41	2.79				
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)	1.61	7.86	2.63				
Conv. Total (cfs)	101979.4	Conv. (cfs)	7204.9	92147.7	2626.8				
Length Wtd. (ft)	48.91	Wetted Per. (ft)	109.77	71.33	18.83				
Min Ch El (ft)	804.25	Shear (lb/sq ft)	0.26	1.24	0.40				
Alpha	1.47	Stream Power (lb/ft s)	119.30	0.00	0.00				
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	133.46	52.09	65.49				
C & E Loss (ft)	0.00	Cum SA (acres)	39.29	4.81	14.28				

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3304.54

INPUT
Description: E
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-193.15	818.45	-183.47	814.34	-183.16	814.28	-176.73	813.26	-163.3	813.13
-138.32	812.35	-120.78	812.28	-86.53	811.72	-71.47	811.24	-56.51	810.18
-43	809.27	-36.76	808.75	-36.03	808.62	-36	808.61	-35.97	808.61
-35.94	808.6	-35.9	808.6	-35.86	808.59	-35.82	808.58	-35.77	808.58
-35.72	808.57	-35.67	808.56	-35.62	808.55	-35.57	808.54	-35.45	808.52
-35.38	808.51	-35.31	808.49	-35.22	808.47	-35.13	808.45	-35.02	808.43
-34.88	808.4	-34.73	808.37	-34.53	808.33	-34.3	808.28	-33.99	808.22
-33.59	808.13	-33.11	808.03	-32.95	808	-29.62	807.39	-22.04	806
-15.25	804.68	-11.71	804.25	-11.66	804.25	0	804.25	11.43	804.25
12.59	804.25	14.93	804.25	22.78	805.33	26.75	806	35.39	807.94
35.56	807.97	35.68	808	36.05	808.12	42.24	810	48.06	811.81
48.44	811.93	48.47	811.94	48.67	812	48.97	812.09	55.11	814
58.52	814.76	64.02	816	64.05	816	64.06	816	64.11	816
64.12	816	64.16	816	64.18	816	64.21	816	64.23	816
64.27	816	64.29	816	64.51	816	64.55	816	64.59	816
64.63	816	64.66	816	64.7	816	64.72	816	64.98	816
65.48	816	65.86	816	66.57	816	71.47	816.01	72.7	816.02
72.75	816.02	73.29	816.02	74.51	816.02	75.35	816.02	84.84	816
93.89	815.84	94	815.84	95.83	815.82	98.76	815.86	102.88	815.92
106.57	816	109.76	817.28	111.63	818	113.65	818.64	117.46	820

123.18	821.49	124.76	821.91	125.09	822	125.17	822	125.18	822
125.45	822.01	125.65	822.02	126.04	822.04	126.82	822.08	127.57	822.09
152.93	822.56	166.8	822.78						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-193.15	.05	-36.76	.035	35.39	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.76	35.39	55	50	47	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.10	Reach Len. (ft)	55.00	50.00	47.00
Crit W.S. (ft)		Flow Area (sq ft)	191.48	551.10	43.79
E.G. Slope (ft/ft)	0.002650	Area (sq ft)	191.48	551.10	43.79
Q Total (cfs)	5150.00	Flow (cfs)	387.97	4639.01	123.02
Top Width (ft)	214.49	Top Width (ft)	125.52	72.15	16.82
Vel Total (ft/s)	6.55	Avg. Vel. (ft/s)	2.03	8.42	2.81
Max Chl Dpth (ft)	8.85	Hydr. Depth (ft)	1.53	7.64	2.60
Conv. Total (cfs)	100040.9	Conv. (cfs)	7536.4	90114.7	2389.7
Length Wtd. (ft)	50.49	Wetted Per. (ft)	125.63	72.91	17.60
Min Ch El (ft)	804.25	Shear (lb/sq ft)	0.25	1.25	0.41
Alpha	1.50	Stream Power (lb/ft s)	166.80	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	133.32	51.45	65.44
C & E Loss (ft)	0.09	Cum SA (acres)	39.19	4.73	14.26

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3254.54

INPUT
Description: F
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240.13	819.89	-227.21	814.66	-216.19	812.98	-198.11	812.16	-175.25	811.94
-165.06	811.8	-160.59	811.79	-152.22	811.82	-122.44	811.41	-109.35	811.26
-104.94	811.11	-102.58	811.05	-67.55	810.05	-42.46	809.03	-36.68	808.81
-36.67	808.63	-36.63	808.62	-36.6	808.62	-36.56	808.61	-36.51	808.6

-36.47	808.59	-36.42	808.58	-36.36	808.57	-36.3	808.56	-36.24	808.55
-36.18	808.54	-36.1	808.52	-35.72	808.43	-35.62	808.41	-35.52	808.39
-35.41	808.37	-35.28	808.34	-35.14	808.31	-34.99	808.27	-34.82	808.23
-34.63	808.18	-34.4	808.13	-34.14	808.06	-33.88	808	-31.55	807.56
-23.17	806	-20.88	805.53	-17.84	804.92	-15.28	804.39	-13.32	804.12
-7.98	804.12	-6.03	804.12	-.01	804.12	0	804.12	4.38	804.12
7.24	804.12	15.16	804.12	15.2	804.12	15.21	804.12	15.81	804.12
16.56	804.21	16.72	804.23	28.47	806	32.29	806.81	35.63	807.52
37.86	808	42.77	809.48	44.49	810	46.47	810.68	50.28	812
53.04	812.93	56.3	814	60.48	814.91	63.23	815.52	63.61	815.59
64.3	815.74	65.6	816	65.65	816	65.74	816	65.87	816
65.99	816	66.12	816	66.23	816	66.36	816	66.47	816
66.61	816	66.72	816	66.85	816	66.96	816	67.1	816
67.21	816	67.34	816	67.45	816	67.55	816	67.63	816
67.97	816	68.02	816	68.06	816	68.1	816	68.14	816
68.72	816	68.76	816	69.87	816.02	70.51	816.02	71.52	816.02
71.91	816.03	77.35	816	78.14	816	85.05	814.92	90.53	814.08
91.07	814	91.75	814	98.34	814	102.59	815.16	106.43	816
110.08	817.66	110.84	818	113.36	819.15	115.21	820	116.17	820.22
116.63	820.29	122.85	821.87						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-240.13	.05	-36.68	.035	37.86	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.68	37.86	43	50	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.19	Reach Len. (ft)	43.00	50.00	52.00
Crit W.S. (ft)		Flow Area (sq ft)	362.29	585.89	42.57
E.G. Slope (ft/ft)	0.001939	Area (sq ft)	362.29	585.89	42.57
Q Total (cfs)	5150.00	Flow (cfs)	753.10	4293.35	103.55
Top Width (ft)	271.39	Top Width (ft)	180.88	74.54	15.97
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)	2.08	7.33	2.43
Max Chl Dpth (ft)	9.07	Hydr. Depth (ft)	2.00	7.86	2.67
Conv. Total (cfs)	116951.3	Conv. (cfs)	17102.1	97497.8	2351.5
Length Wtd. (ft)	48.86	Wetted Per. (ft)	180.96	75.50	16.79
Min Ch El (ft)	804.12	Shear (lb/sq ft)	0.24	0.94	0.31
Alpha	1.68	Stream Power (lb/ft s)	122.85	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	132.97	50.80	65.39
C & E Loss (ft)	0.02	Cum SA (acres)	39.00	4.64	14.24

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3204.54

INPUT
Description: G
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-283.58	819.8	-266.29	814.14	-266.24	814.12	-266.23	814.12	-266.09	814.11
-217.5	811.93	-217.38	811.93	-173.11	811.45	-163.78	811.46	-160.93	811.43
-155.76	811.36	-150	811.26	-144.17	811.18	-124.33	810.91	-109.74	810.72
-100.63	810.59	-93.13	810.46	-70.42	809.9	-50.46	809.14	-38.7	808.69
-33.59	808.48	-31.92	807.96	-31.88	807.94	-31.83	807.93	-31.78	807.91
-31.73	807.89	-31.68	807.88	-31.63	807.86	-31.57	807.84	-31.51	807.81
-31.44	807.79	-31.37	807.77	-31.29	807.74	-31.2	807.71	-31.1	807.69
-30.89	807.62	-30.78	807.58	-30.66	807.54	-30.52	807.5	-30.38	807.45
-30.22	807.4	-29.76	807.22	-29.6	807.16	-29.42	807.08	-29.23	807
-28.94	806.91	-28.61	806.8	-28.23	806.67	-27.79	806.53	-27.29	806.36
-26.69	806.17	-26.19	806	-21.56	805.01	-18.47	804.35	-16.86	804.05
-8.24	804.05	-2.99	804.05	0	804.05	3.37	804.05	15.21	804.05
15.24	804.05	16.56	804.21	27.88	806	30.45	806.52	37.81	808
39.9	808.63	44.4	810	47.91	811.09	50.79	812	54.71	813.27
56.99	814	57.54	814.1	57.74	814.13	60.08	814.54	62.07	814.88
63.39	815.06	64.64	815.27	69.51	816	69.65	816	69.72	816
69.9	816	69.98	816	70.07	816	70.16	816	70.17	816
70.18	816	70.19	816	70.2	816	71.28	816	71.34	816
71.39	816	71.44	816	71.49	816	88.72	817.7	91.55	818
96.32	818.82	102.84	820	107.71	820.7	116.72	821.98		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-283.58	.05	-33.59	.035	37.81	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.59	37.81	44	50	51	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

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E.G. Elev (ft)	813.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.15	Reach Len. (ft)	44.00	50.00	51.00
Crit W.S. (ft)		Flow Area (sq ft)	465.05	576.03	43.23
E.G. Slope (ft/ft)	0.001746	Area (sq ft)	465.05	576.03	43.23
Q Total (cfs)	5150.00	Flow (cfs)	977.26	4073.98	98.76
Top Width (ft)	299.13	Top Width (ft)	211.19	71.40	16.54
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)	2.10	7.07	2.28
Max Chl Dpth (ft)	9.10	Hydr. Depth (ft)	2.20	8.07	2.61

* Conv. Total (cfs)	*123248.3	* Conv. (cfs)	* 23387.4	* 97497.3	* 2363.6	*			
* Length Wtd. (ft)	* 48.73	* Wetted Per. (ft)	* 211.26	* 72.36	* 17.33	*			
* Min Ch El (ft)	* 804.05	* Shear (lb/sq ft)	* 0.24	* 0.87	* 0.27	*			
* Alpha	* 1.80	* Stream Power (lb/ft s)	* 116.72	* 0.00	* 0.00	*			
* Frctn Loss (ft)	* 0.08	* Cum Volume (acre-ft)	* 132.56	* 50.13	* 65.34	*			
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 38.81	* 4.56	* 14.22	*			

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3154.54

INPUT
Description: H
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-344.06	820.17	-341.76	819.33	-335.3	817.11	-317.4	813.56	-307.81	813.2
-291.22	811.81	-276.12	811.8	-258.35	811.75	-229.19	811.76	-224.11	811.69
-215.03	811.6	-171.68	811.14	-151.63	811.01	-147.14	810.92	-145.09	810.87
-117.3	810.47	-103.72	810.29	-98.64	810.21	-79.31	809.67	-63.22	809.32
-54.02	808.86	-34.08	808.02	-31.16	807.11	-31.09	807.09	-31.01	807.06
-30.93	807.04	-30.84	807.02	-30.75	806.99	-30.65	806.96	-30.55	806.93
-30.44	806.9	-30.32	806.86	-30.2	806.83	-30.06	806.79	-29.91	806.74
-29.75	806.7	-29.57	806.66	-29.38	806.61	-28.95	806.49	-28.71	806.42
-28.43	806.33	-28.13	806.24	-27.79	806.14	-27.4	806.02	-27.33	806
-25.54	805.56	-19.16	804	-17.81	803.9	-14.84	803.9	-12.95	803.9
-11.52	803.9	-10.4	803.9	-9.49	803.9	-8.03	803.9	-7.43	803.9
-6.92	803.9	-6.49	803.9	-6.11	803.9	-5.77	803.9	-5.54	803.9
-5.32	803.9	0	803.9	3.09	803.9	3.31	803.9	3.55	803.9
3.82	803.9	4.15	803.9	4.52	803.9	4.96	803.9	5.47	803.9
6.08	803.9	6.81	803.9	7.72	803.9	8.87	803.9	10.64	803.9
13.16	803.9	14.82	804	20.71	805.01	26.47	806	34.72	807.69
36.26	808	41.95	809.75	42.76	810	43.86	810.36	48.82	812
51.4	812.8	55.27	814	56.44	814.25	58.83	814.76	62.79	815.6
64.71	816	64.81	816	65.06	816	65.18	816	65.22	816
65.34	816	66.33	816	66.69	816	71	816	71.46	816
71.82	816	76.48	816.77	77.53	816.86	80.56	817.14	83.2	817.46
87.71	817.86	89.18	817.99	89.27	818	89.46	818.03	100.7	820
108.63	821.17	115.16	822	115.51	822	115.58	822		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-344.06	.05	-34.08	.035	34.72	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.08	34.72	48	50	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

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* E.G. Elev (ft)	* 813.67	* Element	* Left OB *	Channel * Right OB *

* Vel Head (ft)	* 0.53	* Wt. n-Val.	* 0.050	* 0.035	* 0.050	*			
* W.S. Elev (ft)	* 813.15	* Reach Len. (ft)	* 48.00	* 50.00	* 52.00	*			
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 622.89	* 569.08	* 50.27	*			
* E.G. Slope (ft/ft)	*0.001501	* Area (sq ft)	* 622.89	* 569.08	* 50.27	*			
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 1242.26	* 3795.56	* 112.18	*			
* Top Width (ft)	* 359.70	* Top Width (ft)	* 273.10	* 68.80	* 17.80	*			
* Vel Total (ft/s)	* 4.15	* Avg. Vel. (ft/s)	* 1.99	* 6.67	* 2.23	*			
* Max Chl Dpth (ft)	* 9.25	* Hydr. Depth (ft)	* 2.28	* 8.27	* 2.82	*			
* Conv. Total (cfs)	*132938.0	* Conv. (cfs)	* 32066.7	* 97975.5	* 2895.8	*			
* Length Wtd. (ft)	* 49.52	* Wetted Per. (ft)	* 273.21	* 69.69	* 18.63	*			
* Min Ch El (ft)	* 803.90	* Shear (lb/sq ft)	* 0.21	* 0.77	* 0.25	*			
* Alpha	* 1.97	* Stream Power (lb/ft s)	* 115.58	* 0.00	* 0.00	*			
* Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	* 132.01	* 49.48	* 65.29	*			
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 38.56	* 4.48	* 14.20	*			

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3104.54

INPUT
Description: I
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-383.34	816.88	-380.41	816.27	-361.18	811.96	-358.34	811.62	-338.46	811.1
-330.45	811.09	-301.63	811.16	-297.15	811.2	-278.53	811.33	-275.53	811.33
-225.16	811.18	-203.03	811.34	-171.74	811.16	-165.14	811.09	-154.69	810.93
-154.09	810.93	-138.76	810.85	-128.69	810.69	-108.79	810.52	-62.36	809.45
-61.73	809.43	-61.33	809.43	-61.1	809.42	-34.68	808.63	-32.1	807.88
-32.06	807.85	-32.01	807.83	-31.95	807.8	-31.9	807.77	-31.84	807.74
-31.78	807.71	-31.72	807.68	-31.65	807.64	-31.58	807.61	-31.5	807.57
-31.37	807.53	-31.23	807.48	-30.68	807.28	-30.54	807.22	-30.4	807.16
-30.24	807.1	-30.08	807.03	-29.9	806.95	-29.7	806.87	-29.49	806.78
-29.26	806.69	-29.02	806.58	-28.7	806.46	-28.35	806.33	-27.96	806.18
-27.52	806.01	-27.48	806	-22.31	804.38	-21.08	804	-11.63	803.47
-11.58	803.47	-11.54	803.47	-11.44	803.47	-7.05	803.47	-4.63	803.47
-2.3	803.47	-.93	803.47	0	803.47	2.92	803.47	3.66	803.47
3.67	803.47	8.94	803.47	13.25	803.47	15.58	804	23.04	805.4
26.21	806	31.87	807.14	36.15	808	38.74	808.76	43	810
46.9	811.41	48.53	812	53.61	813.61	54.83	814	54.97	814.03
55.06	814.05	64.07	816	64.37	816	64.47	816	64.78	816
64.82	816	64.83	816	64.85	816	64.86	816	64.88	816
68.81	816	71.72	816	73.12	816	74.23	816	84.17	817.64
87	818	87.13	818	91.93	818.78	99.35	820	104.37	820.67
104.41	820.68	115.25	822	115.59	822	115.69	822	124.72	822.11

135.24 822.23 144.49 822.33 144.6 822.33 151.56 822.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-383.34	.05	-34.68	.035	36.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.68	36.15	22	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.15	Reach Len. (ft)	22.00	50.00	48.00
Crit W.S. (ft)		Flow Area (sq ft)	768.94	592.84	42.32
E.G. Slope (ft/ft)	0.001263	Area (sq ft)	768.94	592.84	42.32
Q Total (cfs)	5150.00	Flow (cfs)	1421.95	3645.32	82.73
Top Width (ft)	418.61	Top Width (ft)	331.79	70.83	15.99
Vel Total (ft/s)	3.67	Avg. Vel. (ft/s)	1.85	6.15	1.95
Max Chl Dpth (ft)	9.68	Hydr. Depth (ft)	2.32	8.37	2.65
Conv. Total (cfs)	144887.1	Conv. (cfs)	40004.4	102555.2	2327.5
Length Wtd. (ft)	42.07	Wetted Per. (ft)	331.98	72.08	16.81
Min Ch El (ft)	803.47	Shear (lb/sq ft)	0.18	0.65	0.20
Alpha	2.06	Stream Power (lb/ft s)	151.56	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	131.24	48.81	65.23
C & E Loss (ft)	0.02	Cum SA (acres)	38.23	4.40	14.18

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3054.54

INPUT
Description: J
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-429.24	820.02	-421.03	817.24	-412.97	815.16	-397.1	811.6	-374.14	811.01
-367.57	810.72	-352.22	810.82	-334.91	810.87	-315.95	811.01	-280.2	811.02
-262.38	810.97	-222.98	811.25	-208.79	811.28	-204.94	811.31	-200.98	811.37
-183.88	811.19	-166.39	810.98	-163.8	810.96	-152.84	810.92	-122.32	810.87
-114.52	810.84	-84.08	809.91	-75.91	809.69	-67.79	809.61	-35.1	809.26
-35.07	808.53	-34.81	808.37	-34.74	808.35	-34.67	808.33	-34.6	808.31

-34.52	808.29	-34.44	808.26	-34.36	808.24	-34.27	808.21	-34.17	808.18
-33.73	808	-33.7	808	-33.64	808	-33.6	808	-33.59	808
-33.58	808	-33.56	808	-33.54	808	-31.01	807.15	-27.53	806
-23.61	804.75	-21.27	804	-16.03	803.04	-12.18	803.04	-12.13	803.04
-12.11	803.04	-11.95	803.04	-11.89	803.04	-4.65	803.04	-2.06	803.04
0	803.04	1.54	803.04	2.63	803.04	6.59	803.04	7.86	803.04
9.9	803.04	14.57	803.48	17.29	804	21.31	804.85	26.85	806
28.59	806.34	33.57	807.34	35.91	807.81	36.86	808	38.61	808.46
44.41	810	49.01	811.58	50.23	812	51.33	812.33	57.04	814
66.81	815.06	75.8	816	75.82	816	75.86	816	75.89	816
75.91	816	75.93	816	75.94	816	75.95	816	75.96	816
77.14	816	78.3	816.19	78.68	816.24	79.1	816.3	79.86	816.42
81.74	816.76	83.22	816.97	89.82	818	93.81	818.77	99.8	820
105.59	821.09	110.84	821.97						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-429.24	.05	-35.1	.035	38.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.1	38.61	23	50	53	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.14	Reach Len. (ft)	23.00	50.00	53.00
Crit W.S. (ft)		Flow Area (sq ft)	859.44	627.31	37.31
E.G. Slope (ft/ft)	0.001093	Area (sq ft)	859.44	627.31	37.31
Q Total (cfs)	5150.00	Flow (cfs)	1483.32	3602.72	63.96
Top Width (ft)	458.05	Top Width (ft)	368.86	73.71	15.48
Vel Total (ft/s)	3.38	Avg. Vel. (ft/s)	1.73	5.74	1.71
Max Chl Dpth (ft)	10.10	Hydr. Depth (ft)	2.33	8.51	2.41
Conv. Total (cfs)	155793.7	Conv. (cfs)	44872.1	108986.7	1934.8
Length Wtd. (ft)	41.75	Wetted Per. (ft)	369.07	75.78	16.18
Min Ch El (ft)	803.04	Shear (lb/sq ft)	0.16	0.56	0.16
Alpha	2.10	Stream Power (lb/ft s)	110.84	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	130.83	48.11	65.19
C & E Loss (ft)	0.02	Cum SA (acres)	38.05	4.32	14.17

CROSS SECTION

RIVER: Buckeye Creek

REACH: Buckeye Creek RS: 3004.54

INPUT
Description: K
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-469.9	819.55	-464.82	817.83	-445.16	812.74	-439.76	811.53	-432.36	811.33
-408.99	810.29	-370.93	810.49	-362.09	810.6	-358.19	810.65	-356.83	810.66
-304.24	810.68	-285.06	810.58	-250.46	810.66	-226.31	810.87	-201.92	811.25
-180.38	811.02	-178.06	811.01	-142.44	810.98	-125	810.7	-123.4	810.68
-103.48	810.53	-85.36	810	-63.3	809.72	-38.45	809.01	-35.94	808.19
-35.5	808.15	-35.41	808.15	-35.32	808.14	-35.23	808.13	-35.07	808.12
-34.91	808.11	-34.74	808.1	-34.56	808.09	-34.37	808.07	-34.17	808.06
-33.97	808.05	-33.76	808.03	-33.54	808.02	-33.31	808.01	-33.23	808
-33.22	808	-29.25	806.47	-28.04	806	-24.92	804.84	-22.64	804
-21.26	803.52	-19.32	802.84	-16.91	802.19	-16.85	802.19	-16.82	802.19
-16.69	802.19	-5.82	802.19	-3.39	802.19	-1.15	802.19	.55	802.19
5.22	802.19	7.83	802.19	15.01	804	17.99	804.66	24.08	806
28.83	806.92	34.36	808	39.34	809.23	42.42	810	43.7	810.36
46.48	811.12	48.67	811.73	49.66	812	51.94	812.56	53.3	812.86
55.11	813.29	58.2	813.97	58.24	813.98	58.31	814	58.32	814
58.46	814	58.5	814	58.52	814	58.54	814	58.56	814
58.91	814.04	59.21	814.08	59.5	814.11	59.78	814.15	60.05	814.18
60.31	814.21	60.56	814.25	60.8	814.28	65.04	814.69	65.28	814.71
67.85	814.94	69.06	815.07	71.32	815.3	73.81	815.51	77.92	815.88
78.98	816	81.68	816.58	88.8	818	91.98	818.82	96.72	820
100.95	821.02	104.2	821.84						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-469.9	.05	-38.45	.035	34.36	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.45	34.36	36	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.15	Reach Len. (ft)	36.00	50.00	48.00
Crit W.S. (ft)		Flow Area (sq ft)	1028.06	639.43	51.77
E.G. Slope (ft/ft)	0.000886	Area (sq ft)	1028.06	639.43	51.77
Q Total (cfs)	5150.00	Flow (cfs)	1682.18	3383.76	84.06
Top Width (ft)	501.26	Top Width (ft)	408.29	72.81	20.16
Vel Total (ft/s)	3.00	Avg. Vel. (ft/s)	1.64	5.29	1.62
Max Chl Dpth (ft)	10.96	Hydr. Depth (ft)	2.52	8.78	2.57
Conv. Total (cfs)	173051.3	Conv. (cfs)	56524.8	113701.7	2824.8
Length Wtd. (ft)	44.74	Wetted Per. (ft)	408.53	74.60	20.81
Min Ch El (ft)	802.19	Shear (lb/sq ft)	0.14	0.47	

```
   0.14  *
* Alpha                 *    2.15  * Stream Power (lb/ft s) *  104.20  *    0.00  *
   0.00  *
* Frctn Loss (ft)       *    0.03  * Cum Volume (acre-ft)   *  130.33  *   47.38  *
  65.13  *
* C & E Loss (ft)       *    0.03  * Cum SA (acres)         *   37.85  *    4.23  *
  14.14  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2954.54

INPUT
Description: L
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  -509.9  819.95 -504.94  818.22 -502.96  817.64 -479.97  811.59 -461.37  810.54
 -447.19   809.9 -436.37  809.96 -403.73  810.08 -396.99  810.15 -359.14  810.32
 -344.07  810.32 -312.63  810.14 -291.29  810.11 -285.49   810.1 -260.08  810.18
 -242.17  810.32 -187.74  811.09 -186.83  811.08 -186.73  811.08 -185.37  811.08
 -160.81  810.67 -133.05   810.2  -130.8  810.14 -120.98  809.94 -119.28  809.94
 -113.78  809.93 -103.13  809.97  -93.69  809.92  -69.28  809.54  -67.94  809.52
  -52.45  809.04  -45.11  808.85  -35.47  808.67   -31.5  808.25  -31.42  808.24
  -31.35  808.22  -31.26  808.21  -31.16  808.19  -31.04  808.18  -30.92  808.16
   -30.8  808.15  -30.67  808.13  -30.53  808.11  -29.89     808  -29.86     808
  -29.83     808   -29.8     808  -29.75     808  -29.74     808  -29.73     808
  -29.72     808   -29.7     808  -29.05  807.78  -23.67     806  -21.63  805.31
  -17.79     804  -10.69  802.19  -10.66  802.19   -10.4  802.19       0  802.19
    9.16  802.19   11.62  802.51   18.63     804   24.79  805.33   27.88     806
   35.22  807.49   37.75     808   46.11  809.77    47.2     810   53.42  811.42
      56     812   58.23  812.39   59.06  812.53   61.48  812.94   62.86  813.17
   63.48  813.27   64.67  813.47   67.71  813.95   68.01     814   68.09     814
   68.17     814   74.52  814.69   76.39  814.89   77.77  815.04   78.82  815.15
   86.29     816   88.24  816.57   94.41     818   97.98  819.07  101.06     820
  106.62   821.6  108.05     822  110.66  822.46  119.91  823.94  120.29     824
   120.3     824  125.67  824.01  128.68  824.01  130.18  824.02  131.37  824.02
  132.17  824.03  141.52  824.19   144.3  824.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
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  -509.9     .05   -31.5    .035   35.22     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -31.5   35.22              36      50      48             .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
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* E.G. Elev (ft)        *  813.39  * Element               *  Left OB *  Channel *
Right OB *
* Vel Head (ft)         *    0.22  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)        *  813.17  * Reach Len. (ft)       *   36.00  *   50.00  *
  48.00  *
* Crit W.S. (ft)        *          * Flow Area (sq ft)     * 1342.72  *  602.95  *
  76.28  *
* E.G. Slope (ft/ft)    *0.000690  * Area (sq ft)          * 1342.72  *  602.95  *
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* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2157.72	* 2876.78	* 115.50 *
* Top Width (ft)	* 548.87	* Top Width (ft)	* 454.49	* 66.72	* 27.66 *
* Vel Total (ft/s)	* 2.55	* Avg. Vel. (ft/s)	* 1.61	* 4.77	* 1.51 *
* Max Chl Dpth (ft)	* 10.98	* Hydr. Depth (ft)	* 2.95	* 9.04	* 2.76 *
* Conv. Total (cfs)	*196006.1	* Conv. (cfs)	* 82121.6	*109488.7	* 4395.8 *
* Length Wtd. (ft)	* 43.91	* Wetted Per. (ft)	* 454.79	* 68.16	* 28.25 *
* Min Ch El (ft)	* 802.19	* Shear (lb/sq ft)	* 0.13	* 0.38	* 0.12 *
* Alpha	* 2.13	* Stream Power (lb/ft s)	* 144.30	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 129.35	* 46.67	* 65.06 *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 37.49	* 4.15	* 14.12 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2904.54

INPUT
Description: M
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-555.08	818.17	-551.53	817.23	-533.87	812.12	-525.42	811.56	-494.28	809.71
-465.28	809.62	-444.08	809.58	-434.14	809.66	-422.93	809.74	-392.27	810.04
-348.18	810.06	-339.93	810.08	-336.85	810.04	-323.3	810.05	-294.13	810.01
-287.65	810.03	-244.02	810.11	-235.05	810.23	-208.28	810.47	-187.1	810.73
-185.09	810.59	-179.54	810.57	-153.52	809.97	-147.04	809.8	-143.48	809.78
-131.45	809.67	-109.41	809.57	-105.87	809.47	-105.74	809.47	-73.37	809.04
-65.8	808.97	-57.78	808.78	-50.48	808.91	-36.42	808.86	-35.58	808.5
-32.25	807.93	-29.14	806.3	-25.8	805.38	-22.8	804.42	-20.89	804
-20.73	803.97	-20.58	803.93	-20.41	803.9	-20.24	803.86	-20.06	803.82
-19.87	803.78	-19.67	803.73	-19.45	803.68	-19.23	803.64	-19	803.58
-18.75	803.53	-18.49	803.47	-18.21	803.41	-18.2	803.41	-16.63	802.28
-16.25	802	-8.17	802	-3.39	802	0	802	2.06	802
10.99	802	11.25	802	11.76	802	12.15	802.07	12.83	802.2
18.97	803.35	22.4	804	25.48	804.72	30.97	806	31.31	806.08
31.62	806.15	34.08	806.73	36.43	807.28	36.84	807.37	37.52	807.53
37.56	807.54	37.59	807.55	37.62	807.55	37.65	807.56	37.68	807.56
37.7	807.57	37.94	807.62	37.96	807.63	38.35	807.71	38.38	807.71
38.4	807.72	38.42	807.72	38.87	807.81	38.9	807.82	38.92	807.83
39.41	807.93	39.44	807.93	39.96	808.04	40.52	808.15	41.11	808.27
41.15	808.28	41.79	808.41	41.84	808.42	43.87	808.86	44.37	808.96
44.9	809.07	45.41	809.17	45.95	809.28	46.53	809.39	47.15	809.52
47.83	809.65	49.22	809.95	49.46	810	51.94	810.54	58.66	812
59.36	812.09	59.65	812.13	63.68	812.64	65.81	812.9	68.23	813.21
72.37	813.72	73.02	813.8	74.71	814	79.31	814.6	82.93	815.09
86.03	815.5	89.61	816	89.68	816	93.22	817.02	96.64	818
100.75	819.42	102.44	820	107.15	821.46	108.87	822	113.42	823.17
116.74	824	116.77	824	116.78	824	116.88	824	116.89	824
117.07	824.01								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-555.08	.05	-36.42	.035	41.79	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.42	41.79	42	49.96	51	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.20	Reach Len. (ft)	42.00	49.96	51.00
Crit W.S. (ft)		Flow Area (sq ft)	1623.13	708.81	56.47
E.G. Slope (ft/ft)	0.000473	Area (sq ft)	1623.13	708.81	56.47
Q Total (cfs)	5150.00	Flow (cfs)	2294.86	2795.18	59.96
Top Width (ft)	605.73	Top Width (ft)	501.18	78.21	26.35
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)	1.41	3.94	1.06
Max Chl Dpth (ft)	11.20	Hydr. Depth (ft)	3.24	9.06	2.14
Conv. Total (cfs)	236876.4	Conv. (cfs)	105553.1	128565.3	2757.9
Length Wtd. (ft)	46.33	Wetted Per. (ft)	501.43	80.26	26.80
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.10	0.26	0.06
Alpha	2.01	Stream Power (lb/ft s)	117.07	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	128.13	45.92	64.99
C & E Loss (ft)	0.01	Cum SA (acres)	37.09	4.07	14.09

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2854.58

INPUT
Description: N
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-604.74	818.03	-587.39	813.47	-585.09	812.8	-577.61	812.3	-543.57	809.78
-498.5	809.63	-494.24	809.57	-493.32	809.62	-490.35	809.6	-464.42	809.7
-449.62	809.77	-442.77	809.62	-433.61	809.82	-392.69	810.06	-389.49	810.07
-346.11	809.57	-337.27	809.58	-300.9	809.69	-284.47	809.73	-253.74	809.76
-239.62	809.94	-231.28	810.08	-222.63	810.03	-219.09	810.11	-207.99	810.26
-195.77	810.2	-192.67	809.81	-189.75	809.76	-188.94	809.79	-181.12	809.87
-161.13	809.86	-154.94	809.75	-148.17	809.64	-131.76	809.27	-129.32	809.24

-116.92	809.12	-99.47	808.99	-99.27	808.99	-99.21	808.99	-87.45	808.85
-82.36	808.91	-76.54	808.84	-69.24	808.81	-62.26	808.9	-35.56	808.9
-34.29	808.35	-33.72	808.09	-31.28	806.16	-31.27	806.16	-31.24	806.14
-27.8	804.33	-27.74	804.32	-27.67	804.3	-27.61	804.29	-27.54	804.27
-27.46	804.25	-27.39	804.23	-27.3	804.21	-27.21	804.19	-27.11	804.17
-27.01	804.14	-26.89	804.12	-26.77	804.09	-26.64	804.06	-26.49	804.02
-26.4	804	-24.06	802.5	-23.28	802	-4.28	802	0	802
14.53	802	19.83	802.93	25.91	804	26.55	804.15	26.9	804.23
26.94	804.25	26.96	804.25	27.08	804.29	27.12	804.3	27.23	804.33
27.28	804.35	27.38	804.38	27.43	804.4	27.53	804.43	27.59	804.45
28.53	804.72	28.64	804.74	28.75	804.77	28.87	804.79	29	804.82
29.39	804.91	29.49	804.94	29.6	804.97	29.75	805	29.91	805.04
30.09	805.09	30.28	805.13	30.48	805.18	30.7	805.24	30.95	805.3
31.21	805.36	31.5	805.43	31.85	805.52	32.24	805.61	32.68	805.72
33.18	805.84	34.31	806.12	34.94	806.28	35.68	806.46	36.54	806.68
37.56	806.94	38.78	807.25	40.46	807.67	42.6	808.2	45.44	808.91
49.4	809.9	49.81	810	57.71	811.96	57.86	812	66.98	813.82
67.88	814	67.97	814	68.01	814	68.24	814	87.56	815.69
88.39	815.76	90.98	816	94.53	817.23	96.75	818	100.5	819.34
102.36	820	103.49	820.39	108.11	822	109.79	822.45	115.56	824
115.88	824.04								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-604.74	.05	-35.56	.035	45.44	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.56	45.44	40	50.04	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.20	Reach Len. (ft)	40.00	50.04	52.00
Crit W.S. (ft)		Flow Area (sq ft)	1892.09	766.75	37.72
E.G. Slope (ft/ft)	0.000358	Area (sq ft)	1892.09	766.75	37.72
Q Total (cfs)	5150.00	Flow (cfs)	2420.66	2695.77	33.56
Top Width (ft)	650.35	Top Width (ft)	550.91	81.00	18.44
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	1.28	3.52	0.89
Max Chl Dpth (ft)	11.20	Hydr. Depth (ft)	3.43	9.47	2.05
Conv. Total (cfs)	272249.3	Conv. (cfs)	127965.8	142509.2	1774.3
Length Wtd. (ft)	44.98	Wetted Per. (ft)	551.13	83.71	18.94
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.08	0.20	0.04
Alpha	1.99	Stream Power (lb/ft s)	115.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	126.43	45.07	64.94
C & E Loss (ft)	0.01	Cum SA (acres)	36.59	3.98	14.06

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2804.54

INPUT
Description: O
Station Elevation Data num= 224

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-636.99	817.78	-620.56	813.37	-593.74	811.22	-573.43	809.84	-567.39	809.75
-532.59	809.32	-523.1	809.82	-493.13	809.57	-486.12	809.6	-483.76	809.54
-473.25	809.31	-455.93	809.7	-446.03	809.76	-418.52	809.68	-391.12	809.35
-371.75	809.21	-353.59	809.07	-320.57	809.32	-310.49	809.4	-285.69	809.54
-264.41	809.57	-260.62	809.62	-252.37	809.53	-243.1	809.46	-235.49	809.62
-210.66	809.92	-203.19	809.88	-197.84	809.23	-197.64	809.22	-194.22	809.36
-191.11	809.39	-177.26	809.36	-170.33	809.28	-164.3	809.01	-153.82	808.7
-139.84	808.71	-132.13	808.6	-123.32	808.22	-121.92	808.15	-120.95	808.13
-107.12	808.07	-104.82	808.04	-97.1	807.93	-90.23	807.96	-83.62	808.09
-65.83	808.29	-65.47	808.31	-61.61	808.39	-41.95	809.2	-35.53	809.4
-35.51	809.4	-34.23	808.97	-33.63	808.75	-31.2	806.83	-31.19	806.83
-29.7	805.77	-29.59	805.69	-29.57	805.68	-25.99	803.68	-25.99	803.67
-25.98	803.66	-25.97	803.64	-25.95	803.62	-25.94	803.61	-25.92	803.59
-25.91	803.57	-25.89	803.55	-25.87	803.53	-25.85	803.5	-25.84	803.48
-25.82	803.46	-25.8	803.43	-25.78	803.4	-25.75	803.38	-25.73	803.35
-25.71	803.32	-25.68	803.29	-25.67	803.27	-23.62	802	-12.29	802
-8.16	802	-.98	802	0	802	18.54	802	18.64	802.02
18.75	802.05	18.76	802.05	18.87	802.08	18.97	802.1	19.06	802.12
19.15	802.15	19.24	802.17	19.32	802.19	19.35	802.19	19.44	802.21
19.51	802.23	19.59	802.25	19.66	802.27	19.73	802.28	19.8	802.3
19.86	802.31	19.92	802.33	19.98	802.34	20.04	802.36	20.09	802.37
20.15	802.38	20.21	802.4	20.26	802.41	20.31	802.42	20.36	802.43
20.41	802.45	20.46	802.46	20.5	802.47	20.55	802.48	20.59	802.49
20.63	802.5	20.67	802.51	20.71	802.52	20.75	802.53	20.78	802.53
20.82	802.54	20.85	802.55	20.88	802.56	20.92	802.57	20.95	802.57
20.98	802.58	21.08	802.61	21.11	802.61	21.14	802.62	21.17	802.63
21.2	802.64	21.23	802.64	21.26	802.65	21.29	802.66	21.31	802.66
21.34	802.67	21.36	802.67	21.39	802.68	21.41	802.69	21.44	802.69
21.46	802.7	21.48	802.7	21.5	802.71	21.53	802.71	21.55	802.72
21.57	802.72	21.59	802.73	21.61	802.73	21.63	802.74	21.65	802.74
21.66	802.75	21.68	802.75	21.7	802.75	21.72	802.76	21.74	802.76
21.75	802.77	21.89	802.8	21.91	802.8	23.53	803.12	23.69	803.16
23.71	803.17	23.81	803.19	24.81	805.05	24.86	805.07	25.04	805.13
25.21	805.2	25.38	805.26	25.55	805.32	25.64	805.35	26.14	805.53
37.03	807.89	42.61	809.52	47.89	809.79	48.09	809.82	48.29	809.86
49.56	810.15	49.78	810.2	50.02	810.26	50.26	810.32	50.54	810.38
50.84	810.45	51.15	810.51	51.47	810.58	51.81	810.66	52.17	810.74
52.9	810.9	53.26	810.98	53.64	811.07	54.04	811.17	54.47	811.27
55.97	811.53	56.29	811.59	56.63	811.67	57.01	811.75	57.43	811.84
57.9	811.94	58.18	812	66	813.35	69.49	813.96	69.71	814
75.94	814.59	80	814.97	82.33	815.19	83.84	815.33	85.64	815.5
87.9	815.68	88.33	815.71	90.91	815.91	91.03	815.92	92.13	816
93.67	816.33	94.43	816.53	96.39	816.99	98.88	817.68	99.33	817.79
100.04	818	105.58	819.9	105.87	820	106.47	820.21	111.67	822
117.68	823.92	117.92	824	118.6	824.19	124.8	825.92		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

-636.99 .05 -35.53 .035 42.61 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-35.53 42.61 87 50 60 .1 .3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.21	Reach Len. (ft)	87.00	50.00	60.00
Crit W.S. (ft)		Flow Area (sq ft)	2206.22	731.35	46.55
E.G. Slope (ft/ft)	0.000305	Area (sq ft)	2206.22	731.35	46.55
Q Total (cfs)	5150.00	Flow (cfs)	2781.68	2329.54	38.78
Top Width (ft)	683.68	Top Width (ft)	582.98	78.14	22.56
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	1.26	3.19	0.83
Max Chl Dpth (ft)	11.21	Hydr. Depth (ft)	3.78	9.36	2.06
Conv. Total (cfs)	294699.3	Conv. (cfs)	159176.6	133303.4	2219.3
Length Wtd. (ft)	69.44	Wetted Per. (ft)	583.23	82.21	22.90
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.07	0.17	0.04
Alpha	1.83	Stream Power (lb/ft s)	124.80	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	124.55	44.21	64.89
C & E Loss (ft)	0.00	Cum SA (acres)	36.07	3.89	14.04

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2754.54

INPUT
Description: P
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-698.23	814.97	-659.71	811.68	-651.97	810.96	-642.03	809.77	-638.67	809.63
-635.14	809.66	-632.55	810.08	-630.89	810.46	-624.76	810.96	-620.05	811.37
-600.27	811.49	-590.44	811.52	-554.05	810.87	-537.71	810.39	-530.73	810.81
-527.89	810.56	-523.95	810.59	-505.73	810.9	-503.07	811.03	-499.25	811.03
-485.61	811	-464.9	810.78	-451.79	810.55	-421.49	810.26	-417.14	810.19
-406.03	810.32	-392.77	810.35	-384.41	810.35	-379.39	810.43	-350.75	810.75
-338.56	810.82	-321.27	811.22	-303.75	811.22	-294.46	811.26	-270.83	811.15
-265.46	810.91	-261.08	810.78	-246.74	810.16	-241.79	810.23	-235.18	810.34
-234.13	810.4	-231.14	810.38	-198.53	809.87	-197.69	809.58	-194.2	808.77
-193.07	808.52	-178.49	807.88	-177.89	807.85	-177.83	807.85	-164.46	807.34
-162.68	807.33	-155.89	807.28	-155.32	806.98	-153.6	807.57	-151.86	807.58

-138.75	807.52	-135.54	807.51	-132.76	807.16	-130.03	806.85	-127	806.75
-124.24	806.57	-118.5	806.53	-110.43	805.94	-108.29	805.37	-106.35	805.03
-104.77	805.01	-102.18	805.14	-99.7	805.76	-99.06	805.87	-98.97	805.86
-98.43	805.92	-84.59	807.47	-83.08	807.51	-83.04	807.51	-82.26	807.53
-69	807.62	-59.03	807.76	-50.91	807.97	-37.84	808.52	-37.5	808.63
-35.62	808.13	-29.14	805.37	-23.52	803.77	-22.81	802.87	-22.75	802.78
-22.67	802.68	-22.59	802.55	-22.48	802.41	-22.36	802.23	-22.34	802.2
-22.29	802.17	-22.01	802	-18.39	802	-17.93	802	-13.41	802
-12.31	802	-8.44	802	-6.7	802	-3.48	802	-1.09	802
0	802	2.18	802	7.06	802	9.46	802	15.81	802
16.72	802	21.17	802	21.19	802	21.25	802.02	21.3	802.03
21.35	802.04	21.4	802.05	21.45	802.07	21.5	802.08	21.55	802.09
21.59	802.1	21.64	802.11	21.69	802.12	21.73	802.13	21.77	802.14
21.81	802.15	21.86	802.16	21.88	802.17	21.93	802.18	25.85	802.95
25.9	802.96	25.93	802.96	28.31	807.37	28.32	807.37	28.37	807.39
28.42	807.41	28.46	807.42	28.5	807.44	28.53	807.45	28.66	807.49
31.44	808.11	45.68	812.31	49.98	813.62	59.56	813.62	60.3	813.64
61.17	813.66	62.2	813.69	63.5	813.72	65.1	813.76	67.14	813.81
69.82	813.88	73.33	813.96	74.76	814	74.9	814	91.42	815.35
99.31	816	102.78	816.84	107.54	818	111.71	819.44	113.34	820
114.82	820.51	119.14	822	124.36	823.8	124.94	824	126.16	824.38
131.32	826	136.2	827.34	138.38	827.91				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-698.23	.05	-37.5	.035	28.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.5	28.66	109	50	58	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.15	Reach Len. (ft)	109.00	50.00	58.00
Crit W.S. (ft)		Flow Area (sq ft)	2053.79	667.27	57.84
E.G. Slope (ft/ft)	0.000384	Area (sq ft)	2053.79	667.27	57.84
Q Total (cfs)	5150.00	Flow (cfs)	2601.10	2481.77	67.12
Top Width (ft)	725.32	Top Width (ft)	639.39	66.16	19.77
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)	1.27	3.72	1.16
Max Chl Dpth (ft)	11.15	Hydr. Depth (ft)	3.21	10.09	2.93
Conv. Total (cfs)	262775.1	Conv. (cfs)	132719.4	126630.7	3424.9
Length Wtd. (ft)	76.39	Wetted Per. (ft)	640.51	70.61	20.57
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.08	0.23	0.07
Alpha	2.18	Stream Power (lb/ft s)	138.38	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	120.30	43.41	64.81
C & E Loss (ft)	0.01	Cum SA (acres)	34.85	3.80	

14.01 *
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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2704.54

INPUT
Description: Q
Station Elevation Data num= 179

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-789.49	815.18	-756.35	812.26	-747.6	811.51	-738.55	810.78	-736.24	810.38
-729.79	810.41	-726.31	810.46	-725.74	810.56	-712.91	811.03	-709.69	811.32
-698.02	811.55	-678.74	812.71	-661.57	812.07	-657.25	812.08	-645.92	812.19
-620.12	812.16	-604.69	812.13	-595.41	812.21	-593.16	812.29	-573.93	812.02
-564.82	811.92	-557.02	811.77	-539.91	811.67	-521.25	811.45	-512.69	811.35
-500.54	811.17	-486.5	811.04	-475.1	811.09	-451.48	811.42	-427.49	811.47
-411.58	811.52	-395.6	811.6	-374.77	811.73	-351.8	811.98	-342.8	812.07
-335.72	812.08	-316.38	811.96	-303.86	811.93	-291.93	811.76	-282.81	811.64
-277.1	811.55	-271.62	811.56	-254.09	811.42	-239.84	811	-202.77	809.89
-198.17	809.76	-197.9	809.7	-194.66	809.43	-189.02	809	-186.65	808.89
-181.71	808.68	-170.27	808.22	-165.51	808	-152.11	807.93	-132.87	807.69
-126.24	807.69	-125.28	807.67	-97.98	807.11	-95.16	807.09	-80.48	807.66
-65.02	808.17	-61.54	808.11	-40.15	808.52	-33.94	808.23	-32.14	808.15
-31.27	808.03	-31.03	807.98	-30.36	807.89	-29.98	807.71	-28.02	805.88
-27.8	805.81	-27.78	805.8	-27.75	805.79	-27.73	805.78	-27.69	805.77
-27.6	805.74	-27.39	805.67	-27.27	805.61	-27.07	805.53	-26.7	805.38
-25.82	805.02	-20.72	802.94	-18.43	802	-17.88	802	-17.79	802
-12.4	802	-11.38	802	-6.9	802	-6.87	802	-4.92	802
-1.38	802	0	802	1.76	802	4.54	802	5.55	802
9.02	802	10.62	802	16.34	802	16.72	802	18.59	802
19.75	802.24	20.4	802.37	21.76	802.65	22.53	802.8	23.02	802.9
23.36	802.97	23.61	803.02	23.8	803.06	23.95	803.09	24.07	803.12
24.17	803.14	24.26	803.16	24.33	803.17	24.39	803.19	24.45	803.2
24.5	803.21	24.54	803.22	24.58	803.22	24.61	803.23	24.64	803.24
24.67	803.24	24.7	803.25	24.72	803.25	24.74	803.26	24.76	803.26
24.78	803.26	24.79	803.27	24.81	803.27	24.83	803.27	24.84	803.28
24.85	803.28	24.86	803.28	24.88	803.28	25.13	803.34	29.99	808.07
30.08	808.22	30.78	808.43	49.1	815.09	58.94	814.78	59.52	814.76
60.15	814.75	60.84	814.73	61.61	814.7	62.47	814.68	64.3	814.63
65.26	814.6	66.34	814.57	67.79	814.53	69.46	814.48	71.4	814.43
73.68	814.37	76.4	814.3	78.5	814.24	82.67	814.11	86.32	814
88.55	814.16	88.99	814.19	93.39	814.5	96.65	814.73	114.4	816
114.46	816	114.54	816	114.59	816	114.7	816	115.25	816.16
116.49	816.52	121.57	818	127.43	819.88	127.81	820	128.27	820.15
133.84	822	139.7	823.91	139.98	824	140.39	824.13	146.22	826
150.1	827.24	152.47	828	157.76	829.1	161.88	829.95		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-789.49	.05	-33.94	.035	29.99	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.94	29.99	52	43.25	43	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-789.49	-500	814	F

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 813.21	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.25	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 812.96	* Reach Len. (ft)	* 52.00	* 43.25	* 43.00 *
* Crit W.S. (ft)	* 809.52	* Flow Area (sq ft)	* 1284.79	* 626.35	* 31.97 *
* E.G. Slope (ft/ft)	*0.000704	* Area (sq ft)	* 1594.45	* 626.35	* 31.97 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 1991.76	* 3114.90	* 43.34 *
* Top Width (ft)	* 807.60	* Top Width (ft)	* 730.41	* 63.93	* 13.26 *
* Vel Total (ft/s)	* 2.65	* Avg. Vel. (ft/s)	* 1.55	* 4.97	* 1.36 *
* Max Chl Dpth (ft)	* 10.96	* Hydr. Depth (ft)	* 2.76	* 9.80	* 2.41 *
* Conv. Total (cfs)	*194063.4	* Conv. (cfs)	* 75053.9	*117376.3	* 1633.3 *
* Length Wtd. (ft)	* 46.55	* Wetted Per. (ft)	* 466.19	* 67.54	* 14.18 *
* Min Ch El (ft)	* 802.00	* Shear (lb/sq ft)	* 0.12	* 0.41	* 0.10 *
* Alpha	* 2.26	* Stream Power (lb/ft s)	* 161.88	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	* 115.73	* 42.66	* 64.75 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 33.13	* 3.73	* 13.99 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2661.29

INPUT
Description: R
Station Elevation Data num= 160

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-845.31	814.71	-835.14	813.64	-834.38	813.53	-831.84	813.36	-795.49	811.05
-791.47	810.88	-789.55	810.68	-787.54	810.19	-786.35	809.98	-783.14	810.1
-782.3	810.32	-779.99	811.07	-778.69	811.22	-772.9	811.41	-768.71	811.32
-758.36	811.32	-736.09	811.46	-712.04	811.29	-701.96	811.41	-675.59	811.1
-664.61	810.78	-654.63	810.47	-651.71	810.28	-649.59	810.19	-645.56	810.33
-634.76	810.45	-611.83	810.53	-601.03	810.62	-577.91	811.21	-565.56	811.53
-564.26	811.76	-563.81	811.81	-558.13	812.13	-551.33	812.41	-545.98	812.31
-539.3	812.14	-513.13	811.42	-486.48	811.4	-474.66	811.33	-473.66	811.35
-463.26	811.51	-439.75	811.72	-407.08	812.06	-405.87	812.06	-387.19	811.92
-380.6	811.87	-363.3	811.74	-356.72	811.72	-343.67	811.78	-327.75	811.87
-321.7	811.81	-301.71	811.62	-300.28	811.6	-298.85	811.6	-294.96	811.61
-293.29	811.64	-289.4	811.68	-284.25	811.64	-280.32	811.61	-274.7	811.36
-272.28	811.36	-264.08	811.18	-255.83	811.05	-251.54	811.02	-244.81	810.95

-227.25	810.41	-224.5	810.33	-215.82	810.12	-195.52	809.57	-161.25	808.77
-157.8	808.7	-155.28	808.68	-136.76	808.08	-110.75	808.1	-105.69	808
-98.01	808.15	-77.01	808.06	-66.06	807.74	-50.99	807.61	-35.7	807.37
-30.35	806.7	-28.35	806.46	-27.72	806.39	-21.76	804.95	-15.72	804.22
-15.2	803.46	-14.95	803.31	-14.93	803.28	-14.91	803.25	-14.89	803.21
-14.86	803.17	-14.84	803.13	-14.81	803.08	-14.77	803.02	-14.73	802.96
-14.69	802.89	-14.64	802.8	-14.58	802.71	-14.51	802.6	-14.43	802.47
-14.33	802.31	-14.21	802.11	-14.14	802	-10.62	802	-9.76	802
-3.67	802	-1.11	802	0	802	3.28	802	7.57	802
10.21	802	16.23	802	17.12	802	20.6	802	20.72	802.01
20.95	802.03	21.16	802.04	21.36	802.06	21.54	802.07	21.72	802.09
27.87	802.57	31.67	806.67	33.46	808.35	46.35	812.63	47.42	812.95
50.63	813.48	56.04	813.65	57.86	813.75	101.72	813.93	102.64	813.94
103.63	813.96	104.68	813.97	105.73	813.98	106.86	813.99	107.53	814
107.58	814	109.13	814.12	109.42	814.15	113.04	814.43	114.04	814.51
115.48	814.62	117.7	814.79	121.05	815.06	124.84	815.34	126.67	815.49
132.02	815.89	132.34	815.91	133.53	816	136.37	816.61	137.94	816.96
139.77	817.36	142.54	818	143.12	818.18	144.55	818.64	147.7	819.64
148.85	820	152.27	821.08	155.2	822	157.11	822.61	158.67	823.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-845.31	.05	-28.35	.035	31.67	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.35	31.67	53	58	63	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-845.31	-400	814	F

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	812.88	Reach Len. (ft)	53.00	58.00	63.00
Crit W.S. (ft)	809.64	Flow Area (sq ft)	1104.07	599.04	40.57
E.G. Slope (ft/ft)	*0.000785	Area (sq ft)	1756.43	599.04	40.57
Q Total (cfs)	5150.00	Flow (cfs)	1899.22	3190.28	60.50
Top Width (ft)	871.52	Top Width (ft)	795.98	60.02	15.52
Vel Total (ft/s)	2.95	Avg. Vel. (ft/s)	1.72	5.33	1.49
Max Chl Dpth (ft)	10.88	Hydr. Depth (ft)	2.97	9.98	2.61
Conv. Total (cfs)	*183823.1	Conv. (cfs)	67790.4	*113873.0	2159.6
Length Wtd. (ft)	56.34	Wetted Per. (ft)	371.77	63.23	16.92
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.15	0.46	0.12
Alpha	2.14	Stream Power (lb/ft s)	158.67	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	113.73	42.06	64.72
C & E Loss (ft)	0.02	Cum SA (acres)	32.22	3.67	

13.97 *
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2603.43

INPUT
Description: S
Station Elevation Data num= 179

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-903.57	816.28	-902.52	816.16	-892.97	814.81	-873.46	813.49	-844.82	811.48
-841.32	811.12	-836.85	810.66	-835.45	810.41	-833.44	810.2	-832.69	810.5
-831.55	810.72	-830.32	810.9	-828.59	811.18	-805.61	810.62	-800.97	810.61
-770.57	810.56	-758.55	810.61	-751.39	810.61	-718.72	810.4	-715.19	810.38
-693.73	810.31	-690.78	810.38	-669.2	810.15	-624.08	809.44	-621.66	809.47
-620.07	809.47	-615.22	809.51	-587.21	810.04	-562.67	810.35	-552.27	810.65
-534.07	811.2	-528.83	811.3	-525.06	811.34	-520.72	811.5	-512.3	811.13
-500.41	811.58	-477.39	811.6	-467.12	811.53	-464.76	811.52	-461.95	811.56
-432.04	811.7	-423.95	811.73	-418.48	811.69	-391.41	811.38	-372.01	811.72
-371.95	811.67	-370.07	811.7	-368.61	811.83	-363.43	811.89	-350.22	811.76
-349.39	811.76	-345.61	811.67	-321.9	811.34	-318.71	811.36	-304.07	810.9
-302.04	810.88	-294.79	810.9	-289.51	810.85	-280.21	810.76	-274.05	810.67
-272.54	810.58	-247.3	810.31	-242.95	810.26	-226.04	809.86	-208.97	809.51
-201.01	809.47	-196.58	809.5	-179.02	809.17	-163.54	808.91	-155.16	808.84
-147.64	808.66	-138.16	808.75	-136.69	808.74	-128.47	808.6	-126.5	808.4
-112.75	808.41	-101.83	808.22	-87.86	808.42	-79.46	808.57	-70.73	808.12
-56.58	807.63	-41.49	806.76	-35.35	806.51	-33	806.38	-27.24	806.67
-26.43	806.53	-26.25	806.42	-25.52	805.98	-22.05	802.88	-21.93	802.8
-21.2	802.12	-21.18	802.1	-21.16	802.09	-21.14	802.08	-21.12	802.07
-21.1	802.06	-21.08	802.04	-21.06	802.03	-21.03	802.02	-21.01	802
-21	802	-3.33	802	0	802	8.49	802	12.86	802
19.91	802	21.65	802.22	23.61	802.46	24.81	802.61	25.62	802.71
26.21	802.79	26.65	802.84	27	802.88	27.28	802.92	27.5	802.95
27.69	802.97	27.71	802.97	27.85	802.99	27.99	803.01	28.11	803.02
28.22	803.04	28.31	803.05	28.39	803.06	28.47	803.07	28.54	803.08
28.6	803.08	28.65	803.09	28.7	803.1	28.75	803.1	28.79	803.11
28.83	803.11	28.87	803.12	28.9	803.12	28.93	803.12	28.96	803.13
28.99	803.13	29.01	803.14	29.04	803.14	29.06	803.14	29.08	803.14
29.1	803.15	29.12	803.15	29.14	803.15	29.16	803.15	29.37	803.21
29.77	803.33	29.88	803.36	35.8	806.62	35.86	806.64	36.09	806.68
36.39	806.71	46.81	807.54	52.56	807.93	59.22	809.23	65.52	809.86
65.97	809.9	73.35	810.89	79.45	811.7	80.35	811.82	80.79	811.87
94.07	812.91	95.32	813.03	98.75	813.24	107.95	813.92	114.81	814.09
117.15	814.33	128.42	814.96	128.96	814.96	139.38	815.3	141.42	815.61
145.31	815.54	148.61	815.53	151.33	815.55	160.13	815.57	160.95	815.58
165.75	815.04	166.67	814.95	167.3	815.16	171.81	816.59		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-903.57	.05	-26.43	.035	35.8	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.43	35.8	68	48.89	51	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-903.57	-350	814	F

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	*	813.11	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.22	* Wt. n-Val.	*	0.050	*	0.035	*	0.050	*	
* W.S. Elev (ft)	*	812.90	* Reach Len. (ft)	*	68.00	*	48.89	*	51.00	*	
* Crit W.S. (ft)	*	809.31	* Flow Area (sq ft)	*	1133.99	*	641.37	*	181.13	*	
* E.G. Slope (ft/ft)	*	0.000576	* Area (sq ft)	*	2187.31	*	641.37	*	181.13	*	
* Q Total (cfs)	*	5150.00	* Flow (cfs)	*	1865.14	*	3010.41	*	274.44	*	
* Top Width (ft)	*	958.89	* Top Width (ft)	*	838.57	*	62.23	*	58.09	*	
* Vel Total (ft/s)	*	2.63	* Avg. Vel. (ft/s)	*	1.52	*	4.69	*	1.52	*	
* Max Chl Dpth (ft)	*	10.90	* Hydr. Depth (ft)	*	3.50	*	10.31	*	3.12	*	
* Conv. Total (cfs)	*	214642.9	* Conv. (cfs)	*	77735.9	*	125468.8	*	11438.3	*	
* Length Wtd. (ft)	*	53.32	* Wetted Per. (ft)	*	323.69	*	64.84	*	58.48	*	
* Min Ch El (ft)	*	802.00	* Shear (lb/sq ft)	*	0.13	*	0.36	*	0.11	*	
* Alpha	*	2.02	* Stream Power (lb/ft s)	*	171.81	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	111.33	*	41.23	*	64.56	*	
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	31.23	*	3.59	*	13.92	*	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2554.54

INPUT
Description: T
Station Elevation Data num= 139

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-980.71	816.65	-966.99	815.72	-911.36	811.71	-908.48	811.07	-902.49	810.68
-900.98	810.45	-899.91	810.48	-897.13	810.75	-896.07	811.03	-892.29	811.28
-887.6	811.56	-880.22	811.58	-864.67	810.85	-857.47	811.08	-844.2	810.59
-827.89	810.55	-810.53	810.54	-808.89	810.49	-793.01	810.03	-739.04	809.86
-733.68	809.8	-724.34	809.77	-692.73	809.42	-688.21	809.41	-662.05	809.38
-655.02	809.41	-652.17	809.09	-622.65	809.43	-607.5	809.45	-561.09	809.11
-552.41	809.15	-549.56	809.18	-504.79	809.52	-502.65	809.58	-492.03	810.02
-479.47	810.44	-478.93	810.37	-477.23	810.45	-472.11	810.51	-457.61	810.92
-451.18	810.99	-440.74	811.54	-437.51	811.53	-416.3	811.75	-415.69	811.75
-415.3	811.74	-414.24	811.88	-400.27	813.22	-381.79	814.19	-377.69	814.34

-372.13	814.15	-345.57	813.99	-344.8	813.99	-331.37	813.94	-304.29	813.83
-291.47	813.82	-282.04	813.66	-265.95	813.24	-255.64	813.03	-243.09	812.44
-238.48	812.34	-220.12	812.29	-217.37	812.29	-210.91	812.01	-200.05	811.45
-195.07	811.43	-178.84	811.24	-167.69	811.33	-160.54	811.31	-139.86	811.31
-129.03	811.32	-105.31	811.26	-98.54	811.22	-75.44	810.6	-68.79	810.44
-65.81	810.3	-51.67	809.76	-46.88	809.31	-43.87	809.05	-34.16	808.14
-31.74	807.97	-30.75	807.66	-29.78	807.07	-25.71	804.6	-25.19	804.28
-24.27	803.72	-20.91	801.64	-14.53	801.01	-13.49	800.98	-4.76	801.32
-4.06	801.36	-3.06	801.36	-3.03	801.36	-2.99	801.36	-2.95	801.36
-2.9	801.36	-2.84	801.37	-2.78	801.37	-2.17	801.38	0	801.42
13.69	801.68	15.73	802.24	21.21	803.74	26.6	805.12	29.74	806
30.15	806.06	30.83	806.16	30.99	806.18	37.76	807.72	42.93	807.76
45.16	807.86	51.27	808.01	53.64	808.06	72.68	808.47	86.63	808.59
94.2	808.73	118.85	810.47	122.89	810.79	123.74	810.9	152.29	815.32
160.72	815.76	161.08	815.74	161.18	815.74	161.39	815.75	161.98	815.77
171.11	815.96	171.87	815.94	183.22	815.73	183.71	815.73	184.32	815.73
184.46	815.73	188.65	815.68	189.99	815.55	191.72	815.42	192.1	815.42
192.46	815.56	192.97	815.92	193.47	816.19	198.2	817.61		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-980.71	.05	-30.75	.035	37.76	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.75	37.76	83 59.92	60	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-980.71	-275	814.31	F

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	812.58	Reach Len. (ft)	83.00	59.92	60.00
Crit W.S. (ft)	809.13	Flow Area (sq ft)	322.68	652.55	335.45
E.G. Slope (ft/ft)	0.001078	Area (sq ft)	1588.63	652.55	335.45
Q Total (cfs)	5150.00	Flow (cfs)	411.91	3990.11	747.98
Top Width (ft)	897.35	Top Width (ft)	731.99	68.51	96.86
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)	1.28	6.11	2.23
Max Chl Dpth (ft)	11.60	Hydr. Depth (ft)	1.50	9.52	3.46
Conv. Total (cfs)	156884.3	Conv. (cfs)	12548.0	121550.6	22785.7
Length Wtd. (ft)	60.85	Wetted Per. (ft)	215.58	71.01	97.08
Min Ch El (ft)	800.98	Shear (lb/sq ft)	0.10	0.62	0.23
Alpha	1.93	Stream Power (lb/ft s)	198.20	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	108.39	40.50	64.25
C & E Loss (ft)	0.16	Cum SA (acres)	30.00	3.51	13.83

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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2494.62

INPUT
Description: U
Station Elevation Data num= 156

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-901.35	819.77	-898.9	819.68	-886.47	820.26	-886.18	820.24	-885.75	820.23
-841.45	821.6	-840.12	821.56	-806.37	822.34	-785.96	823.04	-779.51	823.39
-775.49	823.42	-732.63	822.97	-727.51	822.6	-700.67	820.79	-683.4	819.64
-672.38	818.49	-645.13	814.72	-642.97	814.69	-637.35	814.47	-612.34	816.41
-601.72	817.34	-601.39	817.34	-600.17	817.07	-598.83	817.1	-597.4	817.13
-597	817.19	-559.61	816.78	-549.11	816.72	-513.33	816.58	-509.48	816.55
-501.47	816.51	-482.97	816.42	-471.22	816.35	-468.12	816.36	-441.85	816.15
-401.4	815.76	-386.25	815.51	-373.26	815.48	-338.72	815.07	-334.28	815
-307.86	814.49	-304.35	814.41	-304.01	814.45	-292.77	814.29	-291.75	814.28
-289.24	814.25	-247.02	813.5	-239.27	813.37	-229.33	813.16	-224.65	813.15
-224.32	813.11	-219.31	812.98	-213.16	812.98	-212.61	812.99	-211.09	813.02
-185.27	813.13	-169.91	812.83	-165.7	812.79	-151.41	812.7	-129.64	812.5
-109.68	812.37	-109.31	812.37	-108.95	812.36	-108.58	812.36	-108.22	812.36
-107.85	812.35	-107.49	812.35	-107.13	812.35	-106.76	812.35	-106.4	812.34
-106.04	812.34	-105.67	812.34	-105.31	812.33	-104.95	812.33	-104.59	812.33
-104.23	812.32	-103.87	812.32	-103.51	812.32	-103.15	812.32	-102.79	812.31
-102.43	812.31	-102.08	812.31	-101.72	812.3	-101.36	812.3	-101	812.3
-100.65	812.29	-100.29	812.29	-99.94	812.29	-99.58	812.29	-99.23	812.28
-98.87	812.28	-98.52	812.28	-98.16	812.27	-97.81	812.27	-97.46	812.27
-97.11	812.27	-96.75	812.26	-96.4	812.26	-96.05	812.26	-95.7	812.25
-95.35	812.25	-95	812.25	-94.65	812.24	-94.3	812.24	-93.95	812.24
-93.6	812.24	-93.25	812.23	-92.91	812.23	-92.56	812.23	-92.21	812.22
-91.87	812.22	-69.56	811.87	-68.96	811.86	-68.67	811.86	-68.37	811.85
-68.07	811.85	-67.77	811.85	-67.48	811.84	-67.18	811.84	-66.88	811.84
-64.43	811.75	-59.97	811.56	-52.47	811.16	-40.27	810.34	-37.57	810.15
-35.22	809.68	-24.96	807.08	-20.95	804.26	-14.73	800.24	-13.47	800
-6.97	799.17	-.36	799.4	0	799.4	2.38	799.36	7.84	799.97
11.93	800.16	12.41	800.45	18.41	802.84	21.85	805.15	24.59	805.51
32	807.83	33.12	808.4	33.79	808.65	34.78	808.68	36.69	808.9
48.53	811.75	50.46	811.83	176.11	811.85	190.55	814.5	192.96	815
193.65	815.27	197.2	815.43	197.28	815.43	197.36	815.43	204.13	815.64
209.81	815.78								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-901.35	.05	-35.22	.035	32	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.22	32	170 76.77	86	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-901.35	-25.4	812	T
21.09	209.81	812	T

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	812.78	Element	Left OB	Channel	Right OB		
Vel Head (ft)	2.03	Wt. n-Val.		0.035			
W.S. Elev (ft)	810.75	Reach Len. (ft)	19.58	19.58	19.58		
Crit W.S. (ft)	808.31	Flow Area (sq ft)		450.19			
E.G. Slope (ft/ft)	0.003854	Area (sq ft)	4.53	522.36	17.31		
Q Total (cfs)	5150.00	Flow (cfs)		5150.00			
Top Width (ft)	90.67	Top Width (ft)	11.09	67.22	12.36		
Vel Total (ft/s)	11.44	Avg. Vel. (ft/s)		11.44			
Max Chl Dpth (ft)	11.58	Hydr. Depth (ft)		9.68			
Conv. Total (cfs)	82954.5	Conv. (cfs)		82954.5			
Length Wtd. (ft)	19.58	Wetted Per. (ft)		49.79			
Min Ch El (ft)	799.17	Shear (lb/sq ft)		2.18			
Alpha	1.00	Stream Power (lb/ft s)	209.81	0.00	0.00		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	106.87	39.70	64.01		
C & E Loss (ft)	0.03	Cum SA (acres)	29.29	3.42	13.75		

BRIDGE

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2460.04

INPUT
Description:
Distance from Upstream XS = 19.58
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-167.99	812 0	-50.53	812 0	-22.88	812 810.5
42.47	812 810.5	99.43	812 0		

Upstream Bridge Cross Section Data
Station Elevation Data num= 156

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-901.35	819.77	-898.9	819.68	-886.47	820.26	-886.18	820.24	-885.75	820.23
-841.45	821.6	-840.12	821.56	-806.37	822.34	-785.96	823.04	-779.51	823.39
-775.49	823.42	-732.63	822.97	-727.51	822.6	-700.67	820.79	-683.4	819.64
-672.38	818.49	-645.13	814.72	-642.97	814.69	-637.35	814.47	-612.34	816.41
-601.72	817.34	-601.39	817.34	-600.17	817.07	-598.83	817.1	-597.4	817.13
-597	817.19	-559.61	816.78	-549.11	816.72	-513.33	816.58	-509.48	816.55
-501.47	816.51	-482.97	816.42	-471.22	816.35	-468.12	816.36	-441.85	816.15
-401.4	815.76	-386.25	815.51	-373.26	815.48	-338.72	815.07	-334.28	815
-307.86	814.49	-304.35	814.41	-304.01	814.45	-292.77	814.29	-291.75	814.28
-289.24	814.25	-247.02	813.5	-239.27	813.37	-229.33	813.16	-224.65	813.15
-224.32	813.11	-219.31	812.98	-213.16	812.98	-212.61	812.99	-211.09	813.02
-185.27	813.13	-169.91	812.83	-165.7	812.79	-151.41	812.7	-129.64	812.5
-109.68	812.37	-109.31	812.37	-108.95	812.36	-108.58	812.36	-108.22	812.36
-107.85	812.35	-107.49	812.35	-107.13	812.35	-106.76	812.35	-106.4	812.34
-106.04	812.34	-105.67	812.34	-105.31	812.33	-104.95	812.33	-104.59	812.33
-104.23	812.32	-103.87	812.32	-103.51	812.32	-103.15	812.32	-102.79	812.31
-102.43	812.31	-102.08	812.31	-101.72	812.3	-101.36	812.3	-101	812.3
-100.65	812.29	-100.29	812.29	-99.94	812.29	-99.58	812.29	-99.23	812.28
-98.87	812.28	-98.52	812.28	-98.16	812.27	-97.81	812.27	-97.46	812.27
-97.11	812.27	-96.75	812.26	-96.4	812.26	-96.05	812.26	-95.7	812.25
-95.35	812.25	-95	812.25	-94.65	812.24	-94.3	812.24	-93.95	812.24
-93.6	812.24	-93.25	812.23	-92.91	812.23	-92.56	812.23	-92.21	812.22
-91.87	812.22	-69.56	811.87	-68.96	811.86	-68.67	811.86	-68.37	811.85
-68.07	811.85	-67.77	811.85	-67.48	811.84	-67.18	811.84	-66.88	811.84
-64.43	811.75	-59.97	811.56	-52.47	811.16	-40.27	810.34	-37.57	810.15
-35.22	809.68	-24.96	807.08	-20.95	804.26	-14.73	800.24	-13.47	800
-6.97	799.17	-.36	799.4	0	799.4	2.38	799.36	7.84	799.97
11.93	800.16	12.41	800.45	18.41	802.84	21.85	805.15	24.59	805.51
32	807.83	33.12	808.4	33.79	808.65	34.78	808.68	36.69	808.9
48.53	811.75	50.46	811.83	176.11	811.85	190.55	814.5	192.96	815
193.65	815.27	197.2	815.43	197.28	815.43	197.36	815.43	204.13	815.64
209.81	815.78								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-901.35	.05	-35.22	.035	32	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
-35.22	32	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-901.35	-25.4	812	T
21.09	209.81	812	T

Downstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-420	816	0	-276	814	0	-24.02	812	810.5
42.47	812	810.5	46.81	812	810.5	99.43	812	0
164.68	812	0						

Downstream Bridge Cross Section Data

Station Elevation Data num= 171

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.65	831.11	-469.76	829.04	-465.75	827.61	-459.64	827.13	-454.24	826.73
-429.04	816.19	-422.12	813.11	-420.53	812.35	-394.94	809.37	-383.41	809.07
-378.05	808.85	-362.6	808.46	-337.2	807.25	-336.84	807.26	-334.9	807.26
-334.48	807.27	-333.18	807.27	-332.72	807.28	-330.79	807.28	-326.17	807.36
-325.5	807.37	-323.36	807.43	-320.98	807.49	-319.25	807.53	-318.33	807.56
-317.38	807.58	-316.39	807.61	-315.36	807.63	-312	807.72	-309.5	807.78

-308.17	807.82	-306.77	807.85	-303.76	807.93	-300.44	808.01	-296.75	808.11
-294.75	808.16	-294.61	808.16	-291.67	808.2	-291.57	808.2	-288.52	808.25
-288.31	808.25	-285.37	808.29	-285.05	808.29	-282.23	808.33	-281.79	808.34
-279.09	808.37	-278.53	808.38	-275.96	808.41	-275.27	808.42	-269.71	808.49
-268.76	808.5	-266.59	808.53	-263.48	808.56	-262.25	808.57	-260.37	808.6
-257	808.64	-254.17	808.7	-251.68	808.76	-250.54	808.79	-248.46	808.83
-247.5	808.86	-246.15	808.86	-245.27	808.88	-243.84	808.89	-243.04	808.91
-241.53	808.92	-240.81	808.93	-239.21	808.94	-238.58	808.95	-236.88	808.96
-236.35	808.97	-234.55	808.98	-234.11	808.99	-232.22	808.99	-231.87	809
-229.88	809	-229.63	809.01	-224.18	809.01	-222.72	809	-220.7	808.98
-217.89	808.96	-216.87	808.95	-216.02	808.94	-215.31	808.94	-214.7	808.93
-214.17	808.93	-213.71	808.92	-212.62	808.92	-212.33	808.91	-211.41	808.91
-211.22	808.9	-209.11	808.9	-208.41	808.91	-206.39	808.91	-205.65	808.92
-125.39	811.11	-124.94	811.11	-124.48	811.13	-124.02	811.12	-123.56	811.14
-123.11	811.13	-122.65	811.15	-122.19	811.16	-121.73	811.16	-121.27	811.17
-119.9	811.17	-119.43	811.16	-117.53	811.16	-117.06	811.15	-113.73	811.15
-113.26	811.14	-109.94	811.14	-109.46	811.13	-106.14	811.13	-105.65	811.12
-102.34	811.12	-101.85	811.11	-99.49	811.11	-99	811.1	-95.69	811.1
-95.2	811.09	-92.84	811.09	-92.34	811.08	-89.04	811.08	-88.54	811.07
-86.19	811.07	-85.69	811.06	-83.35	811.06	-82.83	811.05	-80.5	811.05
-79.98	811.04	-76.7	811.04	-76.17	811.03	-73.85	811.03	-73.32	811.02
-72.37	811.02	-72.05	810.91	-53.17	810.86	-48.44	810.69	-37.84	809.07
-30	808.33	-25.59	807.53	-22.23	806.22	-16.85	802.25	-15.05	800.91
-13.8	799.95	-13.33	799.82	-8.16	798.5	-6.82	798.57	-.39	798.8
0	798.79	1.29	798.75	6.69	799.12	8.2	799.53	13.28	800.39
15.02	801.97	21.15	805.17	21.66	805.28	26.21	805.85	26.67	805.91
30.12	807.2	37.5	809.93	37.87	810.04	38.14	810.11	39	810.16
69.62	812.05	85.89	812.92	93.96	813.4	98.67	813.65	100.06	813.69
126.28	814.65								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-477.65	.05	-22.23	.035	21.15	.05

Bank Sta: Left Right Coeff Contr. Expan.
-22.23 21.15 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-410	-126.25	812.82	F
-50	-27	811.25	T
25	50	811.25	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

BRIDGE OUTPUT Profile #100-Year

E.G. US. (ft)	812.78	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	810.75	E.G. Elev (ft)	812.66	812.48	
Q Total (cfs)	5150.00	W.S. Elev (ft)	810.36	810.32	
Q Bridge (cfs)	5150.00	Crit W.S. (ft)	808.28	808.24	
Q Weir (cfs)		Max Chl Dpth (ft)	11.19	11.82	
Weir Sta Lft (ft)		Vel Total (ft/s)	12.18	11.48	
Weir Sta Rgt (ft)		Flow Area (sq ft)	422.95	448.60	
Weir Submerg		Froude # Chl	0.64	0.61	
Weir Max Depth (ft)		Specif Force (cu ft)	4042.31	4093.05	
Min El Weir Flow (ft)	812.01	Hydr Depth (ft)	9.62	9.14	
Min El Prs (ft)	810.50	W.P. Total (ft)	51.62	57.21	
Delta EG (ft)	0.41	Conv. Total (cfs)	72975.5	78908.4	
Delta WS (ft)	0.56	Top Width (ft)	65.36	65.65	
BR Open Area (sq ft)	429.04	Frctn Loss (ft)	0.14	0.12	
BR Open Vel (ft/s)	12.18	C & E Loss (ft)	0.04	0.00	
Coef of Q		Shear Total (lb/sq ft)	2.55	2.09	
Br Sel Method	Energy only	Power Total (lb/ft s)	-901.35	-477.65	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2417.85

INPUT
Description: V
Station Elevation Data num= 171

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.65	831.11	-469.76	829.04	-465.75	827.61	-459.64	827.13	-454.24	826.73
-429.04	816.19	-422.12	813.11	-420.53	812.35	-394.94	809.37	-383.41	809.07
-378.05	808.85	-362.6	808.46	-337.2	807.25	-336.84	807.26	-334.9	807.26
-334.48	807.27	-333.18	807.27	-332.72	807.28	-330.79	807.28	-326.17	807.36
-325.5	807.37	-323.36	807.43	-320.98	807.49	-319.25	807.53	-318.33	807.56

-317.38	807.58	-316.39	807.61	-315.36	807.63	-312	807.72	-309.5	807.78
-308.17	807.82	-306.77	807.85	-303.76	807.93	-300.44	808.01	-296.75	808.11
-294.75	808.16	-294.61	808.16	-291.67	808.2	-291.57	808.2	-288.52	808.25
-288.31	808.25	-285.37	808.29	-285.05	808.29	-282.23	808.33	-281.79	808.34
-279.09	808.37	-278.53	808.38	-275.96	808.41	-275.27	808.42	-269.71	808.49
-268.76	808.5	-266.59	808.53	-263.48	808.56	-262.25	808.57	-260.37	808.6
-257	808.64	-254.17	808.7	-251.68	808.76	-250.54	808.79	-248.46	808.83
-247.5	808.86	-246.15	808.86	-245.27	808.88	-243.84	808.89	-243.04	808.91
-241.53	808.92	-240.81	808.93	-239.21	808.94	-238.58	808.95	-236.88	808.96
-236.35	808.97	-234.55	808.98	-234.11	808.99	-232.22	808.99	-231.87	809
-229.88	809	-229.63	809.01	-224.18	809.01	-222.72	809	-220.7	808.98
-217.89	808.96	-216.87	808.95	-216.02	808.94	-215.31	808.94	-214.7	808.93
-214.17	808.93	-213.71	808.92	-212.62	808.92	-212.33	808.91	-211.41	808.91
-211.22	808.9	-209.11	808.9	-208.41	808.91	-206.39	808.91	-205.65	808.92
-125.39	811.11	-124.94	811.11	-124.48	811.13	-124.02	811.12	-123.56	811.14
-123.11	811.13	-122.65	811.15	-122.19	811.16	-121.73	811.16	-121.27	811.17
-119.9	811.17	-119.43	811.16	-117.53	811.16	-117.06	811.15	-113.73	811.15
-113.26	811.14	-109.94	811.14	-109.46	811.13	-106.14	811.13	-105.65	811.12
-102.34	811.12	-101.85	811.11	-99.49	811.11	-99	811.1	-95.69	811.1
-95.2	811.09	-92.84	811.09	-92.34	811.08	-89.04	811.08	-88.54	811.07
-86.19	811.07	-85.69	811.06	-83.35	811.06	-82.83	811.05	-80.5	811.05
-79.98	811.04	-76.7	811.04	-76.17	811.03	-73.85	811.03	-73.32	811.02
-72.37	811.02	-72.05	810.91	-53.17	810.86	-48.44	810.69	-37.84	809.07
-30	808.33	-25.59	807.53	-22.23	806.22	-16.85	802.25	-15.05	800.91
-13.8	799.95	-13.33	799.82	-8.16	798.5	-6.82	798.57	-.39	798.8
0	798.79	1.29	798.75	6.69	799.12	8.2	799.53	13.28	800.39
15.02	801.97	21.15	805.17	21.66	805.28	26.21	805.85	26.67	805.91
30.12	807.2	37.5	809.93	37.87	810.04	38.14	810.11	39	810.16
69.62	812.05	85.89	812.92	93.96	813.4	98.67	813.65	100.06	813.69
126.28	814.65								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-477.65	.05	-22.23	.035	21.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-22.23	21.15	91 63.32	62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-410	-126.25	812.82	F
-50	-27	811.25	T
25	50	811.25	T

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 812.37	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.18	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 810.19	* Reach Len. (ft)	* 91.00	* 63.32	* 62.00 *
* Crit W.S. (ft)	* 808.31	* Flow Area (sq ft)	* 14.69	* 415.66	* 18.22 *
* E.G. Slope (ft/ft)	*0.004395	* Area (sq ft)	* 410.61	* 415.66	* 50.20 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 59.09	* 4990.37	* 100.54 *
* Top Width (ft)	* 327.33	* Top Width (ft)	* 265.66	* 43.38	* 18.29 *
* Vel Total (ft/s)	* 11.48	* Avg. Vel. (ft/s)	* 4.02	* 12.01	* 5.52 *

* Max Chl Dpth (ft)	*	11.69	* Hydr. Depth (ft)	*	3.08	*	9.58	*	4.73	*
* Conv. Total (cfs)	*	77680.1	* Conv. (cfs)	*	891.3	*	75272.3	*	1516.5	*
* Length Wtd. (ft)	*	68.19	* Wetted Per. (ft)	*	5.04	*	47.18	*	3.89	*
* Min Ch El (ft)	*	798.50	* Shear (lb/sq ft)	*	0.80	*	2.42	*	1.29	*
* Alpha	*	1.07	* Stream Power (lb/ft s)	*	126.28	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	106.73	*	38.91	*	63.95	*
* C & E Loss (ft)	*	0.57	* Cum SA (acres)	*	29.21	*	3.33	*	13.72	*

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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2354.53

INPUT
Description: W
Station Elevation Data num= 273

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-500.98	823.09	-475.76	815.71	-473	814.91	-469.19	814.37	-464.75	813.08
-456.29	811.56	-452.29	810.91	-442.76	810.55	-436.56	810.3	-393.36	808.35
-372.59	807.93	-360.28	807.95	-359.42	807.95	-358.55	807.96	-357.68	807.96
-356.8	807.97	-355.93	807.97	-355.05	807.98	-354.16	807.98	-353.27	807.99
-352.39	807.99	-351.49	808	-350.6	808	-349.7	808.01	-348.79	808.01
-347.89	808.02	-346.98	808.02	-346.07	808.03	-345.15	808.03	-344.24	808.04
-343.31	808.04	-342.39	808.05	-341.46	808.05	-340.53	808.06	-339.59	808.06
-338.66	808.07	-337.71	808.07	-336.77	808.08	-335.82	808.08	-334.87	808.09
-333.91	808.09	-332.96	808.1	-331.99	808.1	-331.03	808.11	-330.06	808.11
-328.11	808.13	-327.13	808.13	-326.15	808.14	-325.16	808.14	-324.17	808.15
-323.17	808.15	-322.18	808.16	-321.18	808.16	-319.16	808.18	-318.15	808.18
-317.13	808.19	-316.11	808.19	-315.09	808.2	-314.06	808.2	-311.99	808.22
-310.95	808.22	-309.91	808.23	-308.86	808.23	-307.81	808.24	-306.75	808.24
-304.63	808.26	-303.56	808.26	-302.49	808.27	-301.41	808.27	-299.25	808.29
-298.16	808.29	-295.97	808.31	-294.87	808.31	-293.77	808.32	-292.66	808.32
-290.42	808.34	-289.3	808.34	-288.17	808.35	-287.04	808.35	-284.76	808.37
-283.62	808.37	-281.32	808.39	-280.16	808.39	-277.83	808.41	-276.65	808.41
-274.29	808.43	-273.11	808.43	-270.72	808.45	-269.52	808.45	-267.1	808.47
-265.89	808.47	-262.33	808.5	-261.12	808.5	-256.41	808.54	-255.17	808.54
-254.04	808.55	-253.97	808.55	-252.85	808.56	-252.78	808.56	-251.67	808.57
-251.59	808.57	-250.48	808.58	-249.3	808.58	-249.21	808.59	-248.02	808.59
-246.93	808.6	-246.82	808.6	-245.75	808.61	-245.63	808.61	-244.57	808.62
-243.51	808.62	-242.47	808.63	-242.34	808.63	-241.3	808.64	-241.16	808.64
-240.14	808.65	-239.98	808.65	-238.97	808.66	-237.62	808.66	-236.64	808.67
-236.45	808.67	-235.47	808.68	-235.27	808.68	-234.3	808.69	-233.14	808.69
-232.91	808.7	-231.73	808.7	-230.81	808.71	-230.56	808.71	-229.65	808.72

-229.38	808.72	-228.49	808.73	-227.33	808.73	-227.02	808.74	-225.84	808.74
-225.01	808.75	-224.67	808.75	-223.85	808.76	-223.49	808.76	-222.69	808.77
-221.54	808.77	-221.13	808.78	-219.96	808.78	-219.23	808.79	-218.78	808.79
-218.08	808.8	-216.93	808.8	-216.42	808.81	-215.78	808.81	-215.24	808.82
-214.07	808.82	-213.5	808.83	-212.89	808.83	-212.36	808.84	-211.22	808.84
-210.53	808.85	-210.09	808.85	-209.35	808.86	-208.18	808.86	-207.84	808.87
-206.72	808.87	-205.82	808.88	-205.62	808.88	-204.64	808.89	-204.51	808.89
-203.46	808.9	-201.16	808.9	-200.9	808.91	-198.19	808.91	-198.07	808.92
-196.33	808.92	-196.11	808.93	-194.44	808.93	-194.08	808.94	-192.3	808.94
-191.74	808.95	-190.43	808.95	-189.66	808.96	-189.04	808.96	-187.97	808.97
-187.81	808.97	-186.47	808.98	-186.13	808.98	-184.95	808.99	-184.44	808.99
-183.41	809	-182.76	809	-181.85	809.01	-181.07	809.01	-180.28	809.02
-179.38	809.02	-178.69	809.03	-177.7	809.03	-177.1	809.04	-176.01	809.04
-175.49	809.05	-174.33	809.05	-173.88	809.06	-172.64	809.07	-172.26	809.07
-170.96	809.08	-170.64	809.08	-169.27	809.09	-169.01	809.09	-167.59	809.1
-167.37	809.1	-165.9	809.11	-165.74	809.11	-164.22	809.12	-164.1	809.12
-162.53	809.13	-162.45	809.13	-159.16	809.15	-158.92	809.15	-158.11	809.16
-157.18	809.16	-156.25	809.17	-155.32	809.17	-153.5	809.19	-152.59	809.19
-151.7	809.2	-150.81	809.2	-149.92	809.21	-143.84	809.14	-140.97	809.14
-139.56	809.13	-131.4	809.13	-130.09	809.12	-122.5	809.12	-121.28	809.11
-113.06	809.11	-111.93	809.1	-103.26	809.1	-102.22	809.09	-94.24	809.09
-93.28	809.08	-72.9	809.08	-53.64	808.83	-53.3	808.83	-42.92	808.79
-36.84	808.13	-23.47	806.92	-19.51	804.16	-12.79	800.05	-10.78	799.14
-7.5	798.07	-3.16	797.95	-.23	798.13	0	798.16	7.77	799.04
12.76	799.53	14.53	799.99	19.12	802.85	22.1	804.84	29.43	805.45
40.13	805.82	47.52	806.56	48.05	806.59	49.68	806.84	53.14	806.92
59.06	807.23	74.02	807.96	88.07	809.49	111.46	811.68	126.83	812.75
130.88	812.86	132.22	812.98	148.01	813.9	183.36	815.24	188.34	815.39
189.8	815.43	195.35	815.57	196.04	814.68				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-500.98	.05	-23.47	.035	22.1	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-23.47	22.1	144	48.15	69	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.42	Reach Len. (ft)	144.00	48.15	69.00
Crit W.S. (ft)		Flow Area (sq ft)	1139.60	501.41	313.18
E.G. Slope (ft/ft)	0.000765	Area (sq ft)	1139.60	501.41	313.18
Q Total (cfs)	5150.00	Flow (cfs)	1788.37	2756.24	605.40
Top Width (ft)	564.11	Top Width (ft)	431.96	45.57	86.58
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	1.57	5.50	1.93
Max Chl Dpth (ft)	13.47	Hydr. Depth (ft)	2.64	11.00	3.62
Conv. Total (cfs)	186150.3	Conv. (cfs)	64641.7	99626.1	21882.6
Length Wtd. (ft)	85.67	Wetted Per. (ft)	432.16	49.52	86.87

* Min Ch El (ft)	* 797.95	* Shear (lb/sq ft)	* 0.13	* 0.48	* 0.17	*	
* Alpha	* 2.51	* Stream Power (lb/ft s)	* 196.04	* 0.00	* 0.00	*	
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 105.11	* 38.24	* 63.69	*	
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 28.48	* 3.27	* 13.65	*	

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2306.38

INPUT
Description: X
Station Elevation Data num= 140

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-600	815.04	-596.19	813.22	-584.78	812.21	-583.55	812.22	-579.05	812
-578.87	811.96	-558.88	811.42	-541.39	811.12	-534.26	811.07	-528.51	810.88
-490.74	810.6	-487.37	810.58	-487.09	810.57	-483.51	810.51	-442.65	810.06
-413.39	808.76	-404	808.13	-396.13	807.99	-392.09	807.99	-391.95	808
-390.23	808	-390.08	808.01	-388.39	808.01	-388.23	808.02	-386.4	808.02
-386.23	808.03	-384.64	808.03	-384.45	808.04	-382.75	808.04	-382.56	808.05
-380.95	808.05	-380.74	808.06	-379.03	808.06	-378.81	808.07	-376.99	808.07
-376.75	808.08	-375.31	808.08	-375.06	808.09	-373.27	808.09	-373.01	808.1
-371.39	808.1	-371.11	808.11	-369.69	808.11	-369.4	808.12	-270.12	808.39
-269.44	808.39	-268.76	808.4	-268.07	808.4	-267.39	808.41	-266.7	808.41
-266	808.42	-265.31	808.42	-264.61	808.43	-263.21	808.43	-262.51	808.44
-261.8	808.44	-261.09	808.45	-260.38	808.45	-259.66	808.46	-258.94	808.46
-258.22	808.47	-257.5	808.47	-256.77	808.48	-256.04	808.48	-255.31	808.49
-254.57	808.49	-253.84	808.5	-252.35	808.5	-251.61	808.51	-250.86	808.51
-250.1	808.52	-249.35	808.52	-248.59	808.53	-247.83	808.53	-247.07	808.54
-246.3	808.54	-245.53	808.55	-244.76	808.55	-243.98	808.56	-243.2	808.56
-242.42	808.57	-241.63	808.57	-240.85	808.58	-240.05	808.58	-239.26	808.59
-238.46	808.59	-237.66	808.6	-221.08	808.63	-194.05	808.39	-190.81	808.4
-189.5	808.43	-176.68	808.62	-165.82	808.85	-165.44	808.85	-165.05	808.86
-163.92	808.86	-163.54	808.87	-162.06	808.87	-161.7	808.88	-160.61	808.88
-67.79	807.94	-61.68	807.94	-61.46	807.95	-55.48	807.95	-55.3	807.96
-53.7	807.96	-46.53	807.87	-42.07	807.83	-25.4	807	-23.53	805.77
-14.98	799.89	-14.31	799.59	-10.39	798.34	-9.53	798.4	-4.34	798.44
0	798.76	2.37	798.93	3.33	799.04	3.92	799.19	9.66	800.26
13.12	802.38	17.84	805.01	36.45	805.24	44.58	806.39	58.79	806.64
63.08	806.74	90.19	807.54	99.16	807.86	114.68	808.3	122.11	808.58
141.52	810.58	154.18	811.63	158.79	812.07	163.4	812.37	166.83	812.49
196.42	813.78	204.95	814.18	207.15	814.28	209.93	814.36	240.28	815.28

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-600	.05	-25.4	.035	17.84	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-25.4	17.84	90	51.84	42	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	* 811.61	* Element	* Left OB	* Channel *

Right OB											
Vel Head (ft)		0.19	Wt. n-Val.		0.050		0.035		0.050		
W.S. Elev (ft)		811.41	Reach Len. (ft)		90.00		51.84		42.00		
Crit W.S. (ft)			Flow Area (sq ft)		1350.08		461.15		515.34		
E.G. Slope (ft/ft)		0.000652	Area (sq ft)		1350.08		461.15		515.34		
Q Total (cfs)		5150.00	Flow (cfs)		1902.96		2287.16		959.88		
Top Width (ft)		710.15	Top Width (ft)		533.17		43.24		133.74		
Vel Total (ft/s)		2.21	Avg. Vel. (ft/s)		1.41		4.96		1.86		
Max Chl Dpth (ft)		13.07	Hydr. Depth (ft)		2.53		10.66		3.85		
Conv. Total (cfs)		201699.7	Conv. (cfs)		74529.4		89576.5		37593.8		
Length Wtd. (ft)		65.15	Wetted Per. (ft)		533.27		47.12		134.00		
Min Ch El (ft)		798.34	Shear (lb/sq ft)		0.10		0.40		0.16		
Alpha		2.51	Stream Power (lb/ft s)		240.28		0.00		0.00		
Frctn Loss (ft)		0.04	Cum Volume (acre-ft)		101.00		37.71		63.04		
C & E Loss (ft)		0.02	Cum SA (acres)		26.88		3.22		13.48		

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2254.54

INPUT
Description: Y
Station Elevation Data num= 228

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-710.8	813.44	-709.97	813.28	-708.61	813.03	-707.74	812.99	-702.01	812.28
-700	811.99	-699.21	811.96	-699.07	811.96	-686.39	811.6	-681.01	811.55
-658.05	811.53	-637	811.35	-632.92	811.32	-619.88	810.88	-619.82	810.63
-610.1	808.98	-609.64	808.98	-609.18	808.97	-607.32	808.97	-606.84	808.96
-605.42	808.96	-604.93	808.95	-603.67	808.96	-603.19	808.97	-602.19	808.97
-601.67	808.98	-601.18	808.98	-600.67	808.99	-600.17	808.99	-599.67	809
-599.16	809	-598.66	809.01	-598.16	809.01	-597.66	809.02	-597.15	809.02
-595.66	809.05	-595.17	809.05	-593.69	809.08	-593.22	809.08	-592.71	809.09
-592.25	809.1	-591.73	809.11	-591.28	809.11	-590.76	809.12	-590.31	809.13
-589.23	809.15	-588.85	809.16	-588.28	809.17	-587.9	809.17	-587.32	809.18
-586.95	809.19	-586.37	809.2	-586	809.21	-585.41	809.21	-583.55	809.24
-582.89	809.26	-582.25	809.27	-579.5	809.33	-579.19	809.34	-578.43	809.36
-578.14	809.37	-577.37	809.4	-577.08	809.4	-576.3	809.43	-576	809.44
-575.19	809.46	-574.91	809.47	-574.09	809.49	-573.57	809.51	-572.68	809.53
-572.44	809.54	-571.59	809.57	-571.36	809.57	-570.49	809.6	-570.28	809.6
-569.39	809.63	-569.2	809.64	-568.29	809.66	-568.11	809.67	-567.18	809.7
-567.02	809.7	-566.07	809.73	-565.93	809.73	-564.96	809.76	-564.84	809.76
-563.85	809.79	-563.74	809.8	-562.74	809.83	-562.65	809.83	-561.62	809.86
-561.55	809.86	-560.51	809.89	-560.45	809.89	-559.39	809.92	-558.26	809.96
-558.14	809.96	-557.05	809.99	-556.82	810	-556	810	-554.99	810.01

-553.02	810.01	-552.06	810.02	-551.11	810.02	-543.84	810	-501.31	810
-501.07	809.99	-499.91	809.97	-498.78	809.94	-497.68	809.92	-496.71	809.9
-495.76	809.87	-494.82	809.85	-494.24	809.85	-493.22	809.82	-493.12	809.82
-492.13	809.79	-491.86	809.78	-490.87	809.75	-489.9	809.73	-488.97	809.7
-488.8	809.7	-487.94	809.67	-487.75	809.67	-486.9	809.65	-486.7	809.64
-485.87	809.62	-485.65	809.62	-484.82	809.6	-484.59	809.59	-483.78	809.57
-483.54	809.57	-482.73	809.55	-482.48	809.54	-481.69	809.52	-481.41	809.52
-480.63	809.5	-480.55	809.5	-480.26	809.49	-479.63	809.49	-479.33	809.48
-478.73	809.48	-478.42	809.47	-477.54	809.45	-477.22	809.44	-476.36	809.42
-476.02	809.41	-475.18	809.39	-474.82	809.39	-474	809.36	-473.62	809.36
-472.82	809.33	-472.36	809.33	-470.39	809.28	-469.96	809.28	-469.2	809.26
-468.76	809.25	-468.02	809.23	-467.57	809.23	-446.83	808.86	-445.12	808.82
-443.57	808.78	-442.84	808.76	-442.78	808.76	-423.48	808.33	-423.16	808.32
-422.85	808.32	-422.26	808.3	-421.99	808.3	-411.23	808	-355.26	808
-305.73	808.14	-305.47	808.15	-304.16	808.15	-303.9	808.16	-302.55	808.16
-302.28	808.17	-301.17	808.17	-300.89	808.18	-299.47	808.18	-299.19	808.19
-298.02	808.19	-297.73	808.2	-296.54	808.2	-296.23	808.21	-295.01	808.21
-294.7	808.22	-293.45	808.22	-293.13	808.23	-252.94	808.31	-239.24	808.19
-207.69	808.26	-176.3	808.43	-167.71	808.62	-50.35	807.51	-26.21	806.95
-22.65	804.84	-15.41	799.87	-12.68	798.81	-11.48	798.53	-7.82	799.05
-5.45	799.34	-.27	799.85	0	799.86	1.79	799.91	8.44	800.17
10.39	800.27	12.02	801.53	18.58	804.69	33.45	805.08	33.64	805.09
33.75	805.11	41.59	806.49	61.29	806.74	63.84	806.78	69.72	806.8
99.43	807.45	99.94	807.47	126.43	807.87	140.95	808.4	142.39	808.43
163.62	809.25	175.01	810.36	176.19	810.47	193.42	812.18	221.23	813.76
226.1	814.12	234.24	814.56	253.92	815.17				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-710.8	.05	-26.21	.035	18.58	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.21	18.58	90	50	45	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.55	* Element	* Left OB	* Channel	* Right OB	*			
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.050	* 0.035	* 0.050	*			
* W.S. Elev (ft)	* 811.43	* Reach Len. (ft)	* 90.00	* 50.00	* 45.00	*			
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 1716.10	* 463.27	* 637.89	*			
* E.G. Slope (ft/ft)	*0.000478	* Area (sq ft)	* 1716.10	* 463.27	* 637.89	*			
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2198.84	* 1940.01	* 1011.15	*			
* Top Width (ft)	* 831.78	* Top Width (ft)	* 619.75	* 44.79	* 167.25	*			
* Vel Total (ft/s)	* 1.83	* Avg. Vel. (ft/s)	* 1.28	* 4.19	* 1.59	*			
* Max Chl Dpth (ft)	* 12.90	* Hydr. Depth (ft)	* 2.77	* 10.34	* 3.81	*			
* Conv. Total (cfs)	*235439.5	* Conv. (cfs)	*100523.2	* 88690.2	* 46226.1	*			
* Length Wtd. (ft)	* 68.68	* Wetted Per. (ft)	* 620.15	* 48.38	* 167.52	*			
* Min Ch El (ft)	* 798.53	* Shear (lb/sq ft)	* 0.08	* 0.29	* 0.11	*			
* Alpha	* 2.33	* Stream Power (lb/ft s)	* 253.92	* 0.00	*				

```
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   97.83  *   37.16  *
  62.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   25.69  *    3.17  *
  13.33  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2204.54

INPUT
Description: Z
Station Elevation Data    num=     165
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -920.1  820.14 -896.19  814.15 -895.12  814.33 -893.31  813.88 -892.86  813.34
 -892.27   813.3 -892.03  813.32 -876.99  813.58 -876.65  813.55 -876.47  813.56
 -876.24  813.54 -872.18  813.51 -870.87  813.28 -869.03  813.08 -868.31  812.86
 -855.14  813.35 -849.65  813.23  -812.3  812.37 -806.56  812.06 -779.56   810.8
 -766.96   810.5 -766.64  810.49 -765.57  810.49  -765.2  810.48 -764.43  810.48
 -764.03  810.47 -763.26  810.47 -762.89  810.46 -761.51  810.46 -758.71  810.45
 -757.65  810.45  -757.1  810.44 -756.54  810.44 -755.96  810.43 -755.35  810.43
 -736.34  810.09 -727.76     810 -724.67     810 -723.11  809.93 -722.72   809.9
 -720.45  809.79 -720.19  809.78 -718.07  809.67 -715.71  809.55 -715.15  809.52
 -713.35  809.43    -711   809.3 -710.14  809.25 -708.66  809.18 -707.65  809.11
 -706.33  809.05 -705.16  808.97 -704.01  808.91 -702.67  808.83  -701.7  808.78
  -700.2  808.68  -699.4  808.64 -695.15  808.37 -694.71  808.35 -692.62  808.21
 -690.13  808.04 -689.45     808  -685.9  807.81 -682.12   807.6 -679.11  807.44
 -677.88  807.38 -671.69  807.04 -669.67  806.94 -668.04  806.85 -665.59  806.72
 -664.32  806.65 -661.42   806.5  -657.4  806.28 -657.06  806.27 -656.63  806.24
 -652.82  806.04 -652.75  806.04 -652.03     806 -593.71     806 -593.13  806.02
 -588.37   806.2  -584.4  806.36 -581.06  806.48 -573.44  806.78 -573.35  806.78
 -572.14  806.82 -570.81  806.86 -569.34   806.9 -567.72  806.95 -565.91     807
 -558.99  807.21 -557.23  807.27 -555.81  807.33 -554.58  807.37 -553.51  807.41
 -552.56  807.45 -551.72  807.48 -550.97  807.51  -550.3  807.53 -550.16  807.53
 -549.52  807.56 -548.94  807.58 -548.41   807.6 -547.93  807.62 -547.49  807.63
 -547.14  807.65 -546.81  807.66 -546.51  807.67 -546.19  807.68 -545.62   807.7
 -545.36  807.71 -536.11     808 -297.24     808  -281.9  808.03 -280.46  808.02
 -277.08  808.03 -262.39  808.11 -202.84  808.29 -173.64   807.9  -170.7  807.89
  -159.9   807.7 -148.14  807.54 -117.32  807.28   -93.7  807.48  -78.23  807.81
  -46.46  808.15  -36.05  807.73  -24.39  806.89  -16.87  802.56  -12.29   799.9
  -10.83  799.57    -3.6  798.81    -.66  799.18       0  799.22    5.47  799.58
    7.65  799.65    9.47  799.75   15.49  800.09   17.16  801.36   19.95  804.35
    25.2   804.7   29.78  804.99   36.45  806.08   39.89  806.63   55.27  806.92
   59.82  806.89   85.88  806.81  100.95  807.11  118.08  807.56  134.44  807.79
  136.61  807.85  149.16  807.76  170.32  807.81  189.32  808.47  190.53  808.49
   191.3  808.57  191.95  808.65  200.96  809.38   215.3  810.83  226.77  812.05
  229.06  812.33  231.06  812.53  233.55  812.84  257.98  814.32  265.36  814.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -920.1     .05  -24.39    .035   19.95     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -24.39   19.95               74      50      44            .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
*******************************************************************************
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* E.G. Elev (ft)	* 811.50	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.45	* Reach Len. (ft)	* 74.00	* 50.00	* 44.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 2694.89	* 472.35	* 781.30 *
* E.G. Slope (ft/ft)	*0.000238	* Area (sq ft)	* 2694.89	* 472.35	* 781.30 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2847.99	* 1418.52	* 883.49 *
* Top Width (ft)	* 1014.70	* Top Width (ft)	* 769.16	* 44.34	* 201.20 *
* Vel Total (ft/s)	* 1.30	* Avg. Vel. (ft/s)	* 1.06	* 3.00	* 1.13 *
* Max Chl Dpth (ft)	* 12.64	* Hydr. Depth (ft)	* 3.50	* 10.65	* 3.88 *
* Conv. Total (cfs)	*334015.7	* Conv. (cfs)	*184713.3	* 92001.5	* 57300.9 *
* Length Wtd. (ft)	* 61.87	* Wetted Per. (ft)	* 769.38	* 48.07	* 201.53 *
* Min Ch El (ft)	* 798.81	* Shear (lb/sq ft)	* 0.05	* 0.15	* 0.06 *
* Alpha	* 1.95	* Stream Power (lb/ft s)	* 265.36	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 93.28	* 36.62	* 61.75 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 24.26	* 3.11	* 13.14 *

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2154.54

INPUT
Description: AA
Station Elevation Data num= 240

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1050.25	820.63	-1046.01	819.69	-1013.47	813.55	-1012.08	813.09	-1010.95	813.03
-1007.66	812.6	-1006.09	811.8	-1005.58	811.43	-1004.49	811.76	-1001.75	812.04
-989.06	811.69	-985.15	811.91	-983.65	811.94	-979.51	811.82	-936.54	810.46
-928.74	810.18	-887.18	809.85	-877.57	809.89	-877.45	809.89	-874.23	809.92
-873.47	809.93	-872.44	809.95	-870.94	809.97	-868.31	810	-868.11	810
-866.76	809.98	-862.23	809.89	-861.9	809.89	-860.39	809.86	-840.5	809.5
-840.11	809.5	-839.76	809.49	-839.4	809.49	-839.03	809.48	-838.65	809.48
-838.27	809.47	-837.88	809.47	-837.48	809.46	-837.07	809.46	-836.64	809.45
-836.21	809.45	-835.29	809.43	-834.8	809.43	-834.3	809.42	-791.76	808.77
-791.35	808.77	-790.71	808.76	-790.31	808.76	-789.67	808.75	-789.27	808.75
-788.62	808.74	-788.23	808.74	-787.57	808.73	-787.19	808.73	-786.53	808.72
-786.15	808.72	-785.48	808.71	-785.12	808.71	-784.44	808.7	-784.08	808.7
-783.41	808.69	-782.8	808.69	-782.12	808.68	-781.77	808.68	-781.08	808.67
-780.73	808.67	-780.03	808.66	-779.69	808.66	-778.99	808.65	-778.65	808.65
-777.94	808.64	-777.61	808.64	-776.89	808.63	-776.56	808.63	-775.85	808.62
-775.52	808.62	-774.8	808.61	-774.49	808.61	-773.76	808.6	-773.45	808.59
-772.71	808.58	-772.41	808.58	-771.67	808.57	-771.38	808.57	-770.63	808.56
-770.34	808.56	-769.59	808.55	-769.3	808.55	-768.54	808.54	-768.27	808.54

-755.87	808.33	-754.97	808.31	-754.81	808.31	-753.89	808.29	-753.74	808.29
-752.82	808.27	-752.67	808.27	-751.74	808.25	-751.61	808.25	-750.66	808.23
-750.54	808.23	-749.59	808.21	-749.47	808.21	-748.51	808.19	-748.41	808.18
-747.01	808.18	-746.94	808.17	-745.76	808.17	-745.04	808.16	-744.9	808.16
-737.16	808	-722.98	808	-705.02	807.3	-704.02	807.25	-701.59	807.16
-700.41	807.1	-697	806.95	-695.48	806.88	-693.78	806.81	-692.11	806.73
-690.19	806.63	-688.92	806.58	-687.86	806.53	-686.95	806.5	-680.97	806.2
-677.18	806.02	-676.84	806	-628.87	806	-624.75	806.11	-623.33	806.14
-621.96	806.18	-621.8	806.18	-619.64	806.26	-617.64	806.32	-615.79	806.38
-613.24	806.47	-612.44	806.5	-612.16	806.5	-611.37	806.52	-611.08	806.53
-610.3	806.55	-610	806.55	-609.26	806.58	-608.94	806.58	-608.55	806.59
-607.55	806.62	-607.22	806.62	-606.55	806.64	-606.21	806.64	-605.55	806.66
-605.2	806.67	-604.55	806.68	-604.19	806.69	-603.55	806.7	-603.18	806.71
-602.55	806.72	-602.16	806.73	-601.54	806.74	-601.12	806.74	-600.5	806.76
-600.1	806.76	-599.49	806.78	-599.08	806.78	-598.48	806.8	-597.21	806.8
-586.51	807.05	-585.97	807.05	-585.09	807.07	-584.53	807.07	-584.1	807.08
-583.54	807.08	-583.12	807.09	-582.51	807.09	-582.08	807.1	-581.52	807.1
-581.1	807.11	-580.52	807.11	-580.11	807.12	-579.13	807.12	-578.55	807.13
-577.56	807.13	-576.79	807.15	-576.19	807.15	-575.81	807.16	-574.83	807.16
-574.23	807.17	-573.24	807.17	-572.87	807.18	-572.26	807.18	-570.36	807.19
-569.13	807.19	-543.02	808	-182.12	808	-177.95	807.96	-177.84	807.96
-139.2	807.49	-77.02	808.07	-43.93	808.02	-37.15	807.53	-21.68	806.24
-11.01	799.74	-10.69	799.54	-10.59	799.52	-5.56	798.6	-5.29	798.62
3.35	798.83	3.54	798.82	12.36	799.3	12.69	799.28	17.23	800.15
17.56	800.21	18.08	800.51	22.06	801.88	28.84	804.5	30.21	804.68
31.01	804.81	38.21	806.5	53.53	806.9	56.01	806.89	83.27	805.56
90.16	805.89	97.72	805.35	98.09	805.33	98.41	805.31	119.58	805.49
134.35	805.66	139.08	805.15	140.47	805.07	142.84	805.35	145.72	805.7
173.74	807.13	185.9	807.67	200.7	808.17	219.31	808.96	227.19	809.44
230.22	809.96	238.42	810.98	255.45	812.86	266.7	813.74	275.06	814.33

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1050.25	.05	-21.68	.035	38.21	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-21.68	38.21	63	48.8	47	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.45	Reach Len. (ft)	63.00	48.80	47.00
Crit W.S. (ft)		Flow Area (sq ft)	3175.11	602.83	927.02
E.G. Slope (ft/ft)	0.000164	Area (sq ft)	3175.11	602.83	927.02
Q Total (cfs)	5150.00	Flow (cfs)	2707.61	1477.29	965.10
Top Width (ft)	1210.67	Top Width (ft)	946.29	59.89	204.48
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)	0.85	2.45	1.04
Max Chl Dpth (ft)	12.85	Hydr. Depth (ft)	3.36	10.07	4.53
Conv. Total (cfs)	402223.1	Conv. (cfs)	211468.4	115378.5	75376.2
Length Wtd. (ft)	56.27	Wetted Per. (ft)	946.50	62.98	

```
 204.84  *
* Min Ch El (ft)          *  798.60  * Shear (lb/sq ft)        *    0.03  *    0.10  *
   0.05  *
* Alpha                   *    1.93  * Stream Power (lb/ft s) *  275.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   *   88.29  *   36.00  *
  60.88  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   22.80  *    3.05  *
  12.94  *
*******************************************************************************
***********

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2105.74

INPUT
Description: BB
Station Elevation Data    num=     200
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
-1284.71   828.4-1264.69  825.28-1263.81  824.96-1255.01  824.13-1251.56  823.73
-1212.64  819.73-1195.99   817.6-1171.48  814.52-1154.57  811.39-1154.51  811.39
-1152.14  811.04-1146.22  810.54-1138.02  810.11-1130.04  809.79-1118.28  809.73
-1102.85  809.11 -1094.7  808.94-1092.67  808.85-1081.42  809.01 -1046.4  808.93
-1040.72  808.97-1038.97  808.94-1035.49  808.84 -992.45  809.89 -987.58     810
  -938.5     810 -913.54  809.72 -907.64   809.6 -907.57   809.6 -906.11  809.58
 -904.69  809.55 -898.14  809.45 -895.76  809.41 -894.62   809.4 -891.36  809.34
 -890.32  809.33 -890.09  809.32 -889.08  809.31 -887.57  809.28 -887.02  809.28
 -886.05  809.26 -885.48  809.25 -884.53  809.24 -883.95  809.23 -883.02  809.21
 -882.41   809.2  -881.5  809.19 -880.88  809.18 -867.82  808.94 -866.93  808.93
 -865.98  808.91 -865.12   808.9 -864.15  808.88 -863.32  808.86 -862.31  808.84
 -861.52  808.83 -860.39  808.81 -859.63   808.8 -858.47  808.77 -857.74  808.76
 -856.55  808.74 -855.85  808.73 -854.63   808.7 -853.97  808.69  -852.7  808.66
 -852.56  808.66 -850.64  808.63  -849.3   808.6 -848.72  808.59 -847.34  808.56
 -846.81  808.55 -843.44  808.48 -842.97  808.48 -841.48  808.45 -841.06  808.44
 -840.69  808.43 -840.29  808.42 -839.89  808.42 -839.51  808.41 -839.14  808.41
 -838.43  808.39 -838.09  808.39 -837.76  808.38 -837.69  808.38 -832.66   808.3
 -831.42  808.27 -827.51  808.21 -826.14  808.18 -823.27  808.14 -823.16  808.13
  -821.7  808.11 -821.62  808.11 -820.13  808.08 -820.07  808.08 -818.57  808.06
 -815.34     808 -742.79     808 -655.57  806.72 -655.26  806.72 -654.72  806.74
 -654.43  806.75 -654.15  806.75  -645.4  807.05 -644.35  807.05 -643.86  807.06
 -640.51  807.06 -640.44  807.07 -638.73   807.1 -638.13  807.12 -636.88  807.14
 -636.24  807.16 -635.57  807.17 -634.89  807.19  -634.2   807.2 -632.75  807.24
 -631.09  807.27 -620.02  807.57 -619.11   807.6 -618.17  807.62  -617.2  807.65
  -614.9  807.71 -612.76  807.75 -610.73  807.81 -610.24  807.81 -610.12  807.82
 -609.89  807.82 -602.84     808 -143.09     808 -135.89  807.88 -134.92  807.87
 -134.16  807.85 -134.09  807.85 -127.27  807.75 -115.54  807.75 -111.92  807.81
 -109.05  807.88 -107.52  807.88 -106.87  807.89 -105.45  807.89 -104.68   807.9
 -103.86   807.9 -102.99  807.91 -101.07  807.91  -90.85  807.94   -89.1  807.94
  -77.29  807.99  -69.47  807.99   -68.7     808  -60.94     808  -60.01  807.99
  -57.27  807.99  -55.07  807.82  -38.23  806.81   -35.2  806.61  -34.55   806.6
  -34.29  806.56  -33.82  806.54  -19.98   805.6     -19  805.03   -11.8  800.15
   -7.71   799.5   -5.17  799.19       0  799.12     1.4  799.11    4.01  798.92
   10.22  798.03   12.53  797.84   16.97   798.1   18.46  798.17   19.54   798.4
    23.6   799.5   26.39  801.64   29.68  803.93   34.42   805.9   38.23  806.07
   42.74   806.3   47.09  806.22   62.78  806.13   63.27  806.12   63.62  806.12
   64.44  806.15   83.44  806.15   91.23  806.63   94.72   806.8  100.52  806.83
  132.42  807.25  132.77  807.26  132.86  807.26  133.05  807.27  173.39  808.66
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193.45	809.45	210.92	809.38	236.84	810.04	248.49	810.08	253.06	810.27
259.03	810.45	272.22	811.95	279.37	812.68	292.07	813.79	296.17	814.12

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1284.71	.05	-19.98	.035	34.42	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.98	34.42	190 202.35	215	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.44	Reach Len. (ft)	190.00	202.35	215.00
Crit W.S. (ft)		Flow Area (sq ft)	3580.46	607.09	785.29
E.G. Slope (ft/ft)	0.000162	Area (sq ft)	3580.46	607.09	785.29
Q Total (cfs)	5150.00	Flow (cfs)	2915.42	1567.16	667.43
Top Width (ft)	1422.57	Top Width (ft)	1134.86	54.40	233.31
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)	0.81	2.58	0.85
Max Chl Dpth (ft)	13.60	Hydr. Depth (ft)	3.15	11.16	3.37
Conv. Total (cfs)	404275.0	Conv. (cfs)	228860.2	123021.9	52392.9
Length Wtd. (ft)	196.94	Wetted Per. (ft)	1135.09	58.22	233.45
Min Ch El (ft)	797.84	Shear (lb/sq ft)	0.03	0.11	0.03
Alpha	2.33	Stream Power (lb/ft s)	296.17	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	83.40	35.33	59.96
C & E Loss (ft)	0.01	Cum SA (acres)	21.29	2.99	12.70

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1903.41

INPUT
Description: CC
Station Elevation Data num= 299

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1413.08	816.72	-1407.17	816.44	-1397.75	816.01	-1388.84	815.67	-1377.66	815.3
-1366.03	814.77	-1359.93	814.45	-1351.29	814.1	-1335.15	813.35	-1330.71	813.1
-1329.95	813.06	-1327.67	812.99	-1311.67	812.18	-1308.35	812.07	-1306.25	810.9
-1302.09	807.29	-1301.39	807.14	-1295.3	807.3	-1292.12	807.21	-1288.74	807.57
-1286.35	807.86	-1281.48	808.5	-1273.69	809.7	-1271.01	810.13	-1270.85	810.19

-1265.96	810.47	-1263.08	810.63	-1256.33	810.92	-1254.83	810.96
-1254.52	810.97	-1250.44	811.04	-1235.5	811.18	-1232.76	811.29
-1226.9	811.26	-1221.86	811.26	-1192.42	811.42	-1178.27	811.68
-1173.41	811.87	-1164.4	811.94	-1147.89	811.78	-1132.78	811.57
-1120.92	811.3	-1104.29	810.83	-1092.34	809.98	-1084.47	809.39
-1078.79	809.03	-1060.74	808.69	-1034.31	808.1	-1002.08	807.01
-988.32	806.88	-983.24	806.72	-979.96	806.54	-962.01	805.21
-957.69	804.98	-957.01	805.11	-947.73	806.94	-947.71	807.06
-945.84	807.99	-944.47	807.48	-858.15	808	-799.47	808
-736.49	807.13	-689.04	806.61	-688.74	806.61	-628.45	806.52
-628.28	806.53	-628.11	806.53	-627.93	806.54	-627.75	806.54
-627.57	806.55	-627.38	806.55	-627.19	806.56	-627	806.56
-626.8	806.57	-626.6	806.57	-626.4	806.58	-626.19	806.59
-625.97	806.59	-625.76	806.6	-625.53	806.6	-625.31	806.61
-625.07	806.62	-624.83	806.62	-624.59	806.63	-624.07	806.65
-623.81	806.65	-623.55	806.66	-622.7	806.69	-622.41	806.69
-621.8	806.71	-620.81	806.74	-619.38	806.78	-618.6	806.8
-618.2	806.82	-616.86	806.85	-616.41	806.87	-615.45	806.89
-614.95	806.91	-614.43	806.92	-613.34	806.96	-612.77	806.97
-611.56	807.01	-610.92	807.02	-609.58	807.06	-608.87	807.08
-608.13	807.11	-607.36	807.13	-606.49	807.15	-605.65	807.18
-604.78	807.2	-602.91	807.26	-601.92	807.28	-587.74	807.73
-586.05	807.79	-584.26	807.85	-582.34	807.91	-580.28	807.98
-579.52	808	-497.85	808	-489.92	807.75	-488.12	807.69
-484.48	807.58	-483.72	807.56	-482.13	807.51	-481.69	807.5
-480.17	807.45	-479.66	807.44	-478.21	807.4	-477.65	807.38
-476.26	807.34	-475.65	807.32	-474.32	807.28	-473.66	807.27
-472.47	807.23	-471.77	807.21	-468.8	807.13	-468	807.11
-466.97	807.08	-466.13	807.06	-465.15	807.03	-464.11	807.01
-461.88	806.95	-459.38	806.89	-458.02	806.86	-456.71	806.82
-455.33	806.79	-453.87	806.75	-452.92	806.72	-451.38	806.69
-450.52	806.66	-448.13	806.6	-440.76	806.39	-439.42	806.36
-439.1	806.35	-436.3	806.29	-431.15	806.17	-427.32	806.09
-425.27	806.04	-423.45	806	-374	806	-373.56	806.01
-372.23	806.02	-370.93	806.04	-369.65	806.05	-368.39	806.07
-367.15	806.08	-365.72	806.1	-365.57	806.1	-358.39	806.22
-357.27	806.23	-354.06	806.29	-342.7	806.44	-335.04	806.52
-334.69	806.53	-333.81	806.54	-333.44	806.55	-332.57	806.57
-332.19	806.57	-331.34	806.59	-330.94	806.59	-330.1	806.61
-329.69	806.61	-328.43	806.64	-327.61	806.65	-327.35	806.66
-326.9	806.66	-326.02	806.68	-325.56	806.68	-324.69	806.7
-324.22	806.71	-323.37	806.72	-322.88	806.73	-322.04	806.74
-321.54	806.75	-320.71	806.77	-320.2	806.77	-319.39	806.79
-319.27	806.79	-318.73	806.8	-317.94	806.81	-317.39	806.82
-316.6	806.83	-316.04	806.84	-315.27	806.86	-314.69	806.86
-313.94	806.88	-292.28	807.29	-291.62	807.31	-290.98	807.32
-290.48	807.33	-290	807.33	-287.07	807.39	-286.61	807.4
-286.15	807.4	-285.72	807.41	-284.96	807.43	-261.22	807.95
-261.14	807.96	-260.71	807.96	-259.22	807.99	-258.97	808
-191.55	808	-160.29	808.57	-159.61	808.57	-158.94	808.58
-154.42	808.58	-153.85	808.59	-138.43	808.58	-137.74	808.57
-135.64	808.57	-134.94	808.56	-132.25	808.56	-131.6	808.55
-129.06	808.55	-128.42	808.54	-125.81	808.54	-125.15	808.53
-122.41	808.53	-103.56	808	-61.32	808	-61.14	807.99
-60.4	808	-59.58	808	-57.87	807.98	-57.25	807.68
-56.22	807.71	-40.74	807.96	-40.56	807.88	-39.48	807.93
-39.31	807.9	-38.39	807.84	-31.6	806.91	-23.04	804.62
-18.39	802.72	-15.31	799.68	-13.61	799.14	-11.15	798.59
-8.71	798.6	-4.88	798.82	-2.24	798.91	0	799.21
2.77	799.59	5.36	799.74	15.86	800.78	19.21	801.07
25.98	801.39	28.13	801.7	34.86	801.78	40.98	802.22
64.91	803.69	67.69	803.76	85.92	804.31	102.91	804.36
107.15	804.41	109.56	804.63	123.37	806.87	124.99	806.92
138.39	807.04	154.02	807.98	175.38	808.83	193.46	809.77
211.27	810.13	232.8	810.02	248.61	809.84	261.98	809.75
286.4	809.66	312.77	809.79	322.37	809.86	329.27	809.78
332.46	809.82	341.59	809.72	361.96	809.56	373.32	809.63
394.07	809.51	398.94	809.45	403.05	809.94	422.39	812.19
432.81	813.02	439.57	813.46				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1413.08	.05	-18.39	.035	28.13	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-18.39	28.13	233	99.41	34	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.43	Reach Len. (ft)	233.00	99.41	34.00
Crit W.S. (ft)		Flow Area (sq ft)	4445.62	530.23	1315.03
E.G. Slope (ft/ft)	0.000098	Area (sq ft)	4445.62	530.23	1315.03
Q Total (cfs)	5150.00	Flow (cfs)	3174.10	1103.72	872.18
Top Width (ft)	1657.55	Top Width (ft)	1223.32	46.52	387.71
Vel Total (ft/s)	0.82	Avg. Vel. (ft/s)	0.71	2.08	0.66
Max Chl Dpth (ft)	12.84	Hydr. Depth (ft)	3.63	11.40	3.39
Conv. Total (cfs)	520524.1	Conv. (cfs)	320814.8	111555.4	88154.0
Length Wtd. (ft)	172.75	Wetted Per. (ft)	1226.76	48.06	388.16
Min Ch El (ft)	798.59	Shear (lb/sq ft)	0.02	0.07	0.02
Alpha	1.97	Stream Power (lb/ft s)	439.57	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	65.90	32.68	54.78
C & E Loss (ft)	0.00	Cum SA (acres)	16.15	2.76	11.17

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1804

INPUT
Description: DD
Station Elevation Data num= 296

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1396.08	812.45	-1394.16	812.47	-1386.82	812.6	-1363.37	812.64	-1342.95	812.75
-1319.38	812.7	-1309.95	812.66	-1278.48	812.04	-1244.69	812.25	-1239.86	812.15
-1215.27	811.93	-1205.33	811.36	-1190.17	811.05	-1189.66	810.99	-1187.8	810.99
-1177	810.67	-1171.75	810.69	-1163.3	810.76	-1154.09	811.51	-1149	814
-1147.51	814.62	-1142.51	815.28	-1138.9	815.02	-1136.01	813.97	-1129.78	813.5
-1120.27	812.53	-1116.23	812.7	-1105.1	811.11	-1104.13	811.09	-1102.51	811.04
-1098.56	810.98	-1090.83	810.8	-1090.55	810.79	-1090.18	810.78	-1089.92	810.75
-1082.31	810.05	-1073.3	810.77	-1071.97	810.86	-1070.19	810.86	-1069.25	810.85
-1047.42	809.46	-1040.06	809.06	-1025.29	808.99	-1001.51	808.41	-998.85	808.4
-997.44	808.39	-976.71	808.4	-964.49	808.74	-953.05	808.89	-924.47	810.03
-898.24	809.48	-897.99	809.48	-897.88	809.49	-895.11	809.42	-873.48	809.03
-872.34	808.96	-861.16	808.55	-847.26	808.4	-842.49	807.94	-840.99	807.97
-839.35	807.99	-838.71	808	-815.71	808	-815.43	809	-813.63	809.02

-813.41	809.02	-813.21	809.03	-813	809.03	-800.85	808.61	-772.61	807.2
-769.36	807.06	-768.49	807.05	-767.63	807.03	-751.09	806.82	-750.59	806.82
-750.09	806.81	-749.61	806.81	-748.65	806.79	-748.19	806.79	-747.73	806.78
-747.27	806.78	-746.48	806.77	-745.68	806.77	-688.57	806	-605.8	806
-564.39	806.32	-561.52	806.36	-560.72	806.35	-559.1	806.35	-550.81	806.3
-550.04	806.3	-548.51	806.29	-547.76	806.29	-547	806.28	-546.23	806.28
-530.19	806	-513.95	806	-513.6	805.99	-512.73	805.96	-511.85	805.94
-510.97	805.92	-510.05	805.89	-509.14	805.87	-509.07	805.87	-508.22	805.84
-508.14	805.84	-507.3	805.82	-507.21	805.82	-506.38	805.8	-506.28	805.8
-504.65	805.76	-504.53	805.76	-503.73	805.74	-503.6	805.74	-502.73	805.71
-502.58	805.71	-501.73	805.69	-501.57	805.69	-500.72	805.67	-500.56	805.67
-499.72	805.65	-499.54	805.65	-498.72	805.63	-498.53	805.63	-497.71	805.61
-497.51	805.61	-496.71	805.59	-496.49	805.59	-495.77	805.57	-495.55	805.57
-494.84	805.55	-494.61	805.55	-493.91	805.54	-493.67	805.54	-492.97	805.52
-492.45	805.52	-492.28	805.53	-491.94	805.53	-490.8	805.49	-489.72	805.45
-489.21	805.43	-412.51	804	-304.14	804	-300.51	804.06	-299.43	804.08
-298.35	804.09	-298.26	804.09	-298.21	804.1	-297.94	804.1	-297.88	804.11
-297.69	804.11	-297.62	804.12	-297.37	804.12	-297.29	804.13	-297.1	804.13
-295.81	804.18	-295.67	804.19	-294.42	804.23	-294.23	804.24	-293.01	804.28
-283.45	804.57	-283.08	804.59	-282.29	804.6	-281.52	804.62	-281.12	804.64
-280.36	804.65	-279.95	804.67	-279.51	804.69	-278.65	804.71	-277.14	804.75
-276.38	804.77	-275.9	804.78	-275.2	804.8	-274.7	804.82	-274.02	804.84
-273.5	804.85	-272.84	804.87	-272.3	804.89	-271.65	804.9	-271.09	804.92
-269.88	804.96	-269.28	804.97	-268.09	805.01	-267.46	805.03	-266.89	805.04
-266.24	805.06	-265.7	805.08	-265.03	805.1	-264.56	805.11	-263.87	805.14
-263.42	805.15	-258.67	805.33	-258.29	805.34	-257.41	805.38	-257.06	805.39
-256.15	805.43	-255.82	805.44	-254.87	805.48	-253.87	805.53	-245.18	806
-244.51	806	-241.38	806.28	-239.56	806.43	-233.05	807	-226.36	807.56
-224.49	807.72	-221.05	808	-218.88	808.26	-218.33	808.32	-215.35	808.68
-212.04	809.07	-208.67	809.48	-205.47	809.86	-205.24	809.89	-204.34	810
-166.05	810	-165.66	809.96	-165.49	809.95	-165.08	809.91	-144.89	808
-141.08	807.78	-135.13	807.45	-133.99	807.39	-132.94	807.33	-131.98	807.28
-131.08	807.23	-130.26	807.19	-129.51	807.14	-128.81	807.11	-128.16	807.07
-127.55	807.04	-126.97	807.01	-125.9	806.95	-125.4	806.92	-124.93	806.9
-114.75	806.57	-114.5	806.58	-105.39	807.14	-105.11	807.15	-104.87	807.59
-102.72	807.59	-99.84	807.51	-96.18	807.6	-83.79	807.59	-82.9	807.46
-82.74	807.43	-81.14	807.02	-74.18	807.03	-58.27	806.73	-58.03	806.72
-55.94	806.72	-39.67	806.59	-32.02	806.65	-22.12	806.46	-19.59	802.08
-16.74	798.47	-15.6	798.33	-11.62	797.78	-6.78	798.22	-4.67	798.39
2.11	799.13	4.72	799.37	6.94	799.64	17.02	800.44	27.02	801.33
28.15	801.42	29.64	801.42	42.74	801.61	46.83	801.9	63.08	802.8
64.68	803.5	88.23	808.27	88.31	808.29	91.21	808.32	108.15	808.3
130.34	808.04	140.71	807.65	154.48	807.21	177.89	807.24	180.59	807.24
189.3	807.66	204.44	808.24	220.81	808.62	241.73	808.87	253.45	808.76
272.31	809.06	295.99	809.55	339.66	809.54	343.47	809.51	348.73	809.54
406.75	809.55	410.08	809.51	417.06	810.39	430.92	812.06	444.91	813.02
449.49	813.3								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1396.08	.05	-19.59	.035	28.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.59	28.15	279	199.46	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.43	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.02	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *

* W.S. Elev (ft)	* 811.42	* Reach Len. (ft)	* 279.00	* 199.46	* 52.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 4797.28	* 567.67	* 1357.71 *
* E.G. Slope (ft/ft)	*0.000075	* Area (sq ft)	* 4797.28	* 567.67	* 1357.71 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 3296.07	* 1060.73	* 793.21 *
* Top Width (ft)	* 1583.85	* Top Width (ft)	* 1138.69	* 47.74	* 397.42 *
* Vel Total (ft/s)	* 0.77	* Avg. Vel. (ft/s)	* 0.69	* 1.87	* 0.58 *
* Max Chl Dpth (ft)	* 13.64	* Hydr. Depth (ft)	* 4.21	* 11.89	* 3.42 *
* Conv. Total (cfs)	*593405.6	* Conv. (cfs)	*379787.3	*122221.5	* 91396.8 *
* Length Wtd. (ft)	* 216.95	* Wetted Per. (ft)	* 1143.05	* 49.71	* 398.25 *
* Min Ch El (ft)	* 797.78	* Shear (lb/sq ft)	* 0.02	* 0.05	* 0.02 *
* Alpha	* 1.83	* Stream Power (lb/ft s)	* 449.49	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 41.18	* 31.43	* 53.73 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 9.83	* 2.65	* 10.86 *

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Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1604.54

INPUT
Description: EE
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-254.5	820.31	-253.81	820	-249.36	818.13	-249.04	818	-248.71	817.86
-244.27	816	-241.75	814.97	-239.41	814	-235.77	812.52	-234.46	812
-232.56	811.25	-229.43	810	-228.2	809.57	-224.74	808.38	-223.94	808.1
-223.65	808	-223.48	808	-221.86	808	-221.07	808	-220.61	808.01
-220.31	808.01	-220.09	808.01	-219.93	808.01	-219.8	808.01	-219.7	808.01
-219.62	808.01	-219.56	808.01	-219.5	808.01	-219.45	808.01	-219.42	808.01
-219.4	808.01	-219.38	808.01	-219.31	808.01	-219.29	808.01	-219.27	808.01
-219.26	808.01	-219.22	808.01	-219.21	808.01	-219.2	808.01	-219.19	808.01
-219.18	808.01	-219.17	808.01	-219.17	808.05	-218.46	808.05	-218.07	808.25
-208.9	807.97	-202.66	807.8	-202.47	807.73	-199.15	806.81	-197.39	806.65
-185.15	805.67	-168.49	805.12	-165.13	805.01	-163.48	805.02	-161.69	805.03
-150.76	805.17	-148.36	804.05	-144.6	801.99	-144.14	801.94	-143.94	801.8
-140.03	799.92	-137.84	799.77	-137.23	799.58	-137.01	799.73	-134.93	801.41
-134.51	801.43	-126.72	801.94	-117.53	801.92	-102.19	801.63	-88	801.53
-78.33	801.45	-66.67	801.3	-53.5	801.47	-51.58	801.47	-36.89	801.33
-18.11	800.66	-15.8	800.56	-15.31	800.44	-11.66	798.9	-2.59	797.82
-2.27	797.8	-1.95	797.77	0	797.54	4.56	797	9.86	796.53
9.89	796.53	14.62	798.12	14.69	798.14	14.81	798.26	20.33	807.16

23.78	807.16	38.24	807.17	53.5	807.14	57.16	807.14	70.39	807.14
74	807.13	112.25	806.72	127.42	806.39	151.27	806.51	160.35	807.08
183.69	807.64	190.99	807.66	210.11	808.16	216.56	808.05	241.85	807.55
242.96	807.5	249.5	807.18	265.56	806.74	289.15	808.84	301.45	809.04
322.56	809.76	342.42	809.63	360.59	809.45	381.97	809.41	400.9	809.43
411.27	809.32	419.05	810.3	430.18	811.75	441.82	812.55	451.46	813.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-254.5	.05	-15.8	.035	20.33	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-15.8	20.33	149 184.82	41	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.35	Reach Len. (ft)	149.00	184.82	41.00
Crit W.S. (ft)		Flow Area (sq ft)	1713.42	459.70	1358.78
E.G. Slope (ft/ft)	0.000177	Area (sq ft)	1713.42	459.70	1358.78
Q Total (cfs)	5150.00	Flow (cfs)	2665.06	1284.07	1200.87
Top Width (ft)	659.94	Top Width (ft)	217.02	36.13	406.80
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)	1.56	2.79	0.88
Max Chl Dpth (ft)	14.82	Hydr. Depth (ft)	7.90	12.72	3.34
Conv. Total (cfs)	386773.2	Conv. (cfs)	200150.6	96435.3	90187.4
Length Wtd. (ft)	128.00	Wetted Per. (ft)	219.87	41.85	407.09
Min Ch El (ft)	796.53	Shear (lb/sq ft)	0.09	0.12	0.04
Alpha	1.59	Stream Power (lb/ft s)	451.46	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	20.33	29.08	52.11
C & E Loss (ft)	0.00	Cum SA (acres)	5.49	2.46	10.38

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1419.72

INPUT
Description: FF
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-133.24	824.56	-130.81	824	-124.37	822.44	-122.58	822	-118.66	821.04

-114.37	820	-112.36	819.49	-106.45	818	-101.64	816.16	-98.65	815.34
-97.21	814.61	-89.43	814.27	-83.42	814	-82.62	813.97	-80.92	813.88
-75.91	810	-75.9	810	-72.82	810.28	-72.74	810.29	-71.16	810.43
-60.51	809.88	-58.71	809.82	-58.63	809.84	-57.68	809.87	-55.63	809.3
-52.04	808.3	-48.95	808.06	-43.9	807.61	-33.31	807.36	-29.68	807.31
-18.8	797.35	-18.51	797.15	-18.37	797.12	-9.34	796.76	-8.3	796.83
-1.89	796.37	-.01	796.51	0	796.51	5.24	797.45	10.42	797.23
15.88	797.82	25.35	798.02	28.91	797.99	35.53	800.94	37.02	801.47
37.8	801.6	46.24	803.46	74.68	805.31	77.76	805.47	79.29	805.55
80.95	805.57	112.25	806.16	129.82	806.8	146.42	807.27	181.61	807.14
183.67	807.12	193.95	807.06	228.2	806.84	237.5	806.83	265.27	806.79
281.86	806.66	304.04	806.21	331.38	805.94	344.68	806.3	350.86	806.46
385.2	806.66	387.18	806.61	399.69	807.42	427.18	809.24	432.84	809.27
465.47	809.54	480.67	809.4	493.5	809.13	509.05	808.96	518.95	808.89
532.2	808.89	549.9	809.02	555.9	809.02	563.05	809.83	577.38	811.63
584.8	812.16	599.7	813.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-133.24	.05	-29.68	.035	46.24	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-29.68	46.24	173	185.67	44	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.38	Element	Left OB	Channel	Right OB				
Vel Head (ft)	0.09	Wt. n-Val.	0.050	0.035	0.050				
W.S. Elev (ft)	811.29	Reach Len. (ft)	173.00	185.67	44.00				
Crit W.S. (ft)		Flow Area (sq ft)	116.41	941.47	2092.18				
E.G. Slope (ft/ft)	0.000197	Area (sq ft)	116.41	941.47	2092.18				
Q Total (cfs)	5150.00	Flow (cfs)	86.90	2879.95	2183.15				
Top Width (ft)	652.23	Top Width (ft)	47.89	75.92	528.42				
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)	0.75	3.06	1.04				
Max Chl Dpth (ft)	14.92	Hydr. Depth (ft)	2.43	12.40	3.96				
Conv. Total (cfs)	366923.6	Conv. (cfs)	6191.5	205188.9	155543.3				
Length Wtd. (ft)	125.81	Wetted Per. (ft)	48.62	80.94	528.76				
Min Ch El (ft)	796.37	Shear (lb/sq ft)	0.03	0.14	0.05				
Alpha	2.13	Stream Power (lb/ft s)	599.70	0.00	0.00				
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	17.20	26.11	50.49				
C & E Loss (ft)	0.01	Cum SA (acres)	5.04	2.22	9.94				

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1234.05

INPUT
Description: GG
Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-206.29	819.46	-200.65	818	-197.84	817.3	-192.78	816	-189.46	815.12
-185.16	814	-177.52	812.02	-177.45	812	-177.24	811.95	-169.56	810
-163.3	808.42	-161.62	808	-160.3	807.77	-150.98	806	-149.55	805.99
-141.69	805.98	-141.5	805.98	-140.88	805.98	-133.89	805.95	-130.64	805.94
-129.27	805.94	-125.41	805.92	-125.27	805.92	-119.66	805.91	-119.47	805.91
-113.88	805.9	-113.72	805.9	-113.55	805.9	-109.15	805.89	-108.89	805.89
-108.61	805.89	-79.16	805.07	-45.36	804.14	-44.53	804.12	-43.45	804.1
-40.44	804.07	-38.68	804.06	-38.54	804.07	-38.37	804.07	-37.77	804.01
-37.24	804.01	-37.19	804	-30.78	802.5	-29.84	802	-26.29	800.22
-25.87	800	-25.24	799.69	-24.32	799.25	-21.9	798	-21.56	798
-18.9	798	-18.8	798	-18.64	798	-17.59	798	-6.79	798
-.56	798	0	798	12.11	798	12.88	798	16.74	798
19.43	799.16	21.39	800	22.15	800.53	22.62	800.82	24.24	801.82
24.53	802	24.55	802.01	24.8	802.16	25.01	802.28	25.19	802.38
25.35	802.48	25.49	802.56	25.62	802.63	25.72	802.69	25.82	802.75
25.91	802.8	25.99	802.85	26.06	802.9	26.13	802.94	26.19	802.97
26.24	803.01	26.29	803.04	26.34	803.07	26.39	803.09	26.43	803.12
26.47	803.14	26.5	803.16	26.54	803.18	26.57	803.2	26.6	803.22
26.63	803.24	26.66	803.24	54.23	804.14	56.94	804.2	74.1	806.44
77.21	806.52	80.14	806.6	85.51	806.59	126.38	806.77	130.45	806.77
167.98	806.63	179.11	806.59	180.44	806.58	215.96	806.5	220.86	806.45
248.62	806.24	255.71	806.16	256.04	806.17	276.79	805.61	282.15	805.6
287.71	805.65	319.14	806.74	339.94	807.72	355.88	808.41	377.43	808.5
408.02	808.34	427.41	808.18	441.89	808.29	466.55	808.44	473.08	808.48
487.87	810.16	499.3	811.52	507.36	812.1	507.64	812.12	523.13	813.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-206.29	.05	-37.19	.035	26.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.19	26.66	117 131.34	192.99	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.28	Reach Len. (ft)	117.00	131.34	192.99
Crit W.S. (ft)		Flow Area (sq ft)	748.73	770.55	2034.00
E.G. Slope (ft/ft)	0.000169	Area (sq ft)	748.73	770.55	2034.00
Q Total (cfs)	5150.00	Flow (cfs)	891.95	2176.63	2081.42
Top Width (ft)	671.93	Top Width (ft)	137.42	63.85	470.65
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)	1.19	2.82	1.02
Max Chl Dpth (ft)	13.28	Hydr. Depth (ft)	5.45	12.07	

```
   4.32  *
* Conv. Total (cfs)       *396595.9  * Conv. (cfs)            * 68688.3  *167620.0
*160287.7  *
* Length Wtd. (ft)        *  151.19  * Wetted Per. (ft)       *  138.05  *   66.44  *
 471.05  *
* Min Ch El (ft)          *  798.00  * Shear (lb/sq ft)       *    0.06  *    0.12  *
   0.05  *
* Alpha                   *    1.92  * Stream Power (lb/ft s) *  523.13  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   *   15.48  *   22.46  *
  48.40  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    4.67  *    1.92  *
   9.44  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 1102.70

INPUT
Description: HH
Station Elevation Data     num=      117
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -289.51  823.17 -284.72  822.19 -283.86     822 -283.27  821.86  -274.9     820
  -267.4  818.33 -265.91     818 -264.06  817.59 -257.15     816 -249.19  814.26
 -248.06     814 -239.53  812.19 -238.72     812 -237.74   811.8  -228.6     810
 -224.13  809.14 -217.49     808 -212.35  807.38 -210.24  807.28 -205.93  806.82
 -205.12  806.75 -199.07  806.63 -196.69  806.46  -195.3  806.37 -195.04  806.35
 -193.44  806.27 -192.41  806.23 -183.22  806.24 -178.07  806.21 -172.74  806.18
 -171.92  806.16 -171.25  806.15  -161.2  806.03 -158.18  806.03 -156.25  806.02
 -151.54  806.03 -151.43  806.03 -146.32  806.01 -146.26  806.01 -142.51     806
 -133.64  805.85 -132.12  805.82 -129.94  805.78 -114.43  805.52 -102.78  805.34
  -97.86  805.26  -93.46   805.2  -90.78  805.15  -87.77   805.1  -80.07  804.98
  -73.86  804.89  -67.18  804.76  -58.77   804.6  -42.37  804.25  -31.66  804.01
  -31.15  804.01  -29.92  804.01  -28.29     804  -27.99     804  -27.33     804
  -26.85     804  -25.69  803.66  -25.11  803.49   -22.2     802   -19.2  800.47
  -18.27     800  -17.41  799.56  -14.62     798   -7.66     798       0     798
    1.73     798   17.37     798   17.58     798   18.13     798   18.51  798.19
   22.22     800   24.75  801.24   26.32     802   28.22  802.93      31     804
   31.94     804   41.11  804.07   45.61   804.3   54.04  804.54   83.33  805.28
   91.06  805.49   94.01  805.59   95.91  805.61  132.94   806.3  136.29  806.33
  139.49  806.35  164.42  806.54   183.4  806.63  186.37  806.61  231.26  806.05
  238.05  806.05  275.37   806.2  280.92   806.2  282.25  806.21  307.77  807.46
   324.8  809.33  330.91  809.81   335.5  810.13  336.15  810.18  372.12  812.23
  372.24  812.18  373.78  812.33  375.76  812.44  382.54  812.44  392.23  812.55
  401.64  812.64  414.95  812.72  417.44  812.75  433.14  812.79  442.12  812.72
  464.37  812.83  472.75   812.9

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -289.51     .05  -25.69    .035      31     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -25.69      31           138.99  130.59  147.99             .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
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* E.G. Elev (ft)	* 811.32	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.25	* Reach Len. (ft)	* 138.99	* 130.59	* 147.99 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 1123.69	* 678.76	* 1543.08 *
* E.G. Slope (ft/ft)	*0.000185	* Area (sq ft)	* 1123.69	* 678.76	* 1543.08 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 1392.40	* 1990.72	* 1766.88 *
* Top Width (ft)	* 589.97	* Top Width (ft)	* 209.28	* 56.69	* 324.00 *
* Vel Total (ft/s)	* 1.54	* Avg. Vel. (ft/s)	* 1.24	* 2.93	* 1.15 *
* Max Chl Dpth (ft)	* 13.25	* Hydr. Depth (ft)	* 5.37	* 11.97	* 4.76 *
* Conv. Total (cfs)	*378186.5	* Conv. (cfs)	*102249.7	*146187.4	*129749.4 *
* Length Wtd. (ft)	* 138.17	* Wetted Per. (ft)	* 209.73	* 59.40	* 324.23 *
* Min Ch El (ft)	* 798.00	* Shear (lb/sq ft)	* 0.06	* 0.13	* 0.06 *
* Alpha	* 1.77	* Stream Power (lb/ft s)	* 472.75	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	* 12.97	* 20.27	* 40.48 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 4.21	* 1.74	* 7.67 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 972.12

INPUT
Description: II
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-326.96	813.78	-325.06	813.78	-324.62	813.77	-312.1	813.79	-311.71	813.79
-311.3	813.78	-310.79	813.77	-310.71	813.77	-310.04	813.76	-309.09	813.74
-299.86	813.58	-299.5	813.58	-299.13	813.57	-296.5	813.51	-289.07	813.22
-281.87	812.99	-279.84	812.9	-276.56	812.81	-272.63	812.68	-270.91	812.59
-269.58	812.52	-264.51	812.38	-258.25	812.17	-257.11	812.12	-253.96	812.01
-252.79	812	-247.85	811.77	-247.06	811.74	-246.01	811.7	-235.69	811.04
-234.51	810.98	-230.45	810.9	-224.77	810.76	-217.17	810.53	-213.54	810.36
-203.45	810	-201.81	809.91	-179	808.59	-178.36	808.56	-174.95	808.41
-168.88	808	-168.86	807.99	-167.73	807.99	-167.72	807.99	-166.02	807.98
-162.03	807.97	-158.82	807.97	-157.81	807.96	-156.68	807.96	-153.18	807.93
-152.17	807.93	-147.01	807.71	-124.98	806.82	-98.36	806.05	-98.02	806.03
-96.39	806	-96.31	806	-91.58	805.99	-90.9	805.99	-90.29	805.98
-88.68	805.98	-87.34	805.98	-85.9	805.97	-82.63	805.96	-80.47	805.95
-78.95	805.94	-77.59	805.94	-55.94	805.33	-51.01	805.29	-46.29	805.27
-42.91	805.22	-39.87	805.19	-36.91	805.19	-33.31	804.55	-30.41	804.02
-30.31	804.02	-30.21	804	-28.09	802.54	-27.19	802	-25.5	801.1
-22.96	800	-18.37	797.56	-17.49	797.56	-17.43	797.56	-17.42	797.56
-13.96	797.56	0	797.56	1.22	797.56	14.24	797.56	17.93	797.56
20.45	798	26.11	799.94	26.31	800	32.11	801.03	32.83	802

49.01	803.35	49.44	803.36	55.53	803.3	55.72	803.39	56.74	803.46
60.16	803.53	85.01	805.01	113.83	805.2	119.81	805.24	126.8	805.29
131.99	805.27	139.45	805.25	147.43	805.3	150.86	805.04	162.7	804.62
166.24	804.54	176.45	805.43	177.27	805.48	179.3	805.58	201.26	806.42
208.15	807.25	223.45	808.52	236.82	809.7	252.78	811.09	252.86	811.07
252.99	811.08	255.67	811.11	272.38	811.61	292.88	811.69	300.43	811.78
310.06	811.68	312.5	811.63	314.79	811.65	317.61	811.73	317.72	811.84
317.8	811.83	320.16	811.81	334.73	811.83	341.58	811.8	343.41	811.9
345.47	811.78	346.96	811.81	348.55	811.78	352.07	811.8	367.83	811.79
370.45	811.82	383.76	811.8	383.94	811.82	395.49	811.86	398.25	811.88
398.32	812.08	398.42	811.98	398.86	812.41	408.62	812.42	418.24	812.27
427.48	812.07	437.72	811.84	443.56	811.77	454.65	811.84	466.98	811.99
475.86	812.18	480.39	812.38	482.7	812.57	490.96	812.47	496.51	812.45
496.72	812.45	505.62	812.64	511.92	812.78				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-326.96	.05	-30.21	.035	32.83	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.21	32.83	168	161.32	108	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	*	811.29	* Element	*	Left OB	*	Channel	*	Right OB *
* Vel Head (ft)	*	0.10	* Wt. n-Val.	*	0.050	*	0.035	*	0.050 *
* W.S. Elev (ft)	*	811.18	* Reach Len. (ft)	*	168.00	*	161.32	*	108.00 *
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	764.22	*	793.48	*	1203.93 *
* E.G. Slope (ft/ft)	*	0.000228	* Area (sq ft)	*	764.22	*	793.48	*	1203.93 *
* Q Total (cfs)	*	5150.00	* Flow (cfs)	*	817.49	*	2681.48	*	1651.03 *
* Top Width (ft)	*	496.01	* Top Width (ft)	*	207.71	*	63.04	*	225.26 *
* Vel Total (ft/s)	*	1.86	* Avg. Vel. (ft/s)	*	1.07	*	3.38	*	1.37 *
* Max Chl Dpth (ft)	*	13.62	* Hydr. Depth (ft)	*	3.68	*	12.59	*	5.34 *
* Conv. Total (cfs)	*	340731.2	* Conv. (cfs)	*	54086.5	*	177410.4	*	109234.3 *
* Length Wtd. (ft)	*	140.95	* Wetted Per. (ft)	*	207.94	*	65.65	*	225.68 *
* Min Ch El (ft)	*	797.56	* Shear (lb/sq ft)	*	0.05	*	0.17	*	0.08 *
* Alpha	*	1.94	* Stream Power (lb/ft s)	*	511.92	*	0.00	*	0.00 *
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	9.96	*	18.07	*	35.81 *
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	3.54	*	1.56	*	6.74 *

CROSS SECTION

RIVER: Buckeye Creek

REACH: Buckeye Creek RS: 810.82

INPUT
Description: JJ
Station Elevation Data num= 159

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-216.91	814	-209.47	814	-201.74	814	-195.8	813.64	-188.84	813.23
-185.45	813.15	-179.25	812.94	-152.13	813.27	-151.81	813.26	-149.47	813.17
-146.37	813.02	-146.36	813.01	-146.32	813.02	-140.6	812.84	-136.23	812.99
-129.02	812.75	-127.18	812.76	-123.2	812.8	-119.29	812.67	-118.82	812.66
-111.87	812.43	-109.55	812.36	-100.54	812.03	-99.84	812	-98.62	811.93
-97.8	811.89	-83.42	811.14	-76.85	810.72	-74.41	810.56	-73.74	810.51
-71.49	810.36	-66.78	810	-61.45	809.65	-58.64	809.44	-52.08	808.96
-50.37	808.85	-41.46	808	-38.34	807.75	-37.59	807.68	-36.09	807.5
-24.8	806	-20.35	804.6	-18.41	804	-18.33	803.94	-15.01	802
-12.97	800.82	-11.05	800	-10.24	799.15	-8.85	797.3	0	797.3
3.17	797.3	10.08	797.3	17.92	797.3	24.85	797.3	27.53	798
27.87	801.86	28.46	802.53	32.36	803.16	42.61	804.76	59.3	804.95
77.03	805.06	103.24	805.26	119.26	805.35	128.03	805.42	149.59	805.57
160.78	805.68	192.07	805.53	197.51	805.48	238.72	804.72	239.38	804.7
240.47	804.67	256.38	804.26	262.57	804.13	266.56	804.18	293.85	808.49
296.89	808.94	300.24	809.22	329.56	811.43	333.28	811.66	333.32	811.67
333.59	811.64	340.57	811.73	344.49	811.76	350.15	811.95	362.33	812.32
365.48	812.39	381.25	812.44	388.26	812.42	396.23	812.36	413.4	812.25
424.49	812.31	455.96	812.46	456.15	812.5	459.79	812.5	467.99	812.4
475.02	812.37	475.36	812.37	475.71	812.37	476.06	812.37	486.93	812.37
487.23	812.37	487.54	812.37	487.85	812.37	488.18	812.37	488.5	812.37
488.83	812.37	489.17	812.37	489.52	812.38	497.79	812.49	497.9	812.49
498.02	812.49	498.14	812.49	498.28	812.49	498.41	812.49	498.56	812.48
498.71	812.48	498.87	812.48	499.04	812.48	499.21	812.48	499.39	812.48
499.57	812.48	499.76	812.48	499.96	812.48	500.17	812.48	500.38	812.49
500.59	812.49	500.81	812.49	501.04	812.49	501.11	812.49	501.27	812.49
501.51	812.49	501.75	812.49	501.99	812.49	502.24	812.49	502.49	812.49
502.74	812.49	503	812.49	503.25	812.49	503.51	812.49	503.76	812.49
504.02	812.49	504.27	812.5	504.52	812.5	504.78	812.5	505.02	812.5
505.27	812.5	505.51	812.5	505.75	812.51	505.98	812.51	506.21	812.51
506.43	812.51	506.65	812.52	506.86	812.52	507.07	812.52	507.27	812.52
507.46	812.53	507.64	812.53	507.82	812.53	524.88	812.93		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-216.91	.05	-20.35	.035	42.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20.35	42.61	200 178.48	258	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.13	Reach Len. (ft)	200.00	178.48	258.00
Crit W.S. (ft)		Flow Area (sq ft)	154.26	725.62	1505.53
E.G. Slope (ft/ft)	0.000312	Area (sq ft)	154.26	725.62	1505.53
Q Total (cfs)	5150.00	Flow (cfs)	146.49	2598.76	2404.74

* Top Width (ft)	*	408.81	* Top Width (ft)	*	62.89	*	62.96	*	282.95	*
* Vel Total (ft/s)	*	2.16	* Avg. Vel. (ft/s)	*	0.95	*	3.58	*	1.60	*
* Max Chl Dpth (ft)	*	13.83	* Hydr. Depth (ft)	*	2.45	*	11.53	*	5.32	*
* Conv. Total (cfs)	*291710.3		* Conv. (cfs)	*	8297.8	*147201.3			*136211.3	*
* Length Wtd. (ft)	*	218.44	* Wetted Per. (ft)	*	63.35	*	69.47	*	283.43	*
* Min Ch El (ft)	*	797.30	* Shear (lb/sq ft)	*	0.05	*	0.20	*	0.10	*
* Alpha	*	1.65	* Stream Power (lb/ft s)	*	524.88	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.05	* Cum Volume (acre-ft)	*	8.18	*	15.25	*	32.46	*
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	3.02	*	1.33	*	6.11	*

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 632.35

INPUT
Description: KK
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-233.17	814	-232.97	814	-232.29	814	-231.37	814	-229.74	814
-227.54	813.99	-224.26	813.99	-217.08	813.99	-215.69	813.99	-206.84	813.98
-205.84	813.98	-204.78	813.98	-194.69	813.99	-163.17	813.97	-158.17	813.97
-152.63	813.96	-146.75	813.97	-144.86	813.97	-139.53	813.97	-138.59	813.97
-138.16	813.97	-136.9	813.97	-134.88	813.97	-127.78	813.97	-125.89	813.97
-121.27	813.96	-116.23	813.98	-115.18	813.97	-115.16	813.97	-113.57	813.97
-103.05	813.98	-102.55	813.98	-96.44	814	-96.4	814	-96.31	814
-96.25	814	-92.59	813.97	-89.12	813.99	-89.1	813.99	-88.87	813.99
-88.46	813.99	-77.63	814	-76.17	814.02	-76.04	814.02	-75.04	814
-72.8	813.99	-71.53	814	-68.29	814.02	-67.62	814.01	-67.06	814
-63.13	813.78	-62.61	813.72	-62.43	813.69	-57.74	813.21	-57.27	813.17
-52.18	812.77	-48.03	812	-43.2	810.5	-41.72	810	-40.18	809.46
-37.42	808	-35.59	807.07	-33.62	806	-31.7	804.92	-29.9	804
-27.7	802.73	-26.29	802	-22.66	800.11	-22.45	800	-22.1	799.82
-21.65	799.6	-20.99	799.31	-19.21	798.49	-18.32	796.97	-6.82	796.97
-2.66	796.97	0	796.97	.16	796.97	11.62	796.97	15.58	798
15.79	798.01	16.67	798.01	16.75	798.07	16.96	798.08	20.03	798.26
21.03	798.28	27.17	798.57	31.86	800.77	32.51	802.17	32.91	802.6
36.36	804.21	36.53	804.25	37.02	804.34	47.09	805.42	47.49	805.46
49.7	805.63	55.05	805.93	68.74	806.02	86.07	805.93	99.48	805.93
103.38	805.75	123.57	805.98	131.93	806.3	155.1	806.45	176.93	806.19
200.24	806.3	221.51	806.49	244.67	806.72	265.49	806.59	289.74	806.31
312.41	806.09	337.11	806.03	356.2	805.86	381.78	805.86	408.47	805.68
427.73	805.75	446.84	805.64	455	805.63	460.39	805.71	465.48	805.94
478.6	806.16	486.66	806.62	496.58	808.09	504.39	809.32	521.17	811.33
528.01	812.14	528.42	812.31	528.56	812.35	529.4	812.29	529.44	812.28
529.77	812.28	529.97	812.27	537.83	812.44	544.99	812.58	545.64	812.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

-233.17 .05 -52.18 .035 37.02 .05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-52.18	37.02	239	198.36	80	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	*	811.18	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.07	* Wt. n-Val.	*		*	0.035	*	0.050	*	
* W.S. Elev (ft)	*	811.11	* Reach Len. (ft)	*	239.00	*	198.36	*	80.00	*	
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*		*	888.20	*	2336.33	*	
* E.G. Slope (ft/ft)	*	0.000189	* Area (sq ft)	*		*	888.20	*	2336.33	*	
* Q Total (cfs)	*	5150.00	* Flow (cfs)	*		*	2418.72	*	2731.28	*	
* Top Width (ft)	*	564.55	* Top Width (ft)	*		*	82.20	*	482.35	*	
* Vel Total (ft/s)	*	1.60	* Avg. Vel. (ft/s)	*		*	2.72	*	1.17	*	
* Max Chl Dpth (ft)	*	14.14	* Hydr. Depth (ft)	*		*	10.81	*	4.84	*	
* Conv. Total (cfs)	*	374563.3	* Conv. (cfs)	*		*	175915.6		*	198647.7	*
* Length Wtd. (ft)	*	136.17	* Wetted Per. (ft)	*		*	88.15	*	482.78	*	
* Min Ch El (ft)	*	796.97	* Shear (lb/sq ft)	*		*	0.12	*	0.06	*	
* Alpha	*	1.65	* Stream Power (lb/ft s)	*	545.64	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.02	* Cum Volume (acre-ft)	*	7.83	*	11.95	*	21.08	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	2.87	*	1.03	*	3.85	*	

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 433.99

INPUT
Description: LL
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-229.28	815.19	-223.93	814	-216.01	812.28	-214.67	812	-213.65	811.85
-199.66	810	-199.48	810	-199.29	810	-197.88	809.99	-194.25	809.96
-194.23	809.96	-190.38	809.95	-185.59	809.93	-178.39	809.93	-174.76	809.91
-173.86	809.91	-173.11	809.91	-135.76	808.85	-130.79	808.72	-124.61	808.57
-120.21	808.48	-106.09	808.19	-104.62	808.16	-97.07	808.01	-96.21	808
-91.4	808	-90.61	808	-79.64	807.53	-70.25	807.22	-64	807.02
-57.82	806.79	-47.76	806.4	-45.29	806.3	-42.52	806.21	-41.03	806.16
-37.62	806.01	-36.96	806.01	-36.96	806	-33.53	804.27	-32.99	804
-30.1	802.54	-28.88	802	-28.63	801.88	-24.46	800	-22.46	799.07
-20.14	796.7	-12.23	796.7	-4.22	796.7	-1.01	796.7	0	796.7
12.22	796.7	14.57	799.05	16.69	800	17.49	800.3	22.91	802

23.15	802	25.9	802.22	28.38	802.57	34	802.72	35.29	802.76
46.96	803	49.07	803.48	55.32	804.73	65.63	804.46	75.14	804.3
82.19	804.93	83.76	805.01	94.64	805.48	107.93	805.05	115.02	805.14
115.99	805.19	132.95	805.87	140.41	806.12	179.17	805.81	186.1	805.75
218.99	805.95	229.65	806.12	243.46	805.89	273.03	805.79	295.71	805.5
315.95	805.54	342.46	805.87	360.5	806.18	374.77	806.1	406.56	805.76
412.8	805.7	423.66	805.74	441.5	805.56	452.35	805.52	466.16	806.57
471.85	806.85	475.67	807.36	490.39	809.41	494.83	809.91	511.44	811.92
511.84	812.08	511.9	812.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-229.28	.05	-36.96	.035	28.38	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.96	28.38	150.99	144.27	75.99	.1 .3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.10	Reach Len. (ft)	150.99	144.27	75.99
Crit W.S. (ft)		Flow Area (sq ft)	444.32	788.87	2529.67
E.G. Slope (ft/ft)	0.000148	Area (sq ft)	444.32	788.87	2529.67
Q Total (cfs)	5150.00	Flow (cfs)	303.77	2061.26	2784.97
Top Width (ft)	712.65	Top Width (ft)	171.02	65.34	476.29
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	0.68	2.61	1.10
Max Chl Dpth (ft)	14.40	Hydr. Depth (ft)	2.60	12.07	5.31
Conv. Total (cfs)	422843.5	Conv. (cfs)	24941.4	169240.6	228661.6
Length Wtd. (ft)	108.76	Wetted Per. (ft)	171.16	69.45	476.88
Min Ch El (ft)	796.70	Shear (lb/sq ft)	0.02	0.11	0.05
Alpha	1.82	Stream Power (lb/ft s)	511.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.61	8.13	16.61
C & E Loss (ft)	0.00	Cum SA (acres)	2.41	0.69	2.97

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 289.71

INPUT
Description: MM
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-348.33	816.57	-348.24	816.54	-347.81	816.44	-345.95	816	-342.84	815.36
-339.64	814.72	-336.02	814	-328.13	813.43	-322.18	813.05	-305.65	812
-302.14	811.76	-298.26	811.43	-280.91	810	-279.28	809.93	-246.45	808.55
-235.55	808	-235.47	808	-231.89	808	-230.12	808	-225.75	808
-220.81	808	-220.77	808	-216.44	808	-211.33	808	-195.52	808
-194.47	808	-194.45	808	-184.64	808	-182.43	808	-178.88	808.05
-178.72	808.05	-178.43	808.06	-178.1	808.06	-172.71	808.2	-168.02	808.31
-160.86	808.55	-144.31	808.1	-141.52	808.02	-137.87	808.02	-133.47	808.03
-127.35	808.03	-116.67	808.04	-91.7	808.03	-68.94	808.02	-63.03	808.02
-59.01	808.02	-55.88	808.02	-55.76	808.02	-55.73	808.02	-53.31	808.01
-52.54	808.01	-49.34	808.01	-47.14	808.01	-46.11	808.01	-43.69	808.01
-42.03	808.01	-41.16	808	-36.46	808	-36.18	807.96	-34.84	807.82
-34.01	807.45	-33.88	807.41	-30.5	806	-28.59	805.2	-25.72	804
-24.06	803.13	-22.27	802	-20.72	801.07	-18.75	800	-17.18	799.08
-15.4	796.46	-1.4	796.46	0	796.46	1.93	796.46	6.13	796.46
16.91	796.46	18.38	798	18.87	798	19.47	798	19.95	798.46
21.23	799.6	21.7	799.87	24.37	800.38	35.61	802.38	50.22	802.63
53.88	802.69	63.02	802.91	78.8	802.53	78.99	802.53	82.81	802.65
94.02	803.02	100.69	804.05	109.95	805.3	112.56	805.37	144.08	805.37
153.1	805.31	186.57	805.2	205.42	805.47	226.33	805.61	253.41	805.45
264.38	805.23	289.6	805.11	294.8	805.28	315.35	805.29	333.93	805.43
339.25	805.41	361.21	806.06	367.63	805.99	382.77	805.65	385.82	805.7
412.49	806.66	414.12	806.72	415.41	806.89	435.44	809.42	453.47	811.42
458.91	812.07	459.37	812.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-348.33	.05	-34.84	.035	35.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.84	35.61	142 180.45	179	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.09	Reach Len. (ft)	142.00	180.45	179.00
Crit W.S. (ft)		Flow Area (sq ft)	707.26	825.10	2378.05
E.G. Slope (ft/ft)	0.000137	Area (sq ft)	707.26	825.10	2378.05
Q Total (cfs)	5150.00	Flow (cfs)	480.47	2020.46	2649.07
Top Width (ft)	744.61	Top Width (ft)	259.28	70.45	414.88
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)	0.68	2.45	1.11
Max Chl Dpth (ft)	14.63	Hydr. Depth (ft)	2.73	11.71	5.73
Conv. Total (cfs)	439699.1	Conv. (cfs)	41021.7	172504.1	226173.4
Length Wtd. (ft)	174.95	Wetted Per. (ft)	259.40	75.50	415.36
Min Ch El (ft)	796.46	Shear (lb/sq ft)	0.02	0.09	0.05
Alpha	1.75	Stream Power (lb/ft s)	459.37	0.00	

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   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    4.62  *    5.46  *
  12.33  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    1.66  *    0.47  *
   2.19  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 109.26

INPUT
Description: NN
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -420.57  814.39  -419.2     814 -407.77  813.42  -407.7  813.42 -379.04     812
 -378.22  811.99  -334.8  811.11 -302.12  810.46  -279.5     810 -278.77     810
 -199.19  808.01 -198.67     808 -196.73     808 -196.71     808 -160.16  807.18
 -150.67  806.97 -143.98  806.83 -123.71  806.44 -101.58     806 -100.78     806
  -92.21  805.99  -80.49  805.97  -77.36  805.97   -69.5  805.98  -53.95     806
  -46.87     806  -41.13     806  -38.95     806  -35.79     806  -33.95  804.99
  -32.14     804  -29.75  802.69  -28.49     802  -26.52  800.92  -25.03     800
  -24.55   799.7  -20.63     798  -13.87  796.17    -7.1  796.17   -6.45  796.17
   -5.34  796.17   -3.06  796.17       0  796.17    9.83  796.17   10.32     798
   11.65     798   12.28     798   15.39  799.59   16.21     800   18.42  801.13
   20.26     802    23.7   803.6   24.16  803.84   24.46     804   25.31  804.27
   25.55  804.34   26.05  804.45   33.05     806   33.29     806   34.24     806
   36.49  805.83   40.87   805.6   49.87  805.76   78.79  805.59  114.93  804.96
  121.77  804.87  141.12  804.61  165.89  804.29   192.3   804.3  201.03  804.39
  211.75  804.67  229.66     805   247.1  805.46  263.63  805.77  272.64  805.95
  279.01  806.31  286.81  806.72  289.32  807.18  307.42  809.78  309.29  809.95
  325.74  811.48  328.02  811.69  328.25  811.72  328.26  811.72  328.83  811.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -420.57     .05  -35.79    .035   33.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -35.79   33.05             105.99  109.26     120             .1      .3

CROSS SECTION OUTPUT  Profile #100-Year
*******************************************************************************
***********
* E.G. Elev (ft)          *  811.10  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)           *    0.07  * Wt. n-Val.             *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)          *  811.03  * Reach Len. (ft)        *  105.99  *  109.26  *
 120.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  914.88  *  791.16  *
1564.78  *
* E.G. Slope (ft/ft)      *0.000200  * Area (sq ft)           *  914.88  *  791.16  *
1564.78  *
* Q Total (cfs)           * 5150.00  * Flow (cfs)             *  817.04  * 2302.15  *
2030.81  *
* Top Width (ft)          *  651.91  * Top Width (ft)         *  295.18  *   68.84  *
 287.89  *
* Vel Total (ft/s)        *    1.57  * Avg. Vel. (ft/s)       *    0.89  *    2.91  *
```

1.30							
* Max Chl Dpth (ft)	* 14.86	* Hydr. Depth (ft)	* 3.10	* 11.49	* 5.44	*	
* Conv. Total (cfs)	*364262.0	* Conv. (cfs)	* 57789.4	*162832.3	*143640.3	*	
* Length Wtd. (ft)	* 113.08	* Wetted Per. (ft)	* 295.24	* 74.12	* 288.24	*	
* Min Ch El (ft)	* 796.17	* Shear (lb/sq ft)	* 0.04	* 0.13	* 0.07	*	
* Alpha	* 1.85	* Stream Power (lb/ft s)	* 328.83	* 0.00	* 0.00	*	
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.97	* 2.11	* 4.23	*	
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.76	* 0.18	* 0.74	*	

****
****

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 0

INPUT
Description: OO
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-417.03	813.82	-412.45	812.94	-406.81	812	-406.1	812	-405.22	812
-395.28	811.74	-380.91	811.39	-371.41	811.15	-364.68	810.99	-359.42	810.86
-355.34	810.77	-345.4	810.64	-340.02	810.54	-336.02	810.47	-325.13	810.34
-312.35	810.19	-297.14	810.01	-296.43	810	-296.02	810	-295.59	810
-285.2	809.91	-274.56	809.84	-274.54	809.84	-273.77	809.83	-272.94	809.82
-262.55	809.73	-253.03	809.67	-251.8	809.66	-250.49	809.65	-241.36	809.57
-232.98	809.51	-230.33	809.49	-227.4	809.46	-224.11	809.42	-220.35	809.37
-208.38	809.22	-174.4	808.34	-171.28	808.24	-167.82	808.24	-159.55	808.19
-158.48	808.19	-156.58	808.18	-145.99	808.1	-143.06	808.1	-141.48	808.1
-141.47	808.1	-141.45	808.1	-141.41	808.1	-139.97	808.09	-136.44	808.09
-134.24	808.08	-131.11	808.06	-127.77	808.05	-120.4	808.02	-118.91	808.01
-118.39	808.01	-117.91	808.01	-117.81	808.01	-115.67	808	-113.81	807.99
-106.61	807.86	-105.72	807.84	-104.61	807.82	-104.57	807.82	-102.61	807.78
-99.96	807.71	-94.79	807.56	-82.5	807.22	-39.63	806	-38.69	806
-32.64	804.46	-31.48	804	-29.07	802.86	-27.45	802	-25.43	800.91
-24.71	800.57	-23.51	800	-21.41	799	-19.3	798	-10.6	796
-.12	796	-.06	796	0	796	11.36	796	20.55	798
22.64	798.89	25.23	800	25.29	800.03	25.3	800.03	29.05	802
30.21	802.61	33.02	804	35.92	804.98	37.94	804.98	38.95	804.98
39.77	804.98	55.66	804.9	86.81	804.9	121.46	804.49	134.69	804.4
178.19	803.99	181.7	803.96	182	803.96	184.59	803.99	228.44	804.47
248.69	805.15	255.51	805.29	257.89	805.39	258.14	805.47	259.94	805.87
277.19	809.69	294.63	811.77	300.3	812.2	300.82	812.43	300.99	812.54

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-417.03	.05	-38.69	.035	35.92	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.69	35.92	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
****

E.G. Elev (ft)	811.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.00	Reach Len. (ft)			
Crit W.S. (ft)	803.91	Flow Area (sq ft)	705.56	889.77	1504.49
E.G. Slope (ft/ft)	0.000191	Area (sq ft)	705.56	889.77	1504.49
Q Total (cfs)	5150.00	Flow (cfs)	484.14	2637.88	2027.98
Top Width (ft)	653.27	Top Width (ft)	326.41	74.61	252.25
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	0.69	2.96	1.35
Max Chl Dpth (ft)	15.00	Hydr. Depth (ft)	2.16	11.93	5.96
Conv. Total (cfs)	372848.1	Conv. (cfs)	35050.7	190976.4	146821.0
Length Wtd. (ft)		Wetted Per. (ft)	326.46	78.27	252.83
Min Ch El (ft)	796.00	Shear (lb/sq ft)	0.03	0.14	0.07
Alpha	1.91	Stream Power (lb/ft s)	300.99	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Buckeye Creek

Reach	River Sta.	n1	n2	n3
Buckeye Creek	3504.54	.05	.035	.05
Buckeye Creek	3454.54	.05	.035	.05
Buckeye Creek	3404.54	.05	.035	.05
Buckeye Creek	3354.54	.05	.035	.05
Buckeye Creek	3304.54	.05	.035	.05
Buckeye Creek	3254.54	.05	.035	.05
Buckeye Creek	3204.54	.05	.035	.05
Buckeye Creek	3154.54	.05	.035	.05
Buckeye Creek	3104.54	.05	.035	.05
Buckeye Creek	3054.54	.05	.035	.05
Buckeye Creek	3004.54	.05	.035	.05
Buckeye Creek	2954.54	.05	.035	.05
Buckeye Creek	2904.54	.05	.035	.05
Buckeye Creek	2854.58	.05	.035	.05
Buckeye Creek	2804.54	.05	.035	.05
Buckeye Creek	2754.54	.05	.035	.05
Buckeye Creek	2704.54	.05	.035	.05
Buckeye Creek	2661.29	.05	.035	.05
Buckeye Creek	2603.43	.05	.035	.05
Buckeye Creek	2554.54	.05	.035	.05
Buckeye Creek	2494.62	.05	.035	.05

*Buckeye Creek	*	2460.04	*Bridge	*	*	*
*Buckeye Creek	*	2417.85	*	.05*	.035*	.05*
*Buckeye Creek	*	2354.53	*	.05*	.035*	.05*
*Buckeye Creek	*	2306.38	*	.05*	.035*	.05*
*Buckeye Creek	*	2254.54	*	.05*	.035*	.05*
*Buckeye Creek	*	2204.54	*	.05*	.035*	.05*
*Buckeye Creek	*	2154.54	*	.05*	.035*	.05*
*Buckeye Creek	*	2105.74	*	.05*	.035*	.05*
*Buckeye Creek	*	1903.41	*	.05*	.035*	.05*
*Buckeye Creek	*	1804	*	.05*	.035*	.05*
*Buckeye Creek	*	1604.54	*	.05*	.035*	.05*
*Buckeye Creek	*	1419.72	*	.05*	.035*	.05*
*Buckeye Creek	*	1234.05	*	.05*	.035*	.05*
*Buckeye Creek	*	1102.70	*	.05*	.035*	.05*
*Buckeye Creek	*	972.12	*	.05*	.035*	.05*
*Buckeye Creek	*	810.82	*	.05*	.035*	.05*
*Buckeye Creek	*	632.35	*	.05*	.035*	.05*
*Buckeye Creek	*	433.99	*	.05*	.035*	.05*
*Buckeye Creek	*	289.71	*	.05*	.035*	.05*
*Buckeye Creek	*	109.26	*	.05*	.035*	.05*
*Buckeye Creek	*	0	*	.05*	.035*	.05*

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

Reach	River Sta.	Left	Channel	Right
*Buckeye Creek	* 3504.54	* 50*	50*	50*
*Buckeye Creek	* 3454.54	* 52*	50*	50*
*Buckeye Creek	* 3404.54	* 55*	50*	50*
*Buckeye Creek	* 3354.54	* 35*	50*	50*
*Buckeye Creek	* 3304.54	* 55*	50*	47*
*Buckeye Creek	* 3254.54	* 43*	50*	52*
*Buckeye Creek	* 3204.54	* 44*	50*	51*
*Buckeye Creek	* 3154.54	* 48*	50*	52*
*Buckeye Creek	* 3104.54	* 22*	50*	48*
*Buckeye Creek	* 3054.54	* 23*	50*	53*
*Buckeye Creek	* 3004.54	* 36*	50*	48*
*Buckeye Creek	* 2954.54	* 36*	50*	48*
*Buckeye Creek	* 2904.54	* 42*	49.96*	51*
*Buckeye Creek	* 2854.58	* 40*	50.04*	52*
*Buckeye Creek	* 2804.54	* 87*	50*	60*
*Buckeye Creek	* 2754.54	* 109*	50*	58*
*Buckeye Creek	* 2704.54	* 52*	43.25*	43*
*Buckeye Creek	* 2661.29	* 53*	58*	63*
*Buckeye Creek	* 2603.43	* 68*	48.89*	51*
*Buckeye Creek	* 2554.54	* 83*	59.92*	60*
*Buckeye Creek	* 2494.62	* 170*	76.77*	86*
*Buckeye Creek	* 2460.04	*Bridge	*	*	*
*Buckeye Creek	* 2417.85	* 91*	63.32*	62*
*Buckeye Creek	* 2354.53	* 144*	48.15*	69*
*Buckeye Creek	* 2306.38	* 90*	51.84*	42*
*Buckeye Creek	* 2254.54	* 90*	50*	45*
*Buckeye Creek	* 2204.54	* 74*	50*	44*
*Buckeye Creek	* 2154.54	* 63*	48.8*	47*
*Buckeye Creek	* 2105.74	* 190*	202.35*	215*
*Buckeye Creek	* 1903.41	* 233*	99.41*	34*
*Buckeye Creek	* 1804	* 279*	199.46*	52*
*Buckeye Creek	* 1604.54	* 149*	184.82*	41*

*Buckeye Creek	*	1419.72	*	173*	185.67*	44*
*Buckeye Creek	*	1234.05	*	117*	131.34*	192.99*
*Buckeye Creek	*	1102.70	*	138.99*	130.59*	147.99*
*Buckeye Creek	*	972.12	*	168*	161.32*	108*
*Buckeye Creek	*	810.82	*	200*	178.48*	258*
*Buckeye Creek	*	632.35	*	239*	198.36*	80*
*Buckeye Creek	*	433.99	*	150.99*	144.27*	75.99*
*Buckeye Creek	*	289.71	*	142*	180.45*	179*
*Buckeye Creek	*	109.26	*	105.99*	109.26*	120*
*Buckeye Creek	*	0	*	0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Buckeye Creek

Reach	River Sta.	Contr.	Expan.
*Buckeye Creek	3504.54	.1	.3
*Buckeye Creek	3454.54	.1	.3
*Buckeye Creek	3404.54	.1	.3
*Buckeye Creek	3354.54	.1	.3
*Buckeye Creek	3304.54	.1	.3
*Buckeye Creek	3254.54	.1	.3
*Buckeye Creek	3204.54	.1	.3
*Buckeye Creek	3154.54	.1	.3
*Buckeye Creek	3104.54	.1	.3
*Buckeye Creek	3054.54	.1	.3
*Buckeye Creek	3004.54	.1	.3
*Buckeye Creek	2954.54	.1	.3
*Buckeye Creek	2904.54	.1	.3
*Buckeye Creek	2854.58	.1	.3
*Buckeye Creek	2804.54	.1	.3
*Buckeye Creek	2754.54	.1	.3
*Buckeye Creek	2704.54	.1	.3
*Buckeye Creek	2661.29	.1	.3
*Buckeye Creek	2603.43	.1	.3
*Buckeye Creek	2554.54	.1	.3
*Buckeye Creek	2494.62	.1	.3
*Buckeye Creek	2460.04 *Bridge		
*Buckeye Creek	2417.85	.1	.3
*Buckeye Creek	2354.53	.1	.3
*Buckeye Creek	2306.38	.1	.3
*Buckeye Creek	2254.54	.1	.3
*Buckeye Creek	2204.54	.1	.3
*Buckeye Creek	2154.54	.1	.3
*Buckeye Creek	2105.74	.1	.3
*Buckeye Creek	1903.41	.1	.3
*Buckeye Creek	1804	.1	.3
*Buckeye Creek	1604.54	.1	.3
*Buckeye Creek	1419.72	.1	.3
*Buckeye Creek	1234.05	.1	.3
*Buckeye Creek	1102.70	.1	.3
*Buckeye Creek	972.12	.1	.3
*Buckeye Creek	810.82	.1	.3
*Buckeye Creek	632.35	.1	.3
*Buckeye Creek	433.99	.1	.3
*Buckeye Creek	289.71	.1	.3
*Buckeye Creek	109.26	.1	.3
*Buckeye Creek	0	.1	.3

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street PREPARED BY: TGJ 1/24/2014
Davis, California CHECKED BY: ARG 26-Jan-2014

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

****

PROJECT DATA
Project Title: 110-811_Sherwood FB HH
Project File : 110-811_SherwoFBHH.prj
Run Date and Time: 1/24/2014 9:15:17 AM

Project in English units

Project Description:
MarkWest Liberty Midstream & Resources, LLC
CEC #110-811
4600 J. Barry Ct., Suite 500
Canonsburg, PA 15317

January 2014

Sherwood Gas Processing Plant - Full
Buildout - Flood Study
Construction in a Floodway Study for Approval of final
grading.

FEMA Zones A, AE, and X from the Doddridge County Indiana FIS
Study shown on FEMA FIRM Panel # 54017C0080 B, effective October 4,
2011.

CEC Engineering Team:
Principal: Rick Celender, C.E.T., CPESC,
CPSWQ
Project Manager: Andy Gullone, P.E., CPESC
Hydraulic Modelers: Tim
Johnston
Reviewers: Andy Gullone, Rick Celender

Model Creation:
Existing
(Pre-project): CEC Created Model File, "110-811_Sherwood FB HH," Plan File,
"110-811_Existing 01-23-2014."
Proposed (Post-project): CEC Created Model
File, "110-811_Sherwood FB HH," Plan File, "110-811_Proposed
1-23-2014."
Geometry file created in HEC-RAS.
Steady flow file created from
Doddridge County FIS, October 4, 2011.

Data Sources:
Geometry - Surface
created from West Virginia Statewide Addressing and Mapping Board DEM blended with field topo survey of the bridge, existing access road from County Route 50/34, and various locations along the reach.
Flow - Total Buckeye Creek
100-year flow = 5,150 CFS.
Downstream Boundary - Known Water Surface Elevation
= 811. Approximate stream distance of 3,504 feet on profile.

****

PLAN DATA

Plan Title: 110-811_Proposed 01-23-2014
Plan File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.p02

Geometry Title: 110-811_Proposed 01-23-2014
Geometry File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.g01

Flow Title : 110-811_100Year
Flow File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.f01

Plan Description:
Proposed Geometry, 100-year storm, subcritical analysis

Plan Summary Information:

Number of:	Cross Sections	= 41	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: 110-811_100Year
Flow File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.f01

Flow Data (cfs)

River	Reach	RS	100-Year
Buckeye Creek	Buckeye Creek	3504.54	5150

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Buckeye Creek	Buckeye Creek	100-Year	*	*

Known WS = 811

GEOMETRY DATA

Geometry Title: 110-811_Proposed 01-23-2014
Geometry File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.g01

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3504.54

INPUT
Description: A
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	838.81	-98.96	838.29	-98.75	838.18	-98.4	838	-96.95	837.26
-96.1	836.83	-95.4	836.48	-94.48	836	-93.69	835.59	-92.75	835.1
-91.68	834.54	-90.65	834	-89.58	833.44	-88.38	832.81	-87.57	832.38
-86.84	832	-85.95	831.54	-85.41	831.26	-84.5	830.79	-83.05	830.02
-83.01	830	-81.27	829.11	-79.1	828	-79.08	827.99	-79.07	827.99
-77.37	827.11	-75.99	826.41	-75.64	826.23	-75.18	826	-74.04	825.4
-73.22	824.97	-72.55	824.62	-71.39	824	-70.83	823.7	-70.35	823.45
-69.1	822.78	-67.62	822	-67.26	821.81	-67.01	821.68	-65.6	820.94
-64.29	820.25	-64.09	820.15	-63.81	820	-62.65	819.38	-61.84	818.95
-61.13	818.57	-60.06	818	-60.02	817.91	-59.96	817.79	-59.91	817.69
-59.87	817.59	-59.83	817.5	-59.8	817.43	-59.77	817.35	-59.73	817.28
-59.7	817.21	-59.67	817.15	-59.65	817.09	-59.62	817.04	-59.6	816.99
-59.58	816.94	-59.56	816.89	-59.54	816.85	-59.46	816.69	-59.15	815.06
-47.25	813.56	-46	813.25	-45.85	813.22	-44.79	812.96	-43.56	812.66
-42.3	812.35	-41.93	812.27	-41.36	808.97	-40.43	808	-40.31	808
-40.27	808	-40.22	808	-40.14	808	-38.54	807.48	-34.04	806
-33.41	805.89	-32.05	805.65	-25.82	804.54	-22.76	804.44	-19.68	804.44
-19.3	804.44	-14.73	804.44	-5.05	804.44	0	804.44	.9	804.44
5.75	804.44	15.3	804.44	16.43	804.44	19.72	804.44	21.76	804.67
25.81	806	28.84	806.95	32.2	808	35.74	808.98	39.4	810
43.29	811.02	47.05	812	49.55	812.68	54.41	814	56.85	814.55
63.18	816	63.21	816	63.24	816	63.62	816.01	63.71	816
63.73	816	63.9	816	64.26	816	66.98	816	71.15	816
79.48	816	89.67	816	95.77	816	97.03	816	99.05	816
101.29	816	101.88	816	102.53	816	103.1	816.19	110.92	818
112.97	819.63	113.44	820	115.04	821.27	116.39	822	119.11	823.46
119.51	824	120.78	825.71	121	826	121.65	826.89	122.64	828
123.43	828.89	124.41	830	125.72	831.48	126.18	832	126.52	832.39
127.95	834	129.37	835.19	130.09	835.93	132.25	835.95	133.34	836
134.36	836.19	136.69	836.42						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.05	-41.93	.035	49.55	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-41.93	49.55	50	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	814.16	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	8.09	735.37	4.05
E.G. Slope (ft/ft)	0.001800	Area (sq ft)	8.09	735.37	4.05
Q Total (cfs)	5150.00	Flow (cfs)	8.69	5137.28	4.03
Top Width (ft)	107.15	Top Width (ft)	10.09	91.48	5.58
Vel Total (ft/s)	6.89	Avg. Vel. (ft/s)	1.07	6.99	1.00
Max Chl Dpth (ft)	9.72	Hydr. Depth (ft)	0.80	8.04	0.73
Conv. Total (cfs)	121387.7	Conv. (cfs)	204.8	121087.9	95.0
Length Wtd. (ft)	50.00	Wetted Per. (ft)	10.28	96.27	5.77
Min Ch El (ft)	804.44	Shear (lb/sq ft)	0.09	0.86	0.08
Alpha	1.03	Stream Power (lb/ft s)	136.69	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	71.84	54.76	65.89
C & E Loss (ft)	0.03	Cum SA (acres)	19.75	5.01	14.38

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3454.54

INPUT
Description: B
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-106.13	826.76	-105.83	826.61	-105.52	826.46	-104.57	826	-104.45	825.95
-104.42	825.93	-103.35	825.44	-102.97	825.27	-102.28	824.95	-101.55	824.59
-101.24	824.44	-100.37	824	-100.19	823.91	-99.27	823.46	-98.9	823.29
-98.27	822.98	-97.55	822.65	-97.23	822.49	-96.16	822	-96.15	821.99
-96.14	821.99	-94.96	821.48	-94.61	821.32	-93.85	820.99	-93.19	820.71
-92.79	820.53	-91.86	820.13	-91.79	820.1	-91.59	820	-90.51	819.47
-90.04	819.26	-89.22	818.86	-88.25	818.41	-87.98	818.28	-87.37	818

-87.36	818	-87.35	818	-87.19	817.14	-86.99	814.66	-83.41	814.33
-78.27	814.15	-64.45	812.92	-42.91	811.21	-42.79	809.16	-42.41	809.13
-42.01	809.09	-41.6	809.06	-41.18	809.02	-40.66	808.97	-40.11	808.93
-39.53	808.88	-37.2	808.63	-36.6	808.56	-35.97	808.48	-35.28	808.4
-32.94	808.07	-32.49	808	-31.34	807.77	-31	807.7	-29.05	807.31
-28.01	807.09	-26.05	806.67	-25.06	806.46	-22.96	806	-22.17	805.82
-21.82	805.74	-19.4	805.19	-17.82	804.84	-16.67	804.58	-14.08	804.38
-13.68	804.38	-6.61	804.38	0	804.38	17.4	804.38	17.52	804.38
23.35	805.7	24.35	806	28.89	807.47	30.57	808	37.14	809.7
38.3	810	39.73	810.36	46.16	812	52.62	813.62	54.12	814
61.82	815.78	62.8	816	62.86	816	62.93	816	62.98	816
63.03	816	63.08	816	63.12	816	63.16	816	63.2	816
63.43	816	72.23	816	72.53	816	77.56	816	88.82	816
92.29	816	92.47	816	93.12	816	93.64	816	96.03	816
98.64	816	99.53	816	101.36	816	103.41	816	105.44	816
108.77	817.27	110.92	818	112.2	819.74	112.38	820	113.85	822
113.85	822.01	115.45	823.6	115.85	824	116.26	824.42	117.85	826
118.35	826.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-106.13	.05	-42.79	.035	30.57	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-42.79	30.57	52	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.78	Reach Len. (ft)	52.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	41.44	592.70	65.07
E.G. Slope (ft/ft)	0.002374	Area (sq ft)	41.44	592.70	65.07
Q Total (cfs)	5150.00	Flow (cfs)	69.38	4894.30	186.33
Top Width (ft)	127.32	Top Width (ft)	31.29	73.36	22.67
Vel Total (ft/s)	7.37	Avg. Vel. (ft/s)	1.67	8.26	2.86
Max Chl Dpth (ft)	9.40	Hydr. Depth (ft)	1.32	8.08	2.87
Conv. Total (cfs)	105700.8	Conv. (cfs)	1423.9	100452.7	3824.3
Length Wtd. (ft)	50.03	Wetted Per. (ft)	33.33	74.31	23.40
Min Ch El (ft)	804.38	Shear (lb/sq ft)	0.18	1.18	0.41
Alpha	1.20	Stream Power (lb/ft s)	118.35	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	71.81	54.00	65.85
C & E Loss (ft)	0.02	Cum SA (acres)	19.73	4.91	14.36

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3404.54

INPUT
Description: C
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.31	819.94	-130.16	819.85	-127.95	818.4	-127.34	818	-124.36	816.46
-123.5	816	-122.92	815.91	-122.44	815.86	-122.09	815.81	-121.89	815.78
-121.74	815.75	-121.45	815.71	-121.31	815.69	-121.19	815.68	-121.09	815.66
-121	815.65	-120.93	815.64	-120.86	815.64	-120.81	815.63	-120.78	815.51
-118.73	815.9	-118.62	815.92	-118.37	815.95	-117.79	815.59	-115.95	814.65
-112.35	813.89	-102.14	815.26	-94.41	813.55	-93.69	813.6	-93.3	813.59
-91.7	813.84	-89.86	814.09	-85.86	814.99	-84.7	814.77	-82.96	814.52
-77.51	814.54	-69.06	813.8	-67.38	813.67	-52.48	812.03	-42.72	810.75
-39.01	809.99	-38.2	809.83	-38.11	809.8	-37.46	809.6	-37.3	809.57
-37.12	809.53	-36.94	809.5	-36.74	809.46	-36.53	809.42	-35.73	809.24
-35.55	809.2	-35.23	809.14	-34.89	809.07	-34.51	809	-34.1	808.92
-33.65	808.83	-33.15	808.73	-32.59	808.62	-31.98	808.5	-31.02	808.31
-30.29	808.16	-29.54	808	-29.5	808	-28.02	807.66	-20.74	806
-15	804.51	-12.96	804.32	-3.54	804.32	0	804.32	4.45	804.32
15.59	804.32	24.88	805.99	24.9	806	29.51	807.42	31.4	808
35.16	808.93	39.43	810	41.01	810.41	47.1	812	50.37	812.89
54.45	814	59.19	815.18	62.48	816	62.51	816	62.55	816
62.56	816	63.15	816	63.19	816	63.22	816	63.23	816
63.24	816	63.25	816	63.26	816	63.27	816	63.28	816
73.18	816	75.76	816	76.08	816	82.98	816	89.81	816
92.74	816	96.15	815.99	98.06	815.99	99.09	815.99	104.95	816
110.42	817.6	111.76	818	112.3	818.75	113.18	820	113.8	820.86
114.59	822	115.75	823.64	116.01	824	117.38	825.93	117.43	826
117.52	826.13	118.81	828	119.32	828.72	120.21	830	120.39	830.24

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.31	.05	-39.01	.035	31.4	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-39.01	31.4	55	50	50	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-130.31	-85.86	815	F

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.45	Reach Len. (ft)	55.00	50.00	50.00
Crit W.S. (ft)	811.28	Flow Area (sq ft)	40.68	544.40	58.41
E.G. Slope (ft/ft)	0.002975	Area (sq ft)	40.68	544.40	58.41
Q Total (cfs)	5150.00	Flow (cfs)	87.51	4879.39	183.09
Top Width (ft)	117.80	Top Width (ft)	26.37	70.41	

	21.03	*									*
*	Vel Total (ft/s)	*	8.00	*	Avg. Vel. (ft/s)	*	2.15	*	8.96	*	3.13 *
*	Max Chl Dpth (ft)	*	9.13	*	Hydr. Depth (ft)	*	1.54	*	7.73	*	2.78 *
*	Conv. Total (cfs)	*	94414.7	*	Conv. (cfs)	*	1604.4	*	89453.6	*	3356.7 *
*	Length Wtd. (ft)	*	50.26	*	Wetted Per. (ft)	*	26.60	*	71.50	*	21.72 *
*	Min Ch El (ft)	*	804.32	*	Shear (lb/sq ft)	*	0.28	*	1.41	*	0.50 *
*	Alpha	*	1.19	*	Stream Power (lb/ft s)	*	120.39	*	0.00	*	0.00 *
*	Frctn Loss (ft)	*	0.13	*	Cum Volume (acre-ft)	*	71.76	*	53.35	*	65.78 *
*	C & E Loss (ft)	*	0.10	*	Cum SA (acres)	*	19.69	*	4.83	*	14.34 *

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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3354.54

INPUT
Description: D
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-161.95	820.72	-159	819.1	-154.74	817.2	-151.93	815.9	-147.17	813.71
-145.77	813.06	-126.21	812.54	-124.87	812.51	-123.36	812.51	-123.07	812.53
-122.06	812.55	-122.03	812.53	-115.94	812.57	-115.14	812.59	-114.95	812.57
-103.12	812.35	-88.28	812.14	-82.76	812.08	-54.87	809.98	-52.64	809.81
-41.07	809.2	-39.11	809.06	-36.85	808.62	-36.78	808.61	-36.71	808.61
-36.64	808.6	-36.56	808.59	-36.14	808.54	-35.65	808.48	-35.49	808.45
-35.3	808.43	-35.09	808.4	-34.83	808.36	-34.53	808.32	-34.16	808.27
-33.7	808.2	-33.12	808.12	-32.28	808.01	-32.21	808	-31.45	807.84
-22.89	806	-21.17	805.62	-18.11	804.96	-15.26	804.34	-13.7	804.25
-13.63	804.25	-13.6	804.25	-13.5	804.25	-.57	804.25	0	804.25
4.84	804.25	8.21	804.25	16.71	804.25	17.49	804.25	26.48	806
31.46	807.35	33.9	808	38.76	809.37	40.95	810	46.89	811.73
47.8	812	48.18	812.11	54.65	814	57.78	814.8	62.56	816
62.6	816	62.66	816	62.67	816	62.73	816	62.74	816
62.91	816	63.02	816	63.12	816	63.22	816	63.3	816
63.38	816	63.45	816	63.52	816	63.58	816	63.63	816
63.69	816	63.74	816	63.78	816	63.83	816	64.54	816
66.78	816.01	67.1	816.01	67.7	816.01	68.02	816.01	68.26	816.01
71.84	816.01	73.95	816.01	74.22	816.01	85.96	816	89.03	815.99
91.01	815.98	96.63	815.95	100.33	815.97	106.93	816	112.68	817.78
113.29	818	113.56	818.18	115.15	820	116.54	821.58	116.9	822
118.58	823.91	118.65	824	118.98	824.38	119.3	824.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-161.95	.05	-36.56	.035	33.9	.05

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

-36.56 33.9 35 50 50 .1 .3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.55	Reach Len. (ft)	35.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	212.23	576.50	53.67
E.G. Slope (ft/ft)	0.002137	Area (sq ft)	212.23	576.50	53.67
Q Total (cfs)	5150.00	Flow (cfs)	450.42	4557.14	142.44
Top Width (ft)	199.92	Top Width (ft)	110.26	70.46	19.20
Vel Total (ft/s)	6.11	Avg. Vel. (ft/s)	2.12	7.90	2.65
Max Chl Dpth (ft)	9.30	Hydr. Depth (ft)	1.92	8.18	2.79
Conv. Total (cfs)	111396.5	Conv. (cfs)	9742.8	98572.6	3081.1
Length Wtd. (ft)	48.65	Wetted Per. (ft)	110.54	71.33	19.99
Min Ch El (ft)	804.25	Shear (lb/sq ft)	0.26	1.08	0.36
Alpha	1.50	Stream Power (lb/ft s)	119.30	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	71.60	52.70	65.71
C & E Loss (ft)	0.00	Cum SA (acres)	19.61	4.75	14.32

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3304.54

INPUT
Description: E
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-193.15	818.45	-183.47	814.34	-183.16	814.28	-176.73	813.26	-163.3	813.13
-138.32	812.35	-120.78	812.28	-86.53	811.72	-71.47	811.24	-56.51	810.18
-43	809.27	-36.76	808.75	-36.03	808.62	-36	808.61	-35.97	808.61
-35.94	808.6	-35.9	808.6	-35.86	808.59	-35.82	808.58	-35.77	808.58
-35.72	808.57	-35.67	808.56	-35.62	808.55	-35.57	808.54	-35.45	808.52
-35.38	808.51	-35.31	808.49	-35.22	808.47	-35.13	808.45	-35.02	808.43
-34.88	808.4	-34.73	808.37	-34.53	808.33	-34.3	808.28	-33.99	808.22
-33.59	808.13	-33.11	808.03	-32.95	808	-29.62	807.39	-22.04	806
-15.25	804.68	-11.71	804.25	-11.66	804.25	0	804.25	11.43	804.25
12.59	804.25	14.93	804.25	22.78	805.33	26.75	806	35.39	807.94
35.56	807.97	35.68	808	36.05	808.12	42.24	810	48.06	811.81
48.44	811.93	48.47	811.94	48.67	812	48.97	812.09	55.11	814
58.52	814.76	64.02	816	64.05	816	64.06	816	64.11	816
64.12	816	64.16	816	64.18	816	64.21	816	64.23	816

64.27	816	64.29	816	64.51	816	64.55	816	64.59	816
64.63	816	64.66	816	64.7	816	64.72	816	64.98	816
65.48	816	65.86	816	66.57	816	71.47	816.01	72.7	816.02
72.75	816.02	73.29	816.02	74.51	816.02	75.35	816.02	84.84	816
93.89	815.84	94	815.84	95.83	815.82	98.76	815.86	102.88	815.92
106.57	816	109.76	817.28	111.63	818	113.65	818.64	117.46	820
123.18	821.49	124.76	821.91	125.09	822	125.17	822	125.18	822
125.45	822.01	125.65	822.02	126.04	822.04	126.82	822.08	127.57	822.09
152.93	822.56	166.8	822.78						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-193.15	.05	-36.76	.035	35.39	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.76	35.39	55	50	47	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.45	Reach Len. (ft)	55.00	50.00	47.00
Crit W.S. (ft)		Flow Area (sq ft)	239.53	576.49	49.91
E.G. Slope (ft/ft)	0.002188	Area (sq ft)	239.53	576.49	49.91
Q Total (cfs)	5150.00	Flow (cfs)	473.36	4543.55	133.09
Top Width (ft)	231.27	Top Width (ft)	141.17	72.15	17.95
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)	1.98	7.88	2.67
Max Chl Dpth (ft)	9.20	Hydr. Depth (ft)	1.70	7.99	2.78
Conv. Total (cfs)	110104.9	Conv. (cfs)	10120.3	97139.2	2845.4
Length Wtd. (ft)	50.59	Wetted Per. (ft)	141.30	72.91	18.78
Min Ch El (ft)	804.25	Shear (lb/sq ft)	0.23	1.08	0.36
Alpha	1.56	Stream Power (lb/ft s)	166.80	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	71.42	52.04	65.65
C & E Loss (ft)	0.08	Cum SA (acres)	19.51	4.67	14.29

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3254.54

INPUT
Description: F
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240.13	819.89	-227.21	814.66	-216.19	812.98	-198.11	812.16	-175.25	811.94
-165.06	811.8	-160.59	811.79	-152.22	811.82	-122.44	811.41	-109.35	811.26
-104.94	811.11	-102.58	811.05	-67.55	810.05	-42.46	809.03	-36.68	808.81
-36.67	808.63	-36.63	808.62	-36.6	808.62	-36.56	808.61	-36.51	808.6
-36.47	808.59	-36.42	808.58	-36.36	808.57	-36.3	808.56	-36.24	808.55
-36.18	808.54	-36.1	808.52	-35.72	808.43	-35.62	808.41	-35.52	808.39
-35.41	808.37	-35.28	808.34	-35.14	808.31	-34.99	808.27	-34.82	808.23
-34.63	808.18	-34.4	808.13	-34.14	808.06	-33.88	808	-31.55	807.56
-23.17	806	-20.88	805.53	-17.84	804.92	-15.28	804.39	-13.32	804.12
-7.98	804.12	-6.03	804.12	-.01	804.12	0	804.12	4.38	804.12
7.24	804.12	15.16	804.12	15.2	804.12	15.21	804.12	15.81	804.12
16.56	804.21	16.72	804.23	28.47	806	32.29	806.81	35.63	807.52
37.86	808	42.77	809.48	44.49	810	46.47	810.68	50.28	812
53.04	812.93	56.3	814	60.48	814.91	63.23	815.52	63.61	815.59
64.3	815.74	65.6	816	65.65	816	65.74	816	65.87	816
65.99	816	66.12	816	66.23	816	66.36	816	66.47	816
66.61	816	66.72	816	66.85	816	66.96	816	67.1	816
67.21	816	67.34	816	67.45	816	67.55	816	67.63	816
67.97	816	68.02	816	68.06	816	68.1	816	68.14	816
68.72	816	68.76	816	69.87	816.02	70.51	816.02	71.52	816.02
71.91	816.03	77.35	816	78.14	816	85.05	814.92	90.53	814.08
91.07	814	91.75	814	98.34	814	102.59	815.16	106.43	816
110.08	817.66	110.84	818	113.36	819.15	115.21	820	116.17	820.22
116.63	820.29	122.85	821.87						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-240.13	.05	-36.68	.035	37.86	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.68	37.86	43	50	52	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
71.52	122.85	816.02	F

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 814.14	* Element	* Left OB	* Channel * Right OB *
* Vel Head (ft)	* 0.59	* Wt. n-Val.	* 0.050	* 0.035 * 0.050 *
* W.S. Elev (ft)	* 813.54	* Reach Len. (ft)	* 43.00	* 50.00 * 52.00 *
* Crit W.S. (ft)	* 810.89	* Flow Area (sq ft)	* 427.03	* 612.40 * 48.44 *
* E.G. Slope (ft/ft)	*0.001568	* Area (sq ft)	* 427.03	* 612.40 * 48.44 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 883.08	* 4156.37 * 110.55 *
* Top Width (ft)	* 274.81	* Top Width (ft)	* 183.22	* 74.54 * 17.05 *
* Vel Total (ft/s)	* 4.73	* Avg. Vel. (ft/s)	* 2.07	* 6.79 * 2.28 *
* Max Chl Dpth (ft)	* 9.42	* Hydr. Depth (ft)	* 2.33	* 8.22 * 2.84 *
* Conv. Total (cfs)	*130052.8	* Conv. (cfs)	* 22300.4	*104960.7 * 2791.7 *
* Length Wtd. (ft)	* 48.69	* Wetted Per. (ft)	* 183.32	* 75.50 * 17.93 *

* Min Ch El (ft)	* 804.12	* Shear (lb/sq ft)	* 0.23	* 0.79	* 0.26	*	
* Alpha	* 1.70	* Stream Power (lb/ft s)	* 122.85	* 0.00	* 0.00	*	
* Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	* 71.00	* 51.36	* 65.60	*	
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 19.30	* 4.58	* 14.27	*	

****

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3204.54

INPUT
Description: G
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-283.58	819.8	-266.29	814.14	-266.24	814.12	-266.23	814.12	-266.09	814.11
-217.5	811.93	-217.38	811.93	-173.11	811.45	-163.78	811.46	-160.93	811.43
-155.76	811.36	-150	811.26	-144.17	811.18	-124.33	810.91	-109.74	810.72
-100.63	810.59	-93.13	810.46	-70.42	809.9	-50.46	809.14	-38.7	808.69
-33.59	808.48	-31.92	807.96	-31.88	807.94	-31.83	807.93	-31.78	807.91
-31.73	807.89	-31.68	807.88	-31.63	807.86	-31.57	807.84	-31.51	807.81
-31.44	807.79	-31.37	807.77	-31.29	807.74	-31.2	807.71	-31.1	807.69
-30.89	807.62	-30.78	807.58	-30.66	807.54	-30.52	807.5	-30.38	807.45
-30.22	807.4	-29.76	807.22	-29.6	807.16	-29.42	807.08	-29.23	807
-28.94	806.91	-28.61	806.8	-28.23	806.67	-27.79	806.53	-27.29	806.36
-26.69	806.17	-26.19	806	-21.56	805.01	-18.47	804.35	-16.86	804.05
-8.24	804.05	-2.99	804.05	0	804.05	3.37	804.05	15.21	804.05
15.24	804.05	16.56	804.21	27.88	806	30.45	806.52	37.81	808
39.9	808.63	44.4	810	47.91	811.09	50.79	812	54.71	813.27
56.99	814	57.54	814.1	57.74	814.13	60.08	814.54	62.07	814.88
63.39	815.06	64.64	815.27	69.51	816	69.65	816	69.72	816
69.9	816	69.98	816	70.07	816	70.16	816	70.17	816
70.18	816	70.19	816	70.2	816	71.28	816	71.34	816
71.39	816	71.44	816	71.49	816	88.72	817.7	91.55	818
96.32	818.82	102.84	820	107.71	820.7	116.72	821.98		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-283.58	.05	-33.59	.035	37.81	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.59	37.81	44	50	51	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 814.04	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.52	* Wt. n-Val.	* 0.050	* 0.035	* 0.050	*
* W.S. Elev (ft)	* 813.52	* Reach Len. (ft)	* 44.00	* 50.00	* 51.00	*

* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 544.05	* 602.23	* 49.51 *
* E.G. Slope (ft/ft)	*0.001404	* Area (sq ft)	* 544.05	* 602.23	* 49.51 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 1109.67	* 3934.15	* 106.17 *
* Top Width (ft)	* 308.45	* Top Width (ft)	* 219.37	* 71.40	* 17.68 *
* Vel Total (ft/s)	* 4.31	* Avg. Vel. (ft/s)	* 2.04	* 6.53	* 2.14 *
* Max Chl Dpth (ft)	* 9.47	* Hydr. Depth (ft)	* 2.48	* 8.43	* 2.80 *
* Conv. Total (cfs)	*137449.7	* Conv. (cfs)	* 29616.4	*104999.6	* 2833.7 *
* Length Wtd. (ft)	* 48.56	* Wetted Per. (ft)	* 219.45	* 72.36	* 18.53 *
* Min Ch El (ft)	* 804.05	* Shear (lb/sq ft)	* 0.22	* 0.73	* 0.23 *
* Alpha	* 1.81	* Stream Power (lb/ft s)	* 116.72	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 70.52	* 50.66	* 65.54 *
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 19.10	* 4.50	* 14.25 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3154.54

INPUT
Description: H
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-344.06	820.17	-341.76	819.33	-335.3	817.11	-317.4	813.56	-307.81	813.2
-291.22	811.81	-276.12	811.8	-258.35	811.75	-229.19	811.76	-224.11	811.69
-223.803	811.688	-223.223	811.679	-223.222	811.679	-222.268	811.664	-222.256	811.664
-221.296	811.649	-221.289	811.649	-220.333	811.635	-220.323	811.635	-219.369	811.620
-219.357	811.620	-218.406	811.606	-218.391	811.606	-217.442	811.591	-217.425	811.591
-216.479	811.577	-216.459	811.577	-215.515	811.562	-215.493	811.563	-214.552	811.548
-214.527	811.548	-213.588	811.534	-213.561	811.534	-212.625	811.520	-192.497	811.392
-191.928	811.383	-189.83	811.363	-189.203	811.353	-187.17	811.333	-186.484	811.322
-184.515	811.303	-183.769	811.290	-181.867	811.271	-181.059	811.257	-180.28	811.245
-178.364	811.226	-177.438	811.212	-175.677	811.194	-174.681	811.179	-172.997	811.162
-171.929	811.145	-170.325	811.128	-167.951	811.097	-166.613	811.082	-165.132	811.066
-163.78	811.050	-162.318	811.035	-147.136	810.868	-139.726	810.795	-139.589	810.793
-139.232	810.788	-139.222	810.788	-139.208	810.788	-139.201	810.788	-117.3	810.47
-103.72	810.29	-98.64	810.21	-79.31	809.67	-63.22	809.32	-54.02	808.86
-34.08	808.02	-31.16	807.11	-31.09	807.09	-31.01	807.06	-30.93	807.04
-30.84	807.02	-30.75	806.99	-30.65	806.96	-30.55	806.93	-30.44	806.9
-30.32	806.86	-30.2	806.83	-30.06	806.79	-29.91	806.74	-29.75	806.7
-29.57	806.66	-29.38	806.61	-28.95	806.49	-28.71	806.42	-28.43	806.33
-28.13	806.24	-27.79	806.14	-27.4	806.02	-27.33	806	-25.54	805.56
-19.16	804	-17.81	803.9	-14.84	803.9	-12.95	803.9	-11.52	803.9
-10.4	803.9	-9.49	803.9	-8.03	803.9	-7.43	803.9	-6.92	803.9
-6.49	803.9	-6.11	803.9	-5.77	803.9	-5.54	803.9	-5.32	803.9
0	803.9	3.09	803.9	3.31	803.9	3.55	803.9	3.82	803.9
4.15	803.9	4.52	803.9	4.96	803.9	5.47	803.9	6.08	803.9
6.81	803.9	7.72	803.9	8.87	803.9	10.64	803.9	13.16	803.9

14.82	804	20.71	805.01	26.47	806	34.72	807.69	36.26	808
41.95	809.75	42.76	810	43.86	810.36	48.82	812	51.4	812.8
55.27	814	56.44	814.25	58.83	814.76	62.79	815.6	64.71	816
64.81	816	65.06	816	65.18	816	65.22	816	65.34	816
66.33	816	66.69	816	71	816	71.46	816	71.82	816
76.48	816.77	77.53	816.86	80.56	817.14	83.2	817.46	87.71	817.86
89.18	817.99	89.27	818	89.46	818.03	100.7	820	108.63	821.17
115.16	822	115.51	822	115.58	822				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-344.06	.05	-34.08	.035	34.72	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.08	34.72	48	50	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.53	Reach Len. (ft)	48.00	50.00	52.00
Crit W.S. (ft)		Flow Area (sq ft)	729.62	595.19	57.25
E.G. Slope (ft/ft)	0.001181	Area (sq ft)	729.62	595.19	57.25
Q Total (cfs)	5150.00	Flow (cfs)	1402.79	3628.94	118.28
Top Width (ft)	370.26	Top Width (ft)	282.43	68.80	19.02
Vel Total (ft/s)	3.73	Avg. Vel. (ft/s)	1.92	6.10	2.07
Max Chl Dpth (ft)	9.63	Hydr. Depth (ft)	2.58	8.65	3.01
Conv. Total (cfs)	149832.5	Conv. (cfs)	40812.2	105579.2	3441.1
Length Wtd. (ft)	49.44	Wetted Per. (ft)	282.55	69.69	19.91
Min Ch El (ft)	803.90	Shear (lb/sq ft)	0.19	0.63	0.21
Alpha	1.97	Stream Power (lb/ft s)	115.58	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	69.87	49.97	65.48
C & E Loss (ft)	0.03	Cum SA (acres)	18.85	4.42	14.23

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3104.54

INPUT
Description: I
Station Elevation Data num= 220

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
**************************************************************************
-401.627822.8626-401.324822.7609 -400.35822.4354-399.895822.2814-399.461 822.137
 -398.97821.9707-398.568821.8372-398.035821.6563-397.672821.5356-397.088821.3371
-396.771821.2315-396.124821.0114-395.862820.9243-395.138820.6768-394.948820.6116
 -394.12820.3292-393.914820.2582 -387.26     818-379.399     816-375.248815.1116
 -361.18  811.96 -358.34  811.62-348.174811.3547-348.097811.3538-347.677811.3489
 -346.86811.3384-346.444811.3321-346.027811.3254 -345.61811.3183-345.191811.3109
-343.637811.3318-343.563 811.329-335.749811.1249-334.712811.1268-334.629811.1264
-328.616811.1372  -328.5811.1368-327.532811.1385-327.411 811.138-326.448811.1397
 -326.32811.1392-325.363811.1409 -325.23811.1403-324.278811.1419-324.139811.1414
-323.193811.1429-323.048811.1424-322.108811.1439-321.957811.1433-321.022811.1448
-320.866811.1442  -319.9811.1474-319.737811.1468-318.777811.1499-318.609811.1493
-317.655811.1524-317.481811.1517-311.946811.1696-311.747 811.169-310.855811.1718
 -310.65811.1711-309.764811.1739-309.554811.1732-308.673 811.176-308.458811.1752
-307.582811.1779-307.362811.1772-306.492811.1798-306.267811.1791-305.402811.1817
-305.171811.1809-304.311811.1834-301.627811.1739 -294.34811.1752 -283.15811.1782
-282.893811.1787-282.201811.1788-281.943811.1793-281.253811.1794-280.993811.1799
-280.304811.1799-280.043811.1805-279.356811.1805-279.093811.1811-278.407811.1812
-278.143811.1817-277.459811.1818-277.193811.1823 -276.51811.1824-276.244811.1829
-275.562 811.183-275.294811.1835-274.613811.1836-274.344811.1842-273.665811.1843
-273.394811.1848-270.704811.1852-270.423811.1859-269.756 811.186-269.474811.1867
-268.809811.1868-268.526811.1875-267.635 811.186-259.523811.2075-258.952811.1971
-258.659811.1978-258.089811.1875-257.795811.1882-257.226 811.178 -256.93811.1787
-256.362811.1685  -255.7811.1585-255.402811.1591-254.741811.1492-254.441811.1499
-253.782811.1399-253.481811.1406-252.823811.1307-252.521811.1314-251.864811.1216
 -251.56811.1222-250.905811.1125  -250.6811.1131-249.946811.1034 -249.64811.1041
-248.987811.0944-248.679 811.095-248.027811.0854-247.719 811.086-247.068811.0764
-246.759811.0771-246.109811.0675-245.799811.0682 -245.15811.0587-169.328810.6069
-169.123810.6071-168.267810.6222-168.067810.6224-167.206810.6376-167.012810.6379
-166.145810.6533-165.957810.6535-165.134810.6682-164.962810.6698-164.333810.6728
-161.218810.7027-160.688810.7052-157.483810.7363-157.053810.7385-153.757810.7709
-153.426810.7726-150.039810.8064-149.379810.8098-145.911810.8326-145.796810.8332
-142.233810.8568 -141.57810.8612-141.516810.8343-141.463810.8075-141.409810.7803
-141.132810.7325-141.067810.7186 -138.76  810.85 -128.69  810.69 -108.79  810.52
  -62.36  809.45  -61.73  809.43  -61.33  809.43   -61.1  809.42  -34.68  808.63
   -32.1  807.88  -32.01  807.83  -31.95   807.8   -31.9  807.77  -31.72  807.68
  -31.65  807.64  -31.58  807.61   -31.5  807.57  -31.37  807.53  -31.23  807.48
  -30.68  807.28   -30.4  807.16  -30.24   807.1  -30.08  807.03   -29.9  806.95
   -29.7  806.87  -29.49  806.78  -29.26  806.69  -29.02  806.58   -28.7  806.46
  -28.35  806.33  -27.52  806.01  -22.31  804.38  -21.08     804  -11.63  803.47
   13.25  803.47   15.58     804   23.04   805.4   26.21     806   36.15     808
   38.74  808.76      43     810   48.53     812   53.61  813.61   54.83     814
   54.97  814.03   55.06  814.05   64.07     816   74.23     816   84.17  817.64
      87     818   87.13     818   91.93  818.78   99.35     820  104.37  820.67
  115.25     822  115.69     822  144.49  822.33   144.6  822.33  151.56  822.39

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
-401.627     .05  -34.68    .035   36.15     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -34.68   36.15               22      50      48             .1      .3

CROSS SECTION OUTPUT  Profile #100-Year
**************************************************************************************
***********
* E.G. Elev (ft)         *  813.87  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  813.55  * Reach Len. (ft)        *   22.00  *   50.00  *
  48.00  *
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Crit W.S. (ft)		Flow Area (sq ft)	945.24	621.64	49.08	
E.G. Slope (ft/ft)	0.000917	Area (sq ft)	945.24	621.64	49.08	
Q Total (cfs)	5150.00	Flow (cfs)	1702.65	3361.62	85.73	
Top Width (ft)	421.71	Top Width (ft)	333.61	70.83	17.28	
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)	1.80	5.41	1.75	
Max Chl Dpth (ft)	10.08	Hydr. Depth (ft)	2.83	8.78	2.84	
Conv. Total (cfs)	170043.9	Conv. (cfs)	56218.6	110994.7	2830.6	
Length Wtd. (ft)	40.52	Wetted Per. (ft)	333.87	72.08	18.15	
Min Ch El (ft)	803.47	Shear (lb/sq ft)	0.16	0.49	0.15	
Alpha	1.99	Stream Power (lb/ft s)	151.56	0.00	0.00	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	68.95	49.28	65.41	
C & E Loss (ft)	0.01	Cum SA (acres)	18.51	4.34	14.21	

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3054.54

INPUT
Description: J
Station Elevation Data num= 273

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-429.24	2819.46	-424.754	818	-416.945	816	-407.382	814	-398.068	812
-397.765	811.9786	-397.34	811.9516	-396.916	811.9272	-396.858	811.927	-396.491	811.9049
-396.418	811.9046	-396.066	811.8842	-395.98	811.8837	-395.641	811.8648	-395.543	811.864
-395.215	811.8464	-395.107	811.8454	-394.79	811.8288	-394.673	811.8277	-394.364	811.812
-394.24	811.8107	-393.939	811.7958	-393.807	811.7943	-393.513	811.7801	-393.242	811.7768
-392.943	811.763	-392.805	811.7612	-392.512	811.7479	-392.368	811.746	-392.082	811.7332
-391.933	811.7311	-391.652	811.7188	-391.498	811.7166	-391.222	811.7046	-390.581	811.7145
-390.283	811.7032	-358.444	810.8729	-357.635	810.8742	-357.313	810.8728	-352.631	810.8807
-352.29	810.8794	-351.537	810.8806	-351.19	810.8793	-350.442	810.8805	-350.09	810.8791
-349.348	810.8803	-348.99	810.8788	-348.253	810.88	-347.889	810.8785	-347.157	810.8797
-346.788	810.8782	-346.062	810.8793	-345.688	810.8778	-344.966	810.8788	-344.586	810.8773
-343.842	810.8797	-343.457	810.8781	-342.718	810.8805	-342.327	810.8789	-341.594	810.8812
-341.198	810.8796	-336.952	810.8928	-336.543	810.8914	-335.86	810.8935	-335.445	810.892
-334.911	810.8936	-334.781	810.8946	-334.405	810.8947	-333.798	810.8992	-333.42	810.8993
-332.814	810.9038	-332.435	810.9039	-331.831	810.9083	-331.45	810.9084	-330.847	810.9129
-330.465	810.9129	-329.864	810.9174	-310.36	810.9245	-308.463	810.9263	-308.056	810.9272
-304.67	810.93	-304.259	810.9309	-298.342	810.9351	-297.917	810.9361	-297.391	810.9362
-296.967	810.9373	-296.441	810.9374	-296.016	810.9385	-295.312	810.9373	-286.697	810.9601
-286.243	810.9519	-285.814	810.9529	-285.361	810.9448	-284.931	810.9458	-284.478	810.9377
-284.048	810.9387	-283.596	810.9306	-283.069	810.9227	-282.636	810.9237	-282.11	810.9158
-281.677	810.9168	-281.151	810.9089	-280.717	810.9099	-280.193	810.902	-279.758	810.903
-279.234	810.8952	-278.798	810.8962	-278.275	810.8884	-277.839	810.8894	-277.316	810.8816
-276.88	810.8826	-276.358	810.8749	-275.92	810.8758	-275.399	810.8681	-274.961	810.8691
-274.44	810.8614	-274.001	810.8624	-273.482	810.8548	-273.042	810.8557	-272.523	810.8481
-211.599	810.4879	-211.218	810.4883	-210.527	810.5004	-210.15	810.5008	-209.455	810.5131

-209.083810.5135-208.384810.5259-208.017810.5263-207.313810.5389-206.951810.5393
-206.242810.5521-205.886810.5525-205.172810.5654-204.821810.5658-204.102810.5789
-203.756810.5793-203.033810.5926-202.013810.5938-201.258810.5984-200.924810.5988
-200.164810.6035-199.836810.6039 -199.07810.6086-198.747 810.609-197.976810.6137
-197.659810.6141-196.882810.6189 -196.57810.6194-195.788810.6242-195.482810.6246
-194.695810.6295-194.394810.6299-193.601810.6349-193.306810.6353-192.508810.6403
-192.218810.6407 -190.6 810.651-190.321810.6514 -189.5810.6566-189.228 810.657
-188.401810.6623-188.134810.6626-187.302 810.668-187.041810.6683-186.203810.6738
-185.948810.6741-185.104810.6796-184.855 810.68-184.005810.6855-183.748 810.686
-182.783810.6929-182.519810.6935-181.545810.7005-181.291810.7011-180.308810.7081
-180.063810.7087 -179.07810.7159-178.835810.7165-177.833810.7237-177.607810.7243
-176.595810.7317-176.379810.7322-175.358810.7397-175.151810.7402-174.121810.7478
-173.924810.7483-172.883 810.756-172.697810.7565-171.646810.7643 -171.47810.7648
-170.409810.7727-170.243810.7732-169.172810.7812-169.016810.7816-167.935810.7898
-167.789810.7902-166.698810.7985-166.563810.7989-165.461810.8073-165.336810.8077
-164.224810.8163 -164.11810.8166-162.988810.8253-162.884810.8256-161.751810.8344
-161.659810.8347-160.514810.8437-160.433810.8439-159.278 810.853-159.208810.8532
-158.041810.8625-157.982810.8627-156.804810.8721-155.568810.8818-154.332810.8916
-153.095810.9016-151.937810.9135-151.882 810.914-151.802810.9149-151.735810.9176
-151.666810.9196-151.606810.9215-151.538 810.924-151.464810.9267-151.392810.9294
-151.324810.9319-151.034810.8906 -122.32 810.87 -114.52 810.84 -84.08 809.91
-75.91 809.69 -35.1 809.26 -35.07 808.53 -34.81 808.37 -34.6 808.31
-34.52 808.29 -34.44 808.26 -34.36 808.24 -34.27 808.21 -34.17 808.18
-33.73 808 -33.54 808 -31.01 807.15 -27.53 806 -23.61 804.75
-21.27 804 -16.03 803.04 9.9 803.04 14.57 803.48 17.29 804
21.31 804.85 26.85 806 28.59 806.34 36.86 808 38.61 808.46
44.41 810 50.23 812 51.33 812.33 57.04 814 66.81 815.06
75.8 816 77.14 816 78.3 816.19 78.68 816.24 79.1 816.3
79.86 816.42 81.74 816.76 83.22 816.97 89.82 818 93.81 818.77
99.8 820 105.59 821.09 110.84 821.97

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-429.242	.05	-35.1	.035	38.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.1	38.61	23	50	53	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.55	Reach Len. (ft)	23.00	50.00	53.00
Crit W.S. (ft)		Flow Area (sq ft)	1056.68	657.61	43.96
E.G. Slope (ft/ft)	0.000788	Area (sq ft)	1056.68	657.61	43.96
Q Total (cfs)	5150.00	Flow (cfs)	1773.11	3309.51	67.38
Top Width (ft)	460.79	Top Width (ft)	370.18	73.71	16.89
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	1.68	5.03	1.53
Max Chl Dpth (ft)	10.51	Hydr. Depth (ft)	2.85	8.92	2.60
Conv. Total (cfs)	183467.4	Conv. (cfs)	63166.5	117900.4	2400.5
Length Wtd. (ft)	40.06	Wetted Per. (ft)	370.40	75.78	

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  17.65  *
* Min Ch El (ft)         *  803.04  * Shear (lb/sq ft)       *    0.14  *    0.43  *
   0.12  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *  110.84  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   68.45  *   48.54  *
  65.36  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   18.33  *    4.26  *
  14.19  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 3004.54

INPUT
Description: K
Station Elevation Data    num=     378
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
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-509.903819.2952-505.649     818-497.946     816-487.979     814-477.904     812
-476.211 811.954-474.352811.9045-474.263811.9032-472.494811.8562-472.361811.8542
-470.638811.8089-470.462811.8064-468.784811.7627-468.565811.7596-466.932811.7176
-466.671811.7139-465.081811.6734 -464.78811.6692-463.232811.6302-462.891811.6255
-455.994811.4534-455.535811.4479-454.307811.4176-453.817811.4117 -452.62811.3825
-452.101811.3764-450.934811.3482-450.386811.3418-449.249811.3146-448.674811.3079
-447.566811.2817-446.963811.2748-445.883811.2495-445.253811.2423-444.201811.2179
-443.545811.2106-442.521811.1871-441.838811.1795-440.841811.1568-440.133 811.149
-409.791810.3666-409.438810.3669-408.606810.3628-406.593810.3647-405.771810.3611
-405.451810.3613-404.623810.3576-404.308810.3579-403.731810.3553 -403.51810.3551
-403.241810.3565-402.519810.3557-402.252810.3571-401.529810.3563-401.263810.3577
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-392.004810.3759-391.276810.3757-391.019810.3775 -390.29810.3773-390.034 810.379
-389.304810.3789-389.049810.3806-388.318810.3804-388.064810.3822-387.333 810.382
-387.079810.3837-370.407810.3864-369.683810.3876-369.455810.3875-368.731810.3886
-368.502810.3886-367.778810.3897 -367.55810.3896-366.825810.3908-366.597810.3907
-365.873810.3919-365.644810.3918 -364.92810.3929-364.692810.3929-363.967 810.394
-363.739810.3939-363.015810.3951-362.786 810.395-362.062810.3961-361.834810.3961
 -361.11810.3972-360.881810.3972-360.157810.3983 -359.25810.3981-358.515810.3996
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-339.708810.4028-339.473810.3992-338.745810.4005 -338.51810.3969-337.783810.3983
-337.548810.3947 -336.82 810.396-336.585810.3925-335.858810.3938-335.623810.3902
-334.895810.3915 -334.66 810.388-333.933810.3892-333.697810.3857-332.971 810.387
-332.735810.3834-305.814810.2147-305.046810.2154-304.749810.2207-303.984810.2214
-303.684810.2267-302.922810.2274-302.619810.2328 -301.86810.2335-301.555 810.239
-300.798810.2398 -300.49810.2453-299.737810.2461-299.427810.2517-298.676810.2525
-298.363810.2582-297.615 810.259  -297.3810.2648-295.071810.2671-294.739810.2691
-294.001810.2698-293.666810.2718-292.931810.2726-292.593810.2746-291.861810.2754
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-288.652810.2839-288.302810.2861-287.582810.2868-287.229 810.289-286.512810.2898
-286.156 810.292-285.443810.2927 -284.72810.2972-284.011 810.298-283.644810.3003
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-275.038810.3261 -274.36810.3269-273.962810.3295-273.288810.3303-272.887810.3329
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-266.856810.3515-266.433810.3543-265.785810.3551-265.358810.3581-264.713810.3588
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-261.498810.3703-261.056810.3734-260.427810.3742 -259.98810.3773-259.356810.3781
-258.905810.3813-258.284810.3821-257.829810.3853-257.213810.3861-256.754810.3894
-256.142810.3902-255.679810.3936-255.071810.3944-254.604810.3977 -254810.3985
-253.528 810.402-252.929810.4028-252.453810.4063-251.858810.4071-251.378810.4106
-250.788810.4114-250.333810.4159-249.748810.4167-249.289810.4213-248.708810.4221
-248.246810.4267-247.669810.4275-247.203810.4322-246.631 810.433-246.161810.4377
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-242.549810.4599-241.998810.4608-241.505810.4659-240.959810.4667-240.462810.4719
-239.921810.4727-239.419 810.478-238.883810.4788-238.377810.4842-237.846 810.485
-237.336810.4905 -236.81810.4913-236.431810.4946-235.909810.4954-235.528810.4988
-230.936 810.506-230.054810.5127-229.557810.5135-227.755810.5279-227.271810.5286
-225.419810.5443-224.947810.5451 -223.04810.5623-222.583810.5631-220.614 810.582
-220.173810.5827-218.137810.6034-217.714810.6042-215.603810.6268 -215.2810.6276
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-183.573811.0466 -180.38 811.02 -178.06 811.01 -142.44 810.98 -125 810.7
-123.4 810.68 -103.48 810.53 -85.36 810 -63.3 809.72 -38.45 809.01
-35.94 808.19 -35.5 808.15 -35.41 808.15 -35.23 808.13 -34.91 808.11
-34.74 808.1 -34.56 808.09 -34.37 808.07 -33.97 808.05 -33.76 808.03
-33.54 808.02 -33.31 808.01 -33.23 808 -29.25 806.47 -28.04 806
-24.92 804.84 -22.64 804 -21.26 803.52 -19.32 802.84 -16.91 802.19
7.83 802.19 15.01 804 24.08 806 34.36 808 39.34 809.23
42.42 810 43.7 810.36 46.48 811.12 48.67 811.73 49.66 812
51.94 812.56 53.3 812.86 55.11 813.29 58.2 813.97 58.31 814
58.56 814 58.91 814.04 59.21 814.08 59.5 814.11 59.78 814.15
60.05 814.18 60.31 814.21 60.56 814.25 60.8 814.28 65.04 814.69
65.28 814.71 67.85 814.94 69.06 815.07 71.32 815.3 73.81 815.51
77.92 815.88 78.98 816 81.68 816.58 88.8 818 91.98 818.82
96.72 820 100.95 821.02 104.2 821.84

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-509.903	.05	-38.45	.035	34.36	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.45	34.36	36	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 813.77	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.20	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 813.57	* Reach Len. (ft)	* 36.00	* 50.00	* 48.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 1338.91	* 669.98	* 60.61 *
* E.G. Slope (ft/ft)	*0.000607	* Area (sq ft)	* 1338.91	* 669.98	* 60.61 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2035.88	* 3028.72	* 85.40 *
* Top Width (ft)	* 542.18	* Top Width (ft)	* 447.36	* 72.81	* 22.02 *
* Vel Total (ft/s)	* 2.49	* Avg. Vel. (ft/s)	* 1.52	* 4.52	*

```
   1.41  *
* Max Chl Dpth (ft)      *   11.38  * Hydr. Depth (ft)       *    2.99  *    9.20  *
   2.75  *
* Conv. Total (cfs)      *208977.8  * Conv. (cfs)            * 82612.3  *122900.2  *
 3465.3  *
* Length Wtd. (ft)       *   44.22  * Wetted Per. (ft)       *  447.56  *   74.60  *
  22.71  *
* Min Ch El (ft)         *  802.19  * Shear (lb/sq ft)       *    0.11  *    0.34  *
   0.10  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *  104.20  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   67.81  *   47.78  *
  65.30  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   18.12  *    4.17  *
  14.17  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 2954.54

INPUT
Description: L
Station Elevation Data    num=     376
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
-509.903819.2952-505.649     818-497.946     816-487.979     814-477.904     812
-476.211 811.954-474.352811.9045-474.263811.9032-472.494811.8562-472.361811.8542
-470.638811.8089-470.462811.8064-468.784811.7627-468.565811.7596-466.932811.7176
-466.671811.7139-465.081811.6734 -464.78811.6692-463.232811.6302-462.891811.6255
-455.994811.4534-455.535811.4479-454.307811.4176-453.817811.4117 -452.62811.3825
-452.101811.3764-450.934811.3482-450.386811.3418-449.249811.3146-448.674811.3079
-447.566811.2817-446.963811.2748-445.883811.2495-445.253811.2423-444.201811.2179
-443.545811.2106-442.521811.1871-441.838811.1795-440.841811.1568-440.133 811.149
-409.791810.3666-409.438810.3669-408.606810.3628-406.593810.3647-405.771810.3611
-405.451810.3613-404.623810.3576-404.308810.3579-403.731810.3553 -403.51810.3551
-403.241810.3565-402.519810.3557-402.252810.3571-401.529810.3563-401.263810.3577
-400.539810.3569-400.274810.3583-399.548810.3575-399.285810.3589-398.558810.3581
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-392.004810.3759-391.276810.3757-391.019810.3775 -390.29810.3773-390.034 810.379
-389.304810.3789-389.049810.3806-388.318810.3804-388.064810.3822-387.333 810.382
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```

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-183.573811.0466 -133.05 810.2 -130.8 810.14 -120.98 809.94 -119.28 809.94
-113.78 809.93 -103.13 809.97 -93.69 809.92 -67.94 809.52 -52.45 809.04
-45.11 808.85 -35.47 808.67 -31.5 808.25 -31.42 808.24 -31.35 808.22
-31.26 808.21 -31.16 808.19 -31.04 808.18 -30.92 808.16 -30.8 808.15
-30.67 808.13 -30.53 808.11 -29.89 808 -29.7 808 -29.05 807.78
-23.67 806 -21.63 805.31 -17.79 804 -10.69 802.19 9.16 802.19
11.62 802.51 18.63 804 27.88 806 35.22 807.49 37.75 808
47.2 810 53.42 811.42 56 812 58.23 812.39 61.48 812.94
62.86 813.17 63.48 813.27 64.67 813.47 67.71 813.95 68.01 814
68.17 814 74.52 814.69 77.77 815.04 78.82 815.15 86.29 816
88.24 816.57 94.41 818 97.98 819.07 101.06 820 106.62 821.6
108.05 822 110.66 822.46 119.91 823.94 120.29 824 125.67 824.01
128.68 824.01 130.18 824.02 131.37 824.02 132.17 824.03 141.52 824.19
144.3 824.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-509.903	.05	-31.5	.035	35.22	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-31.5	35.22	36	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 813.74	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.19	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 813.55	* Reach Len. (ft)	* 36.00	* 50.00	* 48.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 1423.32	* 628.03	* 87.11 *
* E.G. Slope (ft/ft)	*0.000585	* Area (sq ft)	* 1423.32	* 628.03	*

* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2189.99	* 2834.16	* 87.11 * 125.85 *
* Top Width (ft)	* 550.89	* Top Width (ft)	* 454.21	* 66.72	* 29.96 *
* Vel Total (ft/s)	* 2.41	* Avg. Vel. (ft/s)	* 1.54	* 4.51	* 1.44 *
* Max Chl Dpth (ft)	* 11.36	* Hydr. Depth (ft)	* 3.13	* 9.41	* 2.91 *
* Conv. Total (cfs)	*212934.6	* Conv. (cfs)	* 90548.5	*117182.7	* 5203.4 *
* Length Wtd. (ft)	* 43.81	* Wetted Per. (ft)	* 454.44	* 68.16	* 30.57 *
* Min Ch El (ft)	* 802.19	* Shear (lb/sq ft)	* 0.11	* 0.34	* 0.10 *
* Alpha	* 2.11	* Stream Power (lb/ft s)	* 144.30	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 66.67	* 47.04	* 65.22 *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 17.74	* 4.09	* 14.14 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2904.54

INPUT
Description: M
Station Elevation Data num= 433

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-555.077	818.176	-554.443	818	-546.769	816	-536.192	814	-525.148	812
-523.166	811.916	-523.087	811.9139	-521.315	811.8398	-521.164	811.8359	-519.466	811.7659
-519.015	811.7543	-517.33	811.6869	-517.029	811.6792	-515.417	811.6156	-515.048	811.6063
-513.507	811.5463	-513.072	811.5356	-511.6	811.479	-511.181	811.4668	-509.696	811.4135
-509.133	811.4	-507.794	811.3499	-507.171	811.3351	-505.895	811.2879	-505.213	811.272
-500.813	811.1113	-500.039	811.0953	-499.092	811.0612	-498.276	811.0445	-497.373	811.0124
-496.515	810.9951	-495.655	810.9649	-494.755	810.9471	-493.938	810.9187	-492.998	810.9003
-492.221	810.8737	-491.243	810.8548	-490.505	810.8298	-489.49	810.8104	-488.79	810.7871
-487.738	810.7672	-487.076	810.7454	-485.988	810.7251	-485.363	810.7047	-484.24	810.684
-483.65	810.6651	-482.493	810.644	-480.915	810.5938	-479.774	810.5754	-479.304	810.5606
-478.137	810.542	-477.695	810.5283	-476.502	810.5094	-476.086	810.4967	-474.869	810.4777
-474.479	810.4659	-473.237	810.4468	-472.873	810.4359	-471.607	810.4167	-471.267	810.4066
-469.978	810.3873	-469.662	810.378	-468.35	810.3586	-468.059	810.3501	-466.725	810.3305
-466.456	810.3229	-465.1	810.3032	-464.853	810.2962	-463.477	810.2765	-462.635	810.253
-461.322	810.2367	-461.142	810.2317	-459.814	810.2154	-459.65	810.2109	-458.307	810.1947
-458.159	810.1907	-456.8	810.1744	-456.668	810.1709	-455.295	810.1546	-455.178	810.1515
-453.791	810.1353	-453.688	810.1326	-452.287	810.1164	-452.199	810.1141	-450.785	810.0979
-450.71	810.096	-449.283	810.0798	-449.222	810.0783	-447.782	810.0621	-446.282	810.0448
-446.153	810.0417	-444.761	810.0283	-443.369	810.0152	-441.977	810.0024	-441.713	810
-440.906	809.9975	-439.909	809.9945	-438.913	809.9916	-437.916	809.9888	-436.919	809.9862
-435.922	809.9836	-433.087	809.9779	-433.02	809.9782	-432.114	809.9773	-432.045	809.9777
-431.141	809.9768	-431.07	809.9772	-430.168	809.9763	-430.094	809.9767	-429.195	809.9759
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-426.276	809.9747	-426.192	809.9751	-425.303	809.9743	-425.216	809.9748	-422.562	809.973
-422.47	809.9734	-421.586	809.9731	-421.493	809.9736	-420.61	809.9733	-420.516	809.9737
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-109.41 809.57 -105.87 809.47 -105.74 809.47 -73.37 809.04 -65.8 808.97
-57.78 808.78 -50.48 808.91 -36.42 808.86 -35.58 808.5 -32.25 807.93
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-20.58 803.93 -20.41 803.9 -20.24 803.86 -20.06 803.82 -19.87 803.78
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-18.49 803.47 -18.21 803.41 -16.63 802.28 -16.25 802 11.76 802
12.15 802.07 12.83 802.2 18.97 803.35 22.4 804 30.97 806
31.31 806.08 31.62 806.15 36.43 807.28 36.84 807.37 37.52 807.53
37.59 807.55 37.65 807.56 37.94 807.62 38.35 807.71 38.4 807.72
38.87 807.81 39.41 807.93 39.96 808.04 40.52 808.15 41.11 808.27
41.79 808.41 43.87 808.86 44.37 808.96 44.9 809.07 45.41 809.17
45.95 809.28 46.53 809.39 47.15 809.52 47.83 809.65 49.22 809.95
49.46 810 58.66 812 59.36 812.09 59.65 812.13 63.68 812.64
65.81 812.9 68.23 813.21 73.02 813.8 74.71 814 79.31 814.6
82.93 815.09 86.03 815.5 89.61 816 89.68 816 96.64 818
100.75 819.42 102.44 820 107.15 821.46 108.87 822 113.42 823.17
116.74 824 116.89 824 117.07 824.01

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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-555.077 .05 -36.42 .035 41.79 .05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.42	41.79	42	49.96	51	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.57	Reach Len. (ft)	42.00	49.96	51.00
Crit W.S. (ft)		Flow Area (sq ft)	1721.88	738.14	66.91
E.G. Slope (ft/ft)	0.000398	Area (sq ft)	1721.88	738.14	66.91
Q Total (cfs)	5150.00	Flow (cfs)	2336.47	2745.57	67.96
Top Width (ft)	605.01	Top Width (ft)	497.41	78.21	29.39
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)	1.36	3.72	1.02
Max Chl Dpth (ft)	11.57	Hydr. Depth (ft)	3.46	9.44	2.28
Conv. Total (cfs)	258037.3	Conv. (cfs)	117067.3	137564.8	3405.2
Length Wtd. (ft)	46.19	Wetted Per. (ft)	497.61	80.26	29.86
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.09	0.23	0.06
Alpha	1.98	Stream Power (lb/ft s)	117.07	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	65.37	46.25	65.13
C & E Loss (ft)	0.01	Cum SA (acres)	17.35	4.01	14.11

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2854.58

INPUT
Description: N
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-604.736	815.384	-603.278	815.085	-603.201	815.068	-602.327	814.889	-602.221	814.866
-601.372	814.692	-601.238	814.663	-600.416	814.494	-600.254	814.459	-599.458	814.296
-598.718	814.140	-598.515	814.096	-597.795	813.944	-597.57	813.895	-596.869	813.748
-596.622	813.694	-595.941	813.550	-595.671	813.492	-595.01	813.352	-594.717	813.289
-594.076	813.153	-593.761	813.085	-593.14	812.954	-589.38	812.151	-588.273	811.944
-573.693	812	-573.493	811.984	-573.095	811.955	-565.263	811.369	-562.282	811.159
-547.874	810.391	-547.386	810.362	-545.27	810.26	-544.946	810.240	-542.679	810.133
-542.371	810.114	-539.769	810	-537.882	809.968	-537.735	809.968	-536.86	809.954
-536.648	809.953	-535.126	809.930	-534.81	809.928	-534.144	809.918	-533.783	809.916
-533.157	809.908	-532.755	809.905	-532.164	809.898	-531.725	809.895	-531.168	809.888
-530.695	809.885	-530.168	809.879	-529.664	809.876	-529.15	809.871	-528.628	809.868

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-494.12809.6943-493.262809.6862-493.146809.6856-492.284809.6775-492.172 809.677
-491.307809.6688-491.199809.6683 -490.33809.6601-490.225809.6595-489.353809.6513
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-404.674809.9564-404.542809.9565-403.691 809.961-403.557 809.961-402.707809.9655
-402.571809.9655-401.723 809.97-401.585 809.97-400.739809.9745 -400.6809.9745
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-341.764809.5528-341.119809.5463 -340.82 809.547-340.177809.5406-339.875809.5412
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-329.048809.5192-328.717 809.52-327.444809.5256 -327.11809.5264-326.477809.5292
-326.141809.5299 -325.51809.5327-325.171809.5335-324.543809.5363-324.202 809.537

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-304.058809.6871 -302.78809.6911 -302.53809.6915-301.883809.6936-301.639 809.694
-299.429809.7006-299.209809.7009-298.539809.7031-298.326809.7034-296.956809.7078
 -284.47  809.73-263.186810.2169-262.684810.2424 -253.74  809.76 -239.62  809.94
 -231.28  810.08 -222.63  810.03 -219.09  810.11 -207.99  810.26 -195.77   810.2
 -192.67  809.81 -189.75  809.76 -188.94  809.79 -181.12  809.87 -161.13  809.86
 -148.17  809.64 -131.76  809.27 -129.32  809.24 -116.92  809.12  -99.47  808.99
  -99.21  808.99  -87.45  808.85  -82.36  808.91  -76.54  808.84  -69.24  808.81
  -62.26   808.9  -35.56   808.9  -34.29  808.35  -33.72  808.09  -31.28  806.16
   -27.8  804.33  -27.54  804.27  -27.46  804.25  -27.21  804.19  -27.11  804.17
  -27.01  804.14  -26.89  804.12  -26.77  804.09  -26.64  804.06  -26.49  804.02
   -26.4     804  -23.28     802   14.53     802   25.91     804   26.55  804.15
    26.9  804.23   27.08  804.29   27.23  804.33   27.59  804.45   28.53  804.72
   28.64  804.74   28.75  804.77   28.87  804.79   29.39  804.91   29.49  804.94
    29.6  804.97   29.75     805   29.91  805.04   30.09  805.09   30.28  805.13
   30.48  805.18    30.7  805.24   30.95   805.3   31.21  805.36    31.5  805.43
   31.85  805.52   32.24  805.61   32.68  805.72   33.18  805.84   34.31  806.12
   34.94  806.28   35.68  806.46   38.78  807.25   40.46  807.67    42.6   808.2
   45.44  808.91    49.4   809.9   49.81     810   57.71  811.96   57.86     812
   67.88     814   68.24     814   87.56  815.69   88.39  815.76   90.98     816
   96.75     818   100.5  819.34  102.36     820  103.49  820.39  108.11     822
  115.56     824  115.88  824.04

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
-604.736     .05  -35.56    .035   45.44     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -35.56   45.44                 40   50.04      52             .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
*************************************************************************************
***********
* E.G. Elev (ft)         *  813.67  * Element               *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.09  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  813.58  * Reach Len. (ft)       *   40.00  *   50.04  *
  52.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     * 2108.13  *  797.63  *
  45.11  *
* E.G. Slope (ft/ft)     *0.000283  * Area (sq ft)          * 2108.13  *  797.63  *
  45.11  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)           * 2549.87  * 2562.42  *
  37.71  *
* Top Width (ft)         *  661.88  * Top Width (ft)       *  560.53  *   81.00  *
  20.35  *
* Vel Total (ft/s)       *    1.75  * Avg. Vel. (ft/s)     *    1.21  *    3.21  *
   0.84  *
* Max Chl Dpth (ft)      *   11.58  * Hydr. Depth (ft)     *    3.76  *    9.85  *
   2.22  *
* Conv. Total (cfs)      *305905.7  * Conv. (cfs)          *151460.0  *152205.7  *
 2240.1  *
* Length Wtd. (ft)       *   44.79  * Wetted Per. (ft)     *  560.84  *   83.70  *
  20.88  *
* Min Ch El (ft)         *  802.00  * Shear (lb/sq ft)     *    0.07  *    0.17  *
   0.04  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *  115.88  *    0.00  *
   0.00  *
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* Frctn Loss (ft)	*	0.01	* Cum Volume (acre-ft)	*	63.53	*	45.37	* 65.07 *
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	16.84	*	3.92	* 14.08 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2804.54

INPUT
Description: O
Station Elevation Data num= 199

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-636.987	822.778	-636.834	822.767	-636.752	822.751	-635.953	822.694	-635.869	822.678
-635.072	822.622	-633.479	822.489	-632.682	822.413	-632.588	822.395	-631.793	822.319
-631.698	822.301	-627.775	821.925	-605.495	818.723	-603.977	818.443	-601.675	818.003
-600.121	817.698	-600.008	817.670	-599.226	817.512	-599.115	817.485	-598.331	817.326
-598.223	817.300	-597.436	817.141	-595.85	816.810	-595.748	816.785	-594.949	816.614
-594.85	816.590	-594.049	816.418	-593.952	816.395	-593.149	816.223	-591.528	815.866
-591.438	815.844	-588.976	815.287	-587.31	814.900	-584.768	814.295	-584.576	814.262
-583.045	813.876	-580.413	813.219	-571.005	810.729	-569.872	810.416	-568.74	810.103
-567.509	809.753	-567.39	809.75	-532.59	809.32	-523.1	809.82	-493.13	809.57
-486.12	809.6	-483.76	809.54	-473.25	809.31	-455.93	809.7	-446.03	809.76
-418.52	809.68	-403.822	809.818	-403.742	809.816	-402.902	809.806	-402.843	809.805
-391.12	809.35	-353.59	809.07	-310.49	809.4	-285.69	809.54	-282.923	810.419
-282.515	810.439	-264.41	809.57	-260.62	809.62	-252.37	809.53	-243.1	809.46
-235.49	809.62	-210.66	809.92	-203.19	809.88	-197.84	809.23	-197.64	809.22
-194.22	809.36	-191.11	809.39	-177.26	809.36	-170.33	809.28	-164.3	809.01
-153.82	808.7	-139.84	808.71	-132.13	808.6	-123.32	808.22	-121.92	808.15
-120.95	808.13	-107.12	808.07	-97.1	807.93	-90.23	807.96	-83.62	808.09
-65.83	808.29	-65.47	808.31	-61.61	808.39	-41.95	809.2	-35.53	809.4
-34.23	808.97	-33.63	808.75	-31.2	806.83	-29.7	805.77	-29.59	805.69
-25.99	803.67	-25.94	803.61	-25.89	803.55	-25.84	803.48	-25.78	803.4
-25.73	803.35	-25.68	803.29	-23.62	802	18.54	802	18.64	802.02
18.75	802.05	18.87	802.08	18.97	802.1	19.06	802.12	19.15	802.15
19.24	802.17	19.32	802.19	19.44	802.21	19.51	802.23	19.59	802.25
19.66	802.27	19.73	802.28	19.8	802.3	19.86	802.31	19.92	802.33
19.98	802.34	20.04	802.36	20.15	802.38	20.21	802.4	20.36	802.43
20.46	802.46	20.55	802.48	20.75	802.53	20.82	802.54	20.88	802.56
20.95	802.57	21.08	802.61	21.14	802.62	21.2	802.64	21.26	802.65
21.34	802.67	21.41	802.69	21.48	802.7	21.53	802.71	21.59	802.73
21.65	802.74	21.7	802.75	21.89	802.8	23.53	803.12	23.69	803.16
23.81	803.19	24.81	805.05	24.86	805.07	25.04	805.13	25.21	805.2
25.55	805.32	25.64	805.35	26.14	805.53	37.03	807.89	42.61	809.52
47.89	809.79	48.09	809.82	48.29	809.86	49.78	810.2	50.26	810.32
50.54	810.38	50.84	810.45	51.15	810.51	51.47	810.58	51.81	810.66
52.17	810.74	52.9	810.9	53.26	810.98	53.64	811.07	54.04	811.17
54.47	811.27	55.97	811.53	56.29	811.59	56.63	811.67	57.01	811.75
58.18	812	66	813.35	69.49	813.96	69.71	814	82.33	815.19
85.64	815.5	87.9	815.68	88.33	815.71	90.91	815.91	91.03	815.92
92.13	816	93.67	816.33	94.43	816.53	96.39	816.99	98.88	817.68
99.33	817.79	100.04	818	105.58	819.9	105.87	820	106.47	820.21
111.67	822	117.68	823.92	117.92	824	124.8	825.92		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-636.987	.05	-35.53	.035	42.61	.05

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -35.53   42.61                87      50      60             .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
************************************************************************************
***********
* E.G. Elev (ft)         *  813.66  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  813.58  * Reach Len. (ft)        *   87.00  *   50.00  *
  60.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2321.04  *  760.89  *
  55.48  *
* E.G. Slope (ft/ft)     *0.000250  * Area (sq ft)           * 2321.04  *  760.89  *
  55.48  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)             * 2855.62  * 2250.20  *
  44.19  *
* Top Width (ft)         *  649.21  * Top Width (ft)         *  546.34  *   78.14  *
  24.73  *
* Vel Total (ft/s)       *    1.64  * Avg. Vel. (ft/s)       *    1.23  *    2.96  *
   0.80  *
* Max Chl Dpth (ft)      *   11.58  * Hydr. Depth (ft)       *    4.25  *    9.74  *
   2.24  *
* Conv. Total (cfs)      *325993.2  * Conv. (cfs)            *180759.4  *142436.7  *
 2797.1  *
* Length Wtd. (ft)       *   69.95  * Wetted Per. (ft)       *  547.13  *   82.18  *
  25.11  *
* Min Ch El (ft)         *  802.00  * Shear (lb/sq ft)       *    0.07  *    0.14  *
   0.03  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *  124.80  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   61.49  *   44.48  *
  65.01  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   16.33  *    3.83  *
  14.05  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 2754.54

INPUT
Description: P
Station Elevation Data    num=     356
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
-698.226863.6668-658.384863.9648-526.732811.5406 -525.12810.8986-524.341810.5887
-523.886810.5934-519.989810.6583-519.753810.6698-519.018810.6832-518.743810.6966
-518.047810.7103-517.736810.7254-517.075810.7394-516.731810.7562-516.102810.7702
-515.729810.7885-515.129810.8026-514.729810.8222-514.156810.8363-513.093810.8341
-512.628 810.857-512.113810.8438-511.629810.8678-511.134810.8564-510.632810.8815
-510.156810.8717-509.636810.8977-509.178810.8892-508.642810.9162-508.201 810.909
 -507.65810.9368-507.224810.9307-506.658810.9594-506.247810.9543-505.668810.9837
-504.543810.9719-504.012810.9712-503.668810.9677-502.592810.9662-502.248810.9628
-501.704810.9621-501.369810.9588-500.488810.9575-499.847810.9506-499.524  810.95
-498.871810.9428-498.551810.9419-497.887810.9345-497.574810.9335-496.903 810.926
-496.597 810.925-495.919810.9175 -495.62810.9164-494.936810.9088-494.643810.9077
-493.953810.9001-493.665 810.899 -492.97810.8912-492.688810.8901-492.155810.8803
```

-491.441810.8724-491.182 810.864-490.464 810.856-490.209810.8478-489.487810.8397
-489.236810.8317-488.509810.8236-488.262810.8159-487.531810.8077-487.288810.8002
-486.554810.7919-486.314810.7846-485.576810.7763 -485.34810.7692-484.598810.7608
-484.365810.7539 -483.62810.7455 -483.39810.7387-482.641810.7303-482.415810.7236
-481.663810.7152 -481.44810.7087-480.685810.7002-480.464810.6938-479.706810.6853
-479.489810.6791-478.728810.6705-478.513810.6644-477.749810.6558-477.537810.6498
-476.77810.6412-476.561810.6354-475.791810.6266-475.585 810.621-474.813810.6122
-474.608810.6066-473.834810.5978-473.632810.5924-472.855810.5836-472.655810.5782
-471.876810.5694-471.678810.5641-470.897810.5552-470.701810.5501-469.918810.5412
-469.724810.5361-468.938810.5271-468.747810.5222-467.959810.5132 -467.77810.5083
-466.98810.4993-466.793810.4945 -466810.4855-465.928810.4842-465.744810.4813
-464.957810.4662-464.775810.4633-463.986810.4481-463.806810.4453-463.015810.4301
-462.256810.4224-462.075810.4195-461.314810.4117-461.135810.4089-460.372810.4011
-460.194810.3983 -459.43810.3905-459.254810.3878-458.488 810.38-458.314810.3773
-457.546810.3694-457.374810.3668-456.605810.3589-456.434810.3563-455.663810.3484
-455.495810.3458-454.722810.3379-454.555810.3354 -442.06810.2067 -441.09810.2023
-440.92810.1999-439.944810.1955 -439.78810.1931-438.799810.1887 -438.64810.1865
-437.653810.1821 -437.5810.1799-436.507810.1756 -436.36810.1735-435.362810.1691
-435.219810.1671-434.216810.1628-434.079810.1609-433.071810.1566-432.939810.1548
-431.925810.1505-431.798810.1487 -430.78810.1444-430.658810.1428-429.634810.1385
-429.517810.1369-428.489810.1327-428.377810.1312-427.632810.1282-427.523810.1267
-426.776810.1238-426.672810.1224-425.923810.1194-425.003810.1073-424.154810.1063
-424.072810.1052-423.222810.1041-423.141810.1031-422.289810.1021-422.132810.0993
-421.279810.0983-420.769810.0871-419.866810.0875-419.797 810.086-418.894810.0864
-418.825810.0849-417.921810.0852-417.853810.0838-416.949810.0841-416.881810.0827
-415.977 810.083-415.909810.0816-415.005810.0819-414.937810.0805-414.032810.0809
-413.965810.0795 -413.06810.0798-412.993810.0784-412.088810.0788-412.021810.0774
-411.115810.0777-411.049810.0764-410.143810.0767-410.077810.0754-409.171810.0757
-409.105810.0743-408.199810.0746-408.133810.0733-407.226810.0736-407.161810.0724
-406.254810.0726-406.189810.0714-405.282810.0717-405.217810.0704 -404.31810.0707
-404.245810.0694-403.338810.0697-403.273810.0685-402.365810.0688-402.301810.0675
-401.393810.0678-401.329810.0666-400.421810.0669-400.357810.0657-399.449810.0659
-399.385810.0648-398.477 810.065-398.426810.0644-397.518810.0646-397.467 810.064
-396.559810.0642-396.508810.0636 -395.6810.0638 -395.55810.0632-392.824810.0639
-392.732810.0641-391.824810.0644-390.869810.0647-389.676810.0655-389.615810.0656
-388.611810.0663-380.379810.1023 -380.26810.1031-380.206810.1037-380.152810.1042
-380.039810.1057-379.139810.1245-378.232810.1279-378.148810.1297-377.244810.1331
-377.156810.1349-376.254810.1384-376.164810.1403-375.264810.1438-374.678810.1567
-374.574810.1591-374.362810.1638-373.274810.1701-373.162810.1727 -372.08 810.179
-349.455810.2649-349.314810.2687-348.446810.2725-317.297811.1357-314.198811.2224
-311.476811.2207-307.816811.2735 -303.75 811.22 -294.46 811.26 -270.83 811.15
-265.46 810.91 -261.08 810.78 -246.74 810.16 -241.79 810.23 -235.18 810.34
-234.13 810.4 -231.14 810.38 -198.53 809.87 -197.69 809.58 -194.2 808.77
-193.07 808.52 -178.49 807.88 -177.89 807.85 -177.83 807.85 -164.46 807.34
-162.68 807.33 -155.89 807.28 -155.32 806.98 -153.6 807.57 -151.86 807.58
-138.75 807.52 -135.54 807.51 -132.76 807.16 -130.03 806.85 -127 806.75
-124.24 806.57 -118.5 806.53 -110.43 805.94 -108.29 805.37 -106.35 805.03
-104.77 805.01 -102.18 805.14 -99.7 805.76 -99.06 805.87 -98.97 805.86
-84.59 807.47 -83.08 807.51 -82.26 807.53 -69 807.62 -59.03 807.76
-50.91 807.97 -37.84 808.52 -37.5 808.63 -35.62 808.13 -29.14 805.37
-23.52 803.77 -22.81 802.87 -22.75 802.78 -22.67 802.68 -22.59 802.55
-22.48 802.41 -22.36 802.23 -22.29 802.17 -22.01 802 21.19 802
21.25 802.02 21.4 802.05 21.45 802.07 21.55 802.09 21.64 802.11
21.69 802.12 21.81 802.15 21.86 802.16 21.93 802.18 25.85 802.95
25.93 802.96 28.31 807.37 28.37 807.39 28.46 807.42 28.53 807.45
28.66 807.49 31.44 808.11 45.68 812.31 49.98 813.62 59.56 813.62
60.3 813.64 61.17 813.66 62.2 813.69 63.5 813.72 69.82 813.88
73.33 813.96 74.76 814 74.9 814 99.31 816 107.54 818
111.71 819.44 124.94 824 126.16 824.38 131.32 826 136.2 827.34
138.38 827.91

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

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*********************************************
-698.226     .05   -37.5    .035   28.66     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
         -37.5   28.66               109      50      58            .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
************************************************************************************
***********
* E.G. Elev (ft)         *  813.63  * Element               *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.10  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  813.53  * Reach Len. (ft)       *  109.00  *   50.00  *
  58.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     * 1987.16  *  692.63  *
  65.66  *
* E.G. Slope (ft/ft)     *0.000320  * Area (sq ft)          * 1987.16  *  692.63  *
  65.66  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)           * 2666.50  * 2410.87  *
  72.63  *
* Top Width (ft)         *  581.42  * Top Width (ft)       *  494.23  *   66.16  *
  21.03  *
* Vel Total (ft/s)       *    1.88  * Avg. Vel. (ft/s)     *    1.34  *    3.48  *
   1.11  *
* Max Chl Dpth (ft)      *   11.53  * Hydr. Depth (ft)     *    4.02  *   10.47  *
   3.12  *
* Conv. Total (cfs)      *287864.2  * Conv. (cfs)          *149046.7  *134758.0  *
 4059.5  *
* Length Wtd. (ft)       *   78.72  * Wetted Per. (ft)     *  495.61  *   70.60  *
  21.88  *
* Min Ch El (ft)         *  802.00  * Shear (lb/sq ft)     *    0.08  *    0.20  *
   0.06  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *  138.38  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)  *   57.19  *   43.64  *
  64.92  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *   15.29  *    3.74  *
  14.02  *
************************************************************************************
***********

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2704.54

INPUT
Description: Q
Station Elevation Data    num=     166
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
************************************************************************************
 -789.49863.0036-623.802863.8664-623.736863.8668-621.447 863.879-621.388863.8793
-617.914 863.898-616.736863.9043-614.381863.9169-612.026863.9296-610.848863.9359
-608.493863.9485-607.315863.9549-606.138863.9612 -604.96863.9676-603.783863.9739
-602.606863.9802-601.423863.6588 -600.24863.3376-599.058863.0164-597.875862.6952
-596.693 862.374-595.511862.0529-595.414862.0266-489.022811.0753-487.773811.0411
-486.541 811.019-485.308810.9973-484.076 810.976-484.023810.9758-482.843810.9551
-482.777810.9549-481.611810.9345-481.532810.9343-480.618810.9223-480.529810.9221
 -479.62810.9103-479.522  810.91-478.619810.8984 -478.51810.8981-477.614810.8867
-477.256810.8858 -475.62810.8847-475.482810.8844-474.674810.8838-465.836810.8623
-372.181810.9266-371.241  810.93-370.394810.9363 -369.52810.9457-362.788811.0784
```

-362.479811.0781-361.884811.0899-361.578811.0897 -360.98811.1015-360.676811.1013
-360.075811.1133-359.773 811.113-354.087811.2333-353.757811.2336-353.095811.2479
-352.768811.2482-345.424811.2365-344.842811.2509-344.542811.2506-332.552811.5581
-332.148 811.568-320.162811.8788-319.871811.8826-317.548811.9492-317.413811.9538
-316.103 811.962-315.901 811.965-312.768811.9523 -303.86 811.93 -282.81 811.64

-277.1	811.55	-271.62	811.56	-254.09	811.42	-202.77	809.89	-198.17	809.76
-197.9	809.7	-194.66	809.43	-189.02	809	-186.65	808.89	-181.71	808.68
-170.27	808.22	-165.51	808	-152.11	807.93	-132.87	807.69	-126.24	807.69
-97.98	807.11	-95.16	807.09	-80.48	807.66	-65.02	808.17	-61.54	808.11
-40.15	808.52	-33.94	808.23	-32.14	808.15	-31.27	808.03	-31.03	807.98
-30.36	807.89	-29.98	807.71	-28.02	805.88	-27.8	805.81	-27.73	805.78
-27.6	805.74	-27.39	805.67	-27.27	805.61	-27.07	805.53	-26.7	805.38
-25.82	805.02	-20.72	802.94	-18.43	802	18.59	802	19.75	802.24
20.4	802.37	21.76	802.65	22.53	802.8	23.36	802.97	23.61	803.02
23.8	803.06	23.95	803.09	24.07	803.12	24.17	803.14	24.26	803.16
24.33	803.17	24.39	803.19	24.45	803.2	24.54	803.22	24.61	803.23
24.67	803.24	24.74	803.26	24.79	803.27	24.85	803.28	25.13	803.34
29.99	808.07	30.08	808.22	30.78	808.43	49.1	815.09	58.94	814.78
59.52	814.76	60.15	814.75	60.84	814.73	61.61	814.7	62.47	814.68
64.3	814.63	65.26	814.6	67.79	814.53	69.46	814.48	76.4	814.3
78.5	814.24	86.32	814	88.55	814.16	88.99	814.19	114.4	816
114.7	816	121.57	818	127.43	819.88	127.81	820	128.27	820.15
133.84	822	139.7	823.91	139.98	824	140.39	824.13	152.47	828
161.88	829.95								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-789.49	.05	-33.94	.035	29.99	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.94	29.99	52	43.25	43	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.43	Reach Len. (ft)	52.00	43.25	43.00
Crit W.S. (ft)		Flow Area (sq ft)	1578.25	656.20	38.46
E.G. Slope (ft/ft)	0.000478	Area (sq ft)	1578.25	656.20	38.46
Q Total (cfs)	5150.00	Flow (cfs)	2330.56	2773.73	45.71
Top Width (ft)	538.48	Top Width (ft)	460.00	63.93	14.55
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)	1.48	4.23	1.19
Max Chl Dpth (ft)	11.43	Hydr. Depth (ft)	3.43	10.26	2.64
Conv. Total (cfs)	235542.5	Conv. (cfs)	106591.3	126860.5	2090.7
Length Wtd. (ft)	47.04	Wetted Per. (ft)	460.67	67.53	15.55
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.10	0.29	0.07
Alpha	2.07	Stream Power (lb/ft s)	161.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	52.73	42.87	

```
  64.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   14.10  *    3.67  *
  14.00  *
**********************************************************************************
**********

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2661.29

INPUT
Description: R
Station Elevation Data    num=     113
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 -845.31862.3523-651.707863.3521-585.373863.9858 -584.91863.7619-476.444811.3443
-475.377811.3449-472.681811.3477-472.565811.3492-469.992811.3524-469.795 811.355
-467.308 811.359-467.032811.3628-456.322811.3838-363.892811.4667-362.416811.4715
-361.085811.4809-359.714811.4953-349.187811.7001-348.245811.7182-347.302811.7365
-346.357811.7549-345.371811.7744 -343.67  811.78 -327.75  811.87 -301.71  811.62
 -300.28   811.6 -298.85   811.6 -294.96  811.61 -293.29  811.64  -289.4  811.68
 -280.32  811.61  -274.7  811.36 -272.28  811.36 -264.08  811.18 -255.83  811.05
 -251.54  811.02 -244.81  810.95 -227.25  810.41  -224.5  810.33 -215.82  810.12
 -195.52  809.57 -161.25  808.77  -157.8   808.7 -155.28  808.68 -136.76  808.08
 -110.75   808.1 -105.69     808  -98.01  808.15  -77.01  808.06  -66.06  807.74
  -50.99  807.61   -35.7  807.37  -30.35   806.7  -28.35  806.46  -27.72  806.39
  -21.76  804.95  -15.72  804.22   -15.2  803.46  -14.95  803.31  -14.91  803.25
  -14.86  803.17  -14.81  803.08  -14.73  802.96  -14.69  802.89  -14.64   802.8
  -14.58  802.71  -14.51   802.6  -14.43  802.47  -14.33  802.31  -14.21  802.11
  -14.14     802    20.6     802   20.72  802.01   20.95  802.03   21.16  802.04
   21.36  802.06   21.54  802.07   21.72  802.09   27.87  802.57   31.67  806.67
   33.46  808.35   46.35  812.63   47.42  812.95   50.63  813.48   56.04  813.65
   57.86  813.75  101.72  813.93  102.64  813.94  103.63  813.96  106.86  813.99
  107.53     814  107.58     814  109.13  814.12  109.42  814.15  113.04  814.43
  114.04  814.51   117.7  814.79  121.05  815.06  124.84  815.34  126.67  815.49
  132.02  815.89  132.34  815.91  133.53     816  136.37  816.61  137.94  816.96
  139.77  817.36  142.54     818  143.12  818.18  144.55  818.64   147.7  819.64
  148.85     820   155.2     822  158.67  823.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -845.31     .05  -28.35    .035   31.67     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -28.35   31.67                53      58      63             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -845.31    -400  814.25        F

CROSS SECTION OUTPUT  Profile #100-Year
**********************************************************************************
**********
* E.G. Elev (ft)         *  813.57  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  813.35  * Reach Len. (ft)        *   53.00  *   58.00  *
  63.00  *
* Crit W.S. (ft)         *  809.64  * Flow Area (sq ft)      * 1296.26  *  627.15  *
  48.42  *
```

* E.G. Slope (ft/ft)	*0.000578	* Area (sq ft)	* 1449.82	* 627.15	* 48.42 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2130.42	* 2956.36	* 63.22 *
* Top Width (ft)	* 530.45	* Top Width (ft)	* 452.25	* 60.02	* 18.18 *
* Vel Total (ft/s)	* 2.61	* Avg. Vel. (ft/s)	* 1.64	* 4.71	* 1.31 *
* Max Chl Dpth (ft)	* 11.35	* Hydr. Depth (ft)	* 3.49	* 10.45	* 2.66 *
* Conv. Total (cfs)	*214127.7	* Conv. (cfs)	* 88579.2	*122920.0	* 2628.5 *
* Length Wtd. (ft)	* 56.16	* Wetted Per. (ft)	* 371.77	* 63.23	* 19.62 *
* Min Ch El (ft)	* 802.00	* Shear (lb/sq ft)	* 0.13	* 0.36	* 0.09 *
* Alpha	* 2.04	* Stream Power (lb/ft s)	* 158.67	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	* 50.92	* 42.23	* 64.81 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 13.55	* 3.61	* 13.98 *

****

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2603.43

INPUT
Description: S
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-903.57	3861.6	101-866.14	5861.8061	-866.03	861.8068	-848.164	861.9003	-848.105	861.9006
-844.59	861.919	-843.399	861.9253	-841.017	861.9377	-839.825	861.944	-837.443	861.9564
-835.06	861.9689	-833.869	861.9752	-832.677	861.9814	-831.486	861.9876	-830.295	861.9939
-829.122	862	-827.903	862.0064	-826.703	862.0128	-825.502	862.0191	-824.302	862.0255
-823.102	862.0319	-820.702	862.0446	-815.901	862.07	-814.701	862.0764	-808.701	862.1083
-808.635	862.1087	-715.191	862.6142	-571.517	863.9907	-570.575	863.5367	-467.126	813.7144
-462.672	811.5471	-460.621	811.5596	-460.361	811.5603	-458.27	811.5722	-449.724	811.6026
-443.71	811.6214	-442.823	811.622	-441.57	811.6251	-440.747	811.6258	-438.627	811.6298
-437.743	811.6297	-436.275	811.6336	-435.486	811.6336	-433.922	811.6378	-433.224	811.6379
-431.568	811.6425	-430.957	811.6427	-429.27	811.6402	-428.742	811.6403	-426.977	811.6376
-426.528	811.6376	-424.689	811.6346	-424.315	811.6347	-422.405	811.6315	-422.102	811.6315
-420.124	811.6281	-419.891	811.6281	-415.574	811.6206	-415.47	811.6206	-413.303	811.6166
-411.675	811.6136	-391.41	811.38	-372.01	811.72	-371.95	811.67	-370.07	811.7
-368.61	811.83	-363.43	811.89	-350.22	811.76	-349.39	811.76	-345.61	811.67
-321.9	811.34	-318.71	811.36	-304.07	810.9	-302.04	810.88	-294.79	810.9
-280.21	810.76	-274.05	810.67	-272.54	810.58	-242.95	810.26	-226.04	809.86
-208.97	809.51	-201.01	809.47	-196.58	809.5	-179.02	809.17	-163.54	808.91
-155.16	808.84	-147.64	808.66	-138.16	808.75	-136.69	808.74	-128.47	808.6
-126.5	808.4	-112.75	808.41	-101.83	808.22	-87.86	808.42	-79.46	808.57
-70.73	808.12	-56.58	807.63	-41.49	806.76	-35.35	806.51	-33	806.38
-27.24	806.67	-26.43	806.53	-26.25	806.42	-25.52	805.98	-22.05	802.88
-21.93	802.8	-21.2	802.12	-21.14	802.08	-21.08	802.04	-21.01	802
19.91	802	21.65	802.22	23.61	802.46	25.62	802.71	26.21	802.79
27	802.88	27.28	802.92	27.5	802.95	27.69	802.97	27.85	802.99

27.99	803.01	28.11	803.02	28.22	803.04	28.31	803.05	28.47	803.07
28.54	803.08	28.6	803.08	28.7	803.1	28.79	803.11	28.87	803.12
28.93	803.12	28.99	803.13	29.04	803.14	29.1	803.15	29.16	803.15
29.37	803.21	29.77	803.33	29.88	803.36	35.8	806.62	35.86	806.64
36.09	806.68	36.39	806.71	46.81	807.54	52.56	807.93	59.22	809.23
65.52	809.86	65.97	809.9	80.35	811.82	80.79	811.87	94.07	812.91
95.32	813.03	98.75	813.24	107.95	813.92	114.81	814.09	117.15	814.33
128.42	814.96	128.96	814.96	139.38	815.3	141.42	815.61	145.31	815.54
148.61	815.53	151.33	815.55	160.13	815.57	160.95	815.58	165.75	815.04
166.67	814.95	167.3	815.16	171.81	816.59				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-903.573	.05	-26.43	.035	35.8	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.43	35.8	68	48.89	51	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-903.573	-350	814.25	F

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.35	Reach Len. (ft)	68.00	48.89	51.00
Crit W.S. (ft)	809.31	Flow Area (sq ft)	1281.96	669.82	209.12
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1480.41	669.82	209.12
Q Total (cfs)	5150.00	Flow (cfs)	2014.36	2849.24	286.41
Top Width (ft)	566.67	Top Width (ft)	439.95	62.23	64.48
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)	1.57	4.25	1.37
Max Chl Dpth (ft)	11.35	Hydr. Depth (ft)	3.96	10.76	3.24
Conv. Total (cfs)	243819.0	Conv. (cfs)	95366.6	134892.8	13559.6
Length Wtd. (ft)	53.92	Wetted Per. (ft)	323.69	64.83	64.88
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.11	0.29	0.09
Alpha	1.95	Stream Power (lb/ft s)	171.81	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	49.14	41.37	64.63
C & E Loss (ft)	0.02	Cum SA (acres)	13.01	3.53	13.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2554.54

INPUT
Description: T
Station Elevation Data num= 161

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-980.714	860.67	-808.897	861.54	-761.228	861.97	-758.415	861.99	53 -757.44	862.0043
-755.025	862.0273	-754.966	862.0278	-551.992	863.9948	-551.745	863.9972	-551.564	863.903
-551.023	863.6216	-545.149	860.567	-500.166	838.5157	-499.324	838.0938	-498.795	837.8408
-497.967	837.4257	-497.424	837.1656	-496.609	836.7574	-496.05	836.4902	-495.249	836.089
-494.675	835.8146	-493.887	835.4205	-493.297	835.1387	-492.524	834.7519	-491.918	834.4625
-491.159	834.0832	-490.536	833.7861	-489.793	833.4144	-489.153	833.1094	-488.425	832.7454
-487.768	832.4324	-487.055	832.0763	-486.539	831.8309	-485.841	831.4822	-485.146	831.152
-484.464	830.8114	-483.751	830.4725	-483.085	830.1403	-482.352	829.7926	-481.703	829.4689
-480.951	829.1122	-480.32	828.7972	-479.547	828.4314	-478.933	828.1252	-478.141	827.75
-477.544	827.4529	-476.731	827.0682	-476.153	826.7803	-475.318	826.3858	-474.758	826.1074
-473.901	825.7028	-473.361	825.4341	-472.481	825.0193	-471.961	824.7605	-471.058	824.3351
-470.558	824.0865	-460.001	818.8867	-459.683	818.7288	-458.436	818.0895	-458.15	817.9474
-456.867	817.2889	-456.614	817.163	-455.293	816.4847	-455.074	816.3755	-453.714	815.6767
-453.529	815.5848	-452.13	814.8648	-451.981	814.7907	-450.54	814.0489	-450.428	813.9931
-448.944	813.2286	-448.87	813.1919	-447.342	812.4038	-447.275	812.3702	-445.996	811.7095
-440.74	811.54	-437.51	811.53	-416.3	811.75	-415.69	811.75	-415.3	811.74
-414.24	811.88	-400.27	813.22	-381.79	814.19	-377.69	814.34	-372.13	814.15
-345.57	813.99	-344.8	813.99	-304.29	813.83	-291.47	813.82	-282.04	813.66
-265.95	813.24	-255.64	813.03	-243.09	812.44	-238.48	812.34	-220.12	812.29
-217.37	812.29	-210.91	812.01	-200.05	811.45	-195.07	811.43	-178.84	811.24
-167.69	811.33	-160.54	811.31	-129.03	811.32	-105.31	811.26	-98.54	811.22
-75.44	810.6	-68.79	810.44	-65.81	810.3	-51.67	809.76	-46.88	809.31
-43.87	809.05	-34.16	808.14	-31.74	807.97	-30.75	807.66	-29.78	807.07
-25.71	804.6	-25.19	804.28	-24.27	803.72	-20.91	801.64	-14.53	801.01
-13.49	800.98	-4.76	801.32	-4.06	801.36	-2.9	801.36	-2.84	801.37
-2.78	801.37	-2.17	801.38	13.69	801.68	21.21	803.74	26.6	805.12
29.74	806	30.83	806.16	30.99	806.18	37.76	807.72	42.93	807.76
45.16	807.86	51.27	808.01	72.68	808.47	86.63	808.59	94.2	808.73
118.85	810.47	122.89	810.79	123.74	810.9	152.29	815.32	160.72	815.76
161.08	815.74	161.18	815.74	161.39	815.75	161.98	815.77	171.11	815.96
171.87	815.94	183.22	815.73	184.46	815.73	188.65	815.68	189.99	815.55
191.72	815.42	192.1	815.42	192.46	815.56	192.97	815.92	193.47	816.19
198.2	817.61								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-980.714	.05	-30.75	.035	37.76	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
-30.75 37.76 83 59.92 60 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-980.714	-275	814	T

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.12	Reach Len. (ft)	83.00	59.92	60.00

* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 441.61	* 689.39	* 388.47	*
* E.G. Slope (ft/ft)	*0.000801	* Area (sq ft)	* 498.77	* 689.39	* 388.47	*
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 574.64	* 3770.90	* 804.46	*
* Top Width (ft)	* 445.68	* Top Width (ft)	* 276.83	* 68.51	* 100.33	*
* Vel Total (ft/s)	* 3.39	* Avg. Vel. (ft/s)	* 1.30	* 5.47	* 2.07	*
* Max Chl Dpth (ft)	* 12.14	* Hydr. Depth (ft)	* 1.93	* 10.06	* 3.87	*
* Conv. Total (cfs)	*181915.6	* Conv. (cfs)	* 20298.4	*133201.1	* 28416.2	*
* Length Wtd. (ft)	* 61.21	* Wetted Per. (ft)	* 229.58	* 71.01	* 100.59	*
* Min Ch El (ft)	* 800.98	* Shear (lb/sq ft)	* 0.10	* 0.49	* 0.19	*
* Alpha	* 1.98	* Stream Power (lb/ft s)	* 198.20	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.09	* Cum Volume (acre-ft)	* 47.59	* 40.60	* 64.28	*
* C & E Loss (ft)	* 0.14	* Cum SA (acres)	* 12.45	* 3.45	* 13.82	*

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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2494.62

INPUT
Description: U
Station Elevation Data num= 213

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-901.34	6086	0.0855	-834.88	6086	0.6307	-834.483	6086	0.6358	-833.635
6086	0.6388	-801.532	6086	0.8071	-801.242	6086	0.8119	-800.092	860.821
-799.803	6086	0.8257	-799.229	6086	0.8302	-798.939	860.835	-798.366	6086
0.8395	-798.074	6086	0.8444	-797.503	6086	0.8489	-797.21	6086	0.8537
-796.648	6086	0.8582	-796.345	6086	0.8632	-795.778	6086	0.8676	-795.481
6086	0.8726	-794.915	860.877	-794.616	860.882	-794.052	6086	0.8865	-793.752
6086	0.8915	-793.189	6086	0.8959	-792.887	6086	0.9011	-792.326	6086
0.9054	-792.023	6086	0.9106	-791.463	860.915	-791.158	6086	0.9202	-790.601
6086	0.9246	-790.293	6086	0.9299	-789.738	6086	0.9342	-789.429	6086
0.9395	-788.875	6086	0.9438	-788.564	6086	0.9492	-788.012	6086	0.9535
-787.699	860.959	-787.149	6086	0.9632	-786.834	6086	0.9688	-786.287	860.973
-785.97	6086	0.9786	-785.424	6086	0.9828	-785.105	6086	0.9884	-784.561
6086	0.9926	-784.24	6086	0.9984	-783.699	6086	1.0025	-783.375	6086
1.0083	-782.836	6086	1.0124	-782.51	6086	1.0183	-781.973	6086	1.0224
-781.645	6086	1.0284	-781.111	6086	1.0324	-780.78	6086	1.0385	-780.248
6086	1.0425	-779.915	6086	1.0486	-779.386	6086	1.0526	-779.05	6086
1.0588	-778.523	6086	1.0628	-778.185	6086	1.0691	-777.66	6086	1.0731
-777.328	6086	1.0794	-776.798	6086	1.0833	-776.455	6086	1.0898	-775.935
6086	1.0937	-775.589	6086	1.1003	-775.073	6086	1.1041	-774.724	6086
1.1108	-774.211	6086	1.1146	-773.859	6086	1.1214	-773.348	6086	1.1252
-772.993	6086	1.1321	-772.486	6086	1.1358	-772.128	6086	1.1428	-763.748
6086	1.2557	-728.288	862	-712.595	862	1.1563	-711.745	6086	1.1647
-711.222	6086	1.0639	-710.205	861.868	-709.189	861	1.6722	-598.823	840.3993
-568.981	834	0.3392	-559.738	832	0.4623	-558.711	832	0.2538	-557.685
832	0.0454	-551.526	830	0.7946	-549.473	830	0.3778	-548.447	830
0.1694	-546.395	829	0.7526	-545.369	829	0.5442	-544.342	829	0.3359

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-543.316829.1275 -542.29828.9191-541.747828.8088-541.276828.7506-540.273828.6268
-539.271828.5031-538.269828.3793-536.265828.1319-535.262828.0082 -534.26827.8845
-532.256827.6371-531.254827.5134-531.199827.5067-527.246827.0188-527.169827.0095
-525.241826.7716-525.155 826.761-523.237826.5244 -523.14826.5125 -514.22825.4125
-514.075825.3948-510.213824.9186-510.046824.8983-502.198823.9313-439.328816.1953
-438.688816.1175  -401.4  815.76 -386.25  815.51 -373.26  815.48 -338.72  815.07
 -334.28     815 -307.86  814.49 -304.35  814.41 -304.01  814.45 -292.77  814.29
 -291.75  814.28 -289.24  814.25 -239.27  813.37 -229.33  813.16 -224.65  813.15
 -224.32  813.11 -219.31  812.98 -213.16  812.98 -212.61  812.99 -211.09  813.02
 -185.27  813.13 -169.91  812.83  -165.7  812.79 -151.41   812.7 -129.64   812.5
 -109.68  812.37 -109.31  812.37 -108.95  812.36 -108.22  812.36 -107.85  812.35
 -106.76  812.35  -106.4  812.34 -105.67  812.34 -105.31  812.33 -104.59  812.33
 -104.23  812.32 -103.15  812.32 -102.79  812.31 -102.08  812.31 -101.72   812.3
    -101   812.3 -100.65  812.29  -99.58  812.29  -99.23  812.28  -98.52  812.28
  -98.16  812.27  -97.11  812.27  -96.75  812.26  -96.05  812.26   -95.7  812.25
     -95  812.25  -94.65  812.24   -93.6  812.24  -93.25  812.23  -92.56  812.23
  -92.21  812.22  -91.87  812.22  -68.96  811.86  -68.67  811.86  -68.37  811.85
  -67.77  811.85  -67.48  811.84  -66.88  811.84  -64.43  811.75  -59.97  811.56
  -52.47  811.16  -40.27  810.34  -37.57  810.15  -35.22  809.68  -24.96  807.08
  -20.95  804.26  -14.73  800.24  -13.47     800   -6.97  799.17    -.36   799.4
       0   799.4    2.38  799.36    7.84  799.97   11.93  800.16   12.41  800.45
   18.41  802.84   21.85  805.15   24.59  805.51      32  807.83   33.12   808.4
   33.79  808.65   34.78  808.68   36.69   808.9   48.53  811.75   50.46  811.83
  176.11  811.85  190.55   814.5  192.96     815  193.65  815.27   197.2  815.43
  197.36  815.43  204.13  815.64  209.81  815.78
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Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-901.346	.05	-35.22	.035	32	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.22	32	170	86	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-901.346	-25.4	813	T
21.09	209.81	813	T

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.75	Wt. n-Val.		0.035	
W.S. Elev (ft)	811.50	Reach Len. (ft)	19.58	19.58	19.58
Crit W.S. (ft)	808.30	Flow Area (sq ft)		485.35	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)	17.40	573.20	27.84
Q Total (cfs)	5150.00	Flow (cfs)		5150.00	
Top Width (ft)	106.38	Top Width (ft)	23.66	67.22	15.50
Vel Total (ft/s)	10.61	Avg. Vel. (ft/s)		10.61	
Max Chl Dpth (ft)	12.33	Hydr. Depth (ft)		10.44	
Conv. Total (cfs)	94030.2	Conv. (cfs)		94030.2	
Length Wtd. (ft)	19.58	Wetted Per. (ft)		49.79	

* Min Ch El (ft)	*	799.17	* Shear (lb/sq ft)	*		*	1.83	*		
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	209.81	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.10	* Cum Volume (acre-ft)	*	47.10	*	39.74	*	63.99	*
* C & E Loss (ft)	*	0.05	* Cum SA (acres)	*	12.17	*	3.36	*	13.74	*

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

BRIDGE

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2460.04

INPUT
Description:
Distance from Upstream XS = 19.58
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 7

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-167.99	812 0	-50.53	812 0	-22.88	812 0
-22.88	812 810.5	42.47	812 810.5	42.47	812 0
99.43	812 0				

Upstream Bridge Cross Section Data
Station Elevation Data num= 213

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-901.346	860.086	-834.88	860.631	-834.483	860.636	-833.635	860.639	-801.532	860.807
-801.242	860.812	-800.092	860.821	-799.803	860.826	-799.229	860.83	-798.939	860.835
-798.366	860.84	-798.074	860.844	-797.503	860.849	-797.21	860.854	-796.64	860.858
-796.345	860.863	-795.778	860.868	-795.481	860.873	-794.915	860.877	-794.616	860.882
-794.052	860.887	-793.752	860.892	-793.189	860.896	-792.887	860.901	-792.326	860.905
-792.023	860.911	-791.463	860.915	-791.158	860.92	-790.601	860.925	-790.293	860.93
-789.738	860.934	-789.429	860.94	-788.875	860.944	-788.564	860.949	-788.012	860.954
-787.699	860.959	-787.149	860.963	-786.834	860.969	-786.287	860.973	-785.97	860.979
-785.424	860.983	-785.105	860.988	-784.561	860.993	-784.24	860.998	-783.699	861.003
-783.375	861.008	-782.836	861.012	-782.51	861.018	-781.973	861.022	-781.645	861.028
-781.111	861.032	-780.78	861.039	-780.248	861.043	-779.915	861.049	-779.386	861.053
-779.05	861.059	-778.523	861.063	-778.185	861.069	-777.66	861.073	-777.32	861.079
-776.798	861.083	-776.455	861.09	-775.935	861.094	-775.589	861.1	-775.073	861.104
-774.724	861.111	-774.211	861.115	-773.859	861.121	-773.348	861.125	-772.993	861.132
-772.486	861.136	-772.128	861.143	-763.748	861.256	-728.288	862	-712.595	862.156
-711.745	862.165	-711.222	862.064	-710.205	861.868	-709.189	861.672	-598.823	840.399
-568.981	834.339	-559.738	832.462	-558.711	832.254	-557.685	832.045	-551.526	830.795
-549.473	830.378	-548.447	830.169	-546.395	829.753	-545.369	829.544	-544.342	829.336
-543.316	829.128	-542.29	828.919	-541.747	828.809	-541.276	828.751	-540.273	828.627
-539.271	828.503	-538.269	828.379	-536.265	828.132	-535.262	828.008	-534.26	827.885
-532.256	827.637	-531.254	827.513	-531.199	827.507	-527.246	827.019	-527.169	827.01
-525.241	826.772	-525.155	826.761	-523.237	826.524	-523.14	826.513	-514.22	825.413
-514.075	825.395	-510.213	824.919	-510.046	824.898	-502.198	823.931	-439.328	816.195
-438.688	816.118	-401.4	815.76	-386.25	815.51	-373.26	815.48	-338.72	815.07
-334.28	815	-307.86	814.49	-304.35	814.41	-304.01	814.45	-292.77	814.29

-291.75	814.28	-289.24	814.25	-239.27	813.37	-229.33	813.16	-224.65	813.15
-224.32	813.11	-219.31	812.98	-213.16	812.98	-212.61	812.99	-211.09	813.02
-185.27	813.13	-169.91	812.83	-165.7	812.79	-151.41	812.7	-129.64	812.5
-109.68	812.37	-109.31	812.37	-108.95	812.36	-108.22	812.36	-107.85	812.35
-106.76	812.35	-106.4	812.34	-105.67	812.34	-105.31	812.33	-104.59	812.33
-104.23	812.32	-103.15	812.32	-102.79	812.31	-102.08	812.31	-101.72	812.3
-101	812.3	-100.65	812.29	-99.58	812.29	-99.23	812.28	-98.52	812.28
-98.16	812.27	-97.11	812.27	-96.75	812.26	-96.05	812.26	-95.7	812.25
-95	812.25	-94.65	812.24	-93.6	812.24	-93.25	812.23	-92.56	812.23
-92.21	812.22	-91.87	812.22	-68.96	811.86	-68.67	811.86	-68.37	811.85
-67.77	811.85	-67.48	811.84	-66.88	811.84	-64.43	811.75	-59.97	811.56
-52.47	811.16	-40.27	810.34	-37.57	810.15	-35.22	809.68	-24.96	807.08
-20.95	804.26	-14.73	800.24	-13.47	800	-6.97	799.17	-.36	799.4
0	799.4	2.38	799.36	7.84	799.97	11.93	800.16	12.41	800.45
18.41	802.84	21.85	805.15	24.59	805.51	32	807.83	33.12	808.4
33.79	808.65	34.78	808.68	36.69	808.9	48.53	811.75	50.46	811.83
176.11	811.85	190.55	814.5	192.96	815	193.65	815.27	197.2	815.43
197.36	815.43	204.13	815.64	209.81	815.78				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-901.346	.035	-35.22	.035	32	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
-35.22	32	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-901.346	-25.4	813	T
21.09	209.81	813	T

Downstream Deck/Roadway Coordinates num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-420	816	0	-276	814	0	-24.02	812	0
-24.02	812	810.5	42.47	812	810.5	46.81	812	810.5
99.43	812	0	164.68	812	0			

Downstream Bridge Cross Section Data

Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.653	831.341	-476.723	830.863	-437.449	830.649	-437.043	830.647	-426.887	827.59
-426.68	827.634	-426.599	827.651	-417.714	829.554	-417.213	829.526	-415.765	829.444
-415.696	829.44	-383.534	827.586	-382.957	827.552	-382.427	827.36	-328.369	807.782
-327.199	807.358	-326.17	807.36	-325.5	807.37	-323.36	807.43	-320.98	807.49
-319.25	807.53	-318.33	807.56	-317.38	807.58	-316.39	807.61	-315.36	807.63
-312	807.72	-309.5	807.78	-308.17	807.82	-306.77	807.85	-303.76	807.93
-300.44	808.01	-296.75	808.11	-294.75	808.16	-294.61	808.16	-291.67	808.2
-291.57	808.2	-288.52	808.25	-288.31	808.25	-285.37	808.29	-285.05	808.29
-282.23	808.33	-281.79	808.34	-279.09	808.37	-278.53	808.38	-275.96	808.41
-275.27	808.42	-269.71	808.49	-268.76	808.5	-266.59	808.53	-263.48	808.56
-262.25	808.57	-260.37	808.6	-257	808.64	-254.17	808.7	-251.68	808.76
-250.54	808.79	-248.46	808.83	-247.5	808.86	-246.15	808.86	-245.27	808.88
-243.84	808.89	-243.04	808.91	-241.53	808.92	-240.81	808.93	-239.21	808.94
-238.58	808.95	-236.88	808.96	-236.35	808.97	-234.55	808.98	-234.11	808.99
-232.22	808.99	-231.87	809	-229.88	809	-229.63	809.01	-224.18	809.01
-222.72	809	-220.7	808.98	-217.89	808.96	-216.87	808.95	-216.02	808.94
-215.31	808.94	-214.7	808.93	-214.17	808.93	-213.71	808.92	-212.62	808.92
-212.33	808.91	-211.41	808.91	-211.22	808.9	-209.11	808.9	-208.41	808.91
-206.39	808.91	-205.65	808.92	-125.39	811.11	-124.94	811.11	-124.48	811.13
-124.02	811.12	-123.56	811.14	-123.11	811.13	-122.65	811.15	-122.19	811.16

-121.73	811.16	-121.27	811.17	-119.9	811.17	-119.43	811.16	-117.53	811.16
-117.06	811.15	-113.73	811.15	-113.26	811.14	-109.94	811.14	-109.46	811.13
-106.14	811.13	-105.65	811.12	-102.34	811.12	-101.85	811.11	-99.49	811.11
-99	811.1	-95.69	811.1	-95.2	811.09	-92.84	811.09	-92.34	811.08
-89.04	811.08	-88.54	811.07	-86.19	811.07	-85.69	811.06	-83.35	811.06
-82.83	811.05	-80.5	811.05	-79.98	811.04	-76.7	811.04	-76.17	811.03
-73.85	811.03	-73.32	811.02	-72.37	811.02	-72.05	810.91	-53.17	810.86
-48.44	810.69	-37.84	809.07	-30	808.33	-25.59	807.53	-22.23	806.22
-16.85	802.25	-15.05	800.91	-13.8	799.95	-13.33	799.82	-8.16	798.5
-6.82	798.57	-.39	798.8	0	798.79	1.29	798.75	6.69	799.12
8.2	799.53	13.28	800.39	15.02	801.97	21.15	805.17	21.66	805.28
26.21	805.85	26.67	805.91	30.12	807.2	37.5	809.93	37.87	810.04
38.14	810.11	39	810.16	69.62	812.05	85.89	812.92	93.96	813.4
98.67	813.65	100.06	813.69	126.28	814.65				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-477.653	.035	-22.23	.035	21.15	.05

Bank Sta: Left Right Coeff Contr. Expan.
-22.23 21.15 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-394.24	-126.25	812.82	F
-50	-27	811.25	T
25	50	811.25	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

BRIDGE OUTPUT Profile #100-Year

* E.G. US. (ft)	* 813.25	* Element	*Inside BR US	*Inside BR DS *	
* W.S. US. (ft)	* 811.50	* E.G. Elev (ft)	* 813.10	* 812.74	*
* Q Total (cfs)	* 5150.00	* W.S. Elev (ft)	* 810.86	* 810.67	*
* Q Bridge (cfs)	* 5150.00	* Crit W.S. (ft)	* 808.29	* 808.28	*

* Q Weir (cfs)	*	* Max Chl Dpth (ft)	*	11.69	*
12.17 *					
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	*	12.01	*
11.30 *					
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	*	428.65	*
455.70 *					
* Weir Submerg	*	* Froude # Chl	*	0.62	*
0.58 *					
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	*	4227.02	*
4208.36 *					
* Min El Weir Flow (ft)	* 812.01	* Hydr Depth (ft)	*		*
*					
* Min El Prs (ft)	* 810.50	* W.P. Total (ft)	*	95.64	*
105.59 *					
* Delta EG (ft)	* 0.68	* Conv. Total (cfs)	*	49467.7	*
52776.6 *					
* Delta WS (ft)	* 0.94	* Top Width (ft)	*		*
*					
* BR Open Area (sq ft)	* 428.65	* Frctn Loss (ft)	*	0.30	*
0.16 *					
* BR Open Vel (ft/s)	* 12.01	* C & E Loss (ft)	*	0.05	*
0.02 *					
* Coef of Q	*	* Shear Total (lb/sq ft)	*	3.03	*
2.57 *					
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	*	-901.35	*
-477.65 *					

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2417.85

INPUT
Description: V
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.653	831.34	07-476.723	830.86	27-437.449	830.64	94-437.043	830.64	71-426.887	827.58
98 -426.68	827.634	-426.599	827.65	14-417.714	829.55	43-417.213	829.526	-415.765	829.44
37 -415.696	829.43	97-383.534	827.58	59-382.957	827.55	22-382.427	827.36	03-328.369	807.78
21 -327.199	807.35	83 -326.17	807.36	-325.5	807.37	-323.36	807.43	-320.98	807.49
-319.25	807.53	-318.33	807.56	-317.38	807.58	-316.39	807.61	-315.36	807.63
-312	807.72	-309.5	807.78	-308.17	807.82	-306.77	807.85	-303.76	807.93
-300.44	808.01	-296.75	808.11	-294.75	808.16	-294.61	808.16	-291.67	808.2
-291.57	808.2	-288.52	808.25	-288.31	808.25	-285.37	808.29	-285.05	808.29
-282.23	808.33	-281.79	808.34	-279.09	808.37	-278.53	808.38	-275.96	808.41
-275.27	808.42	-269.71	808.49	-268.76	808.5	-266.59	808.53	-263.48	808.56
-262.25	808.57	-260.37	808.6	-257	808.64	-254.17	808.7	-251.68	808.76
-250.54	808.79	-248.46	808.83	-247.5	808.86	-246.15	808.86	-245.27	808.88
-243.84	808.89	-243.04	808.91	-241.53	808.92	-240.81	808.93	-239.21	808.94
-238.58	808.95	-236.88	808.96	-236.35	808.97	-234.55	808.98	-234.11	808.99
-232.22	808.99	-231.87	809	-229.88	809	-229.63	809.01	-224.18	809.01
-222.72	809	-220.7	808.98	-217.89	808.96	-216.87	808.95	-216.02	808.94
-215.31	808.94	-214.7	808.93	-214.17	808.93	-213.71	808.92	-212.62	808.92
-212.33	808.91	-211.41	808.91	-211.22	808.9	-209.11	808.9	-208.41	808.91
-206.39	808.91	-205.65	808.92	-125.39	811.11	-124.94	811.11	-124.48	811.13

-124.02	811.12	-123.56	811.14	-123.11	811.13	-122.65	811.15	-122.19	811.16
-121.73	811.16	-121.27	811.17	-119.9	811.17	-119.43	811.16	-117.53	811.16
-117.06	811.15	-113.73	811.15	-113.26	811.14	-109.94	811.14	-109.46	811.13
-106.14	811.13	-105.65	811.12	-102.34	811.12	-101.85	811.11	-99.49	811.11
-99	811.1	-95.69	811.1	-95.2	811.09	-92.84	811.09	-92.34	811.08
-89.04	811.08	-88.54	811.07	-86.19	811.07	-85.69	811.06	-83.35	811.06
-82.83	811.05	-80.5	811.05	-79.98	811.04	-76.7	811.04	-76.17	811.03
-73.85	811.03	-73.32	811.02	-72.37	811.02	-72.05	810.91	-53.17	810.86
-48.44	810.69	-37.84	809.07	-30	808.33	-25.59	807.53	-22.23	806.22
-16.85	802.25	-15.05	800.91	-13.8	799.95	-13.33	799.82	-8.16	798.5
-6.82	798.57	-.39	798.8	0	798.79	1.29	798.75	6.69	799.12
8.2	799.53	13.28	800.39	15.02	801.97	21.15	805.17	21.66	805.28
26.21	805.85	26.67	805.91	30.12	807.2	37.5	809.93	37.87	810.04
38.14	810.11	39	810.16	69.62	812.05	85.89	812.92	93.96	813.4
98.67	813.65	100.06	813.69	126.28	814.65				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-477.653	.05	-22.23	.035	21.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-22.23	21.15	91	63.32	62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-394.24	-126.25	812.82	F
-50	-27	811.25	T
25	50	811.25	T

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	*	812.57	* Element	*	Left OB	*	Channel	*	Right OB *
* Vel Head (ft)	*	2.00	* Wt. n-Val.	*	0.050	*	0.035	*	0.050 *
* W.S. Elev (ft)	*	810.56	* Reach Len. (ft)	*	91.00	*	63.32	*	62.00 *
* Crit W.S. (ft)	*	808.31	* Flow Area (sq ft)	*	16.48	*	431.90	*	19.66 *
* E.G. Slope (ft/ft)	*	0.003846	* Area (sq ft)	*	366.74	*	431.90	*	58.18 *
* Q Total (cfs)	*	5150.00	* Flow (cfs)	*	66.92	*	4976.30	*	106.78 *
* Top Width (ft)	*	283.65	* Top Width (ft)	*	215.92	*	43.38	*	24.35 *
* Vel Total (ft/s)	*	11.00	* Avg. Vel. (ft/s)	*	4.06	*	11.52	*	5.43 *
* Max Chl Dpth (ft)	*	12.06	* Hydr. Depth (ft)	*	3.45	*	9.96	*	5.11 *
* Conv. Total (cfs)	*	83038.5	* Conv. (cfs)	*	1079.1	*	80237.8	*	1721.7 *
* Length Wtd. (ft)	*	66.49	* Wetted Per. (ft)	*	5.04	*	47.18	*	3.89 *
* Min Ch El (ft)	*	798.50	* Shear (lb/sq ft)	*	0.79	*	2.20	*	1.21 *
* Alpha	*	1.07	* Stream Power (lb/ft s)	*	126.28	*	0.00	*	0.00 *
* Frctn Loss (ft)	*	0.12	* Cum Volume (acre-ft)	*	46.98	*	38.92	*	63.92 *
* C & E Loss (ft)	*	0.47	* Cum SA (acres)	*	12.09	*	3.33	*	13.73 *

****

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2354.53

INPUT
Description: W
Station Elevation Data num= 188

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-500.98	831.7914	-324.358	30.7553	-323.728	30.5517	-321.079	829.6977	-319.707	829.2542
-319.648	829.2351	-257.421	809.1161	-256.307	808.7561	-255.642	808.5412	-255.17	808.54
-254.04	808.55	-253.97	808.55	-252.85	808.56	-252.78	808.56	-251.67	808.57
-251.59	808.57	-250.48	808.58	-249.3	808.58	-249.21	808.59	-248.02	808.59
-246.93	808.6	-246.82	808.6	-245.75	808.61	-245.63	808.61	-244.57	808.62
-243.51	808.62	-242.47	808.63	-242.34	808.63	-241.3	808.64	-241.16	808.64
-240.14	808.65	-239.98	808.65	-238.97	808.66	-237.62	808.66	-236.64	808.67
-236.45	808.67	-235.47	808.68	-235.27	808.68	-234.3	808.69	-233.14	808.69
-232.91	808.7	-231.73	808.7	-230.81	808.71	-230.56	808.71	-229.65	808.72
-229.38	808.72	-228.49	808.73	-227.33	808.73	-227.02	808.74	-225.84	808.74
-225.01	808.75	-224.67	808.75	-223.85	808.76	-223.49	808.76	-222.69	808.77
-221.54	808.77	-221.13	808.78	-219.96	808.78	-219.23	808.79	-218.78	808.79
-218.08	808.8	-216.93	808.8	-216.42	808.81	-215.78	808.81	-215.24	808.82
-214.07	808.82	-213.5	808.83	-212.89	808.83	-212.36	808.84	-211.22	808.84
-210.53	808.85	-210.09	808.85	-209.35	808.86	-208.18	808.86	-207.84	808.87
-206.72	808.87	-205.82	808.88	-205.62	808.88	-204.64	808.89	-204.51	808.89
-203.46	808.9	-201.16	808.9	-200.9	808.91	-198.19	808.91	-198.07	808.92
-196.33	808.92	-196.11	808.93	-194.44	808.93	-194.08	808.94	-192.3	808.94
-191.74	808.95	-190.43	808.95	-189.66	808.96	-189.04	808.96	-187.97	808.97
-187.81	808.97	-186.47	808.98	-186.13	808.98	-184.95	808.99	-184.44	808.99
-183.41	809	-182.76	809	-181.85	809.01	-181.07	809.01	-180.28	809.02
-179.38	809.02	-178.69	809.03	-177.7	809.03	-177.1	809.04	-176.01	809.04
-175.49	809.05	-174.33	809.05	-173.88	809.06	-172.64	809.07	-172.26	809.07
-170.96	809.08	-170.64	809.08	-169.27	809.09	-169.01	809.09	-167.59	809.1
-167.37	809.1	-165.9	809.11	-165.74	809.11	-164.22	809.12	-164.1	809.12
-162.53	809.13	-162.45	809.13	-159.16	809.15	-158.92	809.15	-158.11	809.16
-157.18	809.16	-156.25	809.17	-155.32	809.17	-153.5	809.19	-152.59	809.19
-151.7	809.2	-150.81	809.2	-149.92	809.21	-143.84	809.14	-140.97	809.14
-139.56	809.13	-131.4	809.13	-130.09	809.12	-122.5	809.12	-121.28	809.11
-113.06	809.11	-111.93	809.1	-103.26	809.1	-102.22	809.09	-94.24	809.09
-93.28	809.08	-72.9	809.08	-53.64	808.83	-53.3	808.83	-42.92	808.79
-36.84	808.13	-23.47	806.92	-19.51	804.16	-12.79	800.05	-10.78	799.14
-7.5	798.07	-3.16	797.95	-.23	798.13	0	798.16	7.77	799.04
12.76	799.53	14.53	799.99	19.12	802.85	22.1	804.84	29.43	805.45
40.13	805.82	47.52	806.56	48.05	806.59	49.68	806.84	53.14	806.92
59.06	807.23	74.02	807.96	88.07	809.49	111.46	811.68	126.83	812.75
130.88	812.86	132.22	812.98	148.01	813.9	183.36	815.24	188.34	815.39
189.8	815.43	195.35	815.57	196.04	814.68				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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*********************************************
 -500.98      .05  -23.47    .035    22.1     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -23.47    22.1               144   48.15      69            .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
*************************************************************************************
***********
* E.G. Elev (ft)         *  811.97  * Element               *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  811.54  * Reach Len. (ft)       *  144.00  *   48.15  *
  69.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *  634.70  *  507.10  *
 324.07  *
* E.G. Slope (ft/ft)     *0.001032  * Area (sq ft)          *  634.70  *  507.10  *
 324.07  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)            * 1152.25  * 3261.12  *
 736.63  *
* Top Width (ft)         *  374.95  * Top Width (ft)        *  241.46  *   45.57  *
  87.92  *
* Vel Total (ft/s)       *    3.51  * Avg. Vel. (ft/s)      *    1.82  *    6.43  *
   2.27  *
* Max Chl Dpth (ft)      *   13.59  * Hydr. Depth (ft)      *    2.63  *   11.13  *
   3.69  *
* Conv. Total (cfs)      *160317.8  * Conv. (cfs)           * 35869.3  *101517.7  *
22930.9  *
* Length Wtd. (ft)       *   73.98  * Wetted Per. (ft)      *  242.03  *   49.52  *
  88.21  *
* Min Ch El (ft)         *  797.95  * Shear (lb/sq ft)      *    0.17  *    0.66  *
   0.24  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *  196.04  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)  *   45.93  *   38.24  *
  63.65  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)        *   11.61  *    3.27  *
  13.65  *
*************************************************************************************
***********

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 2306.38

INPUT
Description: X
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
    -600833.2358-265.613830.9616-263.904830.9499-263.659830.9483-263.414830.9466
-262.679830.9416-262.433830.9399-262.187830.9383-261.694830.9349-261.541830.9339
-214.184808.5687 -194.05  808.39 -190.81   808.4  -189.5  808.43 -176.68  808.62
 -165.82  808.85 -165.44  808.85 -165.05  808.86 -163.92  808.86 -163.54  808.87
 -162.06  808.87  -161.7  808.88 -160.61  808.88  -67.79  807.94  -61.68  807.94
  -61.46  807.95  -55.48  807.95   -55.3  807.96   -53.7  807.96  -46.53  807.87
  -42.07  807.83   -25.4     807  -23.53  805.77  -14.98  799.89  -14.31  799.59
  -10.39  798.34   -9.53   798.4   -4.34  798.44       0  798.76    2.37  798.93
    3.33  799.04    3.92  799.19    9.66  800.26   13.12  802.38   17.84  805.01
   36.45  805.24   44.58  806.39   58.79  806.64   63.08  806.74   90.19  807.54
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  99.16  807.86  114.68   808.3  122.11  808.58  141.52  810.58  154.18  811.63
 158.79  812.07   163.4  812.37  166.83  812.49  196.42  813.78  204.95  814.18
 207.15  814.28  209.93  814.36  240.28  815.28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    -600     .05   -25.4    .035   17.84     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -25.4   17.84                90   51.84      42             .1      .3

CROSS SECTION OUTPUT  Profile #100-Year
*************************************************************************************
***********
* E.G. Elev (ft)         *  811.87  * Element               *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  811.55  * Reach Len. (ft)       *   90.00  *   51.84  *
  42.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *  622.51  *  466.98  *
 533.49  *
* E.G. Slope (ft/ft)     *0.000907  * Area (sq ft)          *  622.51  *  466.98  *
 533.49  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)            * 1204.85  * 2755.21  *
1189.95  *
* Top Width (ft)         *  373.71  * Top Width (ft)        *  195.10  *   43.24  *
 135.37  *
* Vel Total (ft/s)       *    3.17  * Avg. Vel. (ft/s)      *    1.94  *    5.90  *
   2.23  *
* Max Chl Dpth (ft)      *   13.21  * Hydr. Depth (ft)      *    3.19  *   10.80  *
   3.94  *
* Conv. Total (cfs)      *170979.8  * Conv. (cfs)           * 40000.9  * 91472.7  *
39506.2  *
* Length Wtd. (ft)       *   58.25  * Wetted Per. (ft)      *  195.80  *   47.12  *
 135.63  *
* Min Ch El (ft)         *  798.34  * Shear (lb/sq ft)      *    0.18  *    0.56  *
   0.22  *
* Alpha                  *    2.05  * Stream Power (lb/ft s)*  240.28  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)  *   43.86  *   37.70  *
  62.97  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *   10.89  *    3.22  *
  13.48  *
*************************************************************************************
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2254.54

INPUT
Description: Y
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
-710.797834.3842-709.069834.3734-434.008 832.652-244.415831.2743-196.793808.3198
  -176.3  808.43 -167.71  808.62  -50.35  807.51  -26.21  806.95  -22.65  804.84
  -15.41  799.87  -12.68  798.81  -11.48  798.53   -7.82  799.05   -5.45  799.34
    -.27  799.85       0  799.86    1.79  799.91    8.44  800.17   10.39  800.27
```

12.02	801.53	18.58	804.69	33.45	805.08	33.64	805.09	33.75	805.11
41.59	806.49	61.29	806.74	63.84	806.78	69.72	806.8	99.43	807.45
99.94	807.47	126.43	807.87	140.95	808.4	142.39	808.43	163.62	809.25
175.01	810.36	176.19	810.47	193.42	812.18	221.23	813.76	226.1	814.12
234.24	814.56	253.92	815.17						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-710.797	.05	-26.21	.035	18.58	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.21	18.58	90	50	45	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.53	Reach Len. (ft)	90.00	50.00	45.00
Crit W.S. (ft)		Flow Area (sq ft)	612.44	468.11	656.03
E.G. Slope (ft/ft)	0.000819	Area (sq ft)	612.44	468.11	656.03
Q Total (cfs)	5150.00	Flow (cfs)	1187.16	2582.61	1380.24
Top Width (ft)	390.38	Top Width (ft)	177.25	44.79	168.34
Vel Total (ft/s)	2.97	Avg. Vel. (ft/s)	1.94	5.52	2.10
Max Chl Dpth (ft)	13.00	Hydr. Depth (ft)	3.46	10.45	3.90
Conv. Total (cfs)	179949.1	Conv. (cfs)	41481.2	90240.4	48227.6
Length Wtd. (ft)	57.79	Wetted Per. (ft)	178.00	48.38	168.62
Min Ch El (ft)	798.53	Shear (lb/sq ft)	0.18	0.49	0.20
Alpha	1.97	Stream Power (lb/ft s)	253.92	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	42.58	37.14	62.39
C & E Loss (ft)	0.01	Cum SA (acres)	10.51	3.17	13.33

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2204.54

INPUT
Description: Z
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-920.098	836.563	-244.617	831.634	-241.632	831.612	-237.217	831.579	-235.743	831.568
-234.268	831.557	-232.791	831.546	-184.302	808.039	-184.235	808.006	-184.175	807.977

-173.64	807.9	-170.7	807.89	-159.9	807.7	-148.14	807.54	-117.32	807.28
-93.7	807.48	-78.23	807.81	-46.46	808.15	-36.05	807.73	-24.39	806.89
-16.87	802.56	-12.29	799.9	-10.83	799.57	-3.6	798.81	-.66	799.18
0	799.22	5.47	799.58	7.65	799.65	9.47	799.75	15.49	800.09
17.16	801.36	19.95	804.35	25.2	804.7	29.78	804.99	36.45	806.08
39.89	806.63	55.27	806.92	59.82	806.89	85.88	806.81	100.95	807.11
118.08	807.56	134.44	807.79	136.61	807.85	149.16	807.76	170.32	807.81
189.32	808.47	190.53	808.49	191.3	808.57	191.95	808.65	200.96	809.38
215.3	810.83	226.77	812.05	229.06	812.33	231.06	812.53	233.55	812.84
257.98	814.32	265.36	814.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-920.098	.05	-24.39	.035	19.95	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-24.39	19.95	74	50	44	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.52	Reach Len. (ft)	74.00	50.00	44.00
Crit W.S. (ft)		Flow Area (sq ft)	631.46	475.54	795.83
E.G. Slope (ft/ft)	0.000681	Area (sq ft)	631.46	475.54	795.83
Q Total (cfs)	5150.00	Flow (cfs)	1183.90	2427.77	1538.33
Top Width (ft)	413.32	Top Width (ft)	167.10	44.34	201.88
Vel Total (ft/s)	2.71	Avg. Vel. (ft/s)	1.87	5.11	1.93
Max Chl Dpth (ft)	12.71	Hydr. Depth (ft)	3.78	10.72	3.94
Conv. Total (cfs)	197367.7	Conv. (cfs)	45371.6	93041.4	58954.8
Length Wtd. (ft)	52.99	Wetted Per. (ft)	167.97	48.07	202.21
Min Ch El (ft)	798.81	Shear (lb/sq ft)	0.16	0.42	0.17
Alpha	1.94	Stream Power (lb/ft s)	265.36	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	41.29	36.60	61.64
C & E Loss (ft)	0.02	Cum SA (acres)	10.15	3.11	13.14

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2154.54

INPUT
Description: AA

Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1050.24	838.06	-1697.39	835.46	-1742.172	832.001	-1238.346	831.971	6 -1237.39	831.964
-1232.607	831.927	5 -1231.651	831.920	2 -1230.695	831.912	8 -1229.738	831.905	5 -1228.782	831.898
-1227.825	831.890	8 -1224.956	831.868	7 -1223.999	831.861	4 -1223.043	831.854	1 -1222.086	831.846
-1221.138	831.839	4 -1220.584	831.835	2 -1171.639	807.883	8 -139.2	807.49	-77.02	808.07
-43.93	808.02	-37.15	807.53	-21.68	806.24	-11.01	799.74	-10.69	799.54
-10.59	799.52	-5.56	798.6	-5.29	798.62	3.35	798.83	3.54	798.82
12.36	799.3	12.69	799.28	17.23	800.15	17.56	800.21	18.08	800.51
22.06	801.88	28.84	804.5	30.21	804.68	31.01	804.81	38.21	806.5
53.53	806.9	56.01	806.89	83.27	805.56	90.16	805.89	97.72	805.35
98.09	805.33	98.41	805.31	119.58	805.49	134.35	805.66	139.08	805.15
140.47	805.07	142.84	805.35	145.72	805.7	173.74	807.13	185.9	807.67
200.7	808.17	219.31	808.96	227.19	809.44	230.22	809.96	238.42	810.98
255.45	812.86	266.7	813.74	275.06	814.33				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1050.24	.05	-21.68	.035	38.21	.05

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

-21.68	38.21	63	48.8	47	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.54	Reach Len. (ft)	63.00	48.80	47.00
Crit W.S. (ft)		Flow Area (sq ft)	585.39	608.03	944.81
E.G. Slope (ft/ft)	0.000475	Area (sq ft)	585.39	608.03	944.81
Q Total (cfs)	5150.00	Flow (cfs)	906.74	2551.53	1691.73
Top Width (ft)	422.59	Top Width (ft)	157.43	59.89	205.27
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.55	4.20	1.79
Max Chl Dpth (ft)	12.94	Hydr. Depth (ft)	3.72	10.15	4.60
Conv. Total (cfs)	236236.3	Conv. (cfs)	41593.3	117041.3	77601.6
Length Wtd. (ft)	50.82	Wetted Per. (ft)	158.35	62.98	205.63
Min Ch El (ft)	798.60	Shear (lb/sq ft)	0.11	0.29	0.14
Alpha	1.76	Stream Power (lb/ft s)	275.06	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	40.26	35.98	60.77
C & E Loss (ft)	0.01	Cum SA (acres)	9.88	3.05	12.93

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2105.74

INPUT
Description: BB
Station Elevation Data num= 118

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1284.78	840.5214	-1266.19	840.3765	-1265.91	840.3743	-1113.67	839.1824	-1113.46	839.1812
-1112.79	839.176	-1112.59	839.1748	-1111.78	839.1685	-1111.57	839.1673	-1110.76	839.161
-1110.55	839.1598	-1109.75	839.1535	-1109.53	839.1523	-1108.73	839.146	-1108.52	839.1448
-1107.71	839.1385	-1107.58	839.1373	-1106.7	839.131	-1106.48	839.1298	-1105.68	839.1235
-1105.47	839.1223	-1104.66	839.116	-1098.15	839.0772	-1050.09	838.7049	-1047.18	838.6866
-250.954	832.4283	-233.584	832.2924	-233.502	832.2917	-230.159	832.2655	-230.086	832.265
-211.586	832.1201	-211.44	832.119	-211.294	832.1178	-211.147	832.1167	-211.001	832.1156
-209.976	832.1075	-209.829	832.1064	-209.537	832.1041	-209.39	832.1029	-209.244	832.1018
-209.097	832.1007	-208.951	832.0995	-208.658	832.0972	-208.59	832.0967	-159.578	808
-143.09	808	-135.89	807.88	-134.92	807.87	-134.16	807.85	-134.09	807.85
-127.27	807.75	-115.54	807.75	-111.92	807.81	-109.05	807.88	-107.52	807.88
-106.87	807.89	-105.45	807.89	-104.68	807.9	-103.86	807.9	-102.99	807.91
-101.07	807.91	-90.85	807.94	-89.1	807.94	-77.29	807.99	-69.47	807.99
-68.7	808	-60.94	808	-60.01	807.99	-57.27	807.99	-55.07	807.82
-38.23	806.81	-35.2	806.61	-34.55	806.6	-34.29	806.56	-33.82	806.54
-19.98	805.6	-19	805.03	-11.8	800.15	-7.71	799.5	-5.17	799.19
0	799.12	1.4	799.11	4.01	798.92	10.22	798.03	12.53	797.84
16.97	798.1	18.46	798.17	19.54	798.4	23.6	799.5	26.39	801.64
29.68	803.93	34.42	805.9	38.23	806.07	42.74	806.3	47.09	806.22
62.78	806.13	63.27	806.12	63.62	806.12	64.44	806.15	83.44	806.15
91.23	806.63	94.72	806.8	100.52	806.83	132.42	807.25	132.77	807.26
132.86	807.26	133.05	807.27	173.39	808.66	193.45	809.45	210.92	809.38
236.84	810.04	248.49	810.08	253.06	810.27	259.03	810.45	272.22	811.95
279.37	812.68	292.07	813.79	296.17	814.12				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1284.7	.05	-19.98	.035	34.42	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.98	34.42	190	202.35	215	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.66	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.23	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.43	* Reach Len. (ft)	* 190.00	* 202.35	* 215.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 543.84	* 606.70	* 783.59 *
* E.G. Slope (ft/ft)	*0.000581	* Area (sq ft)	* 543.84	* 606.70	* 783.59 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 929.83	* 2961.75	* 1258.42 *
* Top Width (ft)	* 434.22	* Top Width (ft)	* 146.58	* 54.40	* 233.25 *
* Vel Total (ft/s)	* 2.66	* Avg. Vel. (ft/s)	* 1.71	* 4.88	* 1.61 *
* Max Chl Dpth (ft)	* 13.59	* Hydr. Depth (ft)	* 3.71	* 11.15	* 3.36 *

* Conv. Total (cfs)	*213682.9	* Conv. (cfs)	* 38580.2	*122888.5	* 52214.2	*	
* Length Wtd. (ft)	* 204.35	* Wetted Per. (ft)	* 147.46	* 58.22	* 233.39	*	
* Min Ch El (ft)	* 797.84	* Shear (lb/sq ft)	* 0.13	* 0.38	* 0.12	*	
* Alpha	* 2.10	* Stream Power (lb/ft s)	* 296.17	* 0.00	* 0.00	*	
* Frctn Loss (ft)	* 0.11	* Cum Volume (acre-ft)	* 39.44	* 35.30	* 59.83	*	
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 9.66	* 2.99	* 12.70	*	

****

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1903.41

INPUT
Description: CC
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1413.07	842.81	-1008.27	839.72	-1007.67	839.71	-1007.31	839.71	-1006.71	839.71
-1006.26	839.70	-1005.67	839.70	-1005.22	839.70	-1004.62	839.69	-1004.18	839.695
-1003.58	839.69	-1003.13	839.68	-1002.53	839.685	-1002.09	839.68	-1001.49	839.67
-1001.05	839.67	-1000.44	839.67	-1000	839.668	-999.402	839.664	-998.962	839.661
-980.568	839.55	-954.849	839.36	-947.922	839.318	-751.001	837.757	-619.136	836.750
-186.077	833.44	-185.696	833.442	-135.81	808.567	-135.64	808.57	-134.94	808.56
-132.25	808.56	-131.6	808.55	-129.06	808.55	-128.42	808.54	-125.81	808.54
-125.15	808.53	-122.41	808.53	-103.56	808	-61.32	808	-61.14	807.99
-60.4	808	-59.58	808	-57.87	807.98	-57.25	807.68	-56.22	807.71
-40.74	807.96	-40.56	807.88	-39.48	807.93	-39.31	807.9	-38.39	807.84
-31.6	806.91	-23.04	804.62	-18.39	802.72	-15.31	799.68	-13.61	799.14
-11.15	798.59	-8.71	798.6	-4.88	798.82	-2.24	798.91	0	799.21
2.77	799.59	5.36	799.74	15.86	800.78	19.21	801.07	25.98	801.39
28.13	801.7	34.86	801.78	40.98	802.22	64.91	803.69	67.69	803.76
85.92	804.31	102.91	804.36	107.15	804.41	109.56	804.63	123.37	806.87
124.99	806.92	138.39	807.04	154.02	807.98	175.38	808.83	193.46	809.77
211.27	810.13	232.8	810.02	248.61	809.84	261.98	809.75	286.4	809.66
312.77	809.79	322.37	809.86	329.27	809.78	332.46	809.82	341.59	809.72
361.96	809.56	373.32	809.63	394.07	809.51	398.94	809.45	403.05	809.94
422.39	812.19	432.81	813.02	439.57	813.46				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1413.07	.05	-18.39	.035	28.13	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-18.39	28.13	233	99.41	34	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

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* E.G. Elev (ft)	* 811.54	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.19	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.34	* Reach Len. (ft)	* 233.00	* 99.41	*

```
  34.00  *
* Crit W.S. (ft)        *          * Flow Area (sq ft)      *  434.92  *  526.38  *
1282.97  *
* E.G. Slope (ft/ft)    *0.000525  * Area (sq ft)           *  434.92  *  526.38  *
1282.97  *
* Q Total (cfs)         * 5150.00  * Flow (cfs)             *  682.16  * 2526.21  *
1941.63  *
* Top Width (ft)        *  556.51  * Top Width (ft)         *  122.99  *   46.52  *
 386.99  *
* Vel Total (ft/s)      *    2.29  * Avg. Vel. (ft/s)       *    1.57  *    4.80  *
   1.51  *
* Max Chl Dpth (ft)     *   12.75  * Hydr. Depth (ft)       *    3.54  *   11.32  *
   3.32  *
* Conv. Total (cfs)     *224674.3  * Conv. (cfs)            * 29760.1  *110208.6  *
84705.6  *
* Length Wtd. (ft)      *   98.13  * Wetted Per. (ft)       *  124.48  *   48.06  *
 387.45  *
* Min Ch El (ft)        *  798.59  * Shear (lb/sq ft)       *    0.11  *    0.36  *
   0.11  *
* Alpha                 *    2.37  * Stream Power (lb/ft s) *  439.57  *    0.00  *
   0.00  *
* Frctn Loss (ft)       *    0.04  * Cum Volume (acre-ft)   *   37.31  *   32.67  *
  54.73  *
* C & E Loss (ft)       *    0.02  * Cum SA (acres)         *    9.07  *    2.76  *
  11.17  *
*******************************************************************************
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 1804

INPUT
Description: DD
Station Elevation Data    num=     247
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
-1396.08843.2904-1315.31843.0128-1313.01843.0055-1311.28     843   -1308842.9731
-992.185840.3901-980.349840.2933-980.253840.2926-973.832  840.24-972.824840.2338
-972.753840.2333-971.815840.2277-971.729840.2269 -970.79840.2213-970.705840.2206
-969.766 840.215-969.681840.2143-968.742840.2087-968.657 840.208-967.717840.2024
-967.633840.2017-966.692840.1961-966.609840.1954-965.668840.1898-965.585840.1891
-964.643840.1835-964.561840.1828-936.034840.0038-931.865  839.97-921.544839.9014
-844.199839.2341-819.455839.0504-769.773838.5773-768.652838.5673-768.445838.5654
-721.623815.4509-721.449815.4479-668.695814.5433 -668.32814.5369-667.676814.5258
-643.519814.1116 -630.48813.8881-568.989812.8337-568.419812.8246-566.893812.7825
-565.522812.7291 -564.39 812.669-564.145812.6748-562.772812.6881 -561.36812.6856
-556.597812.6258-554.735812.6024-528.529812.2732-405.318810.7254-403.952810.7051
-402.687810.6786-402.081 810.658-401.447810.6326-400.782810.6016-400.084810.5643
-399.346810.5197-398.566810.4667-398.151810.4353 -397.02810.3369-395.579810.2021
-394.437810.0879 -394.02810.0416 -393.54809.9853-393.081809.9295-392.853809.9011
-392.627809.8724-390.994809.6517-390.897809.6379-390.668809.6049-390.216809.5382
-389.214809.3843    -389809.3503-387.928 809.174-387.727  809.14-386.572808.9375
-386.388808.9042-385.138808.6708-384.973808.6391-384.334808.5126-383.462808.3369
-376.927806.9525-376.766806.9185-370.395805.5688 -370.34805.5572-369.386 805.355
-367.328804.9191-363.702804.1511-362.989     804 -304.14     804 -300.51  804.06
 -299.43  804.08 -298.35  804.09 -298.26  804.09 -298.21   804.1 -297.94   804.1
 -297.88  804.11 -297.69  804.11 -297.62  804.12 -297.37  804.12 -297.29  804.13
  -297.1  804.13 -295.81  804.18 -295.67  804.19 -294.42  804.23 -294.23  804.24
 -293.01  804.28 -283.45  804.57 -283.08  804.59 -282.29   804.6 -281.52  804.62
 -281.12  804.64 -280.36  804.65 -279.95  804.67 -279.51  804.69 -278.65  804.71
```

-277.14	804.75	-276.38	804.77	-275.9	804.78	-275.2	804.8	-274.7	804.82
-274.02	804.84	-273.5	804.85	-272.84	804.87	-272.3	804.89	-271.65	804.9
-271.09	804.92	-269.88	804.96	-269.28	804.97	-268.09	805.01	-267.46	805.03
-266.89	805.04	-266.24	805.06	-265.7	805.08	-265.03	805.1	-264.56	805.11
-263.87	805.14	-263.42	805.15	-258.67	805.33	-258.29	805.34	-257.41	805.38
-257.06	805.39	-256.15	805.43	-255.82	805.44	-254.87	805.48	-253.87	805.53
-245.18	806	-244.51	806	-241.38	806.28	-239.56	806.43	-233.05	807
-226.36	807.56	-224.49	807.72	-221.05	808	-218.88	808.26	-218.33	808.32
-215.35	808.68	-212.04	809.07	-208.67	809.48	-205.47	809.86	-205.24	809.89
-204.34	810	-166.05	810	-165.66	809.96	-165.49	809.95	-165.08	809.91
-144.89	808	-141.08	807.78	-135.13	807.45	-133.99	807.39	-132.94	807.33
-131.98	807.28	-131.08	807.23	-130.26	807.19	-129.51	807.14	-128.81	807.11
-128.16	807.07	-127.55	807.04	-126.97	807.01	-125.9	806.95	-125.4	806.92
-124.93	806.9	-114.75	806.57	-114.5	806.58	-105.39	807.14	-105.11	807.15
-104.87	807.59	-102.72	807.59	-99.84	807.51	-96.18	807.6	-83.79	807.59
-82.9	807.46	-82.74	807.43	-81.14	807.02	-74.18	807.03	-58.27	806.73
-58.03	806.72	-55.94	806.72	-39.67	806.59	-32.02	806.65	-22.12	806.46
-19.59	802.08	-16.74	798.47	-15.6	798.33	-11.62	797.78	-6.78	798.22
-4.67	798.39	2.11	799.13	4.72	799.37	6.94	799.64	17.02	800.44
27.02	801.33	28.15	801.42	29.64	801.42	42.74	801.61	46.83	801.9
63.08	802.8	64.68	803.5	88.23	808.27	88.31	808.29	91.21	808.32
108.15	808.3	130.34	808.04	140.71	807.65	154.48	807.21	177.89	807.24
180.59	807.24	189.3	807.66	204.44	808.24	220.81	808.62	241.73	808.87
253.45	808.76	272.31	809.06	295.99	809.55	339.66	809.54	343.47	809.51
348.73	809.54	406.75	809.55	410.08	809.51	417.06	810.39	430.92	812.06
444.91	813.02	449.49	813.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1396.08	.05	-19.59	.035	28.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.59	28.15	279 199.46	52	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-1396.08	-240	812	F

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.48	Element	Left OB	Channel
Vel Head (ft)	0.14	Wt. n-Val.	0.050	0.035
W.S. Elev (ft)	811.34	Reach Len. (ft)	279.00	199.46
Crit W.S. (ft)	805.91	Flow Area (sq ft)	765.30	563.85
E.G. Slope (ft/ft)	0.000391	Area (sq ft)	1757.73	563.85
Q Total (cfs)	5150.00	Flow (cfs)	1021.26	2389.54
Top Width (ft)	878.79	Top Width (ft)	434.30	47.74
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	1.33	4.24
Max Chl Dpth (ft)	13.56	Hydr. Depth (ft)	3.47	11.81
Conv. Total (cfs)	260471.4	Conv. (cfs)	51652.0	120855.9
Length Wtd. (ft)	185.84	Wetted Per. (ft)	223.61	49.71

Right OB				
0.050				
52.00				
1325.98				
1325.98				
1739.20				
396.76				
1.31				
3.34				
87963.5				
397.58				

* Min Ch El (ft)	*	797.78	* Shear (lb/sq ft)	*	0.08	*	0.28	*	0.08	*	
* Alpha	*	2.46	* Stream Power (lb/ft s)	*	449.49	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.05	* Cum Volume (acre-ft)	*	31.45	*	31.42	*	53.71	*	
* C & E Loss (ft)	*	0.03	* Cum SA (acres)	*	7.58	*	2.65	*	10.86	*	

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1604.54

INPUT
Description: EE
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-254.5	820.31	-253.81	820	-249.36	818.13	-249.04	818	-248.71	817.86
-244.27	816	-241.75	814.97	-239.41	814	-235.77	812.52	-234.46	812
-232.56	811.25	-229.43	810	-228.2	809.57	-224.74	808.38	-223.94	808.1
-223.65	808	-223.48	808	-221.86	808	-221.07	808	-220.61	808.01
-220.31	808.01	-220.09	808.01	-219.93	808.01	-219.8	808.01	-219.7	808.01
-219.62	808.01	-219.56	808.01	-219.5	808.01	-219.45	808.01	-219.42	808.01
-219.4	808.01	-219.38	808.01	-219.31	808.01	-219.29	808.01	-219.27	808.01
-219.26	808.01	-219.22	808.01	-219.21	808.01	-219.2	808.01	-219.19	808.01
-219.18	808.01	-219.17	808.01	-219.17	808.05	-218.46	808.05	-218.07	808.25
-208.9	807.97	-202.66	807.8	-202.47	807.73	-199.15	806.81	-197.39	806.65
-185.15	805.67	-168.49	805.12	-165.13	805.01	-163.48	805.02	-161.69	805.03
-150.76	805.17	-148.36	804.05	-144.6	801.99	-144.14	801.94	-143.94	801.8
-140.03	799.92	-137.84	799.77	-137.23	799.58	-137.01	799.73	-134.93	801.41
-134.51	801.43	-126.72	801.94	-117.53	801.92	-102.19	801.63	-88	801.53
-78.33	801.45	-66.67	801.3	-53.5	801.47	-51.58	801.47	-36.89	801.33
-18.11	800.66	-15.8	800.56	-15.31	800.44	-11.66	798.9	-2.59	797.82
-2.27	797.8	-1.95	797.77	0	797.54	4.56	797	9.86	796.53
9.89	796.53	14.62	798.12	14.69	798.14	14.81	798.26	20.33	807.16
23.78	807.16	38.24	807.17	53.5	807.14	57.16	807.14	70.39	807.14
74	807.13	112.25	806.72	127.42	806.39	151.27	806.51	160.35	807.08
183.69	807.64	190.99	807.66	210.11	808.16	216.56	808.05	241.85	807.55
242.96	807.5	249.5	807.18	265.56	806.74	289.15	808.84	301.45	809.04
322.56	809.76	342.42	809.63	360.59	809.45	381.97	809.41	400.9	809.43
411.27	809.32	419.05	810.3	430.18	811.75	441.82	812.55	451.46	813.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-254.5	.05	-15.8	.035	20.33	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-15.8	20.33	149 184.82	41	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.40	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.05	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.35	* Reach Len. (ft)	* 149.00	* 184.82	* 41.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 1713.42	* 459.70	* 1358.78 *
* E.G. Slope (ft/ft)	*0.000177	* Area (sq ft)	* 1713.42	* 459.70	* 1358.78 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2665.06	* 1284.07	* 1200.87 *
* Top Width (ft)	* 659.94	* Top Width (ft)	* 217.02	* 36.13	* 406.80 *
* Vel Total (ft/s)	* 1.46	* Avg. Vel. (ft/s)	* 1.56	* 2.79	* 0.88 *
* Max Chl Dpth (ft)	* 14.82	* Hydr. Depth (ft)	* 7.90	* 12.72	* 3.34 *
* Conv. Total (cfs)	*386773.2	* Conv. (cfs)	*200150.6	* 96435.3	* 90187.4 *
* Length Wtd. (ft)	* 128.00	* Wetted Per. (ft)	* 219.87	* 41.85	* 407.09 *
* Min Ch El (ft)	* 796.53	* Shear (lb/sq ft)	* 0.09	* 0.12	* 0.04 *
* Alpha	* 1.59	* Stream Power (lb/ft s)	* 451.46	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 20.33	* 29.08	* 52.11 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 5.49	* 2.46	* 10.38 *

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1419.72

INPUT
Description: FF
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-133.24	824.56	-130.81	824	-124.37	822.44	-122.58	822	-118.66	821.04
-114.37	820	-112.36	819.49	-106.45	818	-101.64	816.16	-98.65	815.34
-97.21	814.61	-89.43	814.27	-83.42	814	-82.62	813.97	-80.92	813.88
-75.91	810	-75.9	810	-72.82	810.28	-72.74	810.29	-71.16	810.43
-60.51	809.88	-58.71	809.82	-58.63	809.84	-57.68	809.87	-55.63	809.3
-52.04	808.3	-48.95	808.06	-43.9	807.61	-33.31	807.36	-29.68	807.31
-18.8	797.35	-18.51	797.15	-18.37	797.12	-9.34	796.76	-8.3	796.83
-1.89	796.37	-.01	796.51	0	796.51	5.24	797.45	10.42	797.23
15.88	797.82	25.35	798.02	28.91	797.99	35.53	800.94	37.02	801.47
37.8	801.6	46.24	803.46	74.68	805.31	77.76	805.47	79.29	805.55
80.95	805.57	112.25	806.16	129.82	806.8	146.42	807.27	181.61	807.14
183.67	807.12	193.95	807.06	228.2	806.84	237.5	806.83	265.27	806.79
281.86	806.66	304.04	806.21	331.38	805.94	344.68	806.3	350.86	806.46
385.2	806.66	387.18	806.61	399.69	807.42	427.18	809.24	432.84	809.27
465.47	809.54	480.67	809.4	493.5	809.13	509.05	808.96	518.95	808.89
532.2	808.89	549.9	809.02	555.9	809.02	563.05	809.83	577.38	811.63
584.8	812.16	599.7	813.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-133.24	.05	-29.68	.035	46.24	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-29.68	46.24	173 185.67	44	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.29	Reach Len. (ft)	173.00	185.67	44.00
Crit W.S. (ft)		Flow Area (sq ft)	116.41	941.47	2092.18
E.G. Slope (ft/ft)	0.000197	Area (sq ft)	116.41	941.47	2092.18
Q Total (cfs)	5150.00	Flow (cfs)	86.90	2879.95	2183.15
Top Width (ft)	652.23	Top Width (ft)	47.89	75.92	528.42
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)	0.75	3.06	1.04
Max Chl Dpth (ft)	14.92	Hydr. Depth (ft)	2.43	12.40	3.96
Conv. Total (cfs)	366923.6	Conv. (cfs)	6191.5	205188.9	155543.3
Length Wtd. (ft)	125.81	Wetted Per. (ft)	48.62	80.94	528.76
Min Ch El (ft)	796.37	Shear (lb/sq ft)	0.03	0.14	0.05
Alpha	2.13	Stream Power (lb/ft s)	599.70	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	17.20	26.11	50.49
C & E Loss (ft)	0.01	Cum SA (acres)	5.04	2.22	9.94

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1234.05

INPUT
Description: GG
Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-206.29	819.46	-200.65	818	-197.84	817.3	-192.78	816	-189.46	815.12
-185.16	814	-177.52	812.02	-177.45	812	-177.24	811.95	-169.56	810
-163.3	808.42	-161.62	808	-160.3	807.77	-150.98	806	-149.55	805.99
-141.69	805.98	-141.5	805.98	-140.88	805.98	-133.89	805.95	-130.64	805.94
-129.27	805.94	-125.41	805.92	-125.27	805.92	-119.66	805.91	-119.47	805.91
-113.88	805.9	-113.72	805.9	-113.55	805.9	-109.15	805.89	-108.89	805.89
-108.61	805.89	-79.16	805.07	-45.36	804.14	-44.53	804.12	-43.45	804.1
-40.44	804.07	-38.68	804.06	-38.54	804.07	-38.37	804.07	-37.77	804.01

-37.24	804.01	-37.19	804	-30.78	802.5	-29.84	802	-26.29	800.22
-25.87	800	-25.24	799.69	-24.32	799.25	-21.9	798	-21.56	798
-18.9	798	-18.8	798	-18.64	798	-17.59	798	-6.79	798
-.56	798	0	798	12.11	798	12.88	798	16.74	798
19.43	799.16	21.39	800	22.15	800.53	22.62	800.82	24.24	801.82
24.53	802	24.55	802.01	24.8	802.16	25.01	802.28	25.19	802.38
25.35	802.48	25.49	802.56	25.62	802.63	25.72	802.69	25.82	802.75
25.91	802.8	25.99	802.85	26.06	802.9	26.13	802.94	26.19	802.97
26.24	803.01	26.29	803.04	26.34	803.07	26.39	803.09	26.43	803.12
26.47	803.14	26.5	803.16	26.54	803.18	26.57	803.2	26.6	803.22
26.63	803.24	26.66	803.24	54.23	804.14	56.94	804.2	74.1	806.44
77.21	806.52	80.14	806.6	85.51	806.59	126.38	806.77	130.45	806.77
167.98	806.63	179.11	806.59	180.44	806.58	215.96	806.5	220.86	806.45
248.62	806.24	255.71	806.16	256.04	806.17	276.79	805.61	282.15	805.6
287.71	805.65	319.14	806.74	339.94	807.72	355.88	808.41	377.43	808.5
408.02	808.34	427.41	808.18	441.89	808.29	466.55	808.44	473.08	808.48
487.87	810.16	499.3	811.52	507.36	812.1	507.64	812.12	523.13	813.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-206.29	.05	-37.19	.035	26.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.19	26.66	117	131.34	192.99	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.28	Reach Len. (ft)	117.00	131.34	192.99
Crit W.S. (ft)		Flow Area (sq ft)	748.73	770.55	2034.00
E.G. Slope (ft/ft)	0.000169	Area (sq ft)	748.73	770.55	2034.00
Q Total (cfs)	5150.00	Flow (cfs)	891.95	2176.63	2081.42
Top Width (ft)	671.93	Top Width (ft)	137.42	63.85	470.65
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)	1.19	2.82	1.02
Max Chl Dpth (ft)	13.28	Hydr. Depth (ft)	5.45	12.07	4.32
Conv. Total (cfs)	396595.9	Conv. (cfs)	68688.3	167620.0	160287.7
Length Wtd. (ft)	151.19	Wetted Per. (ft)	138.05	66.44	471.05
Min Ch El (ft)	798.00	Shear (lb/sq ft)	0.06	0.12	0.05
Alpha	1.92	Stream Power (lb/ft s)	523.13	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	15.48	22.46	48.40
C & E Loss (ft)	0.00	Cum SA (acres)	4.67	1.92	9.44

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1102.70

INPUT
Description: HH
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-289.51	823.17	-284.72	822.19	-283.86	822	-283.27	821.86	-274.9	820
-267.4	818.33	-265.91	818	-264.06	817.59	-257.15	816	-249.19	814.26
-248.06	814	-239.53	812.19	-238.72	812	-237.74	811.8	-228.6	810
-224.13	809.14	-217.49	808	-212.35	807.38	-210.24	807.28	-205.93	806.82
-205.12	806.75	-199.07	806.63	-196.69	806.46	-195.3	806.37	-195.04	806.35
-193.44	806.27	-192.41	806.23	-183.22	806.24	-178.07	806.21	-172.74	806.18
-171.92	806.16	-171.25	806.15	-161.2	806.03	-158.18	806.03	-156.25	806.02
-151.54	806.03	-151.43	806.03	-146.32	806.01	-146.26	806.01	-142.51	806
-133.64	805.85	-132.12	805.82	-129.94	805.78	-114.43	805.52	-102.78	805.34
-97.86	805.26	-93.46	805.2	-90.78	805.15	-87.77	805.1	-80.07	804.98
-73.86	804.89	-67.18	804.76	-58.77	804.6	-42.37	804.25	-31.66	804.01
-31.15	804.01	-29.92	804.01	-28.29	804	-27.99	804	-27.33	804
-26.85	804	-25.69	803.66	-25.11	803.49	-22.2	802	-19.2	800.47
-18.27	800	-17.41	799.56	-14.62	798	-7.66	798	0	798
1.73	798	17.37	798	17.58	798	18.13	798	18.51	798.19
22.22	800	24.75	801.24	26.32	802	28.22	802.93	31	804
31.94	804	41.11	804.07	45.61	804.3	54.04	804.54	83.33	805.28
91.06	805.49	94.01	805.59	95.91	805.61	132.94	806.3	136.29	806.33
139.49	806.35	164.42	806.54	183.4	806.63	186.37	806.61	231.26	806.05
238.05	806.05	275.37	806.2	280.92	806.2	282.25	806.21	307.77	807.46
324.8	809.33	330.91	809.81	335.5	810.13	336.15	810.18	372.12	812.23
372.24	812.18	373.78	812.33	375.76	812.44	382.54	812.44	392.23	812.55
401.64	812.64	414.95	812.72	417.44	812.75	433.14	812.79	442.12	812.72
464.37	812.83	472.75	812.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-289.51	.05	-25.69	.035	31	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-25.69	31	138.99	130.59 147.99	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.25	Reach Len. (ft)	138.99	130.59	147.99
Crit W.S. (ft)		Flow Area (sq ft)	1123.69	678.76	1543.08
E.G. Slope (ft/ft)	0.000185	Area (sq ft)	1123.69	678.76	1543.08
Q Total (cfs)	5150.00	Flow (cfs)	1392.40	1990.72	1766.88
Top Width (ft)	589.97	Top Width (ft)	209.28	56.69	324.00
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)	1.24	2.93	1.15
Max Chl Dpth (ft)	13.25	Hydr. Depth (ft)	5.37	11.97	

4.76									
* Conv. Total (cfs)	*378186.5	* Conv. (cfs)	*102249.7	*146187.4	*129749.4				
* Length Wtd. (ft)	* 138.17	* Wetted Per. (ft)	* 209.73	* 59.40	* 324.23				
* Min Ch El (ft)	* 798.00	* Shear (lb/sq ft)	* 0.06	* 0.13	* 0.06				
* Alpha	* 1.77	* Stream Power (lb/ft s)	* 472.75	* 0.00	* 0.00				
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	* 12.97	* 20.27	* 40.48				
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 4.21	* 1.74	* 7.67				

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 972.12

INPUT
Description: II
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-326.96	813.78	-325.06	813.78	-324.62	813.77	-312.1	813.79	-311.71	813.79
-311.3	813.78	-310.79	813.77	-310.71	813.77	-310.04	813.76	-309.09	813.74
-299.86	813.58	-299.5	813.58	-299.13	813.57	-296.5	813.51	-289.07	813.22
-281.87	812.99	-279.84	812.9	-276.56	812.81	-272.63	812.68	-270.91	812.59
-269.58	812.52	-264.51	812.38	-258.25	812.17	-257.11	812.12	-253.96	812.01
-252.79	812	-247.85	811.77	-247.06	811.74	-246.01	811.7	-235.69	811.04
-234.51	810.98	-230.45	810.9	-224.77	810.76	-217.17	810.53	-213.54	810.36
-203.45	810	-201.81	809.91	-179	808.59	-178.36	808.56	-174.95	808.41
-168.88	808	-168.86	807.99	-167.73	807.99	-167.72	807.99	-166.02	807.98
-162.03	807.97	-158.82	807.97	-157.81	807.96	-156.68	807.96	-153.18	807.93
-152.17	807.93	-147.01	807.71	-124.98	806.82	-98.36	806.05	-98.02	806.03
-96.39	806	-96.31	806	-91.58	805.99	-90.9	805.99	-90.29	805.98
-88.68	805.98	-87.34	805.98	-85.9	805.97	-82.63	805.96	-80.47	805.95
-78.95	805.94	-77.59	805.94	-55.94	805.33	-51.01	805.29	-46.29	805.27
-42.91	805.22	-39.87	805.19	-36.91	805.19	-33.31	804.55	-30.41	804.02
-30.31	804.02	-30.21	804	-28.09	802.54	-27.19	802	-25.5	801.1
-22.96	800	-18.37	797.56	-17.49	797.56	-17.43	797.56	-17.42	797.56
-13.96	797.56	0	797.56	1.22	797.56	14.24	797.56	17.93	797.56
20.45	798	26.11	799.94	26.31	800	32.11	801.03	32.83	802
49.01	803.35	49.44	803.36	55.53	803.3	55.72	803.39	56.74	803.46
60.16	803.53	85.01	805.01	113.83	805.2	119.81	805.24	126.8	805.29
131.99	805.27	139.45	805.25	147.43	805.3	150.86	805.04	162.7	804.62
166.24	804.54	176.45	805.43	177.27	805.48	179.3	805.58	201.26	806.42
208.15	807.25	223.45	808.52	236.82	809.7	252.78	811.09	252.86	811.07
252.99	811.08	255.67	811.11	272.38	811.61	292.88	811.69	300.43	811.78
310.06	811.68	312.5	811.63	314.79	811.65	317.61	811.73	317.72	811.84
317.8	811.83	320.16	811.81	334.73	811.83	341.58	811.8	343.41	811.9
345.47	811.78	346.96	811.81	348.55	811.78	352.07	811.8	367.83	811.79
370.45	811.82	383.76	811.8	383.94	811.82	395.49	811.86	398.25	811.88
398.32	812.08	398.42	811.98	398.86	812.41	408.62	812.42	418.24	812.27
427.48	812.07	437.72	811.84	443.56	811.77	454.65	811.84	466.98	811.99
475.86	812.18	480.39	812.38	482.7	812.57	490.96	812.47	496.51	812.45
496.72	812.45	505.62	812.64	511.92	812.78				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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 -326.96     .05  -30.21    .035   32.83     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -30.21   32.83               168  161.32     108             .1       .3

CROSS SECTION OUTPUT  Profile #100-Year
************************************************************************************
***********
* E.G. Elev (ft)         *  811.29  * Element               *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.10  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  811.18  * Reach Len. (ft)       *  168.00  *  161.32  *
 108.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *  764.22  *  793.48  *
1203.93  *
* E.G. Slope (ft/ft)     *0.000228  * Area (sq ft)          *  764.22  *  793.48  *
1203.93  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)            *  817.49  * 2681.48  *
1651.03  *
* Top Width (ft)         *  496.01  * Top Width (ft)        *  207.71  *   63.04  *
 225.26  *
* Vel Total (ft/s)       *    1.86  * Avg. Vel. (ft/s)      *    1.07  *    3.38  *
   1.37  *
* Max Chl Dpth (ft)      *   13.62  * Hydr. Depth (ft)      *    3.68  *   12.59  *
   5.34  *
* Conv. Total (cfs)      *340731.2  * Conv. (cfs)           * 54086.5  *177410.4
*109234.3  *
* Length Wtd. (ft)       *  140.95  * Wetted Per. (ft)      *  207.94  *   65.65  *
 225.68  *
* Min Ch El (ft)         *  797.56  * Shear (lb/sq ft)      *    0.05  *    0.17  *
   0.08  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *  511.92  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)  *    9.96  *   18.07  *
  35.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *    3.54  *    1.56  *
   6.74  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 810.82

INPUT
Description: JJ
Station Elevation Data    num=     159
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 -216.91     814 -209.47     814 -201.74     814  -195.8  813.64 -188.84  813.23
 -185.45  813.15 -179.25  812.94 -152.13  813.27 -151.81  813.26 -149.47  813.17
 -146.37  813.02 -146.36  813.01 -146.32  813.02  -140.6  812.84 -136.23  812.99
 -129.02  812.75 -127.18  812.76  -123.2   812.8 -119.29  812.67 -118.82  812.66
 -111.87  812.43 -109.55  812.36 -100.54  812.03  -99.84     812  -98.62  811.93
   -97.8  811.89  -83.42  811.14  -76.85  810.72  -74.41  810.56  -73.74  810.51
  -71.49  810.36  -66.78     810  -61.45  809.65  -58.64  809.44  -52.08  808.96
  -50.37  808.85  -41.46     808  -38.34  807.75  -37.59  807.68  -36.09   807.5
   -24.8     806  -20.35   804.6  -18.41     804  -18.33  803.94  -15.01     802
  -12.97  800.82  -11.05     800  -10.24  799.15   -8.85   797.3       0   797.3
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3.17	797.3	10.08	797.3	17.92	797.3	24.85	797.3	27.53	798
27.87	801.86	28.46	802.53	32.36	803.16	42.61	804.76	59.3	804.95
77.03	805.06	103.24	805.26	119.26	805.35	128.03	805.42	149.59	805.57
160.78	805.68	192.07	805.53	197.51	805.48	238.72	804.72	239.38	804.7
240.47	804.67	256.38	804.26	262.57	804.13	266.56	804.18	293.85	808.49
296.89	808.94	300.24	809.22	329.56	811.43	333.28	811.66	333.32	811.67
333.59	811.64	340.57	811.73	344.49	811.76	350.15	811.95	362.33	812.32
365.48	812.39	381.25	812.44	388.26	812.42	396.23	812.36	413.4	812.25
424.49	812.31	455.96	812.46	456.15	812.5	459.79	812.5	467.99	812.4
475.02	812.37	475.36	812.37	475.71	812.37	476.06	812.37	486.93	812.37
487.23	812.37	487.54	812.37	487.85	812.37	488.18	812.37	488.5	812.37
488.83	812.37	489.17	812.37	489.52	812.38	497.79	812.49	497.9	812.49
498.02	812.49	498.14	812.49	498.28	812.49	498.41	812.49	498.56	812.48
498.71	812.48	498.87	812.48	499.04	812.48	499.21	812.48	499.39	812.48
499.57	812.48	499.76	812.48	499.96	812.48	500.17	812.48	500.38	812.49
500.59	812.49	500.81	812.49	501.04	812.49	501.11	812.49	501.27	812.49
501.51	812.49	501.75	812.49	501.99	812.49	502.24	812.49	502.49	812.49
502.74	812.49	503	812.49	503.25	812.49	503.51	812.49	503.76	812.49
504.02	812.49	504.27	812.5	504.52	812.5	504.78	812.5	505.02	812.5
505.27	812.5	505.51	812.5	505.75	812.51	505.98	812.51	506.21	812.51
506.43	812.51	506.65	812.52	506.86	812.52	507.07	812.52	507.27	812.52
507.46	812.53	507.64	812.53	507.82	812.53	524.88	812.93		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-216.91	.05	-20.35	.035	42.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20.35	42.61	200 178.48	258	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.13	Reach Len. (ft)	200.00	178.48	258.00
Crit W.S. (ft)		Flow Area (sq ft)	154.26	725.62	1505.53
E.G. Slope (ft/ft)	0.000312	Area (sq ft)	154.26	725.62	1505.53
Q Total (cfs)	5150.00	Flow (cfs)	146.49	2598.76	2404.74
Top Width (ft)	408.81	Top Width (ft)	62.89	62.96	282.95
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)	0.95	3.58	1.60
Max Chl Dpth (ft)	13.83	Hydr. Depth (ft)	2.45	11.53	5.32
Conv. Total (cfs)	291710.3	Conv. (cfs)	8297.8	147201.3	136211.3
Length Wtd. (ft)	218.44	Wetted Per. (ft)	63.35	69.47	283.43
Min Ch El (ft)	797.30	Shear (lb/sq ft)	0.05	0.20	0.10
Alpha	1.65	Stream Power (lb/ft s)	524.88	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	8.18	15.25	32.46
C & E Loss (ft)	0.02	Cum SA (acres)	3.02	1.33	

6.11 *
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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 632.35

INPUT
Description: KK
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-233.17	814	-232.97	814	-232.29	814	-231.37	814	-229.74	814
-227.54	813.99	-224.26	813.99	-217.08	813.99	-215.69	813.99	-206.84	813.98
-205.84	813.98	-204.78	813.98	-194.69	813.99	-163.17	813.97	-158.17	813.97
-152.63	813.96	-146.75	813.97	-144.86	813.97	-139.53	813.97	-138.59	813.97
-138.16	813.97	-136.9	813.97	-134.88	813.97	-127.78	813.97	-125.89	813.97
-121.27	813.96	-116.23	813.98	-115.18	813.97	-115.16	813.97	-113.57	813.97
-103.05	813.98	-102.55	813.98	-96.44	814	-96.4	814	-96.31	814
-96.25	814	-92.59	813.97	-89.12	813.99	-89.1	813.99	-88.87	813.99
-88.46	813.99	-77.63	814	-76.17	814.02	-76.04	814.02	-75.04	814
-72.8	813.99	-71.53	814	-68.29	814.02	-67.62	814.01	-67.06	814
-63.13	813.78	-62.61	813.72	-62.43	813.69	-57.74	813.21	-57.27	813.17
-52.18	812.77	-48.03	812	-43.2	810.5	-41.72	810	-40.18	809.46
-37.42	808	-35.59	807.07	-33.62	806	-31.7	804.92	-29.9	804
-27.7	802.73	-26.29	802	-22.66	800.11	-22.45	800	-22.1	799.82
-21.65	799.6	-20.99	799.31	-19.21	798.49	-18.32	796.97	-6.82	796.97
-2.66	796.97	0	796.97	.16	796.97	11.62	796.97	15.58	798
15.79	798.01	16.67	798.01	16.75	798.07	16.96	798.08	20.03	798.26
21.03	798.28	27.17	798.57	31.86	800.77	32.51	802.17	32.91	802.6
36.36	804.21	36.53	804.25	37.02	804.34	47.09	805.42	47.49	805.46
49.7	805.63	55.05	805.93	68.74	806.02	86.07	805.93	99.48	805.93
103.38	805.75	123.57	805.98	131.93	806.3	155.1	806.45	176.93	806.19
200.24	806.3	221.51	806.49	244.67	806.72	265.49	806.59	289.74	806.31
312.41	806.09	337.11	806.03	356.2	805.86	381.78	805.86	408.47	805.68
427.73	805.75	446.84	805.64	455	805.63	460.39	805.71	465.48	805.94
478.6	806.16	486.66	806.62	496.58	808.09	504.39	809.32	521.17	811.33
528.01	812.14	528.42	812.31	528.56	812.35	529.4	812.29	529.44	812.28
529.77	812.28	529.97	812.27	537.83	812.44	544.99	812.58	545.64	812.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-233.17	.05	-52.18	.035	37.02	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-52.18	37.02	239 198.36	80	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	* 811.18	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.07	* Wt. n-Val.	*	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.11	* Reach Len. (ft)	* 239.00	* 198.36	* 80.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 888.20	* 2336.33 *
* E.G. Slope (ft/ft)	*0.000189	* Area (sq ft)	*	* 888.20	*

2336.33	*									
* Q Total (cfs)	*	5150.00	*	Flow (cfs)	*		*	2418.72	*	
2731.28	*									
* Top Width (ft)	*	564.55	*	Top Width (ft)	*		*	82.20	*	
482.35	*									
* Vel Total (ft/s)	*	1.60	*	Avg. Vel. (ft/s)	*		*	2.72	*	
1.17	*									
* Max Chl Dpth (ft)	*	14.14	*	Hydr. Depth (ft)	*		*	10.81	*	
4.84	*									
* Conv. Total (cfs)	*374563.3		*	Conv. (cfs)	*		*175915.6			
*198647.7	*									
* Length Wtd. (ft)	*	136.17	*	Wetted Per. (ft)	*		*	88.15	*	
482.78	*									
* Min Ch El (ft)	*	796.97	*	Shear (lb/sq ft)	*		*	0.12	*	
0.06	*									
* Alpha	*	1.65	*	Stream Power (lb/ft s)	*	545.64	*	0.00	*	
0.00	*									
* Frctn Loss (ft)	*	0.02	*	Cum Volume (acre-ft)	*	7.83	*	11.95	*	
21.08	*									
* C & E Loss (ft)	*	0.00	*	Cum SA (acres)	*	2.87	*	1.03	*	
3.85	*									

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 433.99

INPUT
Description: LL
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-229.28	815.19	-223.93	814	-216.01	812.28	-214.67	812	-213.65	811.85
-199.66	810	-199.48	810	-199.29	810	-197.88	809.99	-194.25	809.96
-194.23	809.96	-190.38	809.95	-185.59	809.93	-178.39	809.93	-174.76	809.91
-173.86	809.91	-173.11	809.91	-135.76	808.85	-130.79	808.72	-124.61	808.57
-120.21	808.48	-106.09	808.19	-104.62	808.16	-97.07	808.01	-96.21	808
-91.4	808	-90.61	808	-79.64	807.53	-70.25	807.22	-64	807.02
-57.82	806.79	-47.76	806.4	-45.29	806.3	-42.52	806.21	-41.03	806.16
-37.62	806.01	-36.96	806.01	-36.96	806	-33.53	804.27	-32.99	804
-30.1	802.54	-28.88	802	-28.63	801.88	-24.46	800	-22.46	799.07
-20.14	796.7	-12.23	796.7	-4.22	796.7	-1.01	796.7	0	796.7
12.22	796.7	14.57	799.05	16.69	800	17.49	800.3	22.91	802
23.15	802	25.9	802.22	28.38	802.57	34	802.72	35.29	802.76
46.96	803	49.07	803.48	55.32	804.73	65.63	804.46	75.14	804.3
82.19	804.93	83.76	805.01	94.64	805.48	107.93	805.05	115.02	805.14
115.99	805.19	132.95	805.87	140.41	806.12	179.17	805.81	186.1	805.75
218.99	805.95	229.65	806.12	243.46	805.89	273.03	805.79	295.71	805.5
315.95	805.54	342.46	805.87	360.5	806.18	374.77	806.1	406.56	805.76
412.8	805.7	423.66	805.74	441.5	805.56	452.35	805.52	466.16	806.57
471.85	806.85	475.67	807.36	490.39	809.41	494.83	809.91	511.44	811.92
511.84	812.08	511.9	812.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-229.28	.05	-36.96	.035	28.38	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.96	28.38	150.99 144.27	75.99	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.10	Reach Len. (ft)	150.99	144.27	75.99
Crit W.S. (ft)		Flow Area (sq ft)	444.32	788.87	2529.67
E.G. Slope (ft/ft)	0.000148	Area (sq ft)	444.32	788.87	2529.67
Q Total (cfs)	5150.00	Flow (cfs)	303.77	2061.26	2784.97
Top Width (ft)	712.65	Top Width (ft)	171.02	65.34	476.29
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	0.68	2.61	1.10
Max Chl Dpth (ft)	14.40	Hydr. Depth (ft)	2.60	12.07	5.31
Conv. Total (cfs)	422843.5	Conv. (cfs)	24941.4	169240.6	228661.6
Length Wtd. (ft)	108.76	Wetted Per. (ft)	171.16	69.45	476.88
Min Ch El (ft)	796.70	Shear (lb/sq ft)	0.02	0.11	0.05
Alpha	1.82	Stream Power (lb/ft s)	511.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.61	8.13	16.61
C & E Loss (ft)	0.00	Cum SA (acres)	2.41	0.69	2.97

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 289.71

INPUT
Description: MM
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-348.33	816.57	-348.24	816.54	-347.81	816.44	-345.95	816	-342.84	815.36
-339.64	814.72	-336.02	814	-328.13	813.43	-322.18	813.05	-305.65	812
-302.14	811.76	-298.26	811.43	-280.91	810	-279.28	809.93	-246.45	808.55
-235.55	808	-235.47	808	-231.89	808	-230.12	808	-225.75	808
-220.81	808	-220.77	808	-216.44	808	-211.33	808	-195.52	808
-194.47	808	-194.45	808	-184.64	808	-182.43	808	-178.88	808.05
-178.72	808.05	-178.43	808.06	-178.1	808.06	-172.71	808.2	-168.02	808.31
-160.86	808.55	-144.31	808.1	-141.52	808.02	-137.87	808.02	-133.47	808.03
-127.35	808.03	-116.67	808.04	-91.7	808.03	-68.94	808.02	-63.03	808.02
-59.01	808.02	-55.88	808.02	-55.76	808.02	-55.73	808.02	-53.31	808.01
-52.54	808.01	-49.34	808.01	-47.14	808.01	-46.11	808.01	-43.69	808.01
-42.03	808.01	-41.16	808	-36.46	808	-36.18	807.96	-34.84	807.82
-34.01	807.45	-33.88	807.41	-30.5	806	-28.59	805.2	-25.72	804
-24.06	803.13	-22.27	802	-20.72	801.07	-18.75	800	-17.18	799.08
-15.4	796.46	-1.4	796.46	0	796.46	1.93	796.46	6.13	796.46

16.91	796.46	18.38	798	18.87	798	19.47	798	19.95	798.46
21.23	799.6	21.7	799.87	24.37	800.38	35.61	802.38	50.22	802.63
53.88	802.69	63.02	802.91	78.8	802.53	78.99	802.53	82.81	802.65
94.02	803.02	100.69	804.05	109.95	805.3	112.56	805.37	144.08	805.37
153.1	805.31	186.57	805.2	205.42	805.47	226.33	805.61	253.41	805.45
264.38	805.23	289.6	805.11	294.8	805.28	315.35	805.29	333.93	805.43
339.25	805.41	361.21	806.06	367.63	805.99	382.77	805.65	385.82	805.7
412.49	806.66	414.12	806.72	415.41	806.89	435.44	809.42	453.47	811.42
458.91	812.07	459.37	812.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-348.33	.05	-34.84	.035	35.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.84	35.61	142 180.45	179	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.09	Reach Len. (ft)	142.00	180.45	179.00
Crit W.S. (ft)		Flow Area (sq ft)	707.26	825.10	2378.05
E.G. Slope (ft/ft)	0.000137	Area (sq ft)	707.26	825.10	2378.05
Q Total (cfs)	5150.00	Flow (cfs)	480.47	2020.46	2649.07
Top Width (ft)	744.61	Top Width (ft)	259.28	70.45	414.88
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)	0.68	2.45	1.11
Max Chl Dpth (ft)	14.63	Hydr. Depth (ft)	2.73	11.71	5.73
Conv. Total (cfs)	439699.1	Conv. (cfs)	41021.7	172504.1	226173.4
Length Wtd. (ft)	174.95	Wetted Per. (ft)	259.40	75.50	415.36
Min Ch El (ft)	796.46	Shear (lb/sq ft)	0.02	0.09	0.05
Alpha	1.75	Stream Power (lb/ft s)	459.37	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	4.62	5.46	12.33
C & E Loss (ft)	0.00	Cum SA (acres)	1.66	0.47	2.19

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 109.26

INPUT
Description: NN
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-420.57	814.39	-419.2	814	-407.77	813.42	-407.7	813.42	-379.04	812
-378.22	811.99	-334.8	811.11	-302.12	810.46	-279.5	810	-278.77	810
-199.19	808.01	-198.67	808	-196.73	808	-196.71	808	-160.16	807.18
-150.67	806.97	-143.98	806.83	-123.71	806.44	-101.58	806	-100.78	806
-92.21	805.99	-80.49	805.97	-77.36	805.97	-69.5	805.98	-53.95	806
-46.87	806	-41.13	806	-38.95	806	-35.79	806	-33.95	804.99
-32.14	804	-29.75	802.69	-28.49	802	-26.52	800.92	-25.03	800
-24.55	799.7	-20.63	798	-13.87	796.17	-7.1	796.17	-6.45	796.17
-5.34	796.17	-3.06	796.17	0	796.17	9.83	796.17	10.32	798
11.65	798	12.28	798	15.39	799.59	16.21	800	18.42	801.13
20.26	802	23.7	803.6	24.16	803.84	24.46	804	25.31	804.27
25.55	804.34	26.05	804.45	33.05	806	33.29	806	34.24	806
36.49	805.83	40.87	805.6	49.87	805.76	78.79	805.59	114.93	804.96
121.77	804.87	141.12	804.61	165.89	804.29	192.3	804.3	201.03	804.39
211.75	804.67	229.66	805	247.1	805.46	263.63	805.77	272.64	805.95
279.01	806.31	286.81	806.72	289.32	807.18	307.42	809.78	309.29	809.95
325.74	811.48	328.02	811.69	328.25	811.72	328.26	811.72	328.83	811.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-420.57	.05	-35.79	.035	33.05	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.79	33.05	105.99	109.26	120	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.03	Reach Len. (ft)	105.99	109.26	120.00
Crit W.S. (ft)		Flow Area (sq ft)	914.88	791.16	1564.78
E.G. Slope (ft/ft)	0.000200	Area (sq ft)	914.88	791.16	1564.78
Q Total (cfs)	5150.00	Flow (cfs)	817.04	2302.15	2030.81
Top Width (ft)	651.91	Top Width (ft)	295.18	68.84	287.89
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)	0.89	2.91	1.30
Max Chl Dpth (ft)	14.86	Hydr. Depth (ft)	3.10	11.49	5.44
Conv. Total (cfs)	364262.0	Conv. (cfs)	57789.4	162832.3	143640.3
Length Wtd. (ft)	113.08	Wetted Per. (ft)	295.24	74.12	288.24
Min Ch El (ft)	796.17	Shear (lb/sq ft)	0.04	0.13	0.07
Alpha	1.85	Stream Power (lb/ft s)	328.83	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.97	2.11	4.23
C & E Loss (ft)	0.00	Cum SA (acres)	0.76	0.18	0.74

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 0

INPUT
Description: OO
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-417.03	813.82	-412.45	812.94	-406.81	812	-406.1	812	-405.22	812
-395.28	811.74	-380.91	811.39	-371.41	811.15	-364.68	810.99	-359.42	810.86
-355.34	810.77	-345.4	810.64	-340.02	810.54	-336.02	810.47	-325.13	810.34
-312.35	810.19	-297.14	810.01	-296.43	810	-296.02	810	-295.59	810
-285.2	809.91	-274.56	809.84	-274.54	809.84	-273.77	809.83	-272.94	809.82
-262.55	809.73	-253.03	809.67	-251.8	809.66	-250.49	809.65	-241.36	809.57
-232.98	809.51	-230.33	809.49	-227.4	809.46	-224.11	809.42	-220.35	809.37
-208.38	809.22	-174.4	808.34	-171.28	808.24	-167.82	808.24	-159.55	808.19
-158.48	808.19	-156.58	808.18	-145.99	808.1	-143.06	808.1	-141.48	808.1
-141.47	808.1	-141.45	808.1	-141.41	808.1	-139.97	808.09	-136.44	808.09
-134.24	808.08	-131.11	808.06	-127.77	808.05	-120.4	808.02	-118.91	808.01
-118.39	808.01	-117.91	808.01	-117.81	808.01	-115.67	808	-113.81	807.99
-106.61	807.86	-105.72	807.84	-104.61	807.82	-104.57	807.82	-102.61	807.78
-99.96	807.71	-94.79	807.56	-82.5	807.22	-39.63	806	-38.69	806
-32.64	804.46	-31.48	804	-29.07	802.86	-27.45	802	-25.43	800.91
-24.71	800.57	-23.51	800	-21.41	799	-19.3	798	-10.6	796
-.12	796	-.06	796	0	796	11.36	796	20.55	798
22.64	798.89	25.23	800	25.29	800.03	25.3	800.03	29.05	802
30.21	802.61	33.02	804	35.92	804.98	37.94	804.98	38.95	804.98
39.77	804.98	55.66	804.9	86.81	804.9	121.46	804.49	134.69	804.4
178.19	803.99	181.7	803.96	182	803.96	184.59	803.99	228.44	804.47
248.69	805.15	255.51	805.29	257.89	805.39	258.14	805.47	259.94	805.87
277.19	809.69	294.63	811.77	300.3	812.2	300.82	812.43	300.99	812.54

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-417.03	.05	-38.69	.035	35.92	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.69	35.92	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.00	Reach Len. (ft)			
Crit W.S. (ft)	803.91	Flow Area (sq ft)	705.56	889.77	1504.49
E.G. Slope (ft/ft)	0.000191	Area (sq ft)	705.56	889.77	1504.49
Q Total (cfs)	5150.00	Flow (cfs)	484.14	2637.88	2027.98
Top Width (ft)	653.27	Top Width (ft)	326.41	74.61	252.25
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	0.69	2.96	1.35

* Max Ch Dpth (ft)	* 15.00	* Hydr. Depth (ft)	* 2.16	* 11.93	* 5.96	*		
* Conv. Total (cfs)	*372848.1	* Conv. (cfs)	* 35050.7	*190976.4	*146821.0	*		
* Length Wtd. (ft)	*	* Wetted Per. (ft)	* 326.46	* 78.27	* 252.83	*		
* Min Ch El (ft)	* 796.00	* Shear (lb/sq ft)	* 0.03	* 0.14	* 0.07	*		
* Alpha	* 1.91	* Stream Power (lb/ft s)	* 300.99	* 0.00	* 0.00	*		
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	*			
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	*			

****

SUMMARY OF MANNING'S N VALUES

River:Buckeye Creek

Reach	River Sta.	n1	n2	n3
Buckeye Creek	3504.54	.05	.035	.05
Buckeye Creek	3454.54	.05	.035	.05
Buckeye Creek	3404.54	.05	.035	.05
Buckeye Creek	3354.54	.05	.035	.05
Buckeye Creek	3304.54	.05	.035	.05
Buckeye Creek	3254.54	.05	.035	.05
Buckeye Creek	3204.54	.05	.035	.05
Buckeye Creek	3154.54	.05	.035	.05
Buckeye Creek	3104.54	.05	.035	.05
Buckeye Creek	3054.54	.05	.035	.05
Buckeye Creek	3004.54	.05	.035	.05
Buckeye Creek	2954.54	.05	.035	.05
Buckeye Creek	2904.54	.05	.035	.05
Buckeye Creek	2854.58	.05	.035	.05
Buckeye Creek	2804.54	.05	.035	.05
Buckeye Creek	2754.54	.05	.035	.05
Buckeye Creek	2704.54	.05	.035	.05
Buckeye Creek	2661.29	.05	.035	.05
Buckeye Creek	2603.43	.05	.035	.05
Buckeye Creek	2554.54	.05	.035	.05
Buckeye Creek	2494.62	.05	.035	.05
Buckeye Creek	2460.04	Bridge		
Buckeye Creek	2417.85	.05	.035	.05
Buckeye Creek	2354.53	.05	.035	.05
Buckeye Creek	2306.38	.05	.035	.05
Buckeye Creek	2254.54	.05	.035	.05
Buckeye Creek	2204.54	.05	.035	.05
Buckeye Creek	2154.54	.05	.035	.05
Buckeye Creek	2105.74	.05	.035	.05
Buckeye Creek	1903.41	.05	.035	.05
Buckeye Creek	1804	.05	.035	.05
Buckeye Creek	1604.54	.05	.035	.05
Buckeye Creek	1419.72	.05	.035	.05
Buckeye Creek	1234.05	.05	.035	.05
Buckeye Creek	1102.70	.05	.035	.05
Buckeye Creek	972.12	.05	.035	.05
Buckeye Creek	810.82	.05	.035	.05
Buckeye Creek	632.35	.05	.035	.05

*Buckeye Creek	*	433.99	*	.05*	.035*	.05*
*Buckeye Creek	*	289.71	*	.05*	.035*	.05*
*Buckeye Creek	*	109.26	*	.05*	.035*	.05*
*Buckeye Creek	*	0	*	.05*	.035*	.05*

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

Reach	River Sta.	Left	Channel	Right
*Buckeye Creek	3504.54	50*	50*	50*
*Buckeye Creek	3454.54	52*	50*	50*
*Buckeye Creek	3404.54	55*	50*	50*
*Buckeye Creek	3354.54	35*	50*	50*
*Buckeye Creek	3304.54	55*	50*	47*
*Buckeye Creek	3254.54	43*	50*	52*
*Buckeye Creek	3204.54	44*	50*	51*
*Buckeye Creek	3154.54	48*	50*	52*
*Buckeye Creek	3104.54	22*	50*	48*
*Buckeye Creek	3054.54	23*	50*	53*
*Buckeye Creek	3004.54	36*	50*	48*
*Buckeye Creek	2954.54	36*	50*	48*
*Buckeye Creek	2904.54	42*	49.96*	51*
*Buckeye Creek	2854.58	40*	50.04*	52*
*Buckeye Creek	2804.54	87*	50*	60*
*Buckeye Creek	2754.54	109*	50*	58*
*Buckeye Creek	2704.54	52*	43.25*	43*
*Buckeye Creek	2661.29	53*	58*	63*
*Buckeye Creek	2603.43	68*	48.89*	51*
*Buckeye Creek	2554.54	83*	59.92*	60*
*Buckeye Creek	2494.62	170*	76.77*	86*
*Buckeye Creek	2460.04	*Bridge *	*	*
*Buckeye Creek	2417.85	91*	63.32*	62*
*Buckeye Creek	2354.53	144*	48.15*	69*
*Buckeye Creek	2306.38	90*	51.84*	42*
*Buckeye Creek	2254.54	90*	50*	45*
*Buckeye Creek	2204.54	74*	50*	44*
*Buckeye Creek	2154.54	63*	48.8*	47*
*Buckeye Creek	2105.74	190*	202.35*	215*
*Buckeye Creek	1903.41	233*	99.41*	34*
*Buckeye Creek	1804	279*	199.46*	52*
*Buckeye Creek	1604.54	149*	184.82*	41*
*Buckeye Creek	1419.72	173*	185.67*	44*
*Buckeye Creek	1234.05	117*	131.34*	192.99*
*Buckeye Creek	1102.70	138.99*	130.59*	147.99*
*Buckeye Creek	972.12	168*	161.32*	108*
*Buckeye Creek	810.82	200*	178.48*	258*
*Buckeye Creek	632.35	239*	198.36*	80*
*Buckeye Creek	433.99	150.99*	144.27*	75.99*
*Buckeye Creek	289.71	142*	180.45*	179*
*Buckeye Creek	109.26	105.99*	109.26*	120*
*Buckeye Creek	0	0*	0*	0*

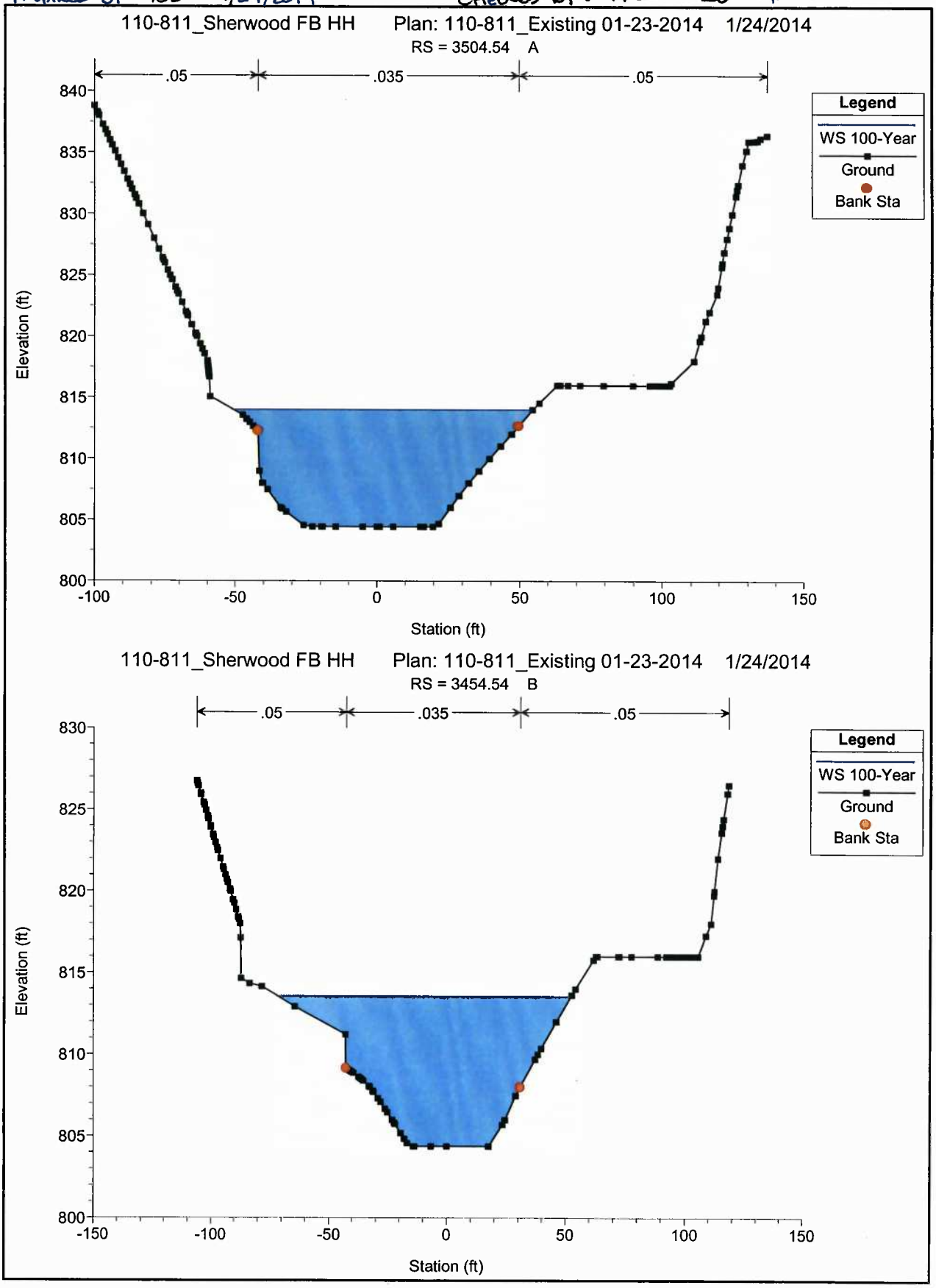
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Buckeye Creek

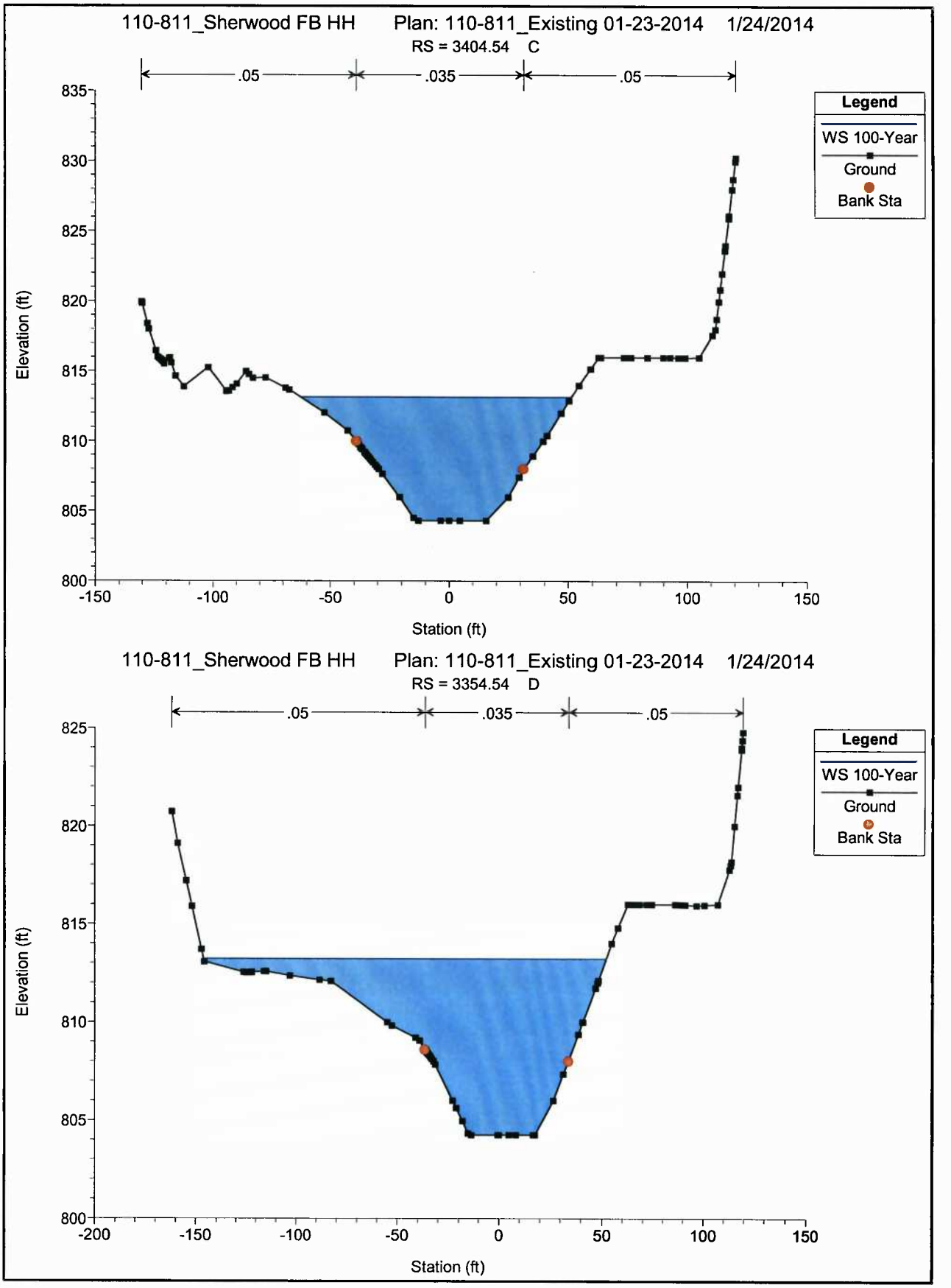
Reach	River Sta.	Contr.	Expan.
Buckeye Creek	3504.54	.1	.3
Buckeye Creek	3454.54	.1	.3
Buckeye Creek	3404.54	.1	.3
Buckeye Creek	3354.54	.1	.3
Buckeye Creek	3304.54	.1	.3
Buckeye Creek	3254.54	.1	.3
Buckeye Creek	3204.54	.1	.3
Buckeye Creek	3154.54	.1	.3
Buckeye Creek	3104.54	.1	.3
Buckeye Creek	3054.54	.1	.3
Buckeye Creek	3004.54	.1	.3
Buckeye Creek	2954.54	.1	.3
Buckeye Creek	2904.54	.1	.3
Buckeye Creek	2854.58	.1	.3
Buckeye Creek	2804.54	.1	.3
Buckeye Creek	2754.54	.1	.3
Buckeye Creek	2704.54	.1	.3
Buckeye Creek	2661.29	.1	.3
Buckeye Creek	2603.43	.1	.3
Buckeye Creek	2554.54	.1	.3
Buckeye Creek	2494.62	.1	.3
Buckeye Creek	2460.04	Bridge	
Buckeye Creek	2417.85	.1	.3
Buckeye Creek	2354.53	.1	.3
Buckeye Creek	2306.38	.1	.3
Buckeye Creek	2254.54	.1	.3
Buckeye Creek	2204.54	.1	.3
Buckeye Creek	2154.54	.1	.3
Buckeye Creek	2105.74	.1	.3
Buckeye Creek	1903.41	.1	.3
Buckeye Creek	1804	.1	.3
Buckeye Creek	1604.54	.1	.3
Buckeye Creek	1419.72	.1	.3
Buckeye Creek	1234.05	.1	.3
Buckeye Creek	1102.70	.1	.3
Buckeye Creek	972.12	.1	.3
Buckeye Creek	810.82	.1	.3
Buckeye Creek	632.35	.1	.3
Buckeye Creek	433.99	.1	.3
Buckeye Creek	289.71	.1	.3
Buckeye Creek	109.26	.1	.3
Buckeye Creek	0	.1	.3

APPENDIX D

EXISTING AND PROPOSED FLOODWAY MAP AND CROSS SECTION OUTPUT

PREPARED BY: TGJ 1/24/2014 CHECKED BY: ALG 26-JAN-2014

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Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 3404.54 C
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
-150
-100
-50
0
50
100
150
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 3354.54 D
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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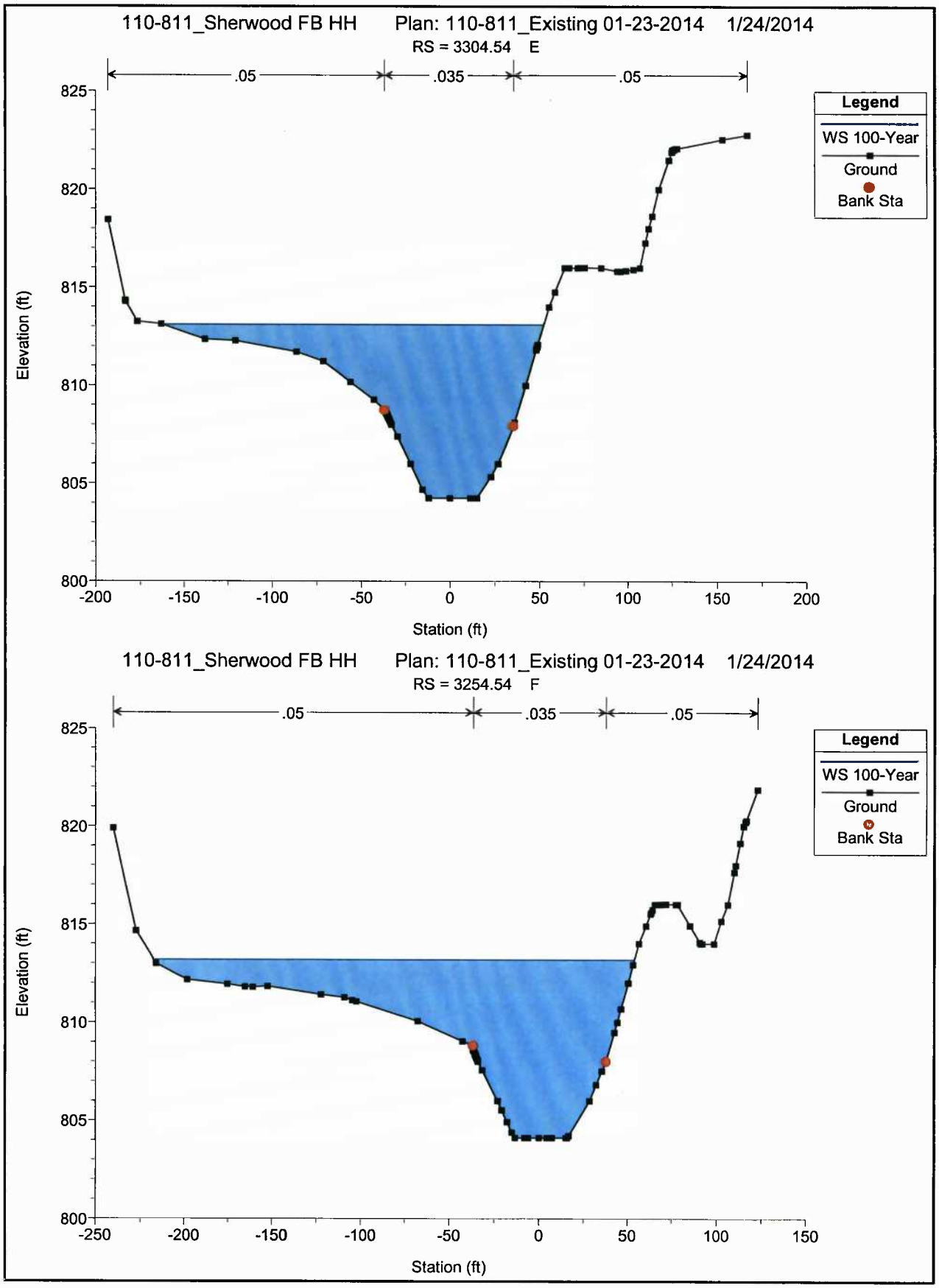
820
815
810
805
800
-200
-150
-100
-50
0
50
100
150
Station (ft)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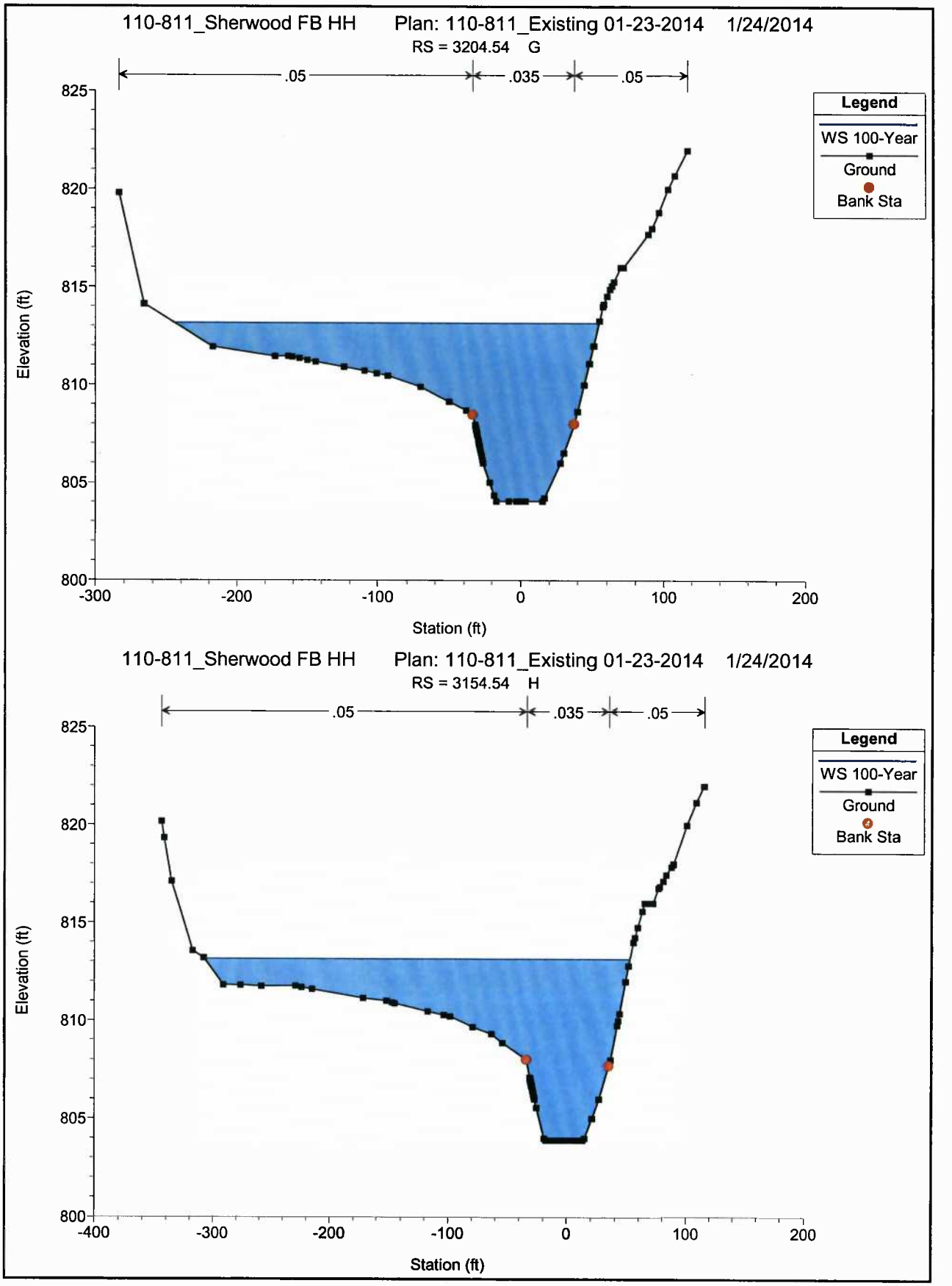
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-200
-150
-100
-50
0
50
100
150
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 3254.54 F
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-250
-200
-150
-100
-50
0
50
100
150
Station (ft)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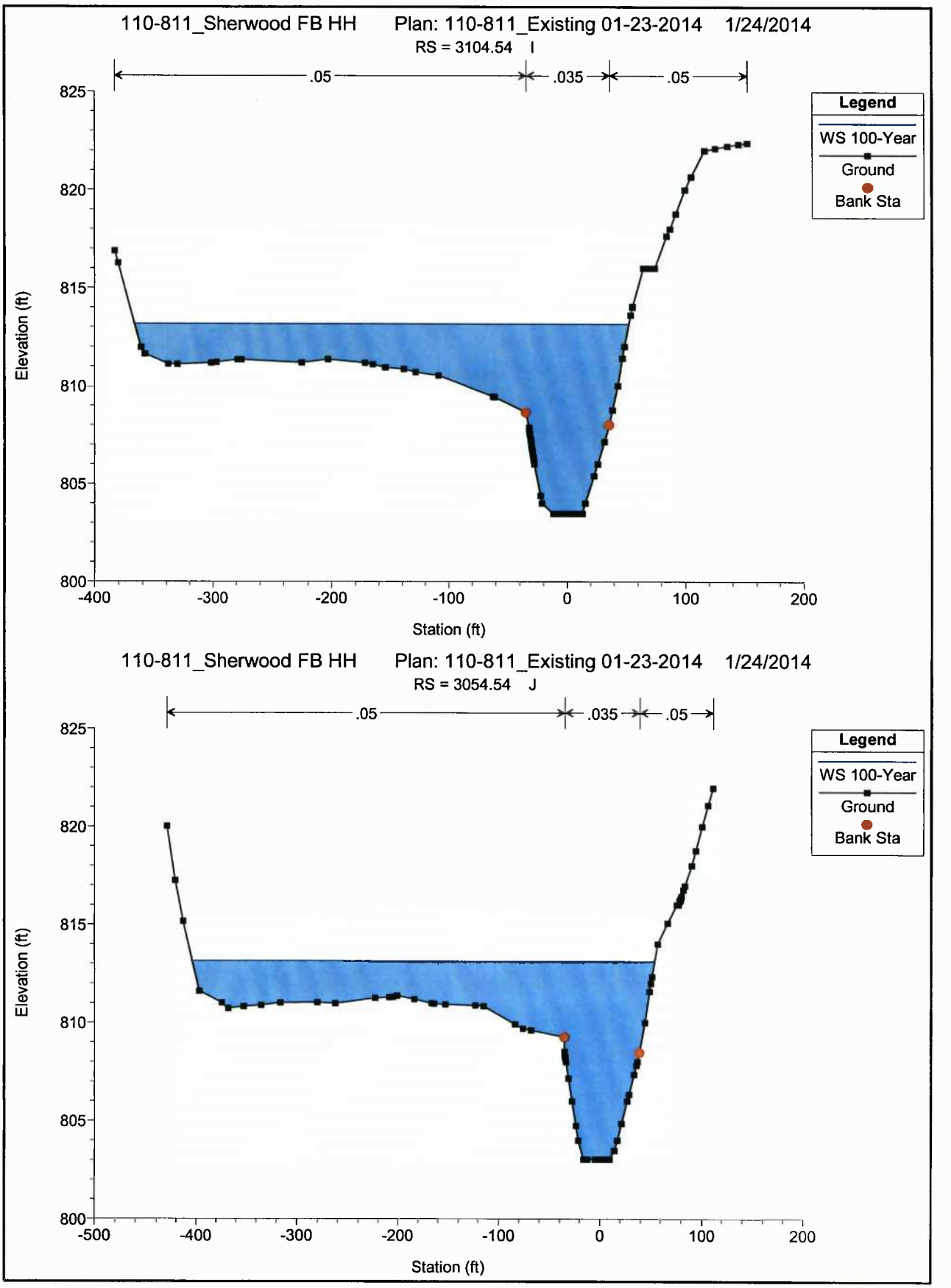
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 3204.54 G
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 3154.54 H
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-400
-300
-200
-100
0
100
200
Station (ft)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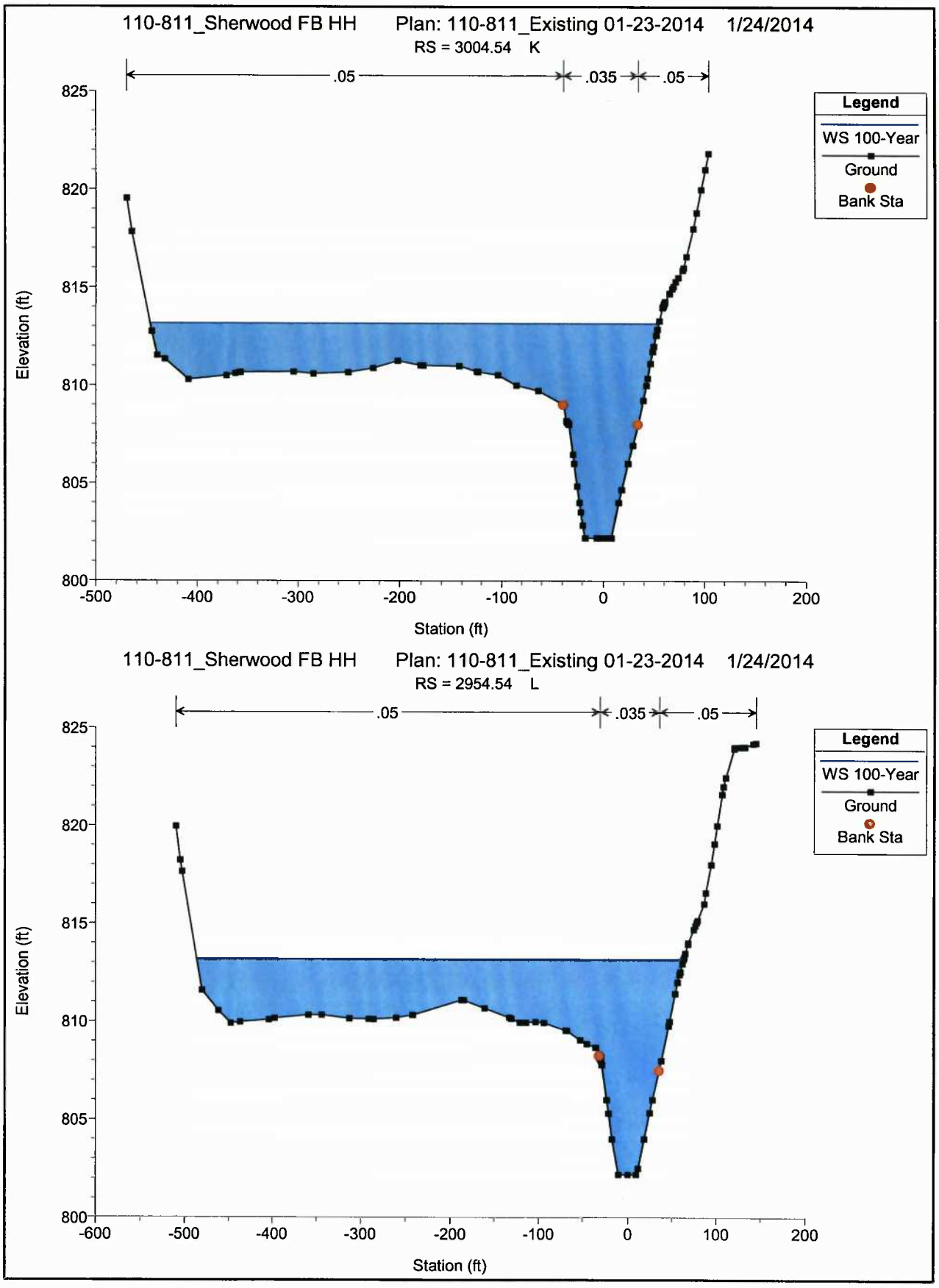
RS = 3104.54 I
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 3054.54 J
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-500
-400
-300
-200
-100
0
100
200
Station (ft)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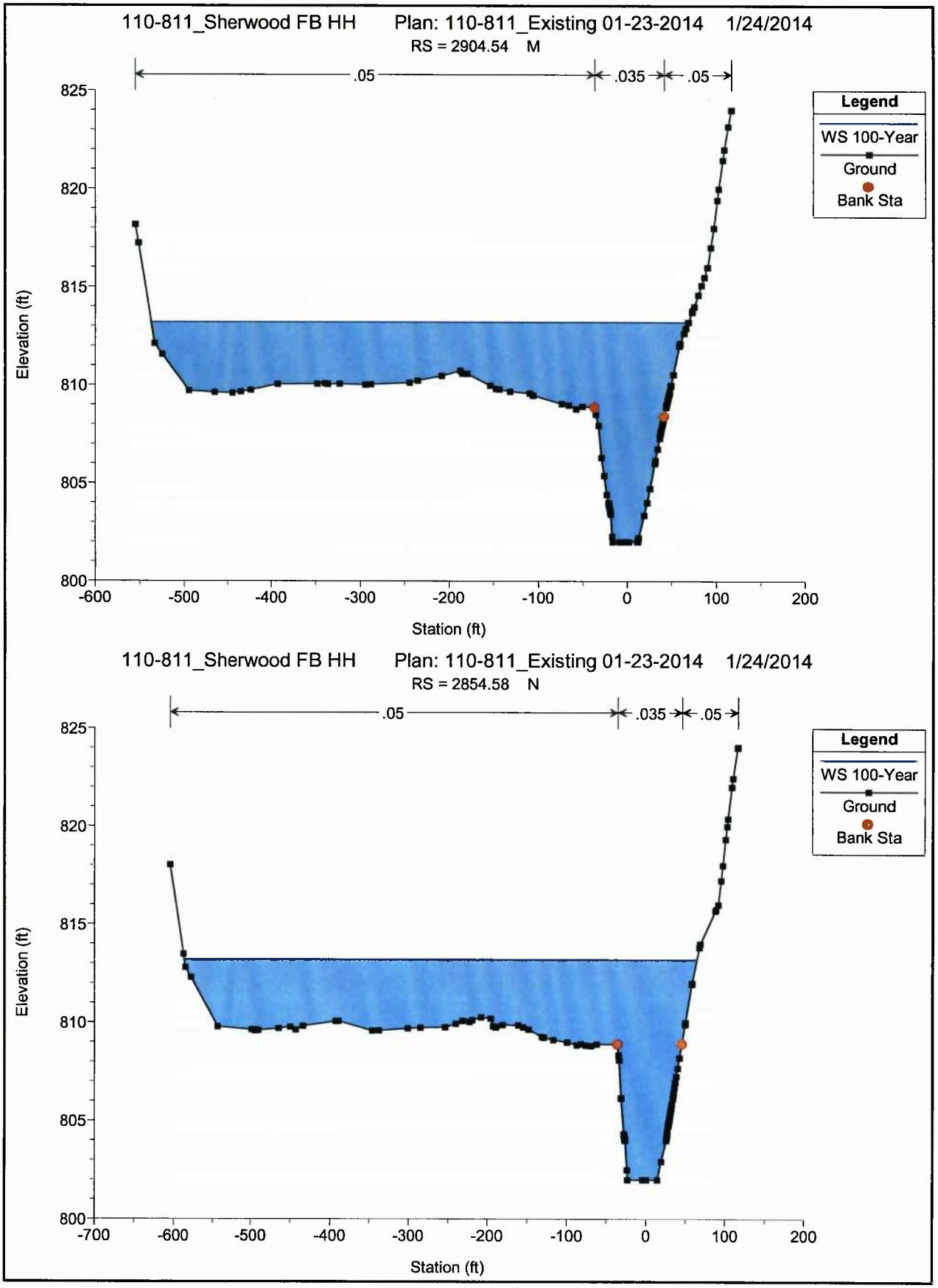
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2954.54 L
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)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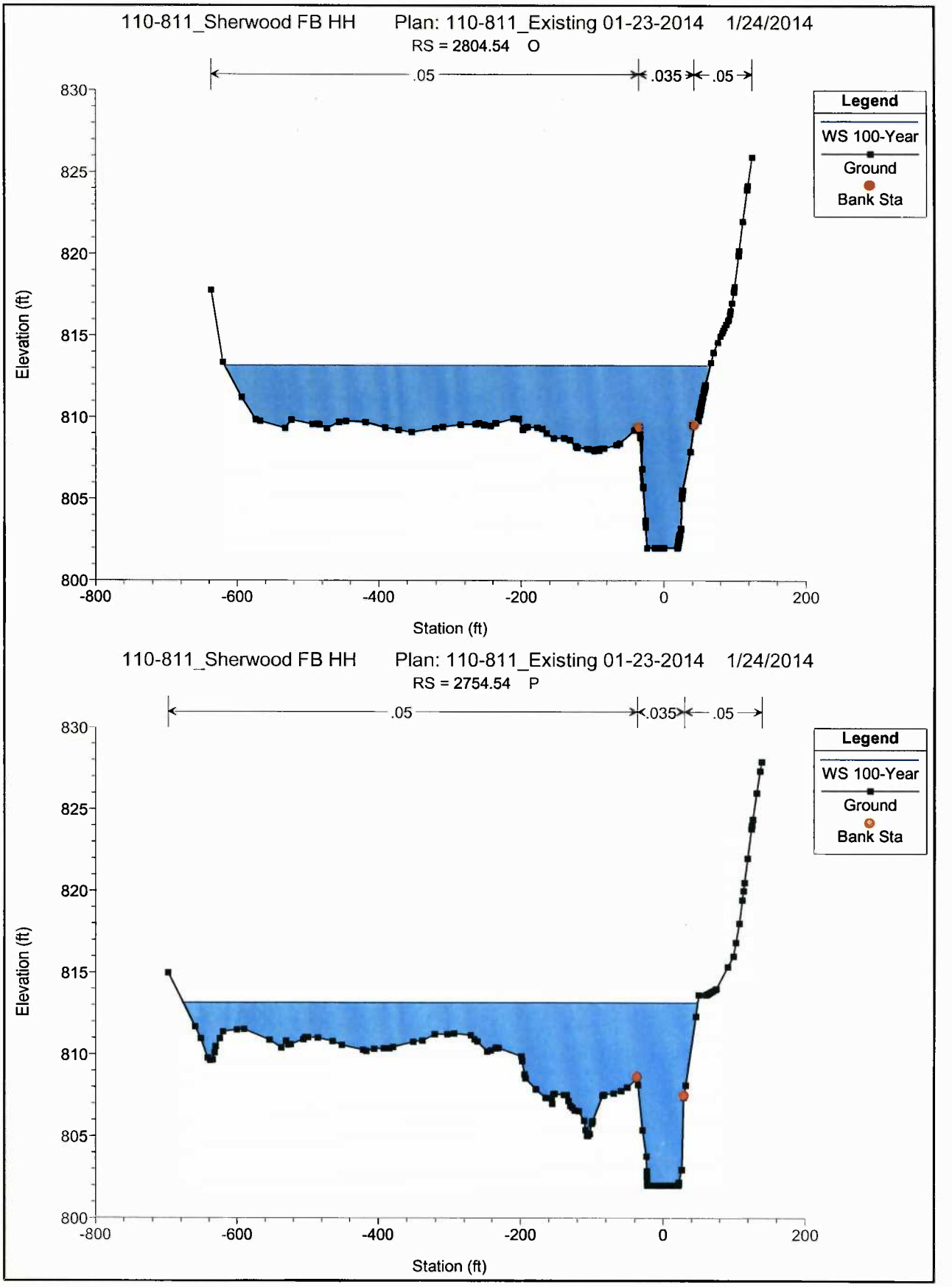
RS = 2904.54 M
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2854.58 N
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-700
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)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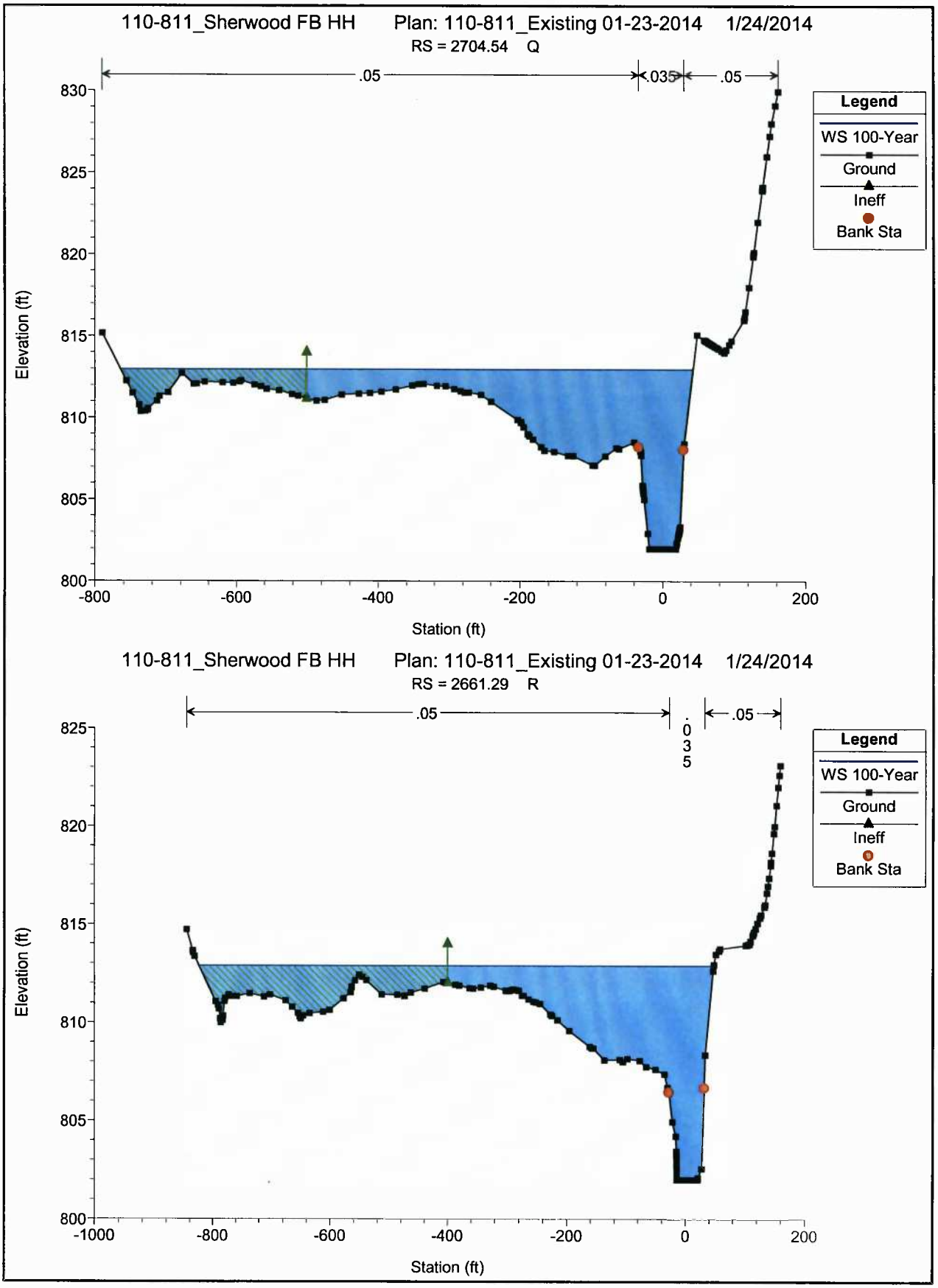
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2754.54 P
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)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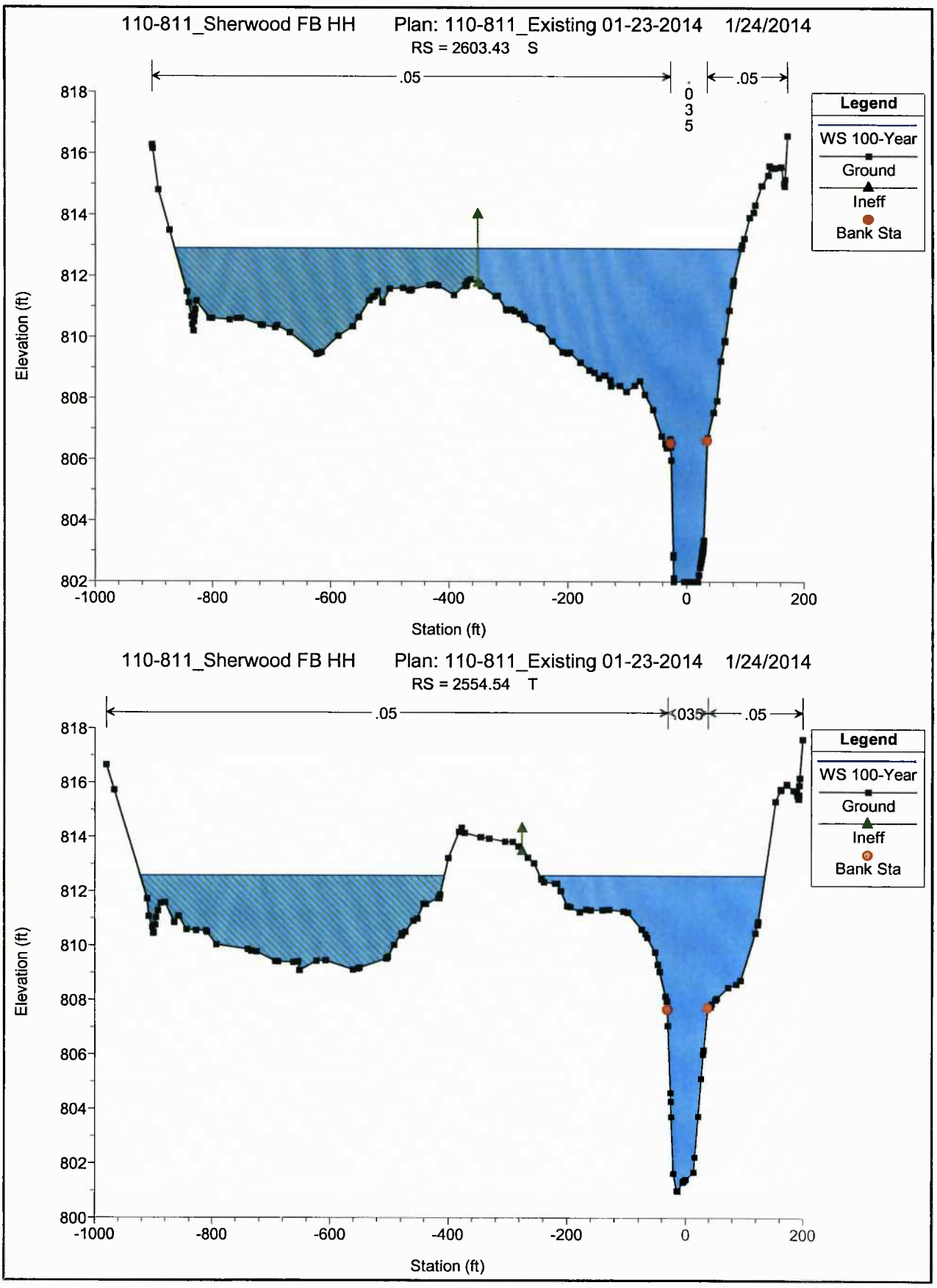
RS = 2704.54 Q
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2661.29 R
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-1000
-800
-600
-400
-200
0
200
Station (ft)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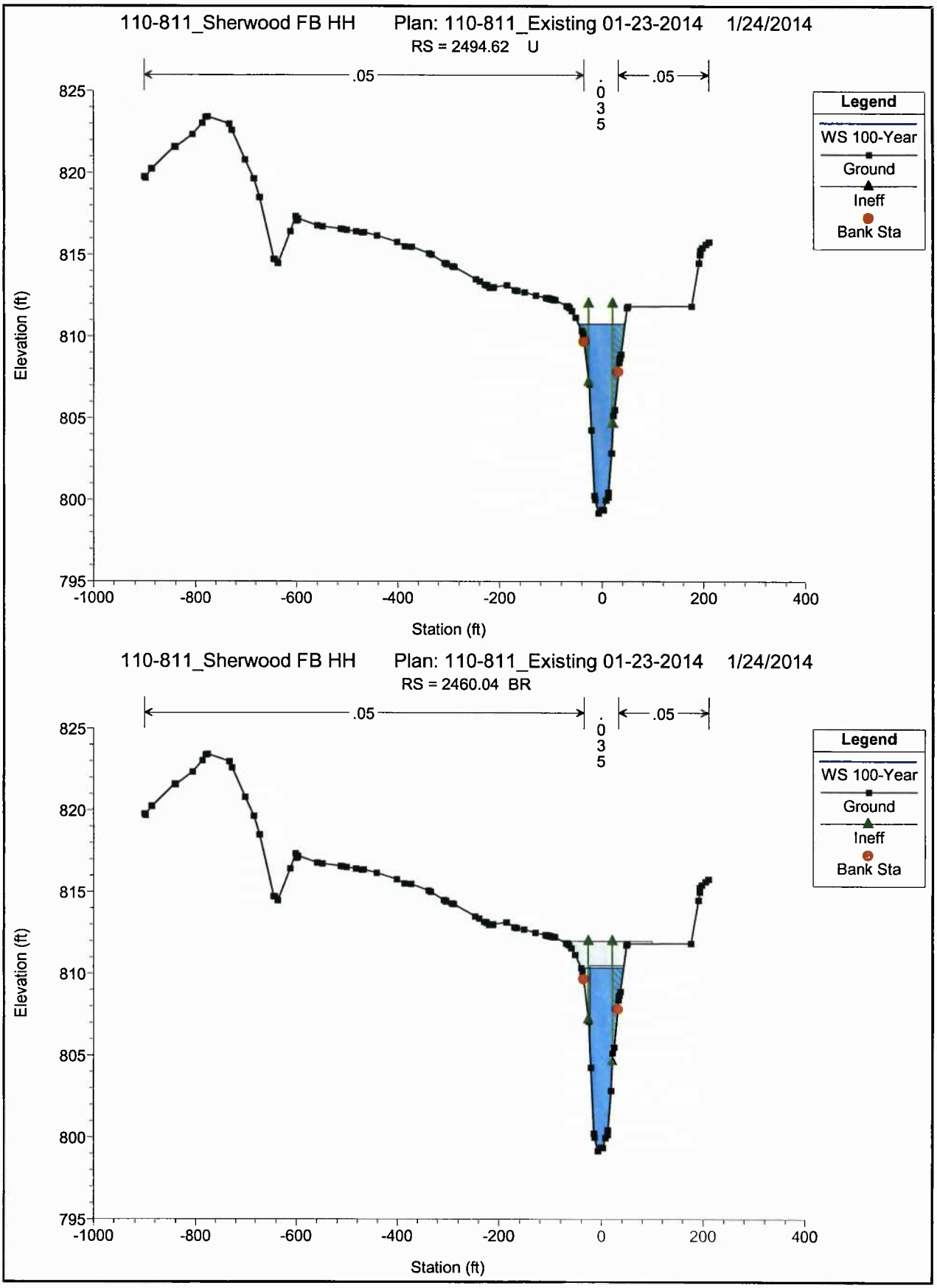
RS = 2603.43 S
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2554.54 T
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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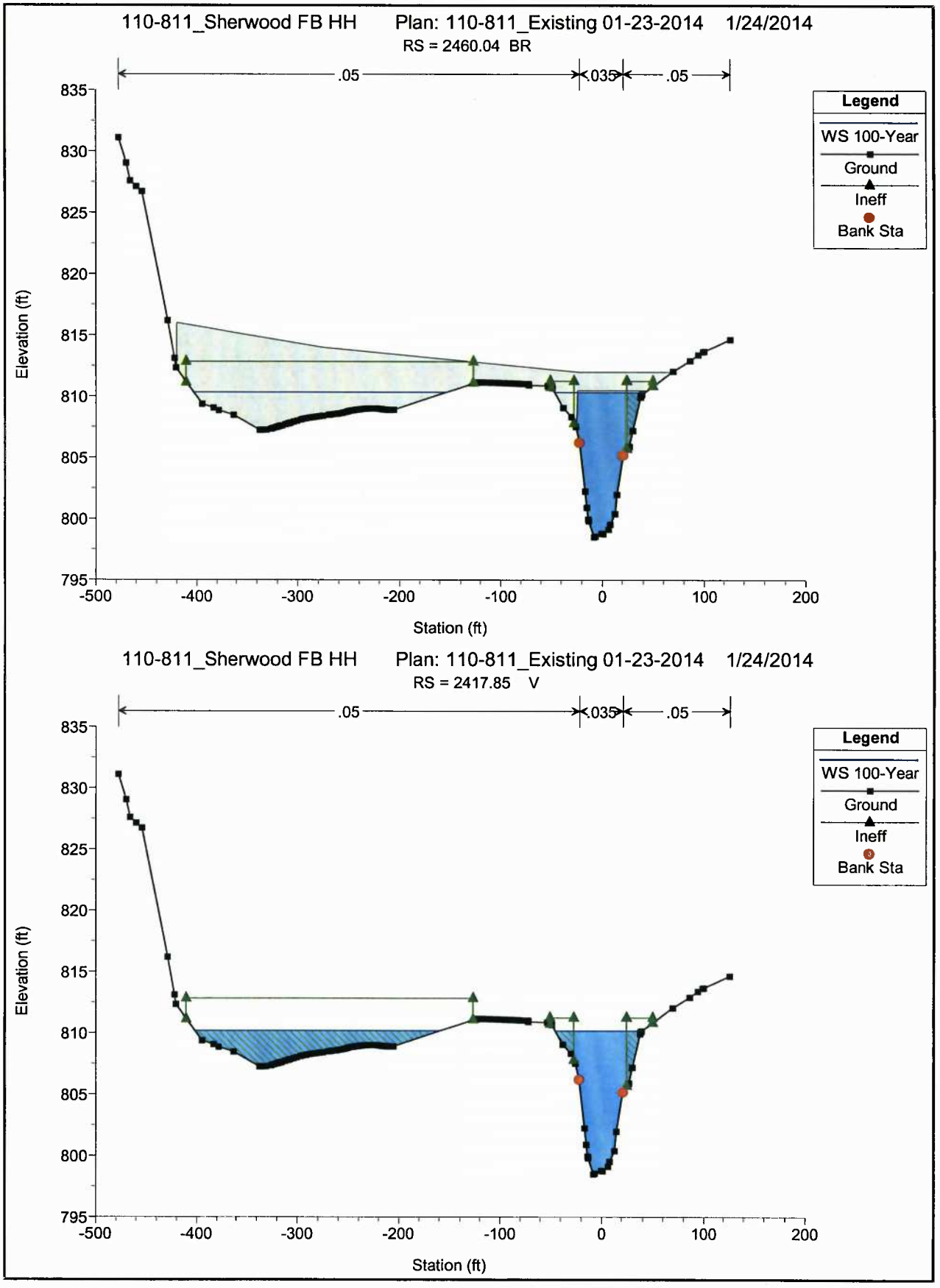
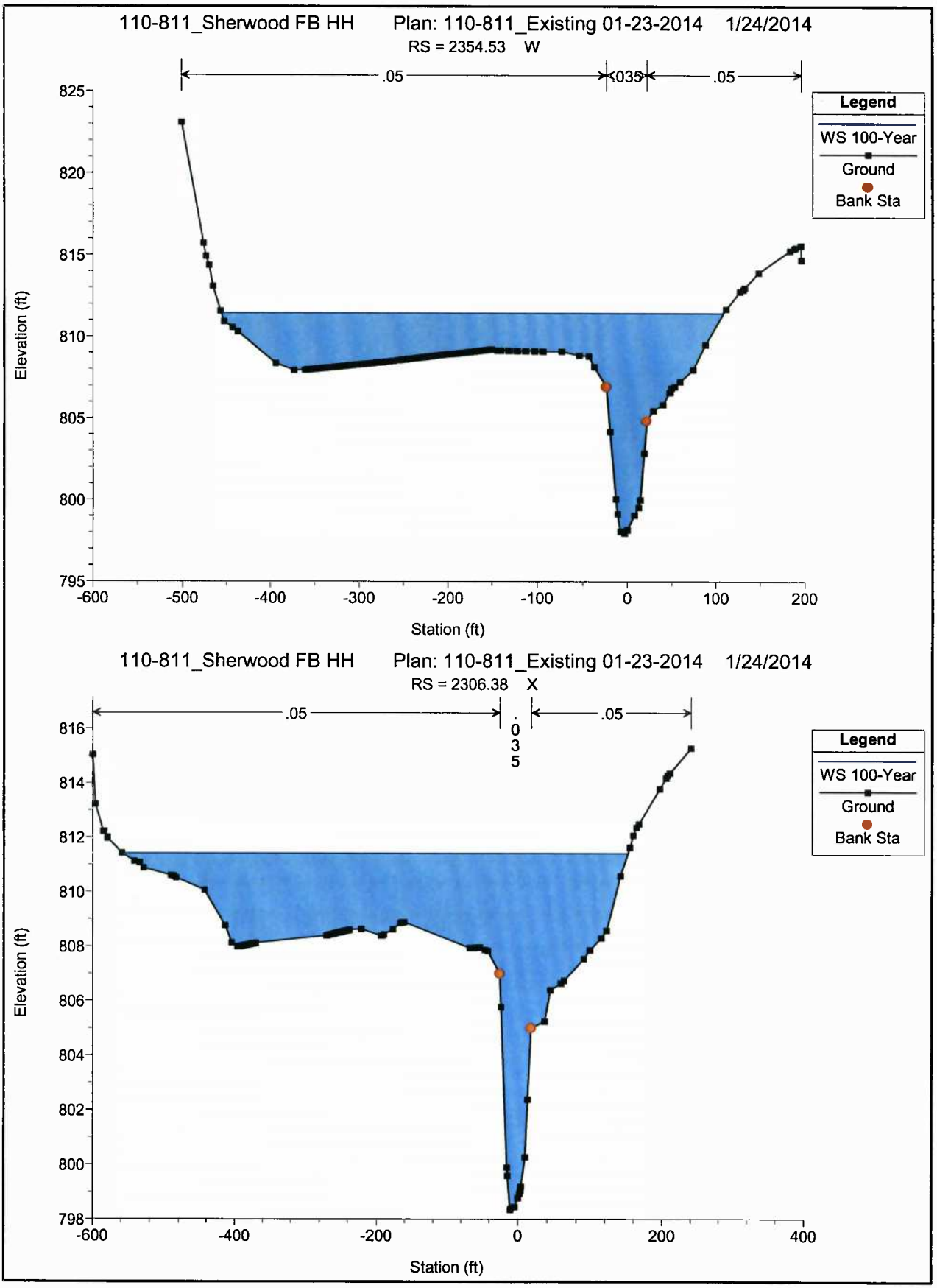
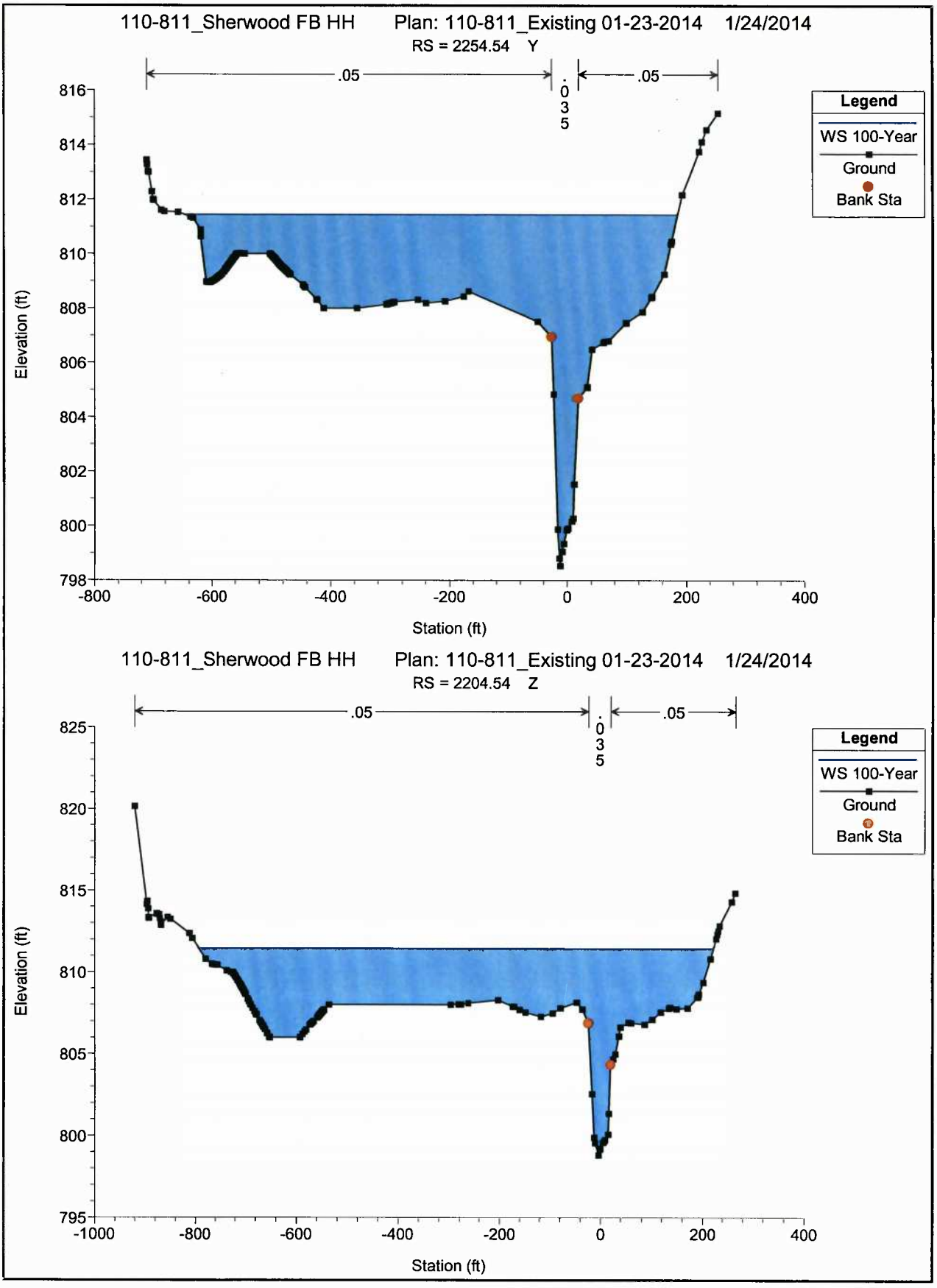
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-1000
-800
-600
-400
-200
0
200
400
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2460.04 BR
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-1000
-800
-600
-400
-200
0
200
400
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2460.04 BR
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
795
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2417.85 V
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
795
-500
-400
-300
-200
-100
0
100
200
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2354.53 W
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2306.38 X
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
816
814
812
810
808
806
804
802
800
798
-600
-400
-200
0
200
400
Station (ft)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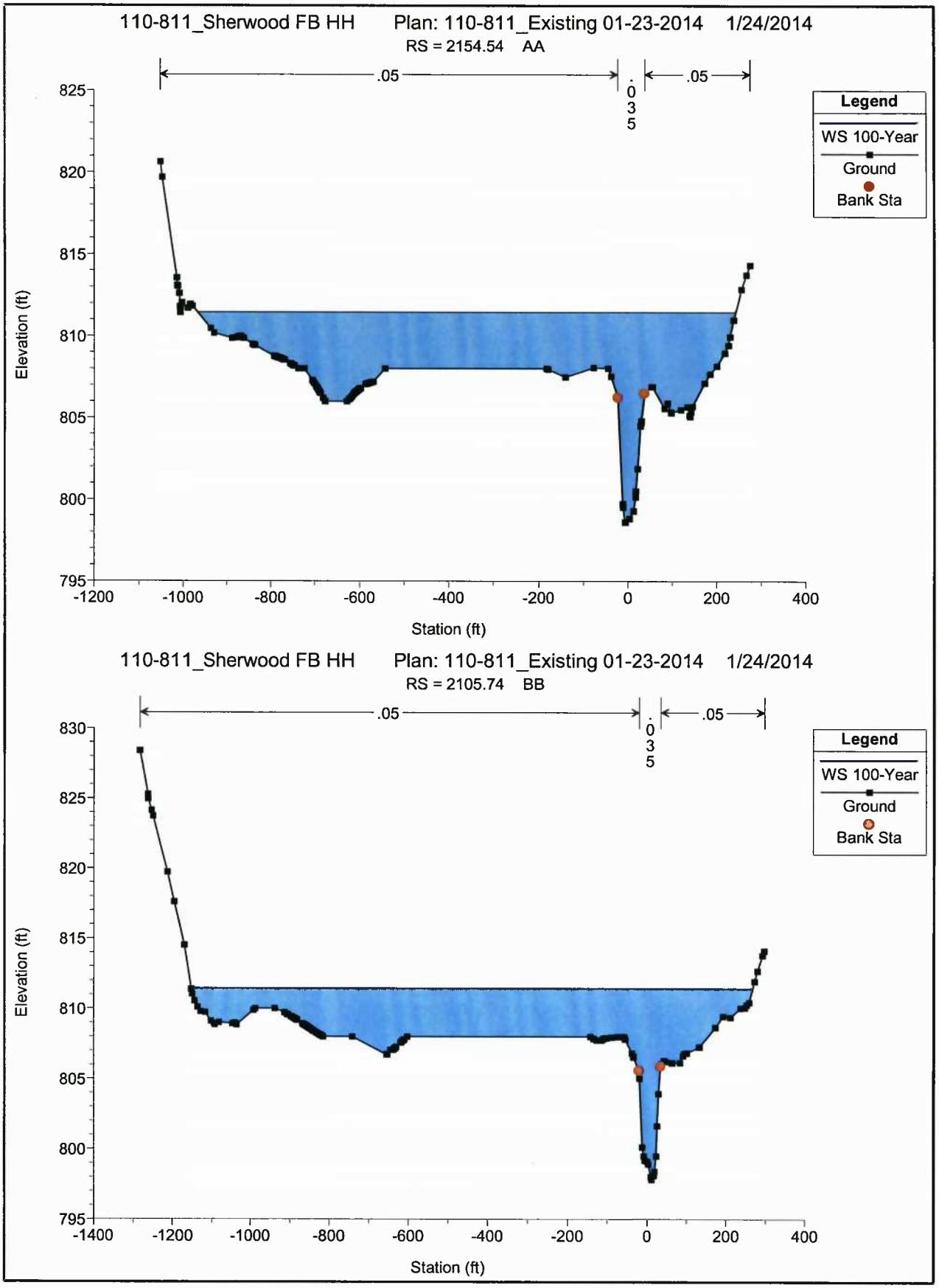
RS = 2254.54 Y
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
816
814
812
810
808
806
804
802
800
798
-800
-600
-400
-200
0
200
400
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2204.54 Z
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-1000
-800
-600
-400
-200
0
200
400
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2154.54 AA
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-1200
-1000
-800
-600
-400
-200
0
200
400
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 2105.74 BB
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
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795
-1400
-1200
-1000
-800
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-400
-200
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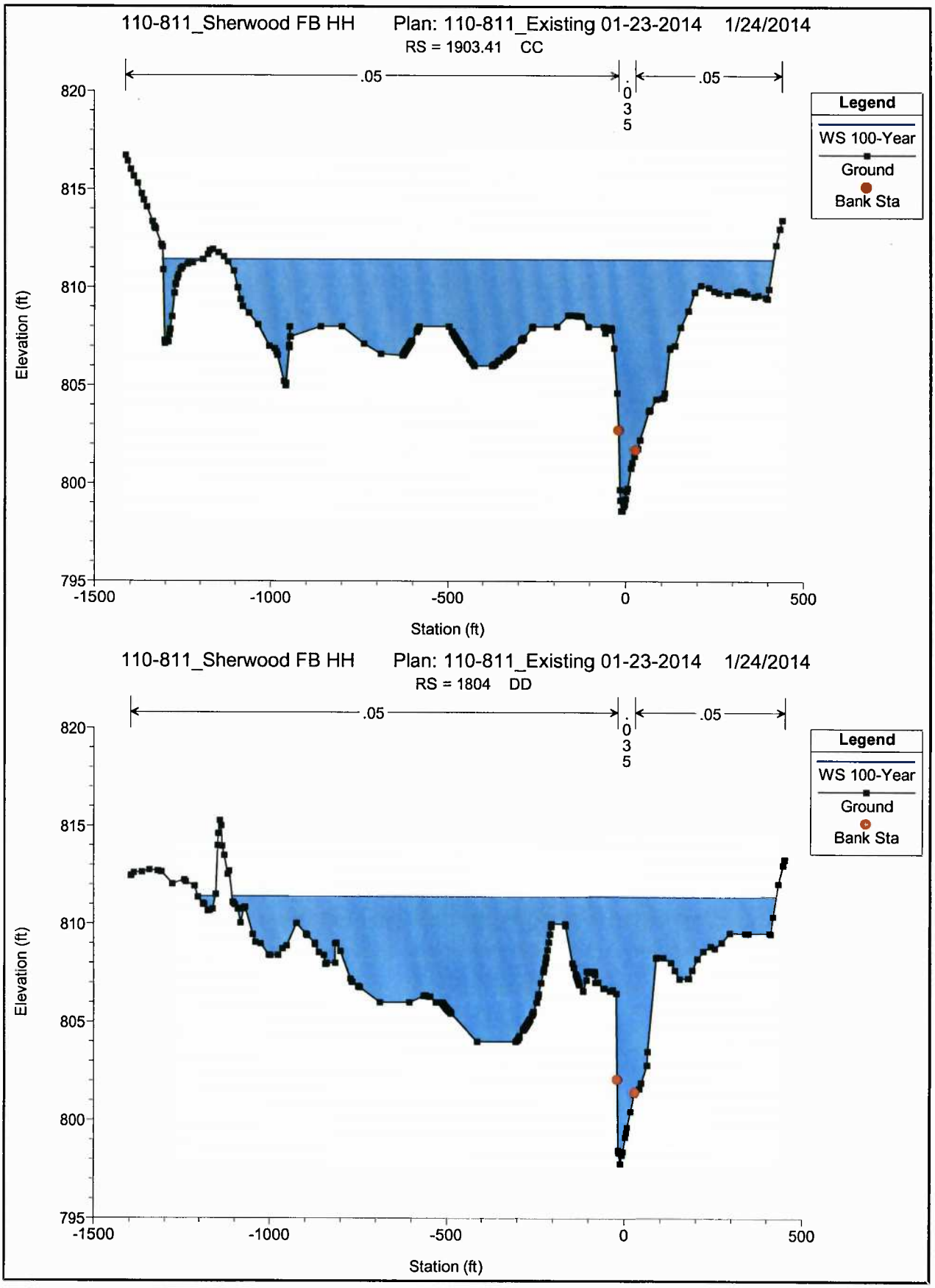
400
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 1903.41 CC
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.05
.035
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
805
800
795
-1500
-1000
-500
0
500
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 1804 DD
.05
.05
.035
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
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800
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-1500
-1000
-500
0
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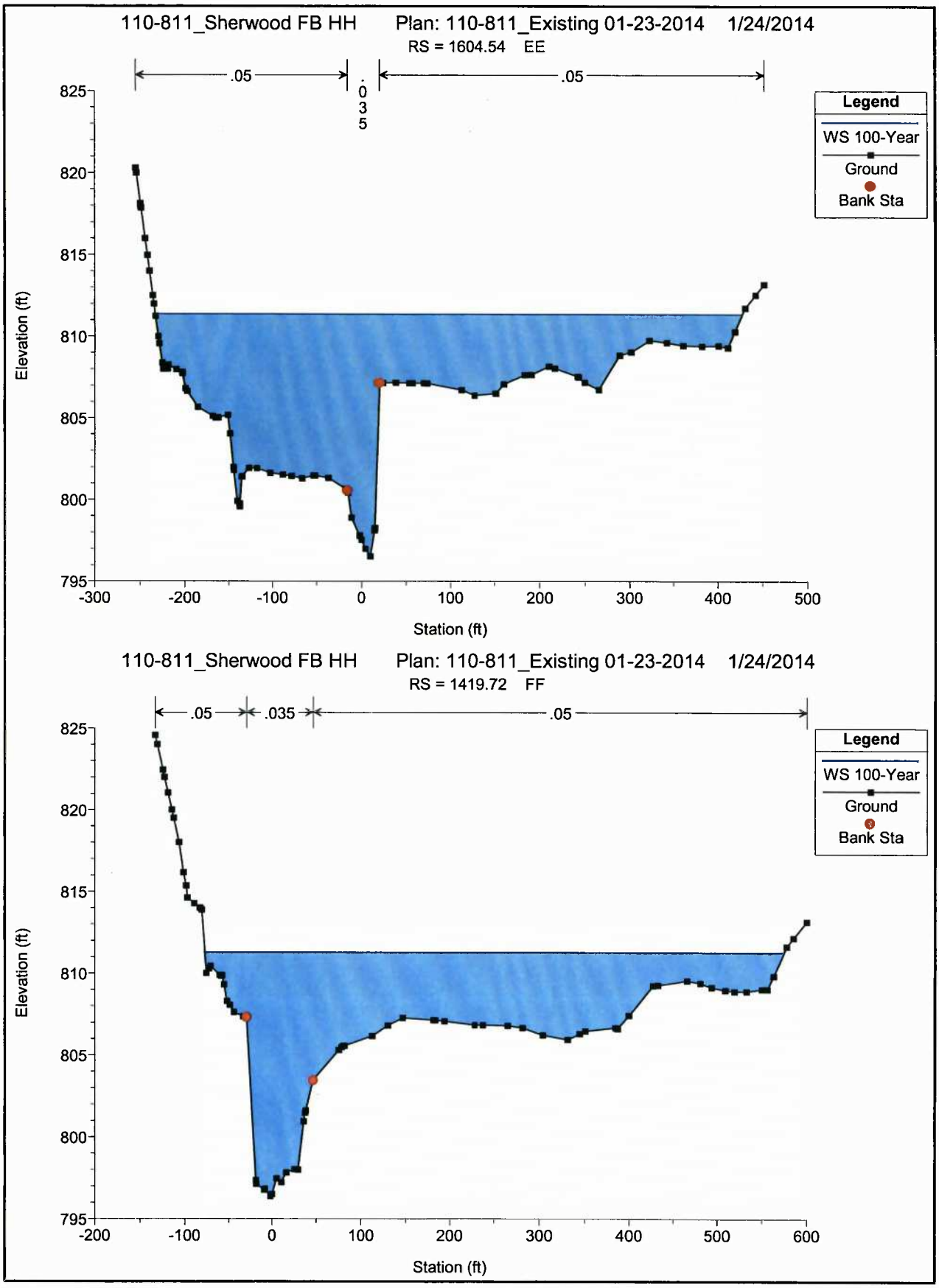
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 1604.54 EE
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.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-300
-200
-100
0
100
200
300
400
500
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 1419.72 FF
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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805
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795
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300
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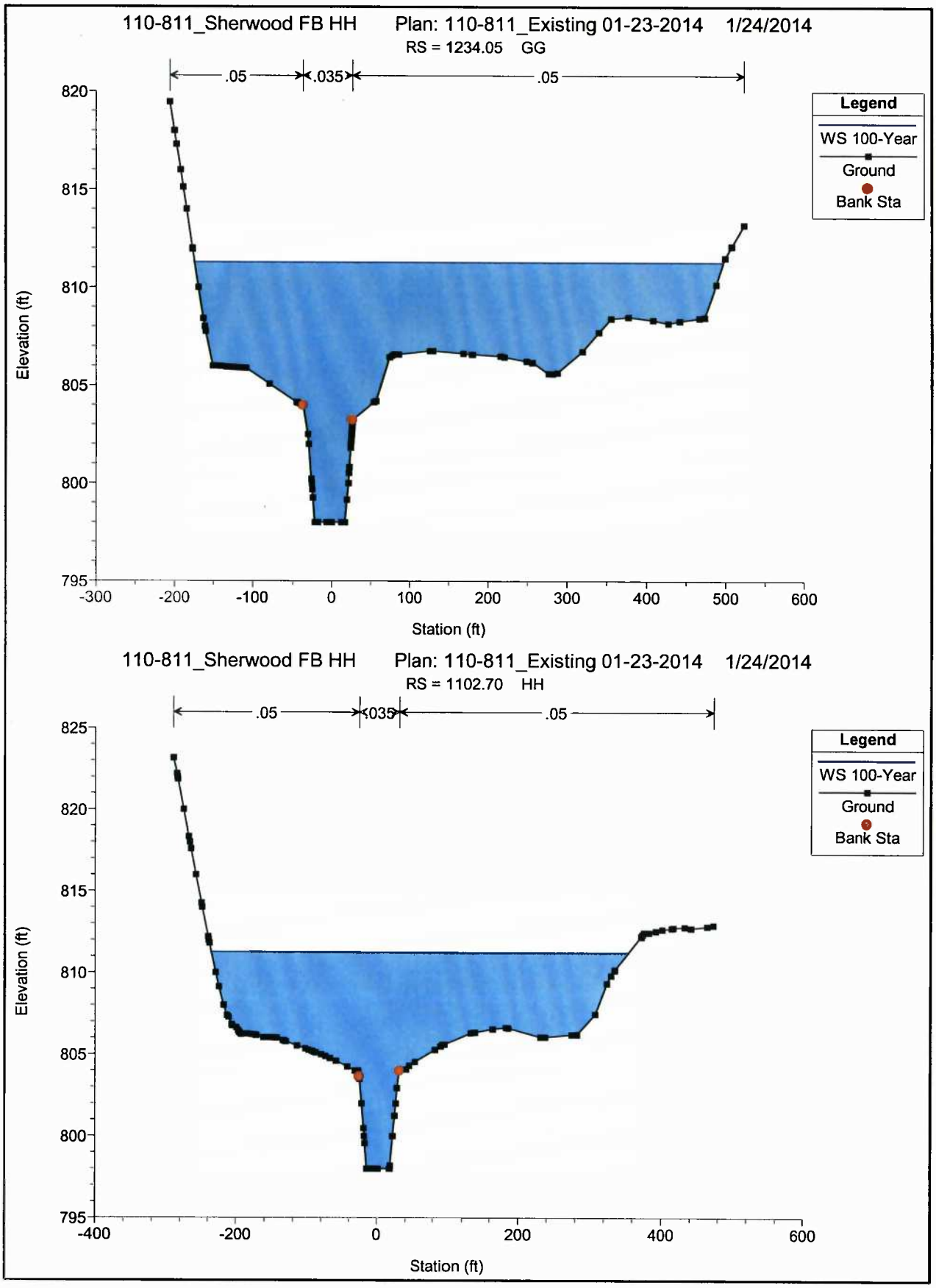
500
600
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 1234.05 GG
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
805
800
795
-300
-200
-100
0
100
200
300
400
500
600
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 1102.70 HH
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
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795
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-200
0
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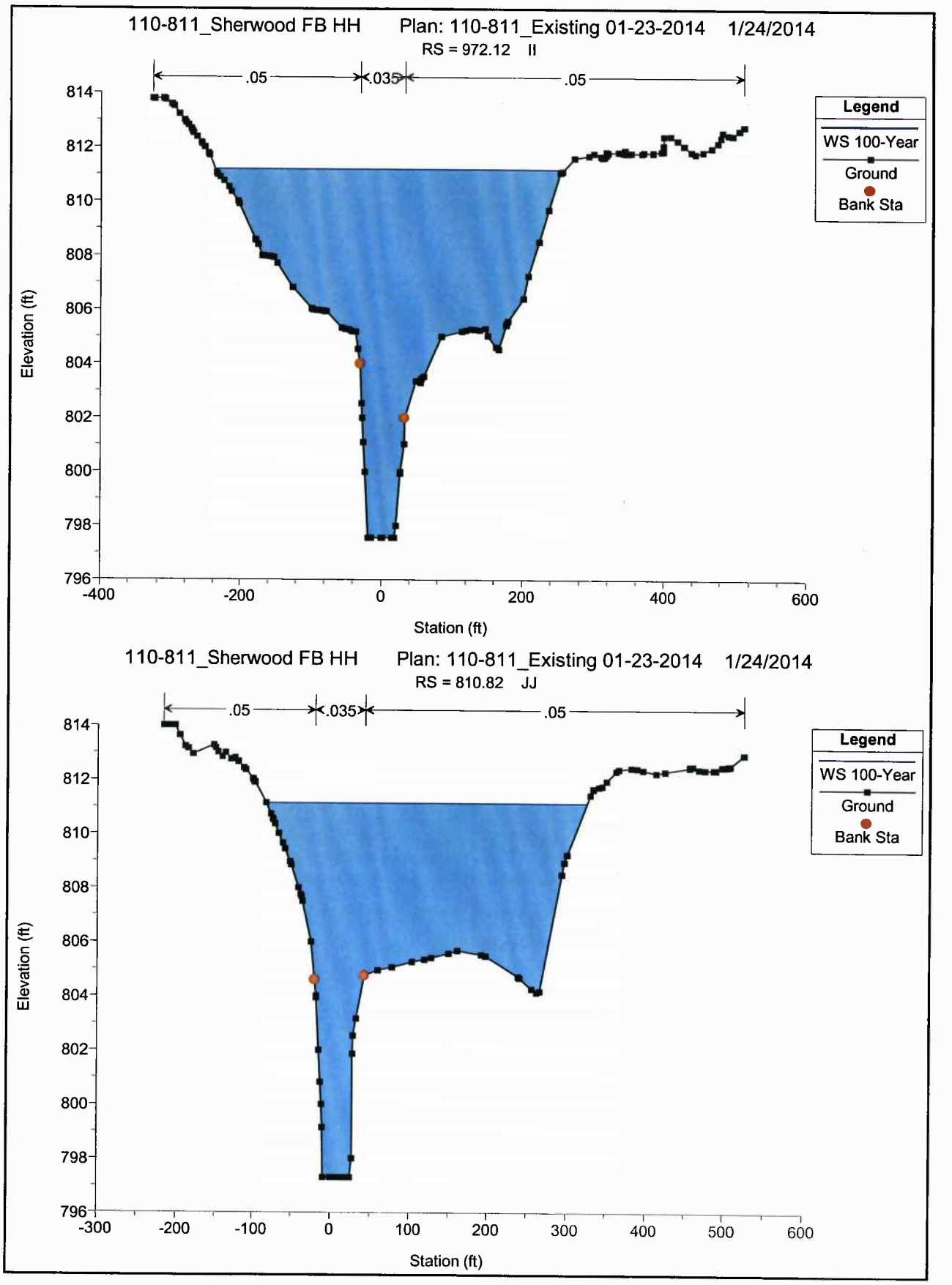
400
600
Station (ft)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Plan: 110-811_Existing 01-23-2014
1/24/2014
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.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
814
812
810
808
806
804
802
800
798
796
-400
-200
0
200
400
600
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 810.82 JJ
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
814
812
810
808
806
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802
800
798
796
-300
-200
-100
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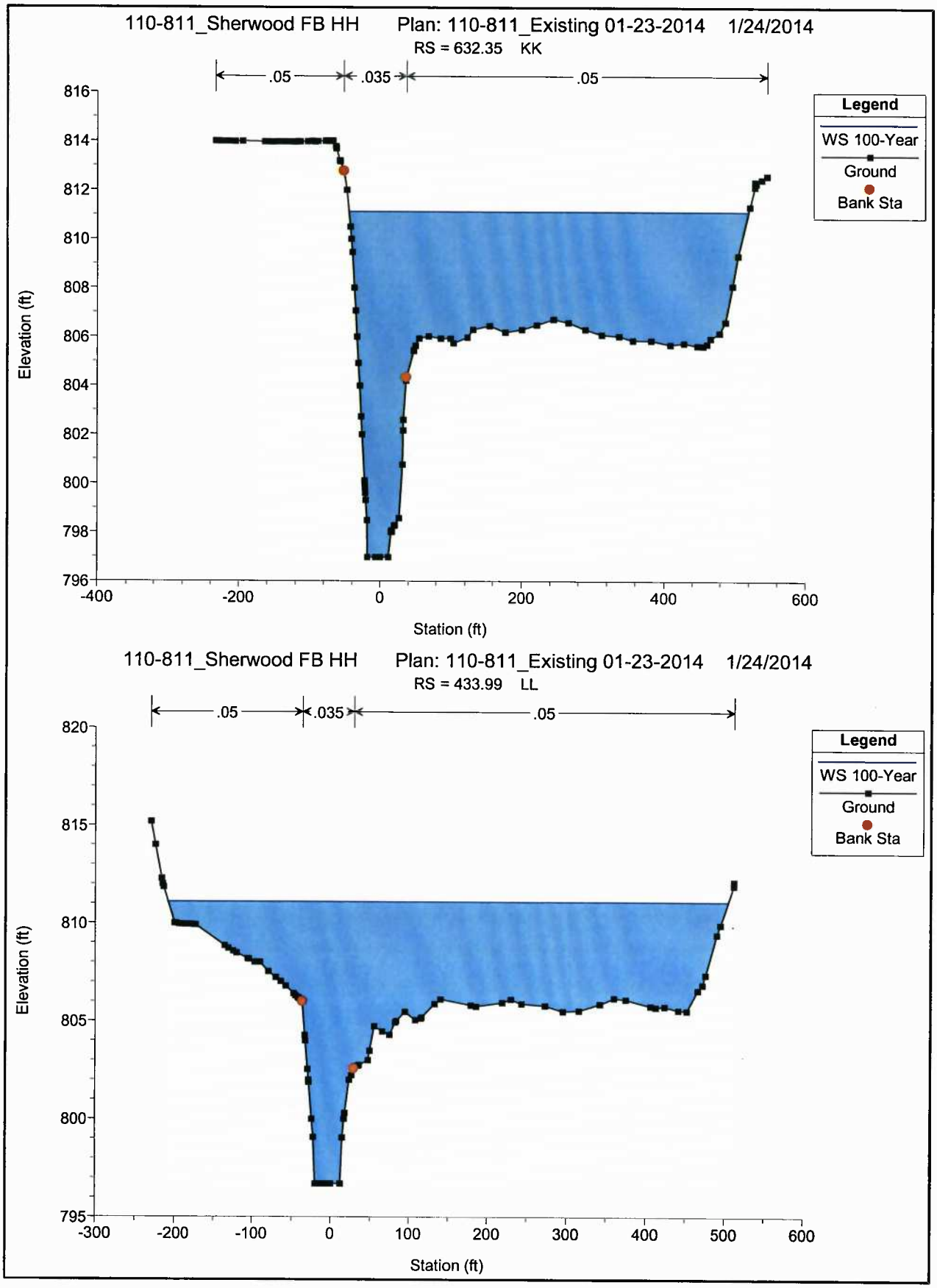
100
200
300
400
500
600
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 632.35 KK
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
816
814
812
810
808
806
804
802
800
798
796
-400
-200
0
200
400
600
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 433.99 LL
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
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805
800
795
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-100
0
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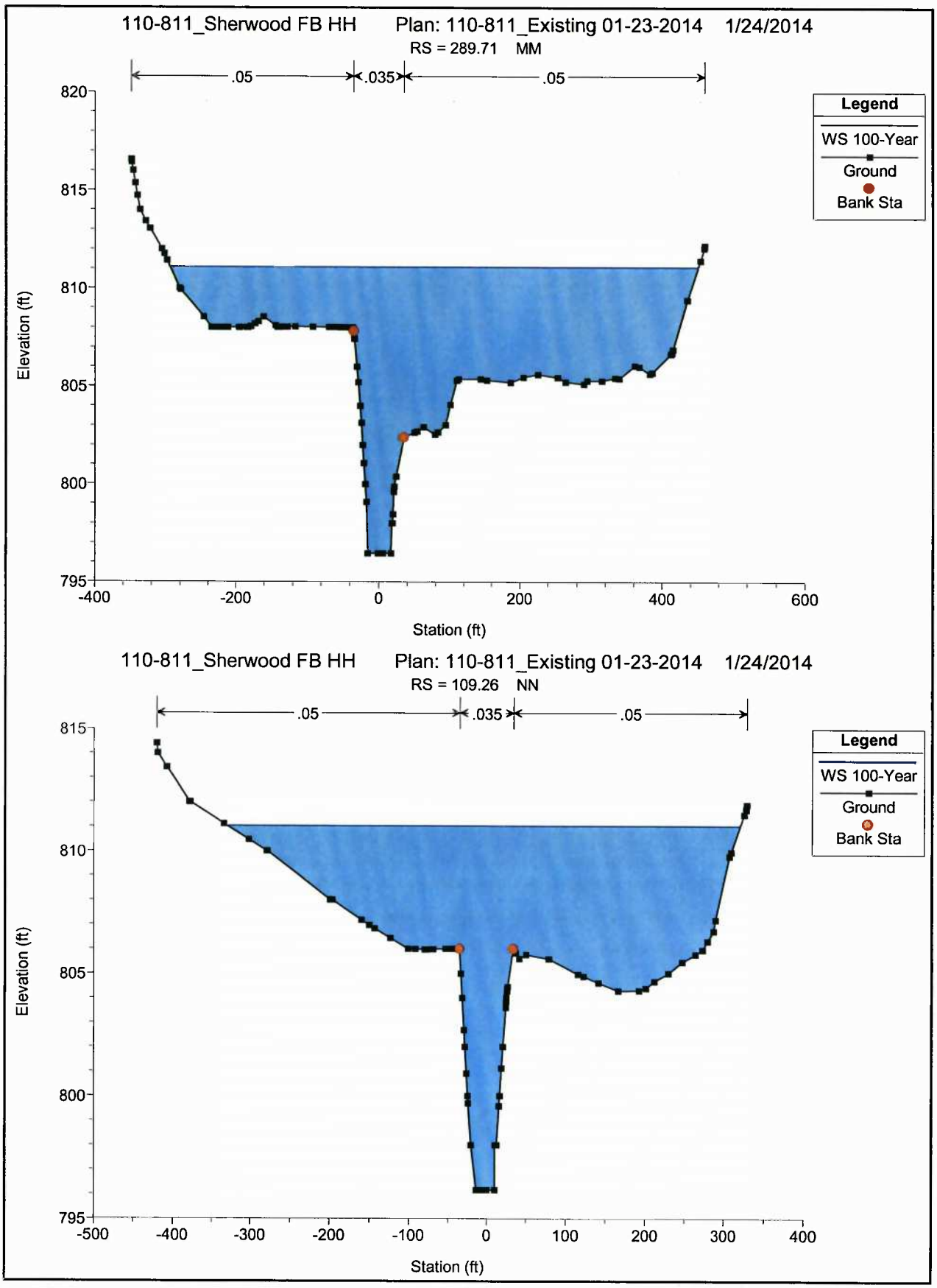
200
300
400
500
600
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 289.71 MM
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
805
800
795
-400
-200
0
200
400
600
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 1/24/2014
RS = 109.26 NN
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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810
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800
795
-500
-400
-300
-200
-100
0
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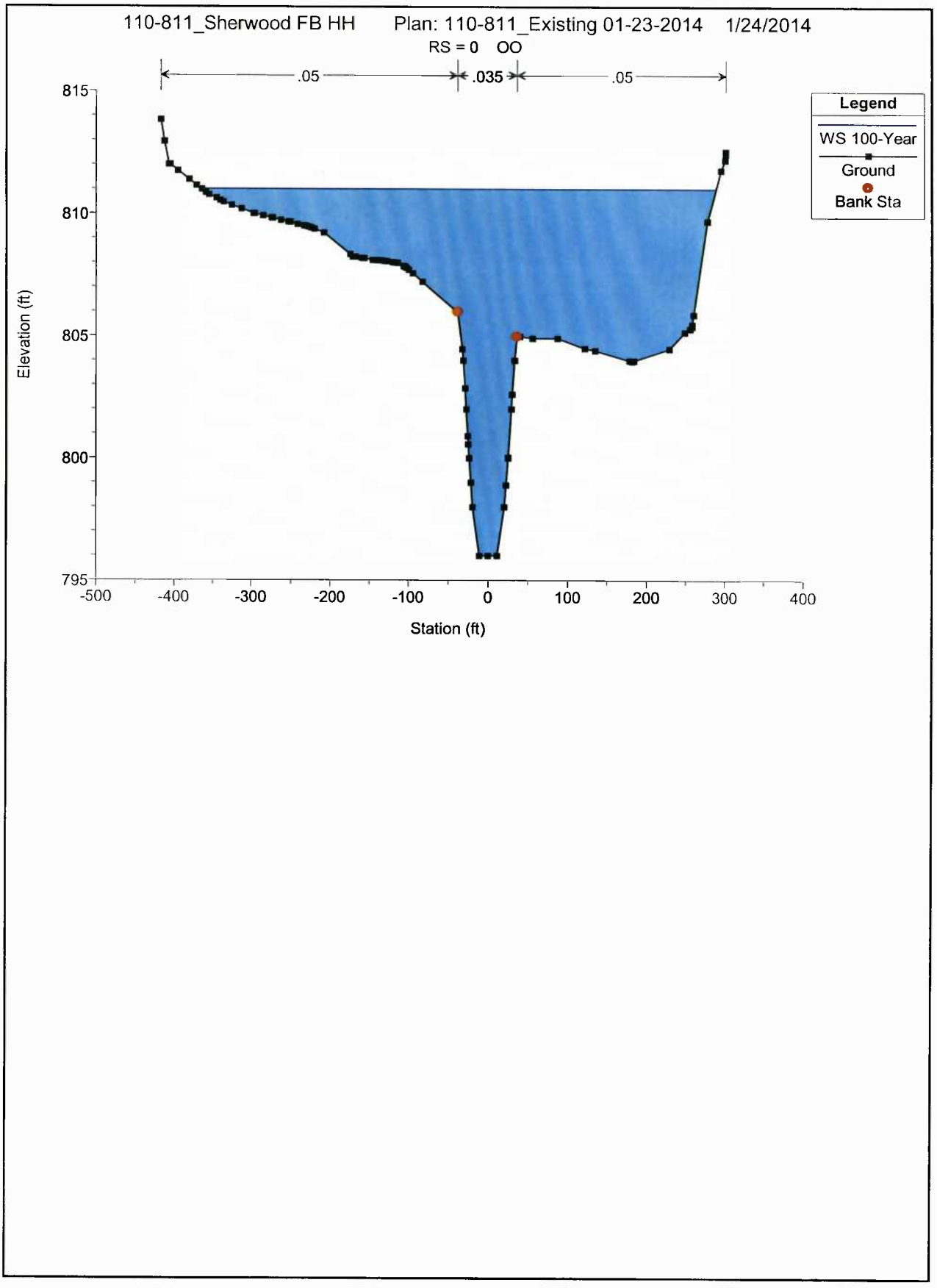
200
300
400
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
1/24/2014
RS = 0 OO
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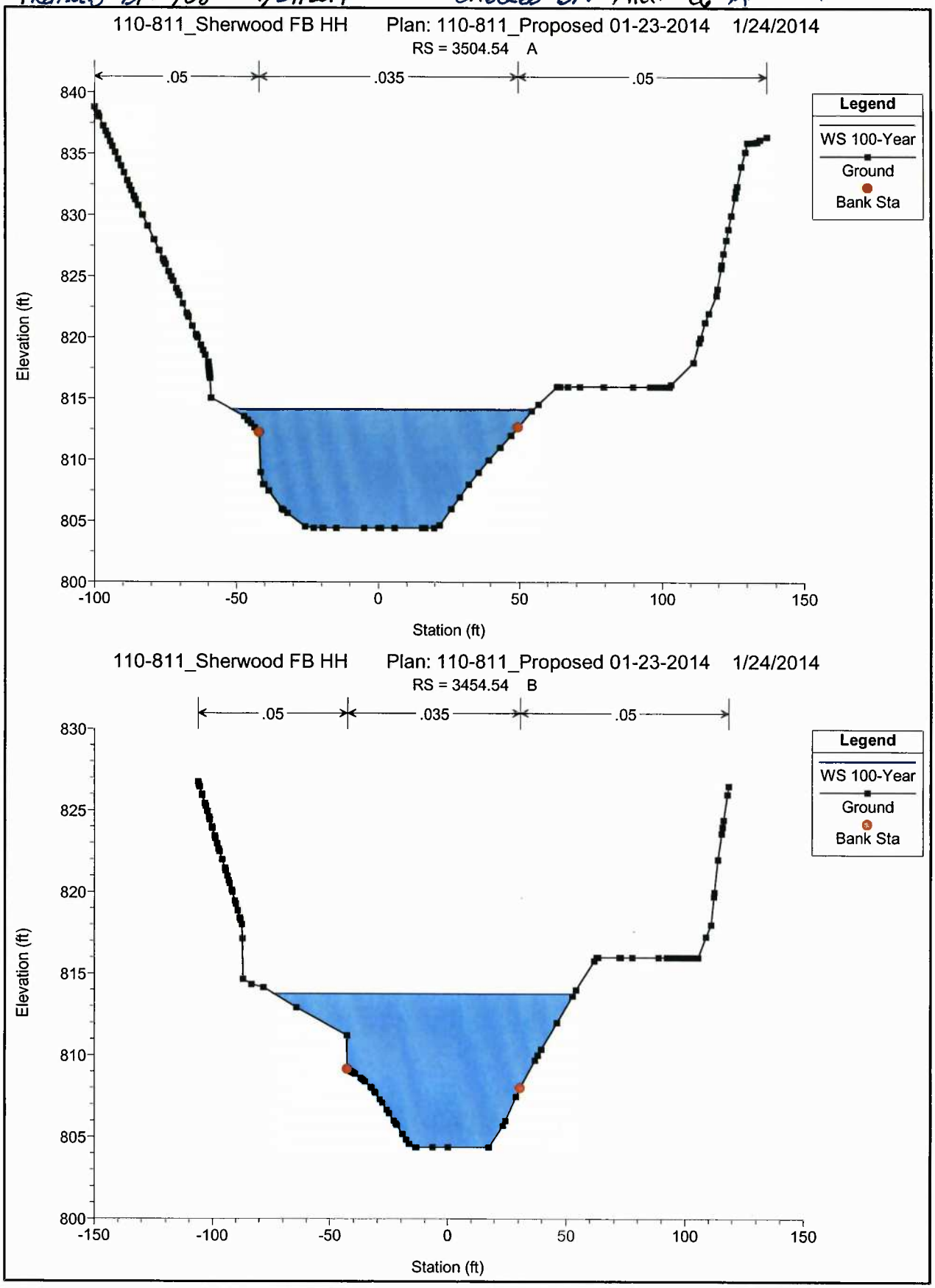
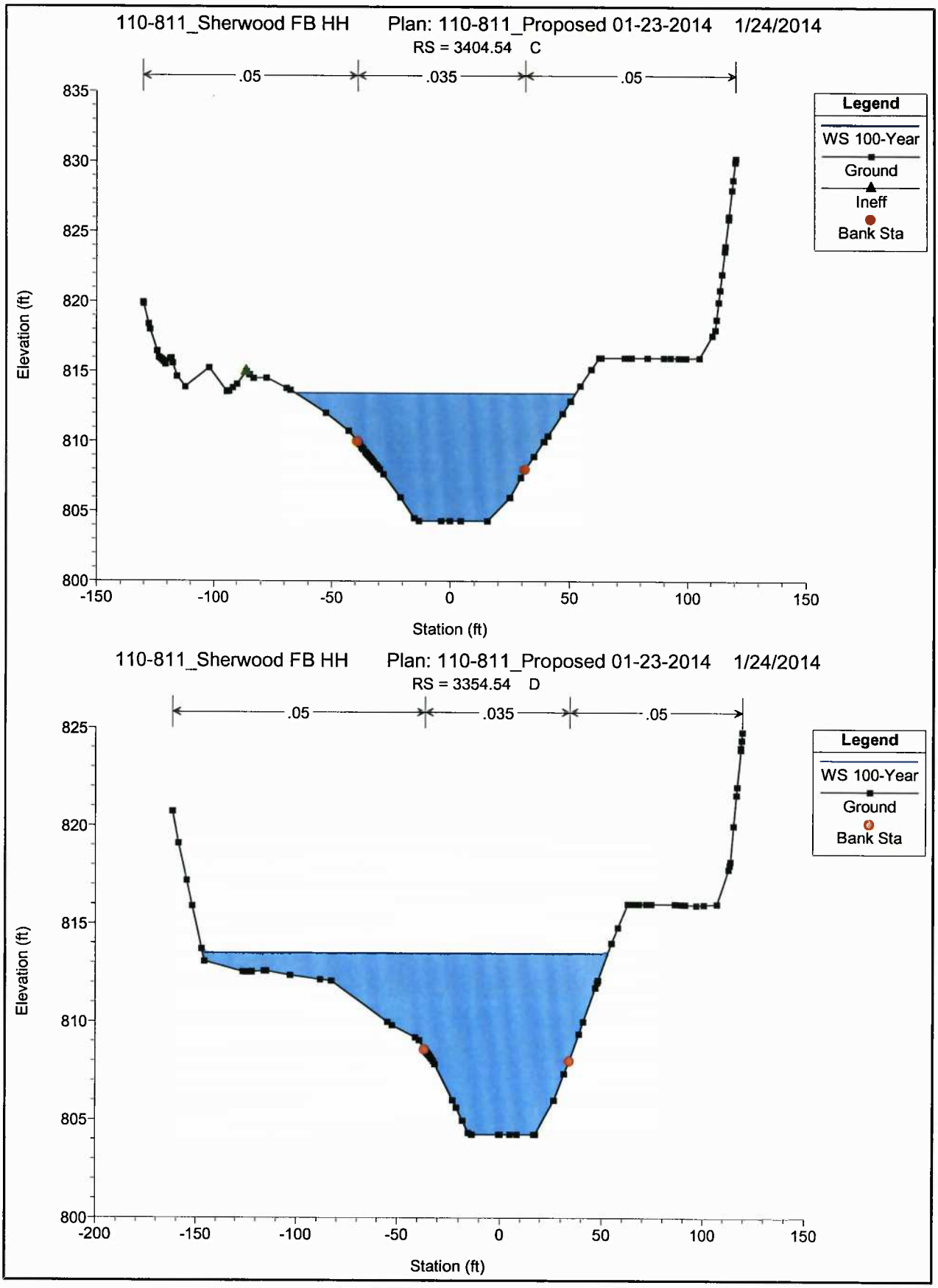
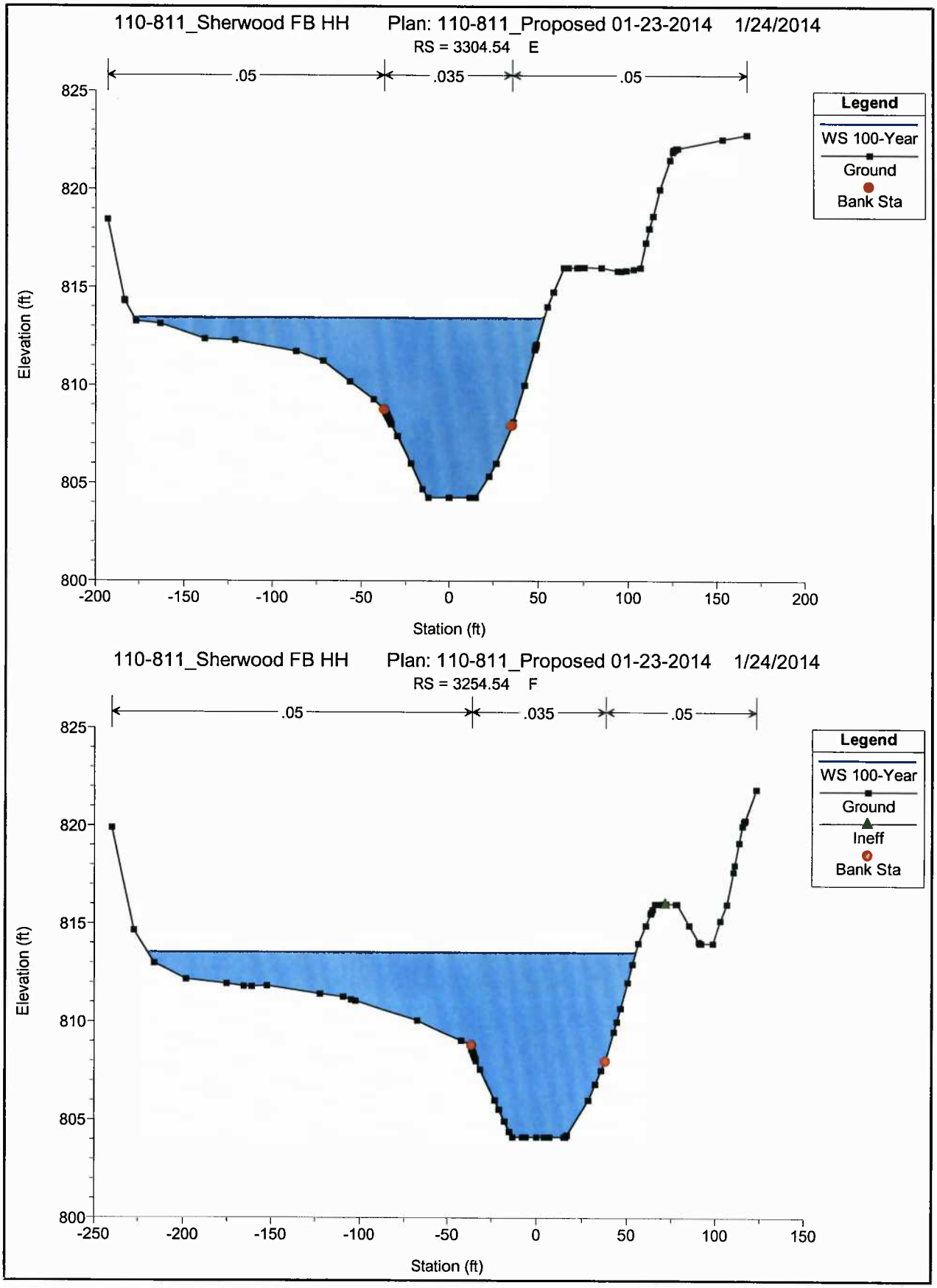
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
815
810
805
800
795
-500
-400
-300
-200
-100
0
100
200
300
400
Station (ft)

PREPARED BY: TGJ 1/24/2014 CHECKED BY: ARG 26-JAN-2014




110-811_Sherwood FB HH Plan: 110-811_Proposed 01-23-2014 1/24/2014
RS = 3404.54 C
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
-150
-100
-50
0
50
100
150
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Proposed 01-23-2014 1/24/2014
RS = 3354.54 D
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-200
-150
-100
-50
0
50
100
150
Station (ft)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1/24/2014
RS = 3304.54 E
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-200
-150
-100
-50
0
50
100
150
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 3254.54 F
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
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810
805
800
-250
-200
-150
-100
-50
0
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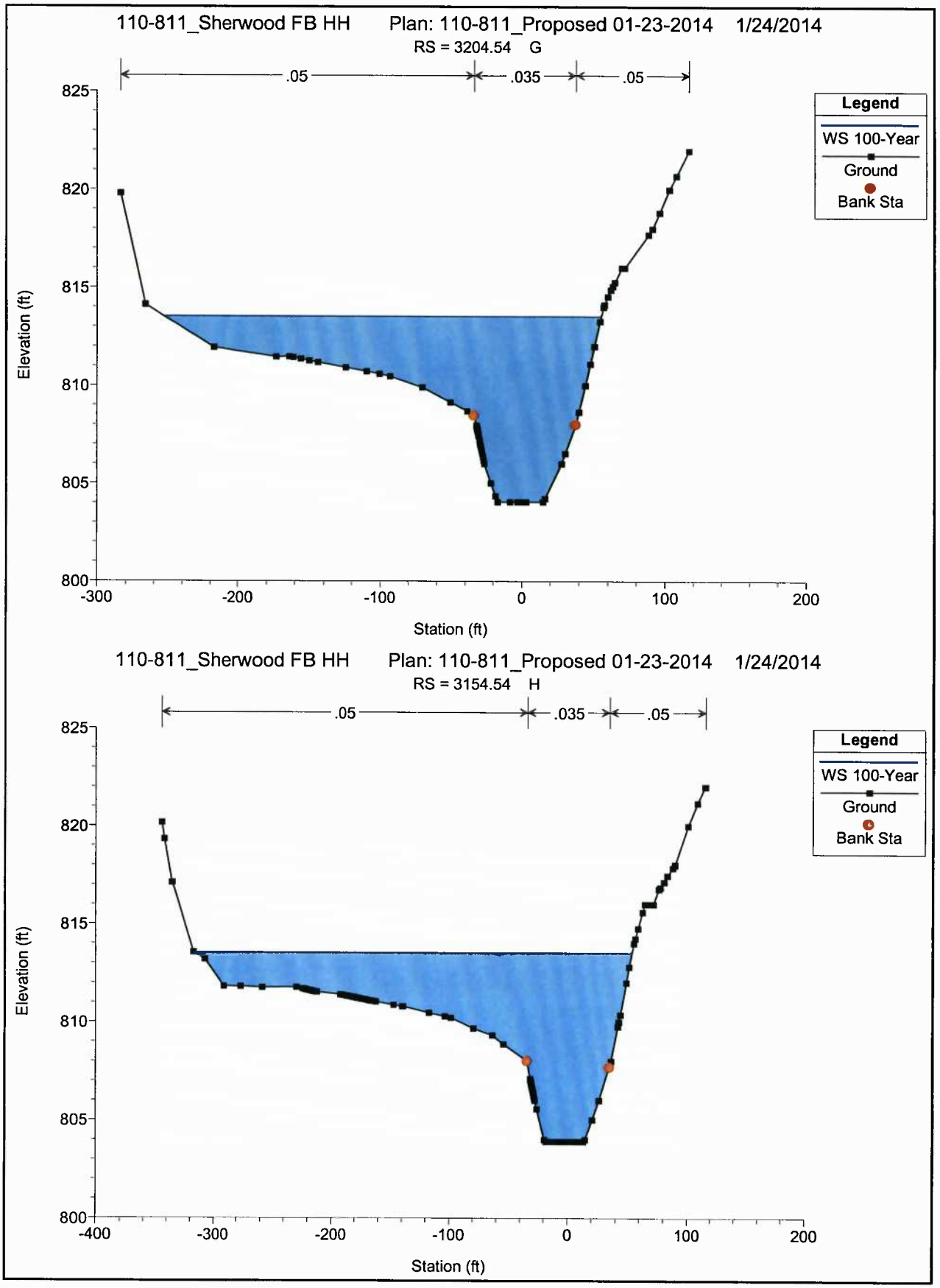
100
150
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 3204.54 G
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 3154.54 H
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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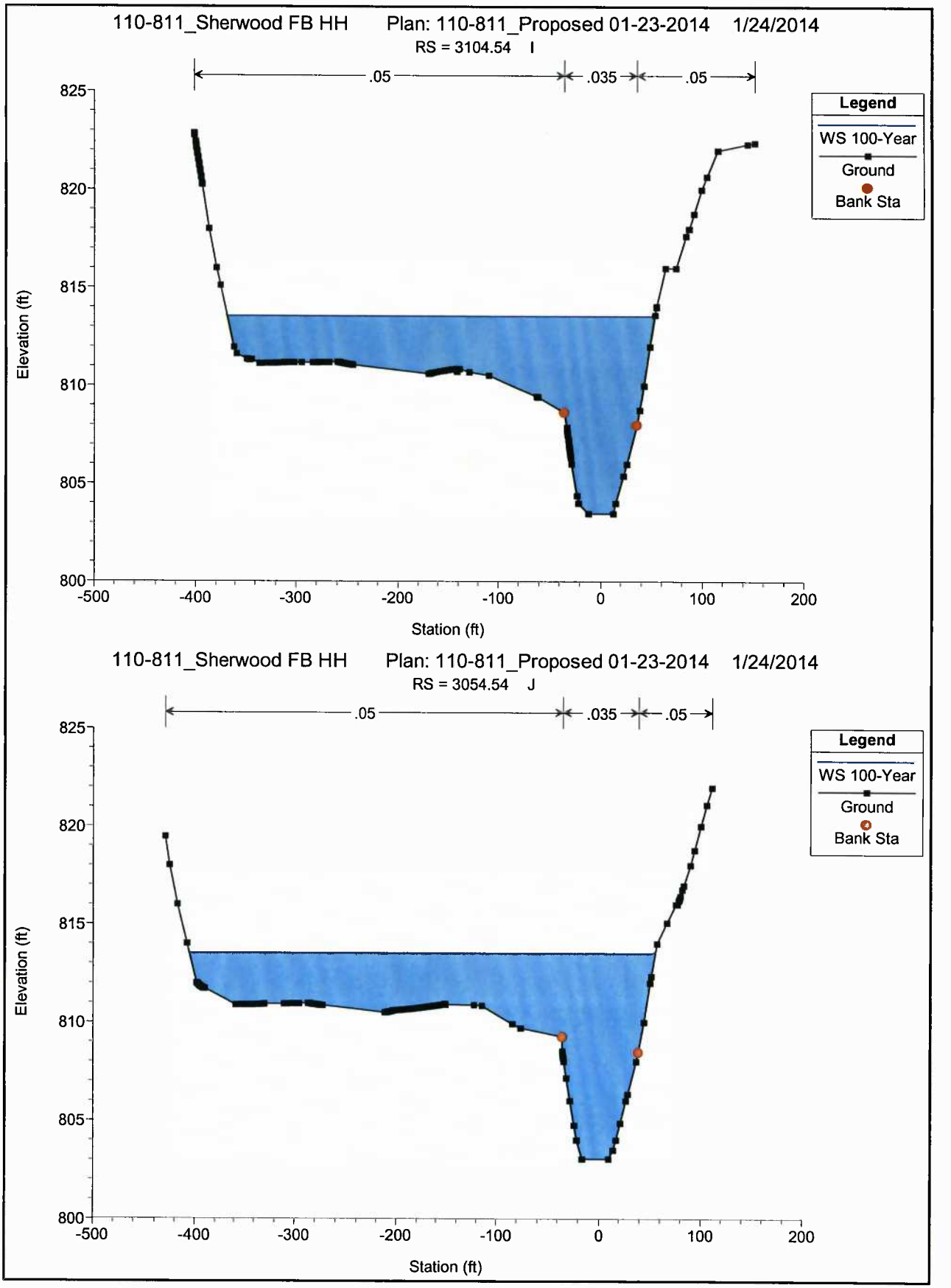
820
815
810
805
800
-400
-300
-200
-100
0
100
200
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 3104.54
I
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 3054.54
J
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
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815
810
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-400
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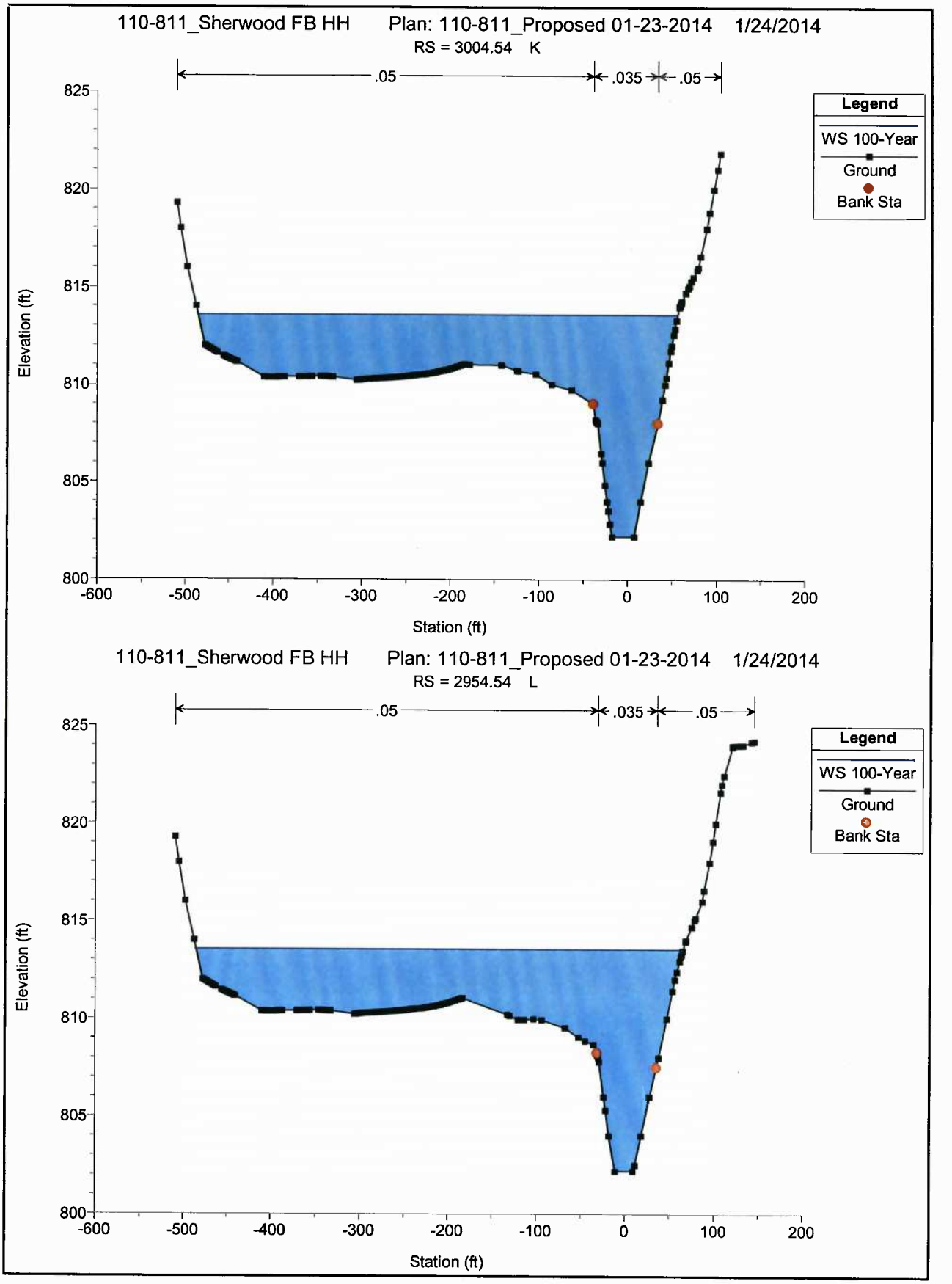
-200
-100
0
100
200
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 3004.54 K
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.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2954.54 L
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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820
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810
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800
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-500
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-300
-200
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0
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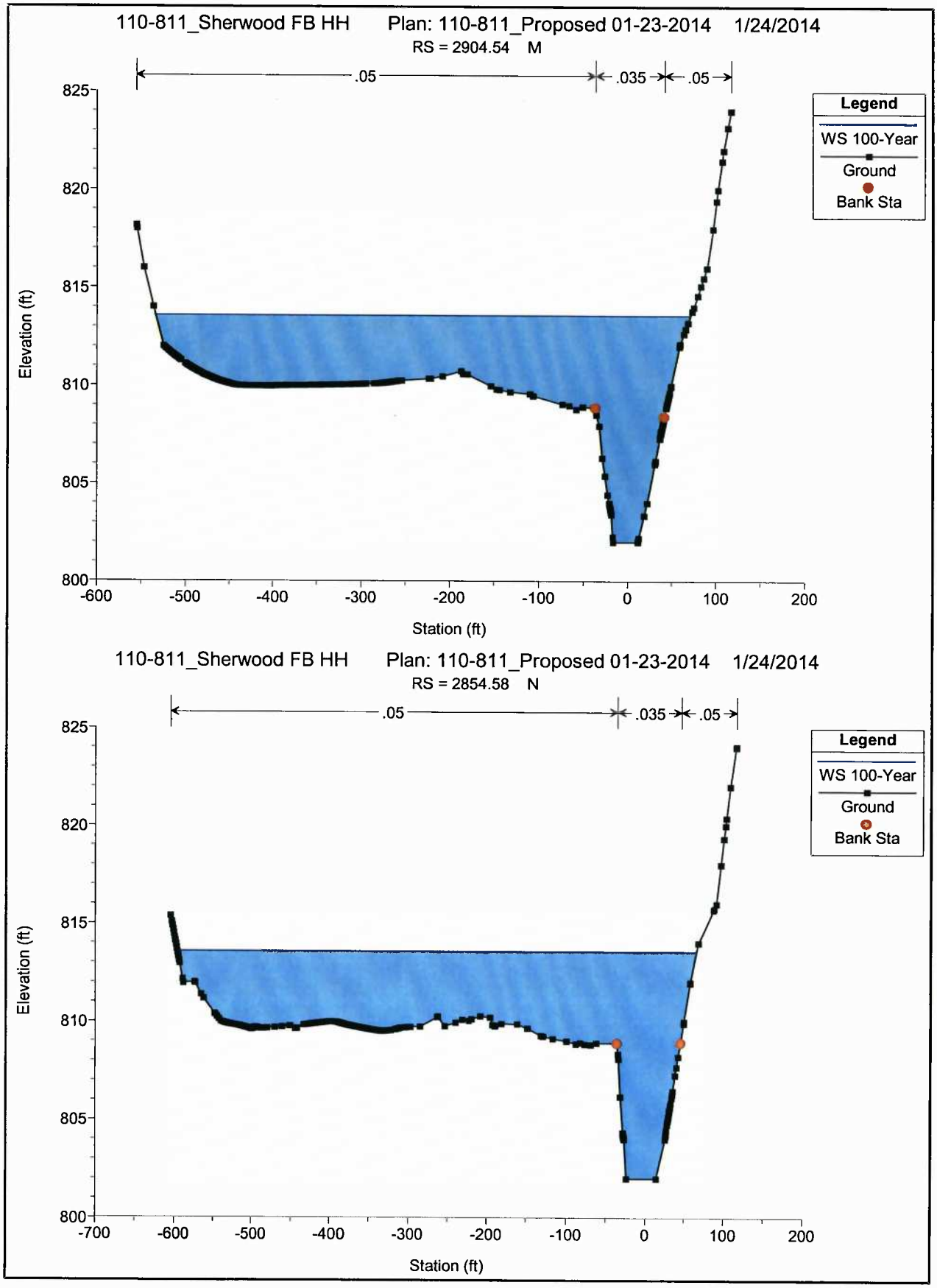
200
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2904.54 M
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2854.58 N
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
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810
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800
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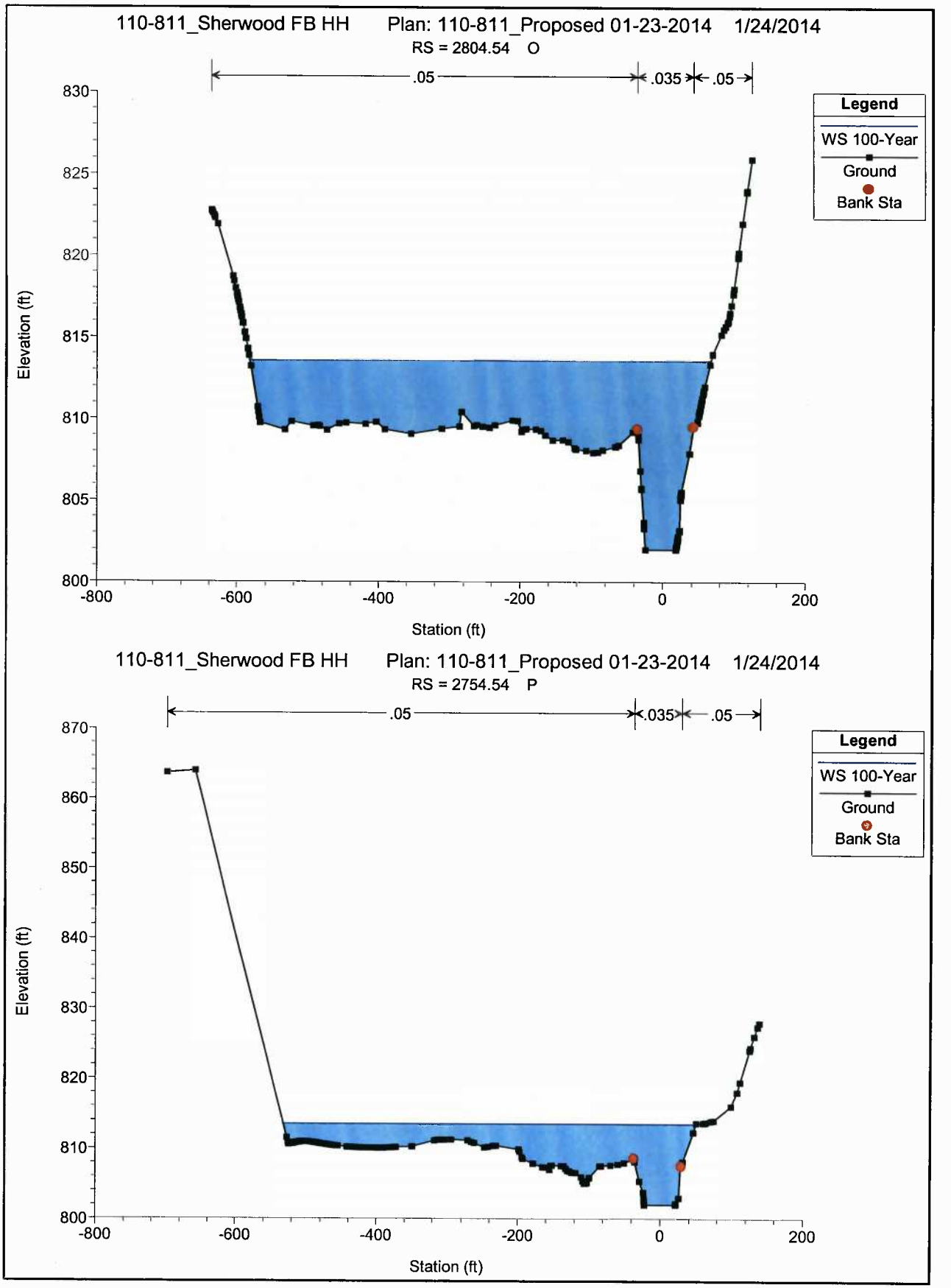
-500
-400
-300
-200
-100
0
100
200
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2804.54 O
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2754.54 P
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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860
850
840
830
820
810
800
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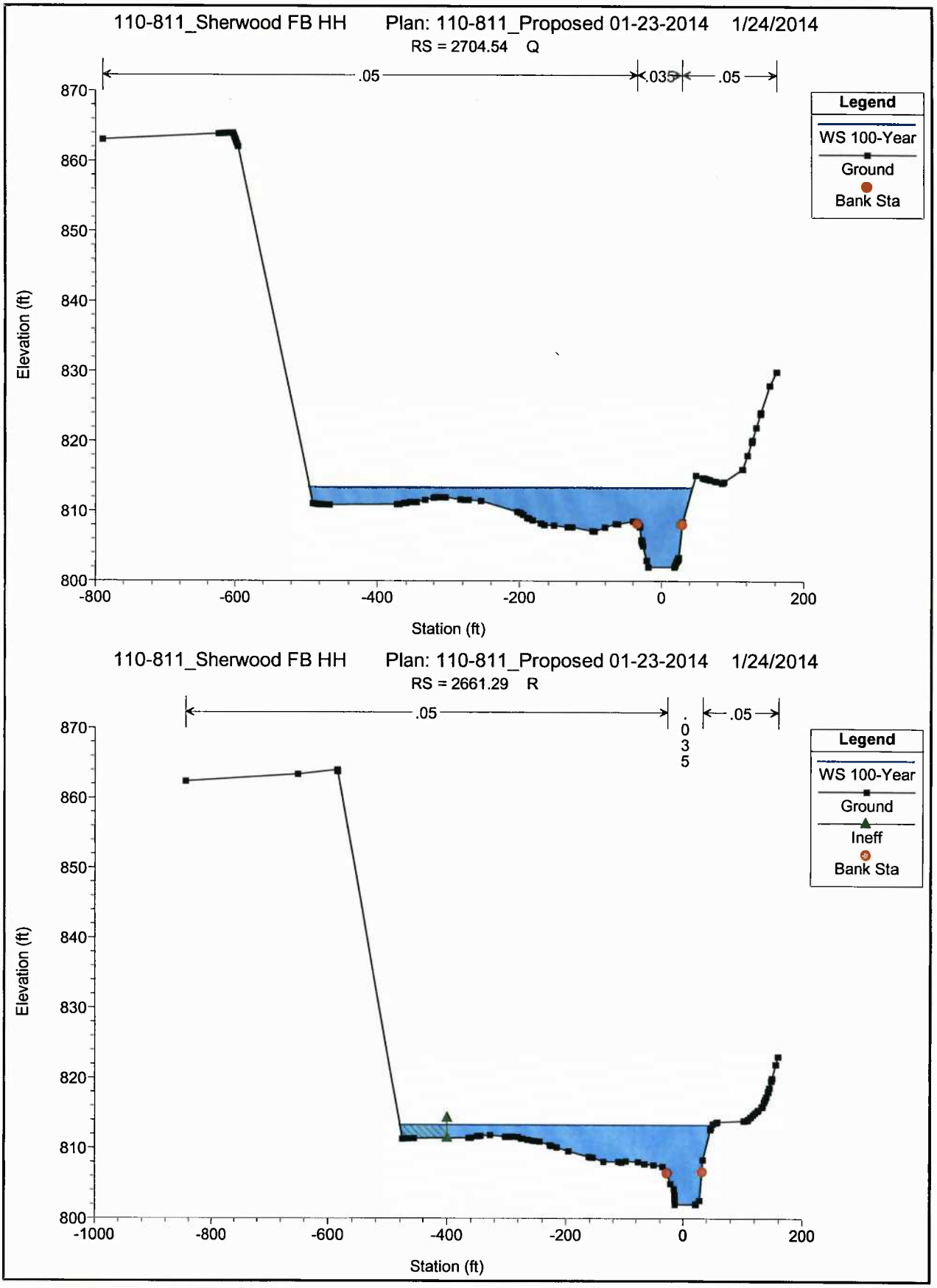
-600
-400
-200
0
200
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Proposed 01-23-2014 1/24/2014
RS = 2704.54 Q
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.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
870
860
850
840
830
820
810
800
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Proposed 01-23-2014 1/24/2014
RS = 2661.29 R
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
870
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850
840
830
820
810
800
-1000
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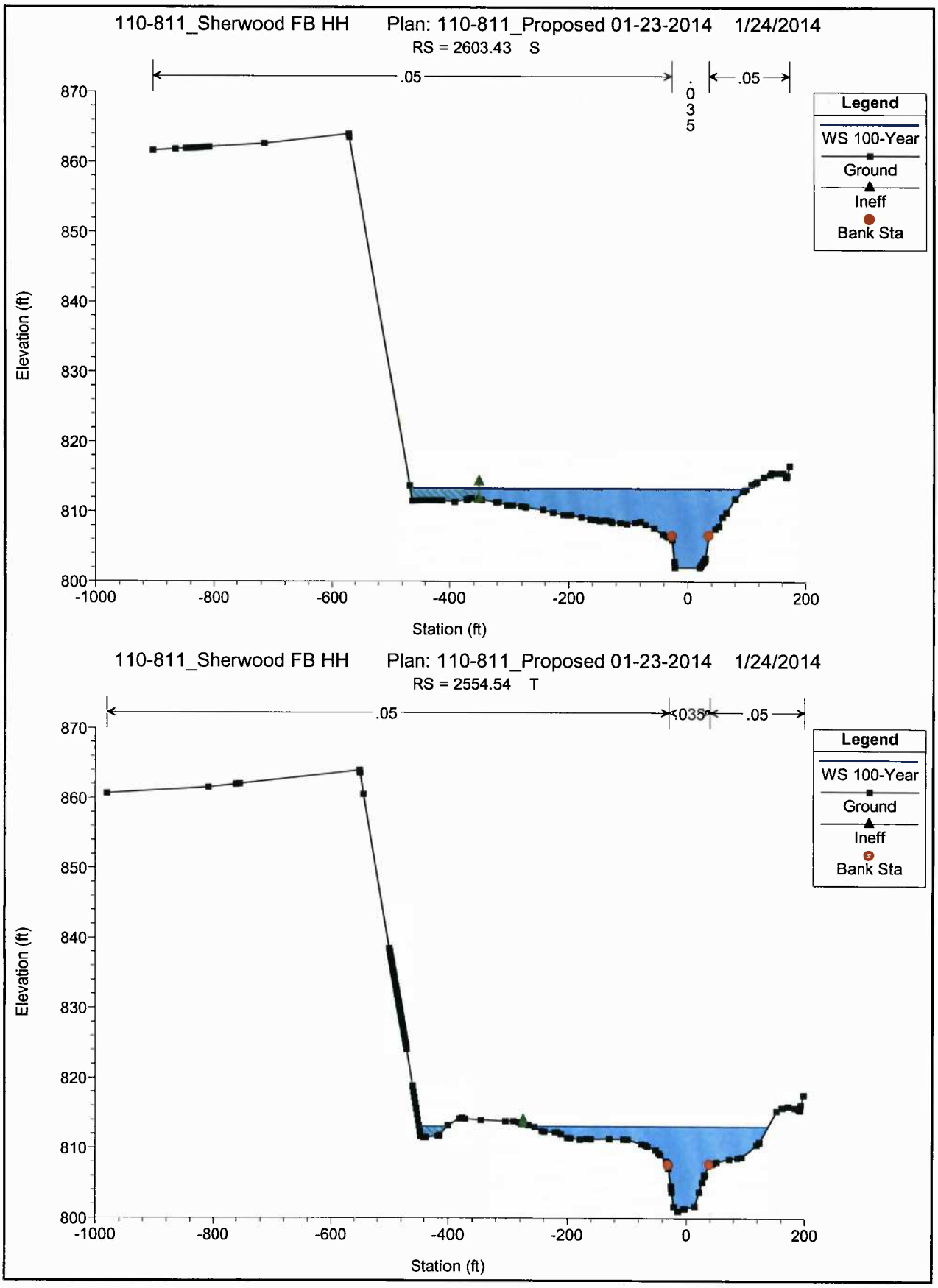
-600
-400
-200
0
200
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2603.43 S
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
870
860
850
840
830
820
810
800
-1000
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2554.54 T
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
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830
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810
800
-1000
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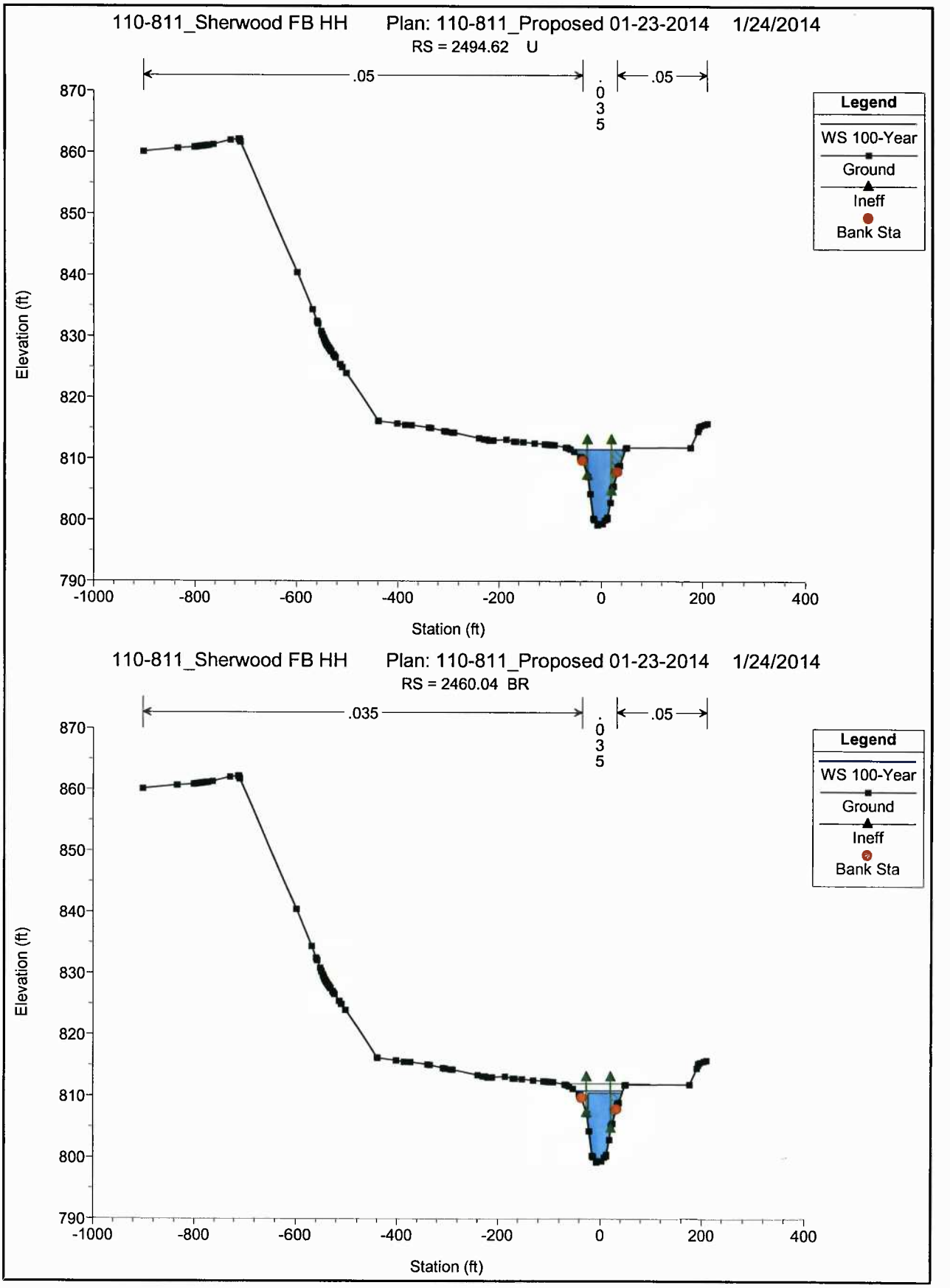
-600
-400
-200
0
200
Station (ft)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Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2494.62 U
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.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
870
860
850
840
830
820
810
800
790
-1000
-800
-600
-400
-200
0
200
400
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2460.04 BR
.035
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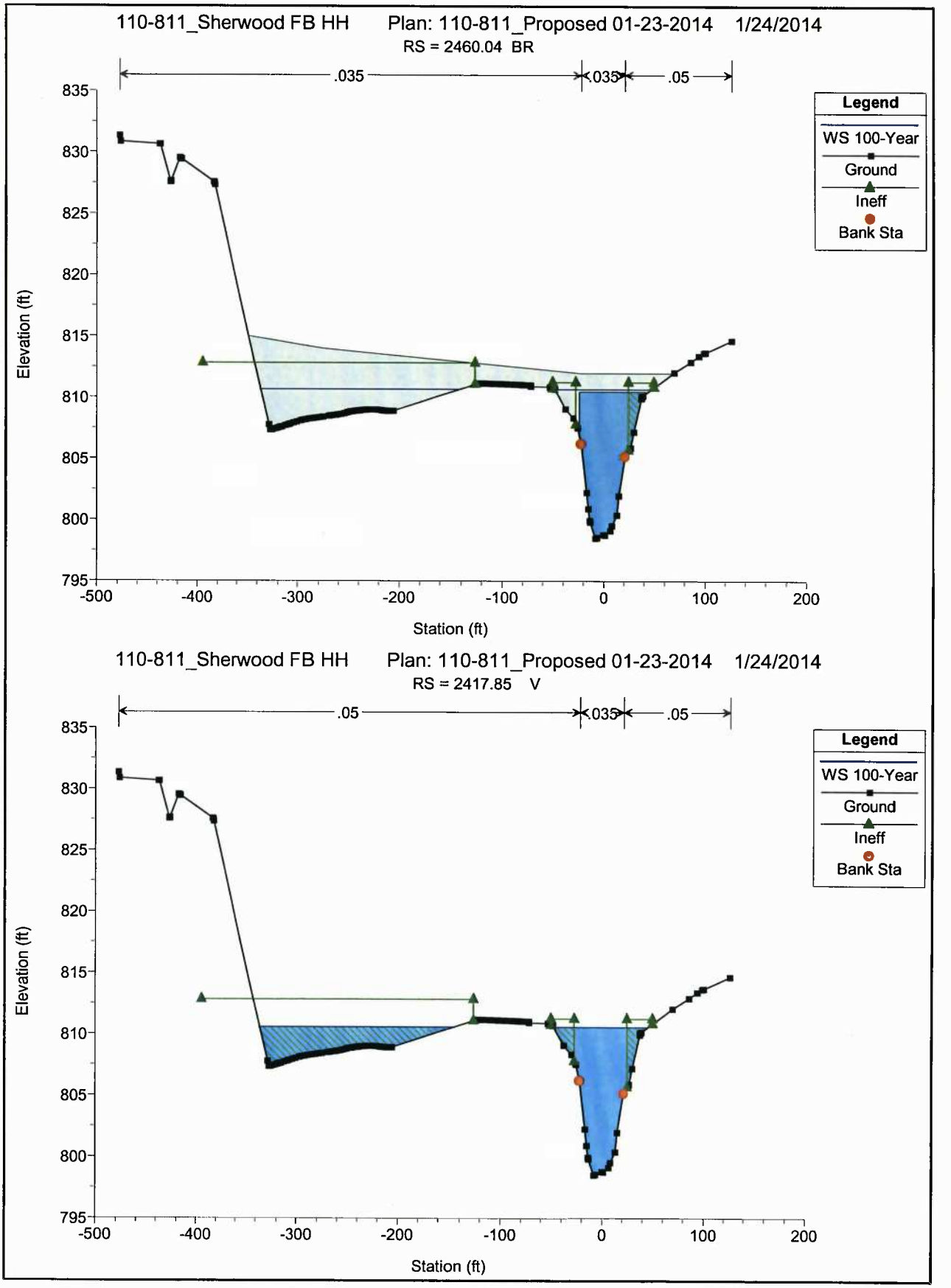
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2460.04 BR
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.035
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Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
795
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2417.85 V
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
835
830
825
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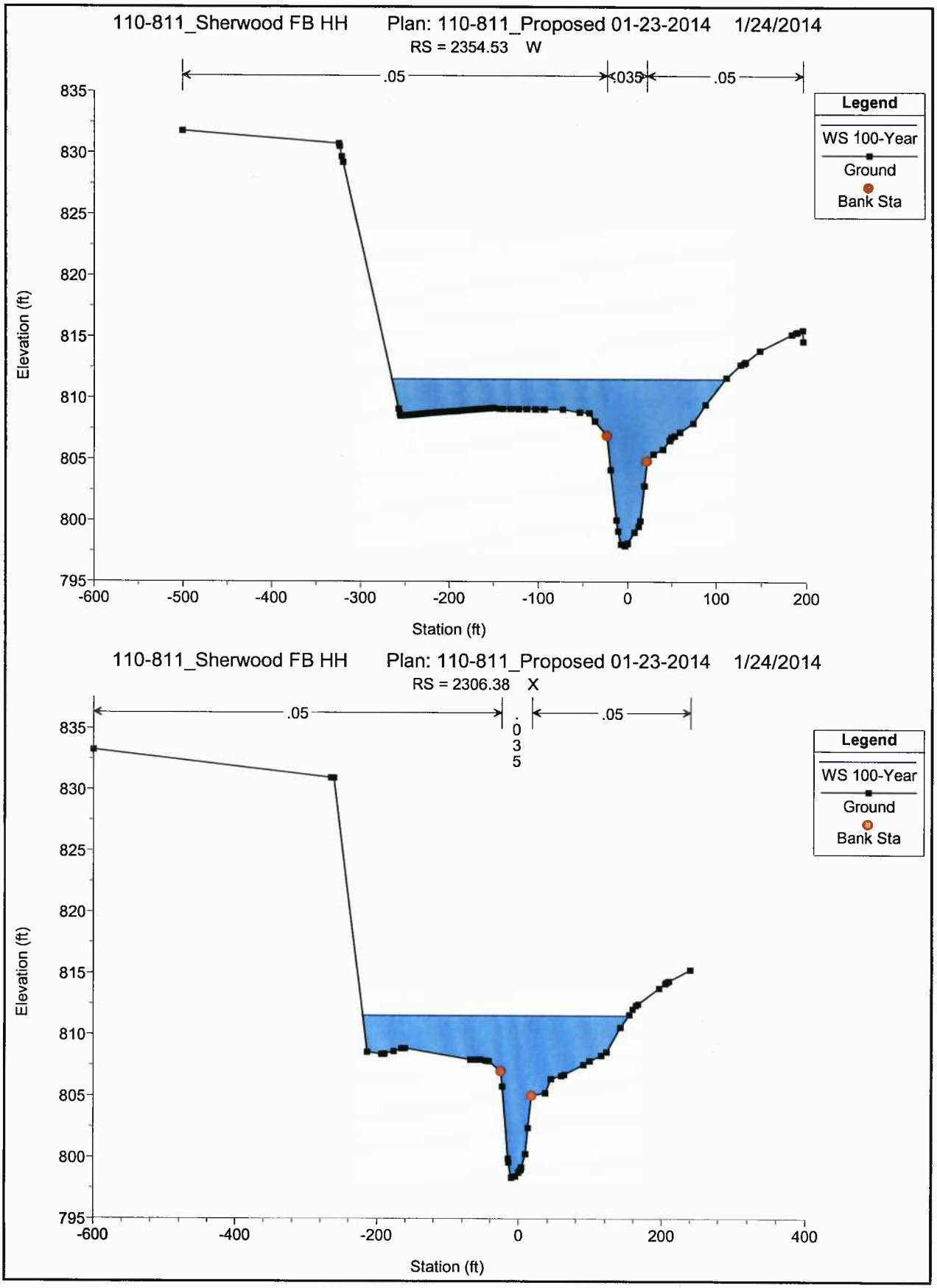
805
800
795
-500
-400
-300
-200
-100
0
100
200
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2354.53 W
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
795
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Proposed 01-23-2014
1/24/2014
RS = 2306.38 X
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
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-200
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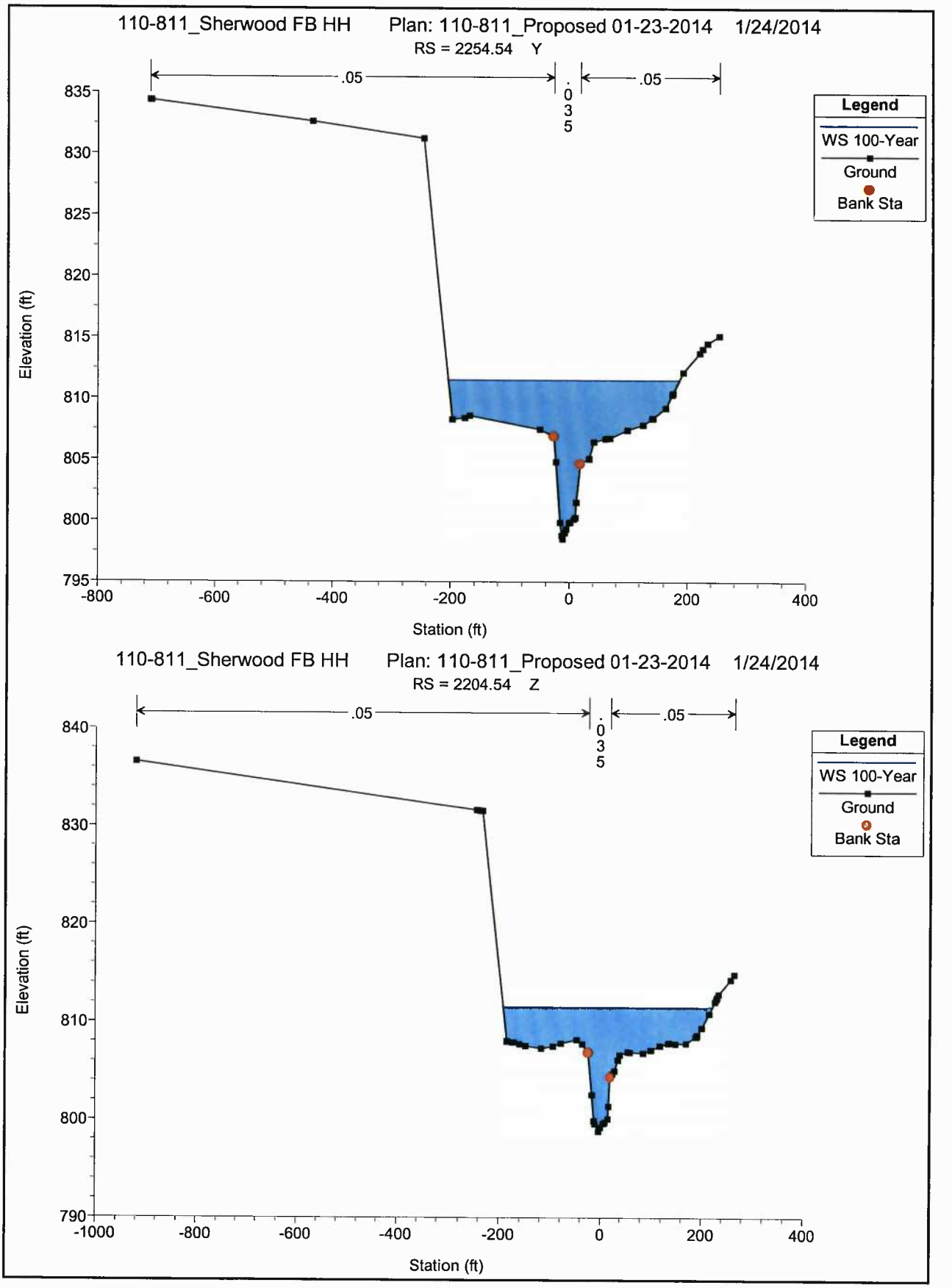
Station (ft)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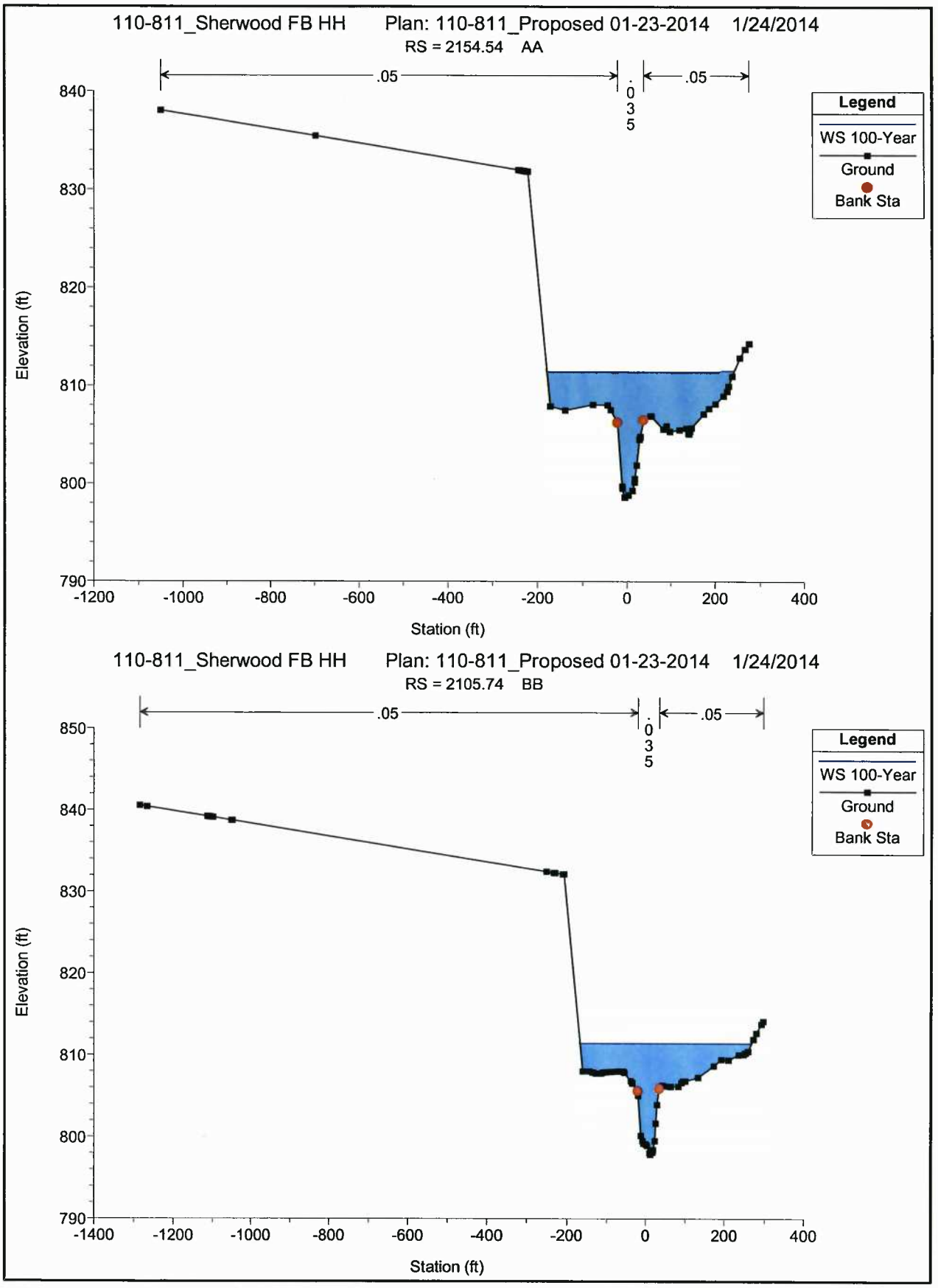
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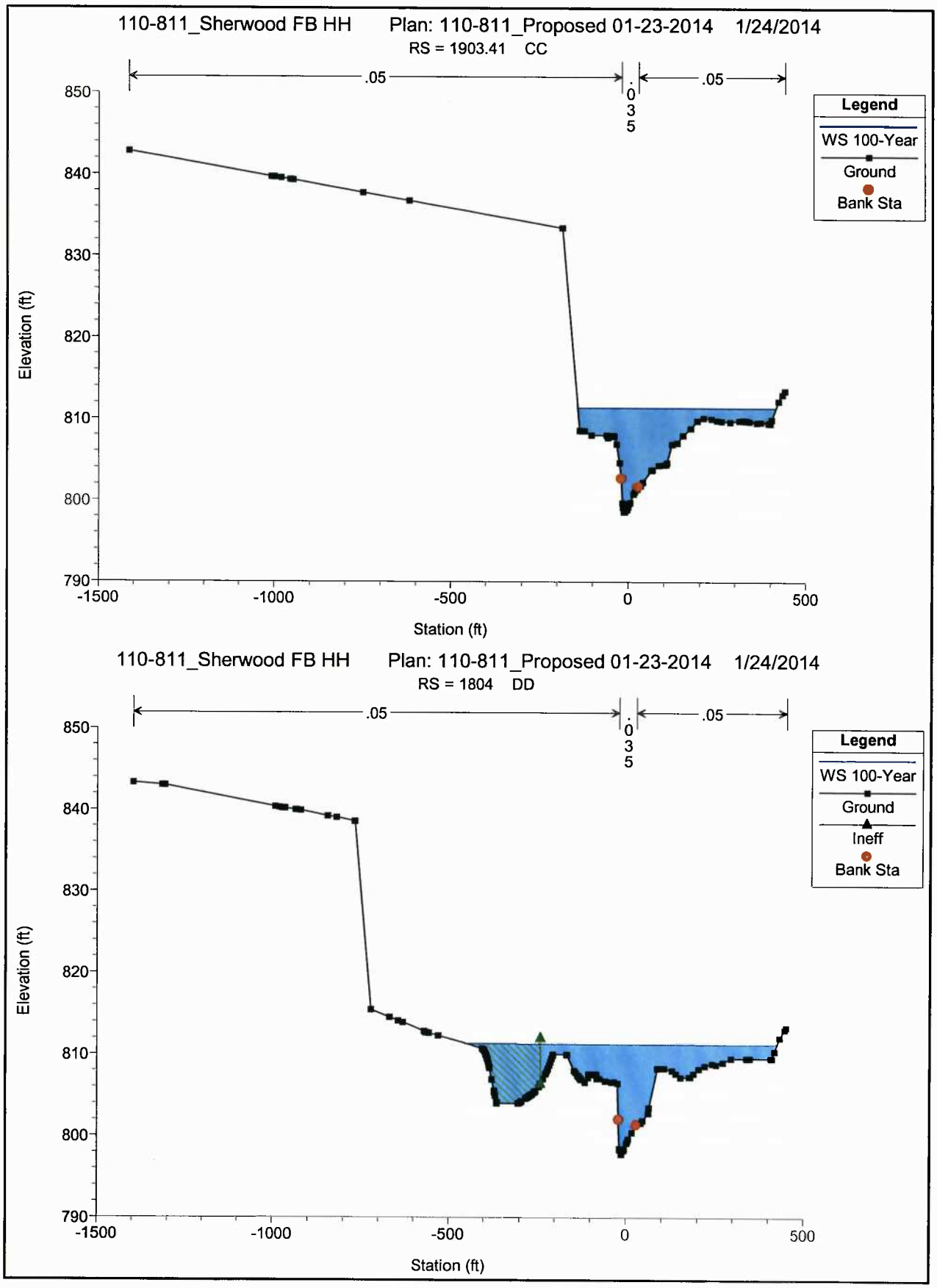
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1/24/2014
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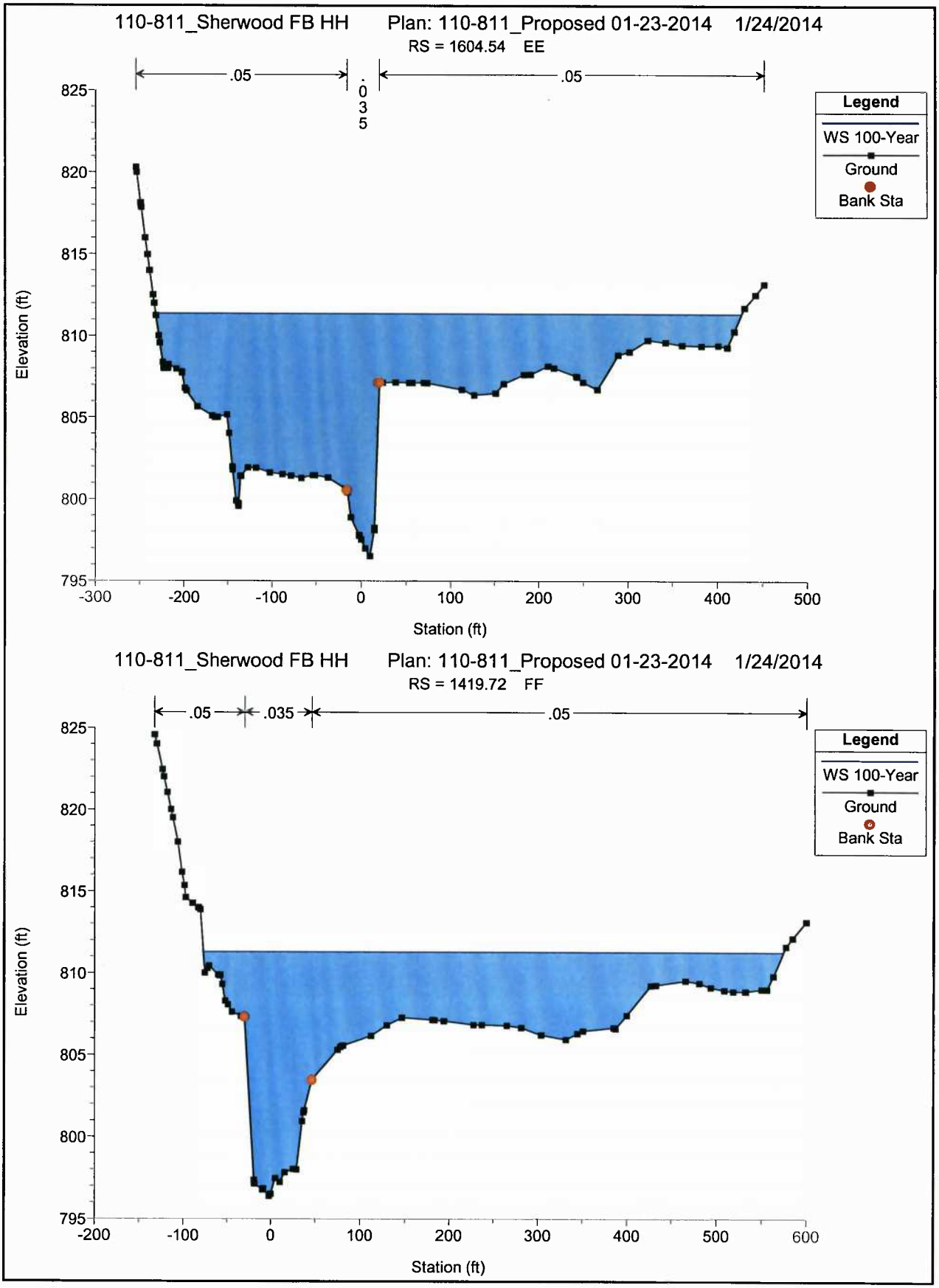
Station (ft)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1/24/2014
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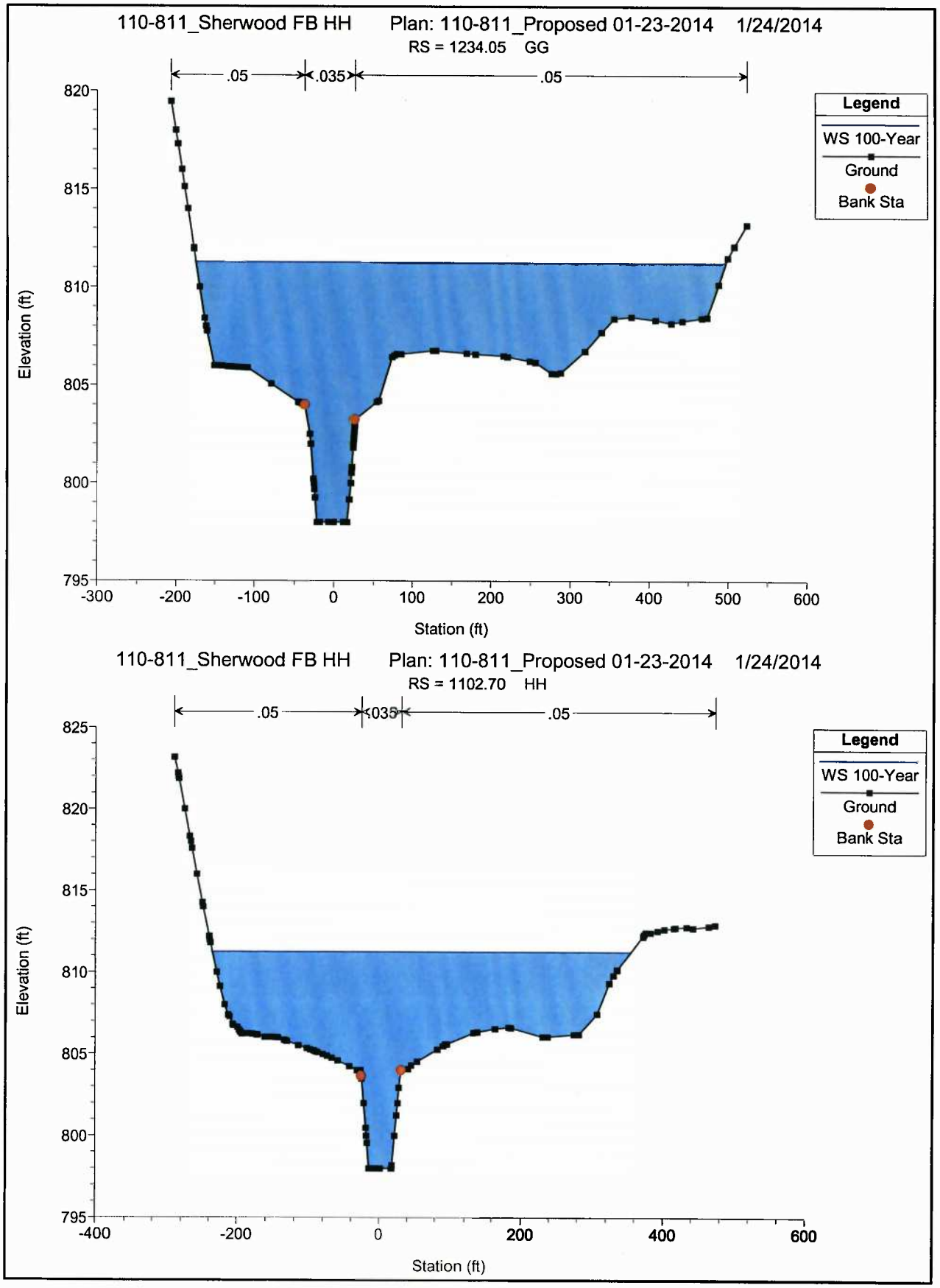
Station (ft)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WS 100-Year
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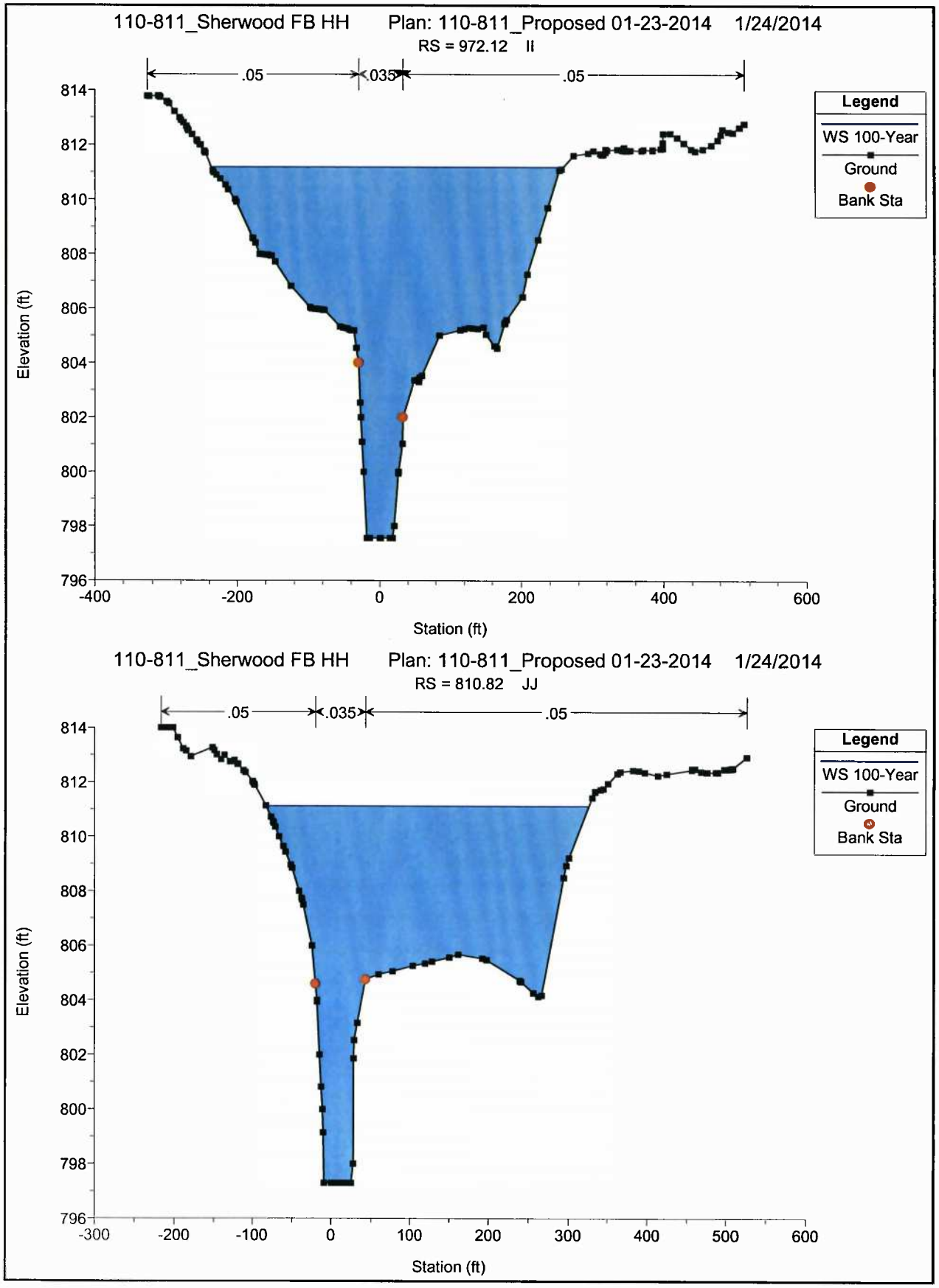
Station (ft)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Ground
Bank Sta
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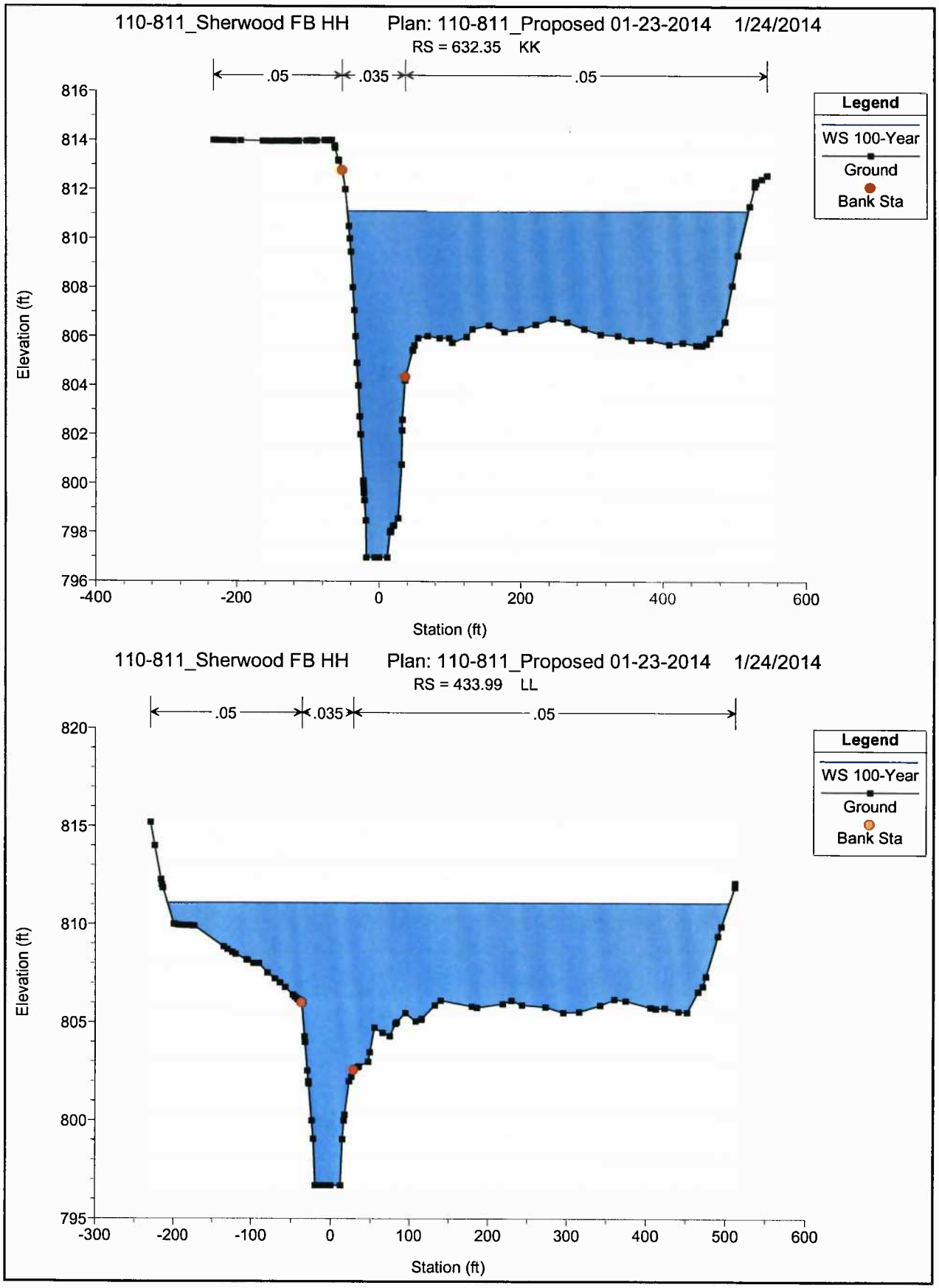
Station (ft)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Ground
Bank Sta
Elevation (ft)
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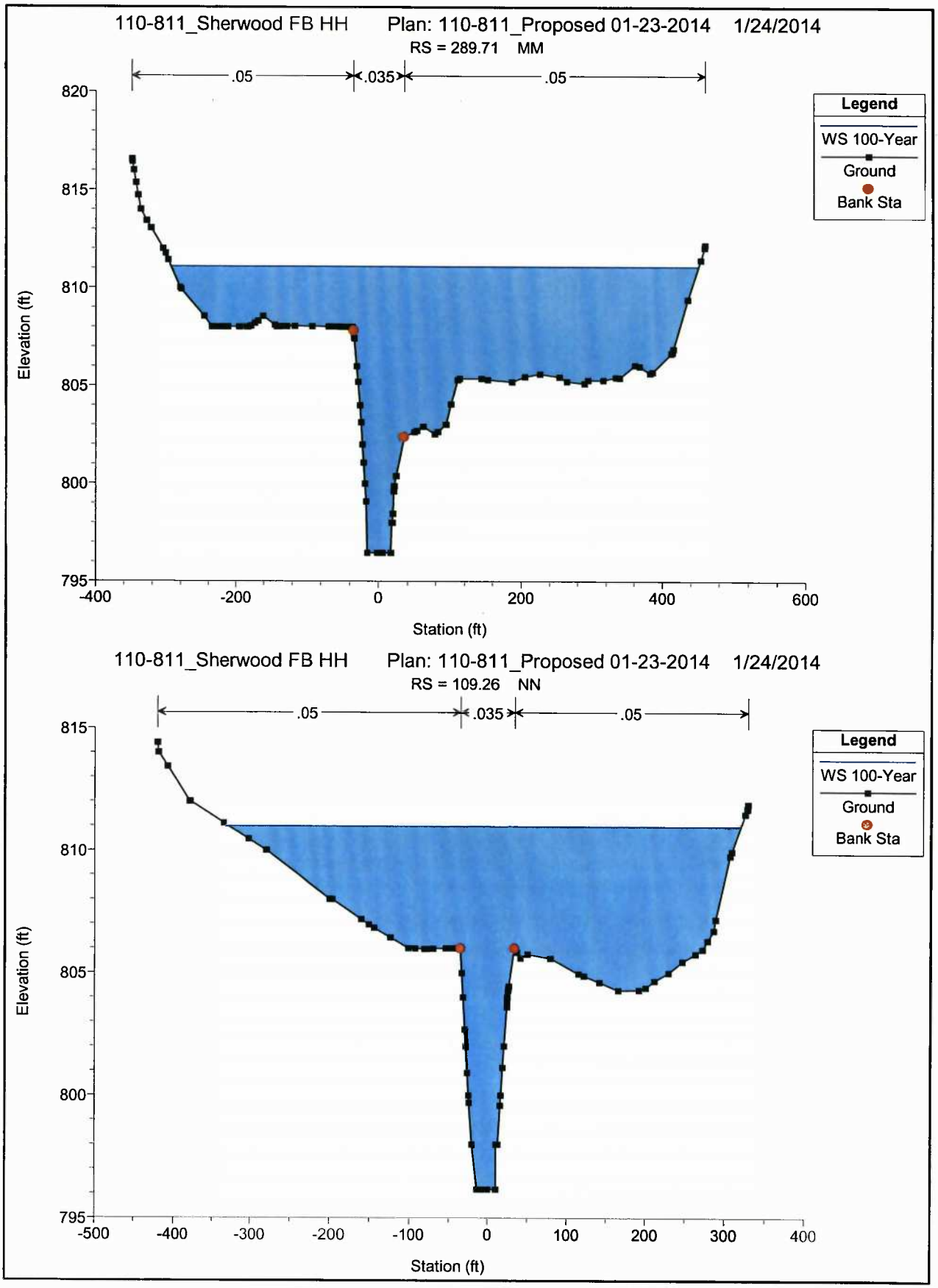
Station (ft)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Station (ft)
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1/24/2014
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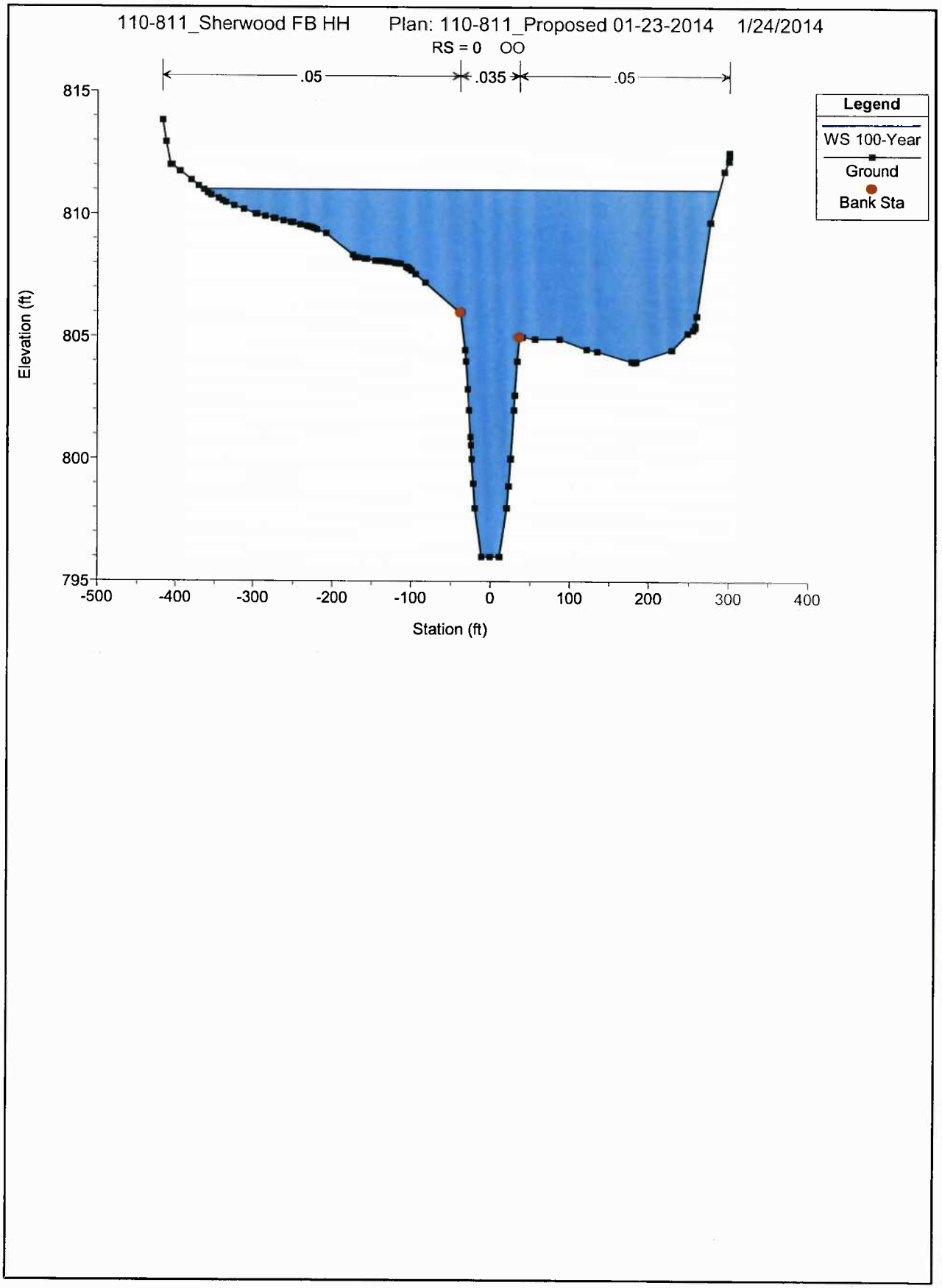
Station (ft)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Ground
Bank Sta
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810
805
800
795
-500
-400
-300
-200
-100
0
100
200
300
400
Station (ft)

NORTH

0+00 – OO
1+09.26 – NN
2+89.71 – MM
4+33.99 – LL
6+32.35 – KK
8+10.82 – JJ
9+72.12 – II
11+02.70 – HH
12+34.05 – GG
14+19.72 – FF
16+04.54 – EE
18+04 – DD
19+03.41 – CC
21+05.74 – BB
21+54.54 – AA
22+04.54 – Z
22+54.54 – Y
23+06.38 – X
23+54.54 – W
24+17.65 – V
24+94.62 – U
25+54.54 – T
26+81.28 – R
26+93.43 – S
27+04.54 – Q
27+54.54 – P
28+04.54 – O
29+04.54 – N
28+54.58 – N
29+54.54 – L
30+04.54 – K
30+54.54 – J
31+04.54 – I
31+54.54 – H
32+04.54 – G
32+54.54 – F
33+04.54 – E
33+54.54 – D
34+04.54 – C
34+54.54 – B
35+04.54 – A

FIRM STUDY FLOODPLAIN LIMITS ZONE AE
FIRM STUDY FLOODPLAIN LIMITS ZONE AE
PROPOSED TRUCK UNLOADING AREA
PROPOSED CONDITIONS FLOODPLAIN LIMITS
EXISTING CONDITIONS FLOODPLAIN LIMITS
EXISTING CONDITIONS FLOODPLAIN LIMITS
PROPOSED CONDITIONS FLOODPLAIN LIMITS
NEW BRIDGE
US ROUTE 50
BUCKEYE CREEK
FIRM STUDY FLOODPLAIN LIMITS ZONE AE
EXISTING CONDITIONS FLOODPLAIN LIMITS
PROPOSED CONDITIONS FLOODPLAIN LIMITS
SHERWOOD GAS PROCESSING PLANT
FIRM STUDY FLOODPLAIN LIMITS ZONE A

LEGEND

- APPROXIMATE STREAM CENTERLINE
- 303+04.54 – K — HEC-RAS CROSS SECTION
- 100-YEAR FLOODPLAIN LIMITS, CURRENT CONDITIONS
- 100-YEAR FLOODPLAIN LIMITS, PROPOSED CONDITIONS
- FIRM STUDY FLOODPLAIN LIMITS ZONE AE
- FIRM STUDY FLOODPLAIN LIMITS ZONE A
- 900 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR

REFERENCE

1. EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING CEC SURVEY DATA AND DIGITAL ELEVATION MODELS (USGS 3-METER), 2003 OF THE u.s. GEOLOGICAL SURVEY (USGS) AND WEST VIRGINIA STATEWISE ADDRSSING & MAPPING BOARD (WVSAMB).
2. STREAM LOCATIONS DELINEATED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3. IMAGE PROVIDED BY GOOGLE EARTH © 2012.

SCALE IN FEET
0 150 300

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road · Cincinnati, OH 45242
513-985-0226 · 800-759-5614
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC.
SHERWOOD GAS PROCESSING PLANT
DODDRIDGE COUNTY, WEST VIRGINIA

EXISTING AND FINAL PROPOSED GRADING
100-YEAR FLOODPLAIN MAP

DATE:	1/29/2013
DWG SCALE:	1"=150'
PROJECT NO:	110-811.5001
DRAWN BY:	TGJ
CHECKED BY:	ARG
APPROVED BY:	

DRAWING NO.: SP01

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APPENDIX E

HEC-RAS SUMMARY OF EXISTING AND PROPOSED HYDRAULIC CALCULATIONS

HEC-RAS Plan: Existing River: Buckeye Creek Reach: Buckeye Creek Profile: 100-Year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Buckeye Creek	3504.54	100-Year	5150.00	804.44	813.99		814.78	0.001940	7.15	728.84	104.98	0.45
Buckeye Creek	3454.54	100-Year	5150.00	804.38	813.55		814.63	0.002635	8.54	670.62	123.86	0.54
Buckeye Creek	3404.54	100-Year	5150.00	804.32	813.16		814.46	0.003423	9.37	609.57	114.07	0.61
Buckeye Creek	3354.54	100-Year	5150.00	804.25	813.22		814.22	0.002550	8.41	777.86	198.11	0.53
Buckeye Creek	3304.54	100-Year	5150.00	804.25	813.10		814.10	0.002650	8.42	786.37	214.49	0.54
Buckeye Creek	3254.54	100-Year	5150.00	804.12	813.19		813.90	0.001939	7.33	990.74	271.39	0.46
Buckeye Creek	3204.54	100-Year	5150.00	804.05	813.15		813.78	0.001746	7.07	1084.31	299.13	0.44
Buckeye Creek	3154.54	100-Year	5150.00	803.90	813.15		813.67	0.001501	6.67	1242.25	359.70	0.41
Buckeye Creek	3104.54	100-Year	5150.00	803.47	813.15		813.58	0.001263	6.15	1404.10	418.61	0.37
Buckeye Creek	3054.54	100-Year	5150.00	803.04	813.14		813.51	0.001093	5.74	1524.05	458.05	0.35
Buckeye Creek	3004.54	100-Year	5150.00	802.19	813.15		813.45	0.000886	5.29	1719.26	501.26	0.31
Buckeye Creek	2954.54	100-Year	5150.00	802.19	813.17		813.39	0.000690	4.77	2021.95	548.87	0.28
Buckeye Creek	2904.54	100-Year	5150.00	802.00	813.20		813.34	0.000473	3.94	2388.40	605.73	0.23
Buckeye Creek	2854.58	100-Year	5150.00	802.00	813.20		813.31	0.000358	3.52	2696.56	650.35	0.20
Buckeye Creek	2804.54	100-Year	5150.00	802.00	813.21		813.29	0.000305	3.19	2984.12	683.68	0.18
Buckeye Creek	2754.54	100-Year	5150.00	802.00	813.15		813.26	0.000384	3.72	2778.90	725.32	0.21
Buckeye Creek	2704.54	100-Year	5150.00	802.00	812.96	809.52	813.21	0.000704	4.97	1943.11	807.60	0.28
Buckeye Creek	2661.29	100-Year	5150.00	802.00	812.88	809.64	813.17	0.000785	5.33	1743.67	871.52	0.30
Buckeye Creek	2603.43	100-Year	5150.00	802.00	812.90	809.31	813.11	0.000576	4.69	1956.50	958.89	0.26
Buckeye Creek	2554.54	100-Year	5150.00	800.98	812.58	809.13	813.05	0.001078	6.11	1310.69	897.35	0.35
Buckeye Creek	2494.62	100-Year	5150.00	799.17	810.75	808.31	812.78	0.003854	11.44	450.19	90.67	0.65
Buckeye Creek	2460.04		Bridge									
Buckeye Creek	2417.85	100-Year	5150.00	798.50	810.19	808.31	812.37	0.004395	12.01	448.57	327.33	0.68
Buckeye Creek	2354.53	100-Year	5150.00	797.95	811.42		811.69	0.000765	5.50	1954.18	564.11	0.29
Buckeye Creek	2306.38	100-Year	5150.00	798.34	811.41		811.61	0.000652	4.96	2326.56	710.15	0.27
Buckeye Creek	2254.54	100-Year	5150.00	798.53	811.43		811.55	0.000478	4.19	2817.26	831.78	0.23
Buckeye Creek	2204.54	100-Year	5150.00	798.81	811.45		811.50	0.000238	3.00	3948.53	1014.70	0.16
Buckeye Creek	2154.54	100-Year	5150.00	798.60	811.45		811.49	0.000164	2.45	4704.97	1210.67	0.14
Buckeye Creek	2105.74	100-Year	5150.00	797.84	811.44		811.48	0.000162	2.58	4972.84	1422.57	0.14
Buckeye Creek	1903.41	100-Year	5150.00	798.59	811.43		811.45	0.000098	2.08	6290.89	1657.55	0.11
Buckeye Creek	1804	100-Year	5150.00	797.78	811.42		811.43	0.000075	1.87	6722.65	1583.85	0.10
Buckeye Creek	1604.54	100-Year	5150.00	796.53	811.35		811.40	0.000177	2.79	3531.91	659.94	0.14
Buckeye Creek	1419.72	100-Year	5150.00	796.37	811.29		811.38	0.000197	3.06	3150.05	652.23	0.15
Buckeye Creek	1234.05	100-Year	5150.00	798.00	811.28		811.35	0.000169	2.82	3553.28	671.93	0.14
Buckeye Creek	1102.70	100-Year	5150.00	798.00	811.25		811.32	0.000185	2.93	3345.53	589.97	0.15
Buckeye Creek	972.12	100-Year	5150.00	797.56	811.18		811.29	0.000228	3.38	2761.62	496.01	0.17
Buckeye Creek	810.82	100-Year	5150.00	797.30	811.13		811.25	0.000312	3.58	2385.42	408.81	0.19
Buckeye Creek	632.35	100-Year	5150.00	796.97	811.11		811.18	0.000189	2.72	3224.53	564.55	0.15
Buckeye Creek	433.99	100-Year	5150.00	796.70	811.10		811.15	0.000148	2.61	3762.86	712.65	0.13
Buckeye Creek	289.71	100-Year	5150.00	796.46	811.09		811.14	0.000137	2.45	3910.40	744.61	0.13
Buckeye Creek	109.26	100-Year	5150.00	796.17	811.03		811.10	0.000200	2.91	3270.82	651.91	0.15
Buckeye Creek	0	100-Year	5150.00	796.00	811.00	803.91	811.08	0.000191	2.96	3099.82	653.27	0.15

PREPARED BY: TGJ 1/24/2014

CHECKED BY: AHG 26-JAN-2014

HEC-RAS Plan: Proposed River: Buckeye Creek Reach: Buckeye Creek Profile: 100-Year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Buckeye Creek	3504.54	100-Year	5150.00	804.44	814.16		814.92	0.001800	6.99	747.51	107.15	0.43
Buckeye Creek	3454.54	100-Year	5150.00	804.38	813.78		814.79	0.002374	8.26	699.20	127.32	0.51
Buckeye Creek	3404.54	100-Year	5150.00	804.32	813.45	811.28	814.64	0.002975	8.96	643.49	117.80	0.57
Buckeye Creek	3354.54	100-Year	5150.00	804.25	813.55		814.42	0.002137	7.90	842.40	199.92	0.49
Buckeye Creek	3304.54	100-Year	5150.00	804.25	813.45		814.31	0.002188	7.88	865.92	231.27	0.49
Buckeye Creek	3254.54	100-Year	5150.00	804.12	813.54	810.89	814.14	0.001568	6.79	1087.87	274.81	0.42
Buckeye Creek	3204.54	100-Year	5150.00	804.05	813.52		814.04	0.001404	6.53	1195.79	308.45	0.40
Buckeye Creek	3154.54	100-Year	5150.00	803.90	813.53		813.95	0.001181	6.10	1382.06	370.26	0.37
Buckeye Creek	3104.54	100-Year	5150.00	803.47	813.55		813.87	0.000917	5.41	1615.96	421.71	0.32
Buckeye Creek	3054.54	100-Year	5150.00	803.04	813.55		813.82	0.000788	5.03	1758.25	460.79	0.30
Buckeye Creek	3004.54	100-Year	5150.00	802.19	813.57		813.77	0.000607	4.52	2069.51	542.18	0.26
Buckeye Creek	2954.54	100-Year	5150.00	802.19	813.55		813.74	0.000585	4.51	2138.46	550.89	0.26
Buckeye Creek	2904.54	100-Year	5150.00	802.00	813.57		813.70	0.000398	3.72	2526.93	605.01	0.21
Buckeye Creek	2854.58	100-Year	5150.00	802.00	813.58		813.67	0.000283	3.21	2950.87	661.88	0.18
Buckeye Creek	2804.54	100-Year	5150.00	802.00	813.58		813.66	0.000250	2.96	3137.41	649.21	0.17
Buckeye Creek	2754.54	100-Year	5150.00	802.00	813.53		813.63	0.000320	3.48	2745.45	581.42	0.19
Buckeye Creek	2704.54	100-Year	5150.00	802.00	813.43		813.60	0.000478	4.23	2272.91	538.48	0.23
Buckeye Creek	2661.29	100-Year	5150.00	802.00	813.35	809.64	813.57	0.000578	4.71	1971.84	530.45	0.26
Buckeye Creek	2603.43	100-Year	5150.00	802.00	813.35	809.31	813.53	0.000446	4.25	2160.90	566.67	0.23
Buckeye Creek	2554.54	100-Year	5150.00	800.98	813.12		813.48	0.000801	5.47	1519.47	445.68	0.30
Buckeye Creek	2494.62	100-Year	5150.00	799.17	811.50	808.30	813.25	0.003000	10.61	485.35	106.38	0.58
Buckeye Creek	2460.04		Bridge									
Buckeye Creek	2417.85	100-Year	5150.00	798.50	810.56	808.31	812.57	0.003846	11.52	468.04	283.65	0.64
Buckeye Creek	2354.53	100-Year	5150.00	797.95	811.54		811.97	0.001032	6.43	1465.88	374.95	0.34
Buckeye Creek	2306.38	100-Year	5150.00	798.34	811.55		811.87	0.000907	5.90	1622.98	373.71	0.32
Buckeye Creek	2254.54	100-Year	5150.00	798.53	811.53		811.80	0.000819	5.52	1736.58	390.38	0.30
Buckeye Creek	2204.54	100-Year	5150.00	798.81	811.52		811.75	0.000681	5.11	1902.83	413.32	0.27
Buckeye Creek	2154.54	100-Year	5150.00	798.60	811.54		811.70	0.000475	4.20	2138.22	422.59	0.23
Buckeye Creek	2105.74	100-Year	5150.00	797.84	811.43		811.66	0.000581	4.88	1934.13	434.22	0.26
Buckeye Creek	1903.41	100-Year	5150.00	798.59	811.34		811.54	0.000525	4.80	2244.27	556.51	0.25
Buckeye Creek	1804	100-Year	5150.00	797.78	811.34	805.91	811.48	0.000391	4.24	2655.13	878.79	0.22
Buckeye Creek	1604.54	100-Year	5150.00	796.53	811.35		811.40	0.000177	2.79	3531.91	659.94	0.14
Buckeye Creek	1419.72	100-Year	5150.00	796.37	811.29		811.38	0.000197	3.06	3150.05	652.23	0.15
Buckeye Creek	1234.05	100-Year	5150.00	798.00	811.28		811.35	0.000169	2.82	3553.28	671.93	0.14
Buckeye Creek	1102.70	100-Year	5150.00	798.00	811.25		811.32	0.000185	2.93	3345.53	589.97	0.15
Buckeye Creek	972.12	100-Year	5150.00	797.56	811.18		811.29	0.000228	3.38	2761.62	496.01	0.17
Buckeye Creek	810.82	100-Year	5150.00	797.30	811.13		811.25	0.000312	3.58	2385.42	408.81	0.19
Buckeye Creek	632.35	100-Year	5150.00	796.97	811.11		811.18	0.000189	2.72	3224.53	564.55	0.15
Buckeye Creek	433.99	100-Year	5150.00	796.70	811.10		811.15	0.000148	2.61	3762.86	712.65	0.13
Buckeye Creek	289.71	100-Year	5150.00	796.46	811.09		811.14	0.000137	2.45	3910.40	744.61	0.13
Buckeye Creek	109.26	100-Year	5150.00	796.17	811.03		811.10	0.000200	2.91	3270.82	651.91	0.15
Buckeye Creek	0	100-Year	5150.00	796.00	811.00	803.91	811.08	0.000191	2.96	3099.82	653.27	0.15

PREPARED BY: TGJ 1/24/2014
CHECKED BY: 26-JAN-2014

Buckeye Creek
Existing vs. Proposed HEC-RAS Models
100-Year Water Surface Elevations Summary
Sherwood Gas Processing Plant - Doddridge County, WV
Project: 110-811.5001

PREPARED BY: TGJ
DATE: 1/23/2014
CHECKED: ARG
DATE: 26-JAN-2014

ID	River Station	100-Year Peak Flow (cfs)	Water Surface Elevations Existing	Water Surface Elevations Proposed	Water Surface Elevations Existing vs. Proposed
A	35+04.54	5150	813.99	814.16	0.17
B	34+54.54	5150	813.55	813.78	0.23
C	34+04.54	5150	813.16	813.45	0.29
D	33+54.54	5150	813.22	813.55	0.33
E	33+04.54	5150	813.10	813.45	0.35
F	32+54.54	5150	813.19	813.54	0.35
G	32+04.54	5150	813.15	813.52	0.37
H	31+54.54	5150	813.15	813.53	0.38
I	31+04.54	5150	813.15	813.55	0.40
J	30+54.54	5150	813.14	813.55	0.41
K	30+04.54	5150	813.15	813.57	0.42
L	29+54.54	5150	813.17	813.55	0.38
M	29+04.54	5150	813.20	813.57	0.37
N	28+54.58	5150	813.20	813.58	0.38
O	28+04.54	5150	813.21	813.58	0.37
P	27+54.54	5150	813.15	813.53	0.38
Q	27+04.54	5150	812.96	813.43	0.47
R	26+61.29	5150	812.88	813.35	0.47
S	26+03.43	5150	812.90	813.35	0.45
T	25+54.54	5150	812.58	813.12	0.54
U	24+94.62	5150	810.75	811.50	0.75
		New Bridge			
V	24+17.85	5150	810.19	810.56	0.37
W	23+54.53	5150	811.42	811.54	0.12
X	23+06.38	5150	811.41	811.55	0.14
Y	22+54.54	5150	811.43	811.53	0.10
Z	22+04.54	5150	811.45	811.52	0.07
AA	21+54.54	5150	811.45	811.54	0.09
BB	21+05.74	5150	811.44	811.43	-0.01
CC	19+03.41	5150	811.43	811.34	-0.09
DD	18+04.00	5150	811.42	811.34	-0.08
EE	16+04.54	5150	811.35	811.35	0.00
FF	14+19.72	5150	811.29	811.29	0.00
GG	12+34.05	5150	811.28	811.28	0.00
HH	11+02.70	5150	811.25	811.25	0.00
II	9+72.12	5150	811.18	811.18	0.00
JJ	8+10.82	5150	811.13	811.13	0.00
KK	6+04.54	5150	811.11	811.11	0.00
LL	433.99	5150	811.10	811.10	0.00
MM	289.71	5150	811.09	811.09	0.00
NN	109.26	5150	811.03	811.03	0.00
OO	0	5150	811.00	811.00	0.00

APPENDIX F

DODDRIDGE COUNTY FLOODPLAIN PERMITS

TO: Clerk of the County Court

118 E. Court St.

West Union, WV 26456

ATT: Beth A. Rogers, Doddridge County Clerk

Ralph Sandora, acting Doddridge County Flood Plain Manager

In regard to: Floodplain Permit Application – Mark West Liberty Sherwood Processing

plant 4&5 #13-103

And also: Floodplain Permit Application – Mark West Liberty Sherwood Processing

plant 4&5 # 14-123

Please do not approve any permit application for flood plain work from Mark West Sherwood Processing Plant.

- This project already has applications on file with the Army Corp of Engineers and the WVDEP water and waste management division, 401 Permitting. This application is

  for burying crucial head water streams and the fill of many connecting wetland areas that cascade downhill toward Buckeye Creek. This permitting has NOT been approved yet, and the Army Corp of Engineers and WVDEP 401 permitting will continue to accept public comment on this project, AND ask for a public hearing until March 7, 2014

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:

C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream

A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall

require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

Thank you for not approving these flood plain permit applications.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

Thank you,

MaryAnne Daggett

New Milton, WV 26411

February 25, 2014

Beth Rogers
Clerk of the County Court
Ralph Sandora
Acting Doddridge County Flood Plain Manager
118 E. Court Street.
West Union, WV 26456

RE: Floodplain Permit Application – Mark West Liberty Sherwood Processing# 14-123

Dear Mr. Sandora:

I would like to affirm as my own the comments submitted by Mirijana Beram:

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is cumulative.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits. This application is for burying crucial head water streams and the filling in wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 404 permitting. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
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TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

I would also plead with you and the County Commission to do all you can to protect the citizens and the land of Doddridge County. It is extremely irresponsible, if not criminal, to have a facility of this nature and size upstream of the West Union water supply. I live within a mile of the project site and I fear for my health and safety and that of my neighbors. In addition to the flood plain permit hearing, I request a public hearing on the expansion of the Mark West site in question.
Thank you for your service to the people of our county.

Sincerely,

Linda Ireland

Linda Ireland
993 Black Lick Run
Salem, WV 26426
304-641-3689

DATE: 2/24/2014
TO: Clerk of the County Court
118 E. Court St.
West Union, WV 26456
ATT: Beth A. Rogers, Doddridge County Clerk
Ralph Sandora, acting Doddridge County Flood Plain Manager

In regard to: Floodplain Permit Application – Mark West Liberty Sherwood Processing plant 4&5 #13-103
And also: Floodplain Permit Application – Mark West Liberty Sherwood Processing plant 4&5 # 14-123

Please do not approve any permit application for flood plain work from Mark West Sherwood Processing Plant.

This project already has applications on file with the Army Corp of Engineers and the WVDEP water and waste management division, 401 Permitting. This application is for burying crucial head water streams and the fill of many connecting wetland areas that cascade downhill toward Buckeye Creek. This permitting has NOT been approved yet, and the Army Corp of Engineers and WVDEP 401 permitting will continue to accept public comment on this project, AND ask for a public hearing until March 7, 2014

According to the Doddridge County flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

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TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.
If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and needs to be revoked. Please recheck your records as to this issue.
Please refer to:
CELRH-RD-E Public Notice No. LRH-2011-753-OHR James Spence, Army Corps of Engineers (304) 399-5610.
http://www.lrh.usace.army.mil/Missions/Regulatory/PublicNotices/tabid/4125/Article/20772/2011-753-ohr.aspx

Wilma Reip, WVDEP water and waste management, 401 Certification Program 304-926-0440

Thank you for not approving these flood plain permit applications.

Name: Jody Mohr

Address: 2328 Miletus Road, Salem, WV 26426

Phone number: 304-782-4019

February 24, 2014

TO: Beth Rogers, Clerk of the County Court
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application – Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is cumulative.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits. This application is for burying crucial head water streams and the filling in wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 404 permitting. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
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TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Jody Mohr

2328 Miletus Road (Doddridge County)

Salem, WV 26426

February 24, 2014

Beth Rogers, Clerk of the County Court
and
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application - Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

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3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is ***cumulative***.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits (*Army Corps. Engineers Public Notice No. LRH-2011-753-OHR*). This application is for burying crucial head water streams and the filling in over 6 acres of wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 401 Certification. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

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TO reiterate - NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Christina Woods

Christina Woods
1585 Broad Run Road
Center Point, WV 26339

February 24, 2014

Beth Rogers, Clerk of the County Court
and
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application - Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is ***cumulative***.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits (*Army Corps. Engineers Public Notice No. LRH-2011-753-OHR*). This application is for burying crucial head water streams and the filling in over 6 acres of wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 401 Certification. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate - NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Wayne Woods
1585 Broad Run Road
Center Point, WV 26339

Feb. 24, 2014

To: Beth Rogers, clerk of the County
Ralph Sandora, Acting County Flood Plain Manager
118 E Court St.
West Union, WV 26456

In RE: Flood Plain Permit Application - MarkWest Liberty Sherwood Processing #14-123

Please do not approve this permit application for MarkWest Sherwood Processing Plant. My reasons are listed below

1- No adjacent property owners were notified as provided by the Doddridge flood plain ordinance.

2- The premise of this study is based on the study that was submitted with the Dec. 2013 floodplain application. This application has not been approved yet and you are waiting for further information on it.

3- The flood plain ordinance clearly states that the elevation can not be raised by more than a foot. When you total up the four studies and applications that MarkWest has submitted, the increase exceeds the one

4.- The fill being placed will destroy wetland areas and block streams. MarkWest needs permits from the Army Corps of Engineers. They Applied for permits. This Application is for burying Crucial head water streams And filling of wetland areas

5- MarkWest also needs a permit from WVDEP Water and Waste Management division, 401 permitting. This permit would Allow them To discharge into Buckeye Creek, which is upstream from the West Union Municipal Water Supply. This permit has NOT been issued yet

According To the Flood Plain ordinance
4.4 C of ordinance
C- Any development And/or use of land shall be permitted PROVIDED that all such uses, Activities And/or development shall be TAKEN in STRICT compliance with the flood proofing And related provisions contained herein and in all other Applicable Federal and STATE laws, Ordinances and Regulations.

Section 4.5 Alteration or Relocation of a Stream
A- Whenever a developer intends To Alter or Relocate a stream within the flood plain area, the developer Shall notify in writing, by Certified Mail, Doddridge County's flood Plain Administrator, The State Coordinating office, and any Adjacent

Communities and any adjacent property owners of all intended Activities PRIOR To the Alteration or Relocation of the Stream. Copies of all required notifications Must be Submitted To the Federal Emergency Management Agency. In Addition PRIOR To ISSUING The local permit, The Flood Plain Administrator Shall Require copies of all Necessary permits From Those Governmental Agencies From which Federal or State law Requires Approval.

To Reiterate - NO PERMITS have been ISSUED Yet from Federal or State Regulators

IF Any Flood Plain permits for This particular project WAS been granted, it would have been granted in Violation of This Flood Plain Ordinance and needs to be Revoked. PLEASE Recheck your Records as To This issue.

I also Request That a Public Meeting be held so That County Residents have an opportunity To voice Their Concerns.

Thank You for your Time →

Respectfully Yours,
Tina Del Prete
4805 Riggins Run
West Union, WV 26456

To Stumpf
4805 Riggins Run
W. Union, W.V. 26456

February 24, 2014

TO: Beth Rogers, Clerk of the County Court
Ralph Sandora, acting Doddridge County Flood Plain Manager
118 E. Court St.
West Union, WV 26456

RE: Floodplain Permit Application – Mark West Liberty Sherwood Processing# 14-123

Please do not approve this permit application for Mark West Sherwood Processing Plant. My reasons are listed below:

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C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
A. Whenever a developer intends to alter or relocate a stream within the Floodplain Area the developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, any adjacent communities and any adjacent property owners of all such intended activities prior to the alteration or relocation of the stream. Copies of all required notifications must be submitted to the Federal Emergency Management Agency. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those governmental agencies from which Federal or State Law requires approval.

TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Mirijana Beram
615 Riggins Run
West Union, WV 26456

TO: Clerk of the County Court
118 E. Court St.
West Union, WV 26456

ATT: Beth A. Rogers, Doddridge County Clerk
Ralph Sandora,Acting Doddridge County Flood Plain Manager

FROM: Jonette Kirkwood
203 Court St.
West Union, WV 26456

RE: Flood plain Permit Application – Mark West Liberty Sherwood Processing #14-123

Please do not approve this permit application. Our county residents deserve more consideration and more protection from the issues and hazards that are presented here. As a resident of West Union, I am particularly concerned about flooding, my water quality, and the damage to our water processing equipment from increased amounts of silt in the water taken in.

Although some of the facts below have been gathered by the efforts of others, they reflect my thoughts and sentiments as well. I would also like to suggest that you consider the entire long term plan for this site (10 plants) and its impact on the health and safety of the land, streams, wildlife and people of Doddridge County.

Please do not approve this application.

- This floodplain handles significant flood waters, allowing waters to spread out during heavy rain preventing flood damage to both upstream and downstream landowners.
- Continued development at this site, resulting in the loss of trees, vegetation, wetlands and headwater streams, will intensify flash flooding. FEMA acknowledges that flash flooding is already a concern in Buckeye Creek, Meathouse Fork, and Middle Island Creek.
- Buckeye Creek is a recreational headwater fishery emptying into Middle Island Creek. Trophy Bass and Muskie, as well as endangered mussels and a diverse aquatic and wildlife population call those creeks home. Detrimental effects have been noted in the last few years including significant erosion, sedimentation, fish with sore lesions, and mussel strandings.
- In this application, Mark West acknowledges there are other options. Please ask them to go back to the drawing board and find solutions that do not obliterate our crucial headwater streams, wetlands, and forests. The loss of all of these will only have detrimental effects on our community and aquatic species.

1. No adjacent property owners were notified as provided by the Doddridge Floodplain Ordinance.
2. The premise of this study is based on the study that was submitted with the December 2013 Floodplain application. This application has NOT been approved yet and you are waiting for further information on it.
3. The Floodplain Ordinance clearly states that the elevation can NOT be raised by more than a foot. When you total up the four studies & applications that Mark West has submitted the increase exceeds the one foot limit. The one foot limit is cumulative.
4. The fill being placed will destroy wetlands areas and block streams. Mark West needs permits from the Army Corps of Engineers. They applied for permits. This application is for burying crucial head water streams and the filling in wetlands areas. This permit has NOT been issued yet.
5. Mark West also needs a permit WVDEP water and waste management division, 404 permitting. This permit would allow them to discharge into Buckeye Creek which is upstream from the West Union municipal water supply. This permit has NOT been issued yet.

According to the flood plain ordinance,

4.4 C of Floodplain Ordinance:
C. Any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, ordinances and regulations.

Section 4.5 Alteration or relocation of a stream
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TO reiterate – NO PERMITS HAVE BEEN ISSUED YET FROM FEDERAL & STATE REGULATORS.

If any prior flood plain permits for this particular project has been granted, it would have been granted in violation of this flood plain ordinance and need to be revoked. Please recheck your records as to this issue.

I request that a public meeting be held so that County Residents have an opportunity to voice their concerns.

Thank you,

Jonath Kirkwood

TO: Clerk of the County Court, Beth Rogers
Ralph Sandora acting flood plain manager
Dan Wellings former flood plain manager
118 E. Court St.
West Union, WV 26456
email: doddcoclerk@hotmail.com
RalphSandora@gmail.com
wellingsd8@gmail.com ask for a return receipt whether sending usps mail or email.

Date: February 24, 2014

IN REGARD TO: #14-123 flood plain application, Mark West Expansion

Please do not approve this application.

- This floodplain handles significant flood waters, allowing waters to spread out during heavy rain preventing flood damage to both upstream and downstream landowners.
- Continued development at this site, resulting in the loss of trees, vegetation, wetlands and headwater streams, will intensify flash flooding. FEMA acknowledges that flash flooding is already a concern in Buckeye Creek, Meathouse Fork, and Middle Island Creek.
- Buckeye Creek is a recreational headwater fishery emptying into Middle Island Creek. Trophy Bass and Muskie, as well as endangered mussels and a diverse aquatic and wildlife population call those creeks home. Detrimental effects have been noted in the last few years including significant erosion, sedimentation, fish with sore lesions, and mussel strandings.
- In this application, Mark West acknowledges there are other options. Please ask them to go back to the drawing board and find solutions that do not obliterate our crucial headwater streams, wetlands, and forests. The loss of all of these will only have detrimental effects on our community and aquatic species.
- If you will not immediately deny this permit, I am requesting a public hearing

Thank you,

Name: Louanne Fatora

Address: Smithton Road, West Union, WV 26456

Phone number: 970-389-5451

Louanne Fatora

typed name indicates this serves as my signature