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: #22-606

Date Approved: February 21, 2022 **Expires: February 21, 2023**

Issued to: MarkWest Liberty Midstream & Resources, LLC **POC: Richard Lowery**

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

Project Address: 662 Swisher Lane West Union, WV 26456

Firm: 54017C0140C **Lat/Long: 39.277376N, -80.689799W**

Purpose of Development: Sherwood Bank Stabilization

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

George C. Eidel

Date: February 21, 2022

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

SENDER: COMPLETE THIS SECTION

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

1. Article Addressed to:

rwood Midstream Holdings, LLC
539 South Main Street
Findlay, OH 45840

9590 9402 4868 9032 9569 12

2. Article Number *(Transfer from service label)*

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

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

FINDLAY, OHIO 45840
Chase Pickering
JAN 24 2022
539 South Main St.
USPS

3. Service Type

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

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

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

1. Article Addressed to:

D&M Powell, LLC
304 Stuart Street
West Union, WV 26456

9590 9402 4868 9032 9569 36

2. Article Number *(Transfer from service label)*

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X D M Powell LLC

☐ Agent
☑ Addressee

B. Received by *(Printed Name)*

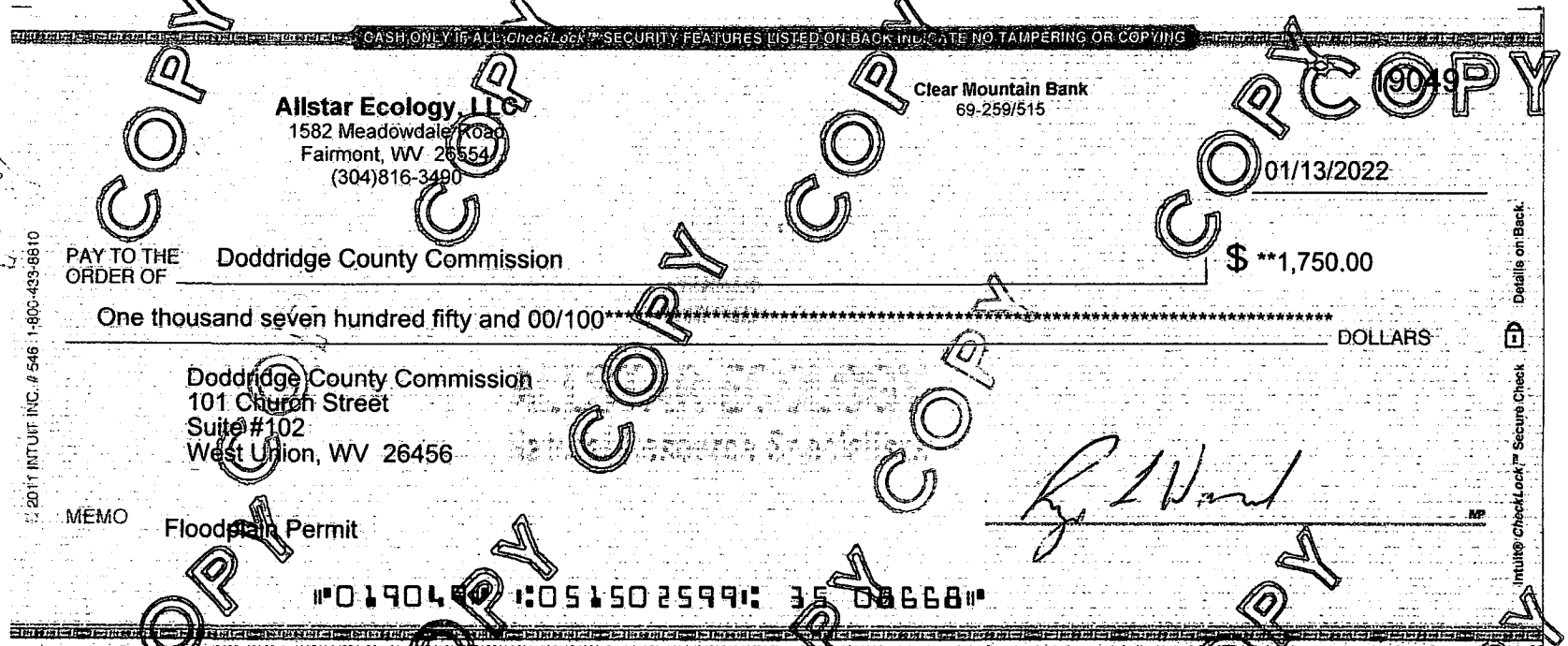
C. Date of Delivery
1-26-22

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

3. Service Type

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

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



CASH ONLY IF ALL CheckLock™ SECURITY FEATURES LISTED ON BACK INDICATE NO TAMPERING OR COPYING

Allstar Ecology, LLC
1582 Meadowdale Road
Fairmont, WV 26554
(304)816-3490

Clear Mountain Bank
69-259/515

19049

01/13/2022

PAY TO THE ORDER OF Doddridge County Commission

$ **1,750.00

One thousand seven hundred fifty and 00/100********** DOLLARS

Doddridge County Commission
101 Church Street
Suite #102
West Union, WV 26456

MEMO Floodplain Permit

⑈019049⑈ ⑆051502599⑆ 35 08668⑈

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Details on Back.

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Natural Resource Specialists

01/13/2022 **Doddridge County Commission** 19049

Floodplain Permit App Fee	1,750.00

FP # 22-606

Clear Mountain Bank (8668)	Floodplain Permit	1,750.00

SENDER: COMPLETE THIS SECTION

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

1. Article Addressed to:

st Liberty Midstream & Resources, LL
539 South Main Street
Findlay, OH 45840

9590 9402 4868 9032 9569 29

2. Article Number *(Transfer from service label)*

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Chase Pickering

C. Date of Delivery

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

539 South Main St.
JAN 24 2022
FINDLAY, OHIO 45840

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
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PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

7020 2450 0002 3081 7452

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Certified Mail Fee	$ 3.75
Extra Services & Fees *(check box, add fee as appropriate)*	
☒ Return Receipt (hardcopy)	$ 3.05
☐ Return Receipt (electronic)	$
☐ Certified Mail Restricted Delivery	$
☐ Adult Signature Required	$
☐ Adult Signature Restricted Delivery	$
Postage	$ .53
Total Postage and Fees	$ 7.33

Postmark Here
JAN 20 2022
WEST UNION, WV
USPS 26456-9998

Sent To: D. M Powell, LLC
Street and Apt. No., or PO Box No.: 304 Stuart St.
City, State, ZIP+4®: West Union, WV 26456 22-606

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

7020 2450 0002 3081 7438

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
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OFFICIAL USE

Certified Mail Fee	$ 3.75
Extra Services & Fees *(check box, add fee as appropriate)*	
☒ Return Receipt (hardcopy)	$ 3.05
☐ Return Receipt (electronic)	$
☐ Certified Mail Restricted Delivery	$
☐ Adult Signature Required	$
☐ Adult Signature Restricted Delivery	$
Postage	$ .53
Total Postage and Fees	$ 7.33

Postmark Here
JAN 20 2022
WEST UNION, WV
USPS 26456-9998

Sent To: MarkWest Liberty Midstream Resources, LLC
Street and Apt. No., or PO Box No.: 539 S. Main St.
City, State, ZIP+4®: Findlay, OH 45840 22-606

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

FLOODPLAIN PERMIT #22-606

MarkWest Liberty Midstream, Sherwood Bank Stabilization, 662 Swisher Ln, 39.277436, -80.689872

TASK	COMPLETE (DATE)	NOTES
CHECK RECEIVED	1/14/22	
US ARMY CORP. ENGINEERS (USACE)		
US FISH & WILDLIFE SERVICES (USFWS)		
WV DEPT. NATURAL RESOURCES (WVDNR)		
WV DEPT. ENVIROMENTAL PROTECTION (WVDEP)		
STATE HISTORIC & PRESERVATION OFFICE (SHPO)		
OFFICE of LAND & STREAM (OLS)		
WVDOH		
Elevation Certificate		
DATE OF COMMISSION READING	2/1/22	
DATE AVAILABLE TO BE GRANTED	2/21/22	
PERMIT GRANTED		
COMPLETE		

7020 2450 0002 3081 7445

7020 2450 0002 3081 7438

7020 2450 0002 3081 7452

7020 2450 0002 3081 7445

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
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Certified Mail Fee $ 3.75

Extra Services & Fees (check box, add fee as appropriate)
- ☒ Return Receipt (hardcopy) $ 3.05
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage $ .53

Total Postage and Fees $ 7.33

WEST UNION, WV
JAN 20 2022
Postmark Here
USPS 26456 0998

Sent To: Sherwood Midstream Holdings LLC

Street and Apt. No., or PO Box No.: 539 South Main St.

City, State, ZIP+4®: Findlay, OH 45840 22-606

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

Doddridge County Floodplain Permits

(Week of January 17, 2022)

Please take notice that on the **(13th)** of **(January), 2022, (MarkWest Liberty Midstream)** filed an application for a Floodplain Permit **(#22-606)** to develop land located at or about **(662 Swisher Lane); Coordinates: 39.277436, -80.689872**. The Application is on file with the Floodplain Manager of the County and may be inspected or copied during regular business hours in accordance to WV Code Chapter 29B Freedom of Information, Article 1 Public Records and county policy and procedures. Any interested persons who desire to comment shall present the same in writing by **(February 21, 2022)** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Floodplain Manager of the County at 105 Court Street, Suite #3, West Union, WV 26456. **This project is for the Sherwood Bank Stabilization Project**

GEORGE C. EIDEL, CFM

Doddridge County Floodplain Manager

Permit# 22-606
Sherwood Bank
Project Name: Stabilization
Permittees Name: Mark West (MPLX)

Doddridge County, WV

Floodplain Development Permit Application

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

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

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

APPLICANT'S SIGNATURE Sam Schuplack

DATE 1/13/2022

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: MarkWest Liberty Midstream and Resources L.L.C.		
Corporate Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	**State:** PA	**Zip:** 15317
Corporate Point of Contact (POC): Richard Lowry		
Corporate POC Title: Adv HES Professional G&P - HES&S - Environmental		
Corporate POC Primary Phone: 724-416-0520		
Corporate POC Primary Email: 412-925-8165		
Corporate FEIN: 30-0528059	**Corporate DUNS:**	
Corporate Website: https://www.mplx.com		
Local Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	**State:** PA	**Zip:** 15317
Local Project Manager (PM): Mike Hoy		
Local PM Primary Phone: 724-416-0520		
Local PM Secondary Phone:		
Local PM Primary Email: MWHoy@marathonpetroleum.com		
Person Filing Application: Ernie Smith		
Applicant Title: Project Manager		
Applicant Primary Phone: 304-816-3490		
Applicant Secondary Phone: 304-694-6476		
Applicant Primary Email: ernie@allstarecology.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Project Narrative:

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

Project Narrative:
The Sherwood Bank Stabilization Project is located approximately 5.9 miles east of West Union near the
intersection of County Route 50/30 and 50/34 in Doddridge County, West Virginia. According to the
Federal Emergency Management Agency (FEMA), the site is located within the Buckeye Creek Zone AE
Flood Hazard Area as designated on the Doddridge County Flood Insurance Rate Map (FIRM) Panel
54017C0140C with an effective date of October 4, 2011. The proposed work that will take place in the
floodplain consists of stabilization of 600 feet streambed and banks of Buckeye Creek. The project will
utilize the natural channel design techniques which include 3 Rock J-Hooks for pipeline protection,
3 Toe wood structures totaling 265 feet for streambank protection, and 1 converging rock cluster
for downstream grade control. Please see the included hydraulic study and compliance certificate.
The project has been submitted to U.S. Fish and Wildlife Service, WVDNR, WVDNR Office of Land and
Streams, and is being submitted to U.S. Army Corps of Engineers and WV DEP. All responses can
be forwarded upon receipt.

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVELOPLMENT ACTIVITIES:

[] Fill [] Mining [] Drilling [] Pipelining
[] Grading
[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
[X] Watercourse Alteration (including dredging and channel modification)
[] Drainage Improvements (including culvert work)
[] Road, Street, or Bridge Construction
[] Subdivision (including new expansion)
[] Individual Water or Sewer System
[x] Other (please specify)

Stream-bank and bed Stabilization

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

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

Property Designation: 1 of 1

Site/Property Information:		
Legal Description: BUCKEYE 178.48 AC		
Physical Address/911 Address: ROUTE 50		
Decimal Latitude/Longitude: 39.277436, -80.689872		
DMS Latitude/Longitude: 39°16'38.77" N, 80°41' 23.54" W		
District: 3	**Map:** 19	**Parcel:** 31
Land Book Description: N/A		
Deed Book Reference: Deed Book 304, Page 355		
Tax Map Reference: 03-19-0031-0000-0000		
Existing Buildings/Use of Property: Farm		

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

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

Property Designation: 1 of 1

Property Owner Data:		
Name of Primary Owner (PO): D&M POWELL LLC		
PO Address: 304 Stuart St.		
City: West Union	**State:** WV	**Zip:** 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO):		
PO Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

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

Property Designation: ____ of ____		
Contractor/Sub-Contractor (C/SC) Information:		
C/SC Company Name: AllStar Ecology LLC		
C/SC WV License Number: WV046329		
C/SC FEIN: 26-1557130	**C/SC DUNS:** 829007876	
Local C/SC Point of Contact (POC): Ernie Smith		
Local C/SC POC Title: Project Manager		
C/SC Mailing Address: 1582 Meadowdale Road		
City: Fairmont	**State:** WV	**Zip-Code:** 26591
Local C/SC Office Phone: 304-816-3490		
Local C/SC POC Phone: 304-694-6476		
Local C/SC POC E-Mail: ernie@allstarecology.com		

Engineer Firm Information:		
Engineer Firm Name: AllStar Ecology LLC		
Engineer WV License Number: Licensed Landscape Architect WV #280		
Engineer Firm FEIN: 26-1557130	**Engineer Firm DUNS:** 829007876	
Engineer Firm Primary Point of Contact (POC): Ernie Smith		
Engineer Firm Primary POC Title: Project Manager		
Engineer Firm Mailing Address: 1582 Meadowdale Road		
City: Fairmont	**State:** WV	**Zip-Code:** 26591
Engineer Firm Office Phone: 304-816-3490		
Engineer Firm Primary POC Phone: 304-694-6476		
Engineer Firm Primary POC E-Mail: ernie@allstarecology.com		

Adjacent and/or Affected Landowners Data

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

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): SHERWOOD MIDSTREAM HOLDINGS LLC		
Physical Address: 539 South Main St.		
City: Findlay	**State:** OH	**Zip:** 45840
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): MARKWEST LIBERTY MIDSTREAM & RESOURCES LLC		
Physical Address: 539 South Main St.		
City: Findlay	**State:** OH	**Zip:** 45840
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): D&M POWELL LLC		
Physical Address: 304 Stuart St.		
City: West Union	**State:** WV	**Zip:** 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): SHERWOOD MIDSTREAM HOLDINGS LLC		
Physical Address: 539 South Main St.		
City: Findlay	**State:** OH	**Zip:** 45840
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

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

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

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

Applicant

Please read print name, sign and date below:

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

Applicant Signature: Sam Schupbach Date: 1/13/2022

Applicant Printed Name: Sam Schupbach

January 12, 2022

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

Subject: MarkWest Midstream and Resources L.L.C.
Sherwood Bank Stabilization Project
Compliance Certificate
Doddridge County, West Virginia
CEC Project 317-437

Civil & Environmental Consultants, Inc. (CEC) is pleased to evaluate the potential floodplain impacts for the above-referenced project on behalf of MarkWest Midstream and Resources L.L.C., 4600 J. Barry Court, Suite 500, Canonsburg, Pennsylvania 15317. The proposed project involves the stabilization of 600 linear feet of streambed and banks of Buckeye Creek in Doddridge County, West Virginia. According to the Federal Emergency Management Agency (FEMA), the site is located within the Buckeye Creek Zone AE Flood Hazard Area as designated on the Doddridge County Flood Insurance Rate Map (FIRM) Panel 54017C0140C with an effective date of October 4, 2011. The proposed construction will utilize natural channel design techniques including Rock J-Hooks for pipeline protection, Toe wood structures for streambank protection, and converging rock clusters for downstream grade control.

A detailed hydraulic study was performed in HEC-RAS to analyze the potential for adverse effects to the water level and floodplain of Buckeye Creek. Two analyses were performed in this study: an existing conditions analysis and a proposed conditions analysis. The existing conditions model was created using cross-sections based on existing topography along the centerline of Buckeye Creek. The flow rate for the 100-year storm event was obtained from FEMA Flood Insurance Study (FIS) report for Doddridge County. Based on the existing topography, the average slope of the stream channel was determined to be approximately 0.002 ft/ft. These values were used as the flow rate and boundary condition in the steady flow data for the model. In the proposed conditions model, the geometries of the cross-sections were modified to reflect the proposed stream channel associated with the stabilization of Buckeye Creek streambed and banks. By comparing the results from the two analyses, the effects of the proposed work on the 100-year water levels of Buckeye Creek were determined. The results indicate that the proposed stabilization project will not increase the base flood elevation in Buckeye Creek. Thus, the project is in compliance with FEMA criteria as well as the Doddridge County Floodplain Ordinance.

This compliance certificate is provided in support of the floodplain development permit application. Your time and effort in reviewing this floodplain development permit application are appreciated.

Please feel free to contact Mr. Gregory S. Linder at 304-933-3119 or via e-mail at glinder@cecinc.com or contact Mr. Sam Schupbach or Mr. Rick Lowry at 724-416-0520 or via e-mail at ssschupbach@marathonpetroleum.com or ralowry@marathonpetroleum.com if you have questions or need additional information.

Respectfully submitted,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Sabin Shrestha, E.I.T.
Assistant Project Manager

Gregory S. Linder, P.E.
Principal

Sherwood Bank Stabilization Project

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

HIGH RISK

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

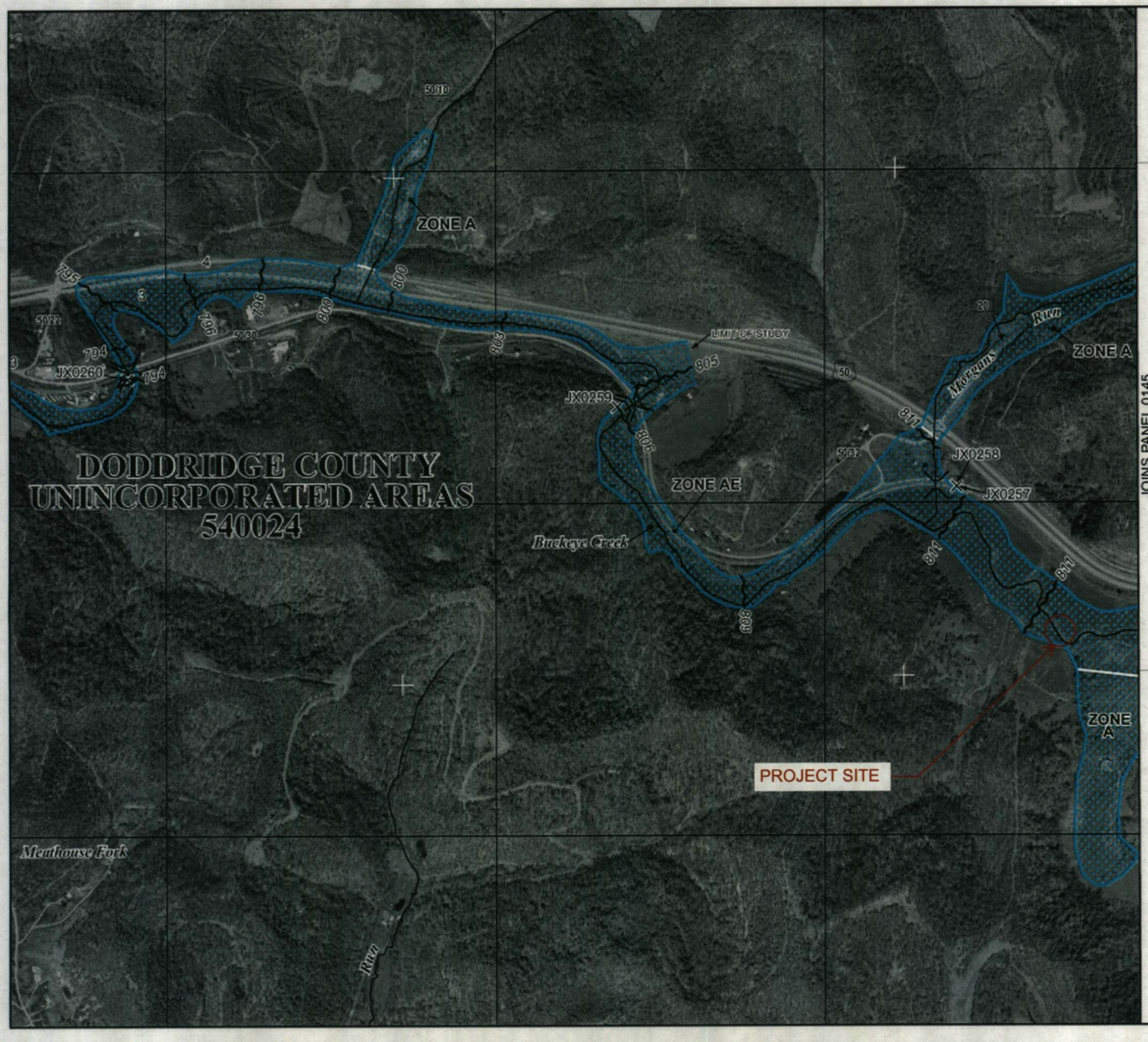
Download the Full Legend for all flood tool symbols
https://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf

Disclaimer:
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. WV Flood Tool (*https://www.MapWV.gov/flood*) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

Flood Info Location — *Map created on 1/6/2022*

User Notes

Flood Hazard Area	Location is **WITHIN** the FEMA 100-year floodplain.
Flood Zone	AE
Stream	Buckeye Creek
Watershed (HUC8)	Little Musringum-Middle Island (5030201)
Flood Height	Flood Height 2 811.9 ft (Source: BFE - Non-Restudy) NAVD8
Water Depth	About 3.6 ft (Source: HEC-RAS)
Elevation	801.1 ft (Source: FEMA 2018-20) (NAVD88)
Community & ID	Doddridge County (ID: 540024)
FEMA Map & Date	54017C0140C; Effective Date: 10/4/2011
Location (lat, long)	(39.277376, -80.689799) (WGS84)
Parcel ID	09-03-0019-0031-0000
E-911 Address	660 SWISHER LN , WEST UNION, WV, 26456



MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

ME

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

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

SHERWOOD BANK STABILIZATION PROJECT

LOCATED IN

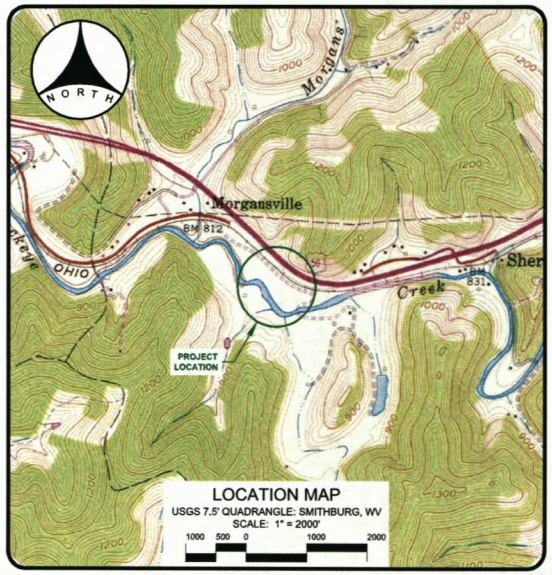
WEST UNION DISTRICT, DODDRIDGE COUNTY, WV

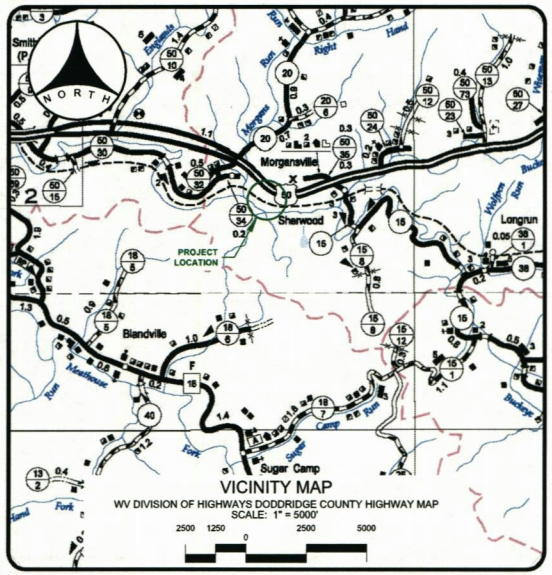
PREPARED FOR

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

4600 J BARRY CT. SUITE 500

CANONSBURG, PA 15317





No.	Revision/Issue	Date

Drawing Index

Drawing	Title
1	COVER SHEET
2	GENERAL NOTES
3	SOILS MAP
4	DRAINAGE AREA MAP
5	EXISTING SITE PLAN
6	EXISTING PROFILE
7-8	EXISTING CROSS SECTIONS
9	PROPOSED SITE PLAN
10	PROPOSED PROFILE
11	PROPOSED CROSS SECTIONS
12-13	DETAILS

Seal

Prepared By

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Scale	Drawn By	Sheet
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Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION

THE PURPOSE OF THE PROJECT INVOLVES PIPELINE MAINTENANCE TO ENSURE INTEGRITY OF EXISTING BURIED PIPELINES AT THE SITE THAT ARE BECOMING EXPOSED DUE TO HEAVY STREAMBANK EROSION ON BUCKEYE CREEK. MARKWEST LIBERTY MIDSTREAM AND RESOURCES, LLC PROPOSES STREAMBANK STABILIZATION ON BUCKEYE CREEK UTILIZING NATURAL CHANNEL DESIGN INCLUDING ROCK J-HOOKS TO SERVE AS GRADE CONTROL TO PROTECT EXISTING PIPELINE CROSSINGS AND TOEWOOD STRUCTURES TO REDUCE BANK EROSION. THE PROJECT LOD IS PROPOSED TO BE 3.41 ACRES. THE PROJECT IS LOCATED IN DODDRIDGE COUNTY, WEST VIRGINIA, APPROXIMATELY 5.9 MILES EAST OF WEST UNION, WEST VIRGINIA.

EXISTING SITE CONDITIONS

THE EXISTING PARCEL CONSISTS OF MOSTLY OPEN MOWED VALLEY SURROUNDED BY INDUSTRIAL AREAS AND STEEPLY SLOPING WOODLANDS. THE SITE DRAINS INTO DIRECTLY BUCKEYE CREEK WHICH THEN FLOWS WESTWARDLY INTO MEATHOUSE FORK.

THE SITE AND ADJACENT PARCELS ARE USED FOR INDUSTRIAL, AGRICULTURAL, AND RESIDENTIAL PURPOSES.

SOILS

THE SITE IS VERY GENTLY SLOPED, RANGING IN ELEVATION FROM 814 AT THE NORTHERN EDGE OF THE SITE TO 800 AT THE BOTTOM OF THE DRAINAGE. PREDOMINANT SOILS ON SITE ARE CHAGRIN SILT LOAM, GILPIN-PEABODY COMPLEX, AND SENSABAUGH SILT LOAM. REFER TO DRAWING 3 FOR DETAILED SOILS INFORMATION.

CRITICAL EROSION AREAS

EARLY ESTABLISHMENT AND PROPER MAINTENANCE OF PERIMETER CONTROLS WILL PROVIDE SEDIMENTATION CONTROL. STABILIZE AND MAINTAIN DITCHES AND FILL SLOPES THROUGHOUT PROJECT CONSTRUCTION TO CONTROL EROSION.

EROSION AND SEDIMENT CONTROL MEASURES

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO STANDARDS AND SPECIFICATIONS OF THE WEST VIRGINIA BEST MANAGEMENT PRACTICE MANUAL. THE STANDARDS OF THE WVBMP MANUAL SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE BY LOCAL AUTHORITIES HAVING JURISDICTION. TEMPORARY SEEDING OR OTHER STABILIZATION SHALL OCCUR IMMEDIATELY AFTER GRADING AND ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE MAINTAINED UNTIL THEY ARE NO LONGER REQUIRED TO COMPLY WITH THE CONTRACT DOCUMENTS OR STATE LAW.

STRUCTURAL PRACTICES

1. **SMART FENCE 42 SILT FENCE AND COMPOST FILTER SOCK**
   SILT FENCE AND / OR COMPOST FILTER SOCK SEDIMENT BARRIERS SHALL BE INSTALLED DOWN-SLOPE OF AREAS WITH MINIMAL GRADES TO FILTER SEDIMENT-LADEN RUNOFF FROM SHEET FLOW AS INDICATED.
2. **PUMP AROUND**
   PROVIDE ADEQUATE SEDIMENT AND EROSION CONTROL ON THE APPROACHES. CONSTRUCTION SHOULD BE PREFORMED IN LOW FLOW PERIODS. USE A PUMP OR PUMPS SUFFICIENTLY LARGE TO PUMP THE MAJORITY OF STREAM FLOW AROUND THE SITE. CONSTRUCT A DAM IMPERVIOUS TO WATER. THE INLET OF THE PUMP IS TO BE SUSPENDED ABOVE THE STREAMBED IN ORDER TO PREVENT SUCKING MUD AND SEDIMENT. THE DISCHARGE POINT MUST BE STABILIZED WITH ROCK TO DISPERSE THE ENERGY AND PREVENT EROSION.
3. **PUMPED WATER FILTER BAG**
   USE FILTER BAGS FOR DEWATERING OPERATIONS THAT DO NOT DISCHARGE TO SEDIMENT DAMS OR SEDIMENT BASINS. FILTER BAGS ARE FABRICATED FROM NON-WOVEN GEOTEXTILE MATERIALS THAT FILTER SEDIMENT-LADEN WATER FROM DEWATERING OPERATIONS. SEDIMENT LADEN WATER IS PUMPED INTO THE NON-WOVEN GEOTEXTILE FABRIC BAG THAT ALLOWS FILTERED WATER TO PASS THROUGH.
4. **ROLLED EROSION CONTROL PRODUCTS**
   ROLLED EROSION CONTROL PRODUCTS (RECPS) ARE TEMPORARY OR PERMANENT EROSION CONTROL NETS, BLANKETS AND THREE-DIMENSIONAL MATRIXES MADE FROM A WIDE VARIETY OF NATURAL (SUCH AS JUTE, COIR AND STRAW) AND MAN-MADE MATERIALS ALONE OR IN COMBINATION. THERE ARE NUMEROUS COMMERCIALLY AVAILABLE PRODUCTS SO GREAT CARE MUST BE USED TO CHOOSE THE CORRECT PRODUCT FOR THE APPLICATION. COIR FIBER MATTING AND CURLEXO METFREE EC BLANKET SHALL BE USED FOR THIS.
5. **STABILIZED CONSTRUCTION ENTRANCE**
   LARGE QUANTITIES OF MUD CAN BE TRACKED ONTO PUBLIC AND PRIVATE ROADS CAUSING DANGEROUS DRIVING CONDITIONS AND MUDDY RUNOFF WHEN IT RAINS. CONSTRUCTION ENTRANCES ARE STABILIZED TO REDUCE THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PAVED ROADS BY VEHICLES OR EQUIPMENT BY CONSTRUCTING A STABILIZED PAD OF STONE AT ENTRANCES TO CONSTRUCTION SITE.
6. **TEMPORARY ACCESS ROADS**
   THE TEMPORARY STABILIZATION OF ACCESS ROADS, HAUL ROADS, PARKING AREAS, LAYDOWN, MATERIAL STORAGE AND OTHER ONSITE VEHICLE TRANSPORTATION ROUTES WITH STONE IMMEDIATELY AFTER GRADING. THIS PRACTICE IS USED TO REDUCE THE EROSION AND SUBSEQUENT REGRADING OF TEMPORARY AND PERMANENT ROADBEDS, WORK AREAS AND PARKING AREAS RUTTED BY CONSTRUCTION TRAFFIC DURING WET WEATHER. PROVIDES EASIER ACCESS IN ALL WEATHER AND REDUCES TRACKING MUD ONTO PUBLIC ROADS.

VEGETATIVE PRACTICES

1. **TOPSOILING (TEMPORARY STOCKPILE):** PRESERVING AND USING TOPSOIL TO PROVIDE A SUITABLE GROWTH MEDIUM FOR VEGETATION USED TO STABILIZE DISTURBED AREAS. APPLICABLE WHERE PRESERVATION OR IMPORTATION OF TOPSOIL IS MOST COST-EFFECTIVE METHOD OF PROVIDING A SUITABLE GROWTH MEDIUM. NOT RECOMMENDED FOR SLOPES STEEPER THAN 2:1 UNLESS OTHER MEASURES ARE TAKEN TO PREVENT EROSION AND SLOUGHING.
2. **TEMPORARY SEEDING:** ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR MORE THAN 14 DAYS SHALL BE SEEDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING OF THOSE AREAS. SELECTION OF THE SEED MIXTURE SHALL DEPEND ON THE TIME OF YEAR IT IS APPLIED.
3. **PERMANENT SEEDING:** ESTABLISHMENT OF PERENNIAL VEGETATIVE COVER BY PLANTING SEED ON ROUGH-GRADED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A YEAR OR MORE OR WHERE PERMANENT, LONG-LIVED VEGETATIVE COVER IS NEEDED ON FINE-GRADED AREAS.
   ALL NON-PAVED AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING. STRAW OR FIBER SHALL BE USED ON ALL SEEDED SURFACES. IN ALL SEEDING OPERATIONS SEED, FERTILIZER AND LIME SHALL BE APPLIED PRIOR TO MULCHING.

MAINTENANCE

ALL EROSION AND SEDIMENT CONTROL MEASURES AT A MINIMUM, PERFORMED ONCE EVERY FOUR CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY RAIN EVENT GREATER THAN 0.25 INCHES PER 24 HOUR PERIOD. THE FOLLOWING ITEMS SHALL BE CHECKED IN PARTICULAR:

1. CHECK THE SILT FENCE BARRIER FOR UNDERMINING OR DETERIORATION OF THE FABRIC. REMOVE SEDIMENT WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER.
2. CHECK THE SEEDING AREAS TO ENSURE THAT A STAND OF GRASS IS MAINTAINED. FERTILIZE AND RESEED AS NEEDED.
3. ESTABLISH TEMPORARY FILL DIVERSIONS AT THE TOP OF FILL SLOPES, AS REQUIRED, AT THE END OF EACH WORKING DAY.

EROSION CONTROL NOTES

1. THE DESIGN BUILDER SHALL INSPECT ALL EROSION CONTROL DEVICES TWICE WEEKLY AND AFTER EVERY RAIN, ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICAL IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 7 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE CONSTRUCTION ACTIVITY WILL RESUME ON A PORTION OF THE SITE WITHIN 14 DAYS FROM WHEN ACTIVITIES CEASED (I.E. THE TOTAL TIME PERIOD THAT CONSTRUCTION ACTIVITY IS TEMPORARILY CEASED IS LESS THAN 14 DAYS), THEN STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE BY THE 7TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY CEASED.
3. ALL EROSION AND SILTATION MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING OPERATIONS.
4. ALL TEMPORARY EARTH BERMS, DIVERSIONS AND SILT DAMS ARE TO BE MULCHED AND SEEDED FOR VEGETATIVE COVER IMMEDIATELY AFTER GRADING. STRAW OR HAY MULCH IS AS NEEDED FOR STABILIZATION. MULCH AND SEED ALL SOIL STOCKPILES.
5. ALL EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
6. THE DESIGN BUILDER MUST BE NOTIFIED 48 HOURS PRIOR TO THE PRE-CONSTRUCTION CONFERENCE AND 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY LAND DISTURBING ACTIVITY.
7. THE DESIGN BUILDER IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
8. ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING A LIVE WATERCOURSE SHALL BE MET.
9. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.
10. THE DESIGN BUILDER SHALL BE RESPONSIBLE FOR MAINTAINING AN "INSPECTION REPORT THROUGHOUT THE COURSE OF THE WORK ASSOCIATED WITH THESE PLANS. THE REPORT SHALL INCLUDE, BUT NOT BE LIMITED TO, DESCRIPTIONS AND DATES OF MAJOR ACTIVITIES, WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON ANY PORTION OF THE SITE, WHEN STABILIZATION MEASURES ARE APPLIED, CONTRACTOR AND SUBCONTRACTOR CERTIFICATION SHEETS, DETAILS OF INSPECTIONS OF EROSION AND SEDIMENT CONTROL DEVICES, AND ACTIONS TAKEN TO MODIFY AND/OR IMPROVE ANY SUCH EROSION AND SEDIMENT CONTROL DEVICES. PROVIDE MAINTENANCE PLAN AND INSPECTION REPORTS TO THE ON-SITE STAFF.

EROSION CONTROL GENERAL CONSTRUCTION SEQUENCE

1. INSTALLATION OF E&S CONTROLS.
2. ESTABLISH ACTIVE WORK ZONES.
3. AMOUNT OF TIME IN EACH WORK ZONE WILL VARY DEPENDING ON THE WORK ZONE. STREAM REACHES RANGING FROM 100-150' WILL STABILIZED AT THE END OF EACH DAY.
4. STABILIZATION WILL BE PERFORMED AS WORK ZONES ARE COMPLETED.
5. REMOVAL OF REMAINING E&S CONTROLS UPON FINAL STABILIZATION.

SEQUENCE OF CONSTRUCTION

1. THE DESIGN LANDSCAPE ARCHITECT SHALL BE NOTIFIED AND GENERAL METHODS OF CONSTRUCTION SHALL BE APPROVED PRIOR TO BEGINNING ANY LAND DISTURBANCE ACTIVITIES. THE DESIGN BUILDER SHALL BE RESPONSIBLE FOR DETERMINING THE MOST EFFICIENT AND PRACTICABLE METHODS FOR CONSTRUCTION IN ACCORDANCE WITH THE PLANS. A WORKFLOW PLAN SHALL BE SUBMITTED TO THE DESIGN LANDSCAPE ARCHITECT PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. THE DESIGN BUILDER SHALL BE RESPONSIBLE FOR IDENTIFYING EXISTING UNDERGROUND AND OVERHEAD SERVICES AND UTILITIES WITHIN LIMITS OF CONSTRUCTION PRIOR TO ANY CONSTRUCTION WORK; ALL EXISTING UTILITIES SHALL BE CLEARLY IDENTIFIED AND MARKED PRIOR TO CONSTRUCTION.
3. PLACE ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO ANY LAND DISTURBANCE.
4. A TEMPORARY WETLAND CROSSING WILL BE MAINTAINED AND USED THROUGHOUT CONSTRUCTION. THE CROSSING WILL BE INSTALLED TO MANUFACTURERS SPECIFICATIONS IN ORDER TO ACCESS BOTH SIDES OF THE STREAM.
5. MATERIALS WILL BE STOCKPILED IN STAGING AREA.
6. SEEDING AND MULCHING WILL BE COMPLETED AS GRADING PROGRESSES.
7. GRADING AS SHOWN ON THE PROPOSED SITE PLAN SHALL BE CONSTRUCTED BY MOVING FROM UPSTREAM TO DOWNSTREAM. STABILIZING TO INCLUDE BUT NOT LIMITED TO SEEDING AND MATTING.
8. CONSTRUCTION IN THE STREAM SHALL BE COMPLETED ONE SPECIFIED SEGMENT OF THE PROPOSED CHANNEL AT A TIME. SPOIL MATERIAL SHALL BE STAGED OUTSIDE OF THE ACTIVE STREAM CHANNEL. PUMP ANY BASE STREAM FLOW FROM UPSTREAM OF THE ACTIVE WORK AREA TO DOWNSTREAM OF THE ACTIVE WORK AREA USING A PUMPED WATER FILTER BAG TO CONTORL EXCESS SEDIMENT. EACH SECTION SHALL BE ROUGH GRADED FIRST ALONG THE SPECIFIED SEGMENT, THEN HAVE STRUCTURES INSTALLED WHILE SIMULTANEOUSLY FINAL GRADING THE BED AND BANKS AS WORK PROCEEDS DOWNSTREAM. FILL SECTIONS SHALL BE INSTALLED IN 6" LIFTS WITH EACH LIFT BEING COMPACTED, CUT MATERIALS SHALL BE STOCKPILED BETWEEN PROPOSED AND EXISTING STREAM CHANNELS FOR EFFICIENT MOVEMENT INTO EXISTING STREAM. FINAL GRADE OF THE PROPOSED CHANNEL SHALL UTILIZE STOCKPILED BED SUBSTRATE MATERIAL FROM THE EXISTING CHANNEL WHERE POSSIBLE AS FINAL LAYER IN THE PROPOSED CHANNEL. COIR FABRIC ALONG THE BANKS SHALL BE INSTALLED USING ECOSTAKES AS PER THE DETAIL. EACH SECTION SHALL BE BROUGHT TO FINAL GRADE AND STABILIZED BEFORE CONTINUING TO NEXT SECTION TAKING SPECIAL CARE TO HAVE THE SITE STABILIZED AT THE END OF EACH DAY. AS FINAL GRADE AND STABILIZATION OF THE BANKS PROGRESS, THE BANKS SHALL BE SEEDED AND THE 700 GRAM COIR FABRIC (OR APPROVED EQUAL) SHALL BE INSTALLED OVERTOP THE NEWLY SEEDED BANKS IN ACCORDANCE WITH THE TYPICAL CROSS-SECTION DETAILS.
9. UPON COMPLETION OF 70% STABILIZATION, CLEAN UP ALL TEMPORARY EROSION CONTROL MEASURES ON SITE.

STRUCTURAL SOILS NOTES

1. **EXCAVATION**
   - CONSISTS OF REMOVAL OF SOIL MATERIALS FROM A PARTICULAR LOCATION. UNAUTHORIZED EXCAVATION CONSISTS OF REMOVAL OF MATERIALS BEYOND INDICATED SUBGRADE ELEVATIONS OR DIMENSIONS WITHOUT SPECIFIC DIRECTION FROM THE OWNER.
   - DEWATERING: PREVENT SURFACE AND SUBSURFACE WATER FROM FLOWING INTO EXCAVATIONS. IF WATER ACCUMULATES IN EXCAVATIONS OR OTHER AREAS THAT COULD BECOME DELETERIOUSLY AFFECTED, REMOVE WATER BY AN APPROVED DEWATERING SYSTEM. DEWATERING SHALL CONTINUE UNTIL ACCEPTANCE OF THE WORK.

2. **SOIL MOISTURE CONTROL**
   - FILL MATERIAL SHALL HAVE A MOISTURE CONTENT THAT IS CONSISTENT WITH GOOD COMPACTION.
   - DO NOT PLACE BACKFILL OR FILL SOIL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
   - THE CONTRACTOR SHALL SCARIFY AND AIR DRY OTHERWISE SATISFACTORY SOIL MATERIAL THAT EXCEEDS OPTIMUM MOISTURE CONTENT.
   - STOCKPILE OR SPREAD SOIL MATERIAL THAT HAS BEEN REMOVED BECAUSE IT IS TOO WET TO PERMIT COMPACTION, ASSIST DRYING BY DISCING, HARROWING, OR PULVERIZING UNTIL MOISTURE CONTENT IS REDUCED TO A SATISFACTORY VALUE.

TOPSOIL NOTES

1. TOPSOIL SHALL CONSIST OF STOCKPILED MATERIAL OBTAINED FROM AREAS WITHIN THE GRADING LIMITS OF THE SITE. VERIFY SUITABILITY OF STOCKPILED SOIL TO PRODUCE TOPSOIL, WHICH SHALL BE FERTILE, FRIABLE, REASONABLY FREE FROM CLAY, LUMPS, COARSE SANDS, STONES, PLANTS, ROOTS, STICKS AND OTHER EXTRANEOUS MATERIALS HARMFUL TO PLANT GROWTH.

No.	Revision/Issue	Date

Legend

Title
SHERWOOD BANK STABILIZATION PROJECT

Project
GENERAL NOTES

Client
MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
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Scale	Drawn By	Sheet
NO SCALE	NCG	2
Date	Checked By	
JAN. 2022	NCG	
Project ID	Approved By	
SHERWOOD	RLW	

MAP UNIT: CH - CHAGRIN SILT LOAM, 0 TO 3 PERCENT SLOPES, OCCASIONALLY FLOODED

COMPONENT: CHAGRIN (85%) HYDROLOGIC SOIL GROUP B

THE CHAGRIN COMPONENT MAKES UP 85 PERCENT OF THE MAP UNIT. SLOPES ARE 0 TO 3 PERCENT. THIS COMPONENT IS ON FLOOD PLAINS ON VALLEYS. THE PARENT MATERIAL CONSISTS OF FINE-LOAMY ALLUVIUM DERIVED FROM SEDIMENTARY ROCK. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS HIGH. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS OCCASIONALLY FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 2W. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

COMPONENT: HOLLY (5%) HYDROLOGIC SOIL GROUP B

SOIL DESCRIPTIONS FOR MINOR COMPONENTS ARE NOT INCLUDED IN THIS REPORT.

MAP UNIT: GSF–GILPIN-PEABODY SILT LOAMS, 35 TO 70 PERCENT SLOPES, VERY STONY

COMPONENT: GILPIN (50%) HYDROLOGIC SOIL GROUP C

THE GILPIN COMPONENT MAKES UP 50 PERCENT OF THE MAP UNIT. SLOPES ARE 35 TO 70 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM SANDSTONE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 25 TO 37 INCHES (DEPTH FROM THE MINERAL SURFACE IS 24 TO 35 INCHES). THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 69 PERCENT. BELOW THIS THIN ORGANIC HORIZON THE ORGANIC MATTER CONTENT IS ABOUT 4 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 7E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

COMPONENT: PEABODY (30%) HYDROLOGIC SOIL GROUP C

THE PEABODY COMPONENT MAKES UP 30 PERCENT OF THE MAP UNIT. SLOPES ARE 35 TO 70 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM SHALE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 20 TO 40 INCHES (DEPTH FROM THE MINERAL SURFACE IS 19 TO 39 INCHES). THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS LOW. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS MODERATE. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 69 PERCENT. BELOW THIS THIN ORGANIC HORIZON THE ORGANIC MATTER CONTENT IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 7E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: GUD–GILPIN-UPSHUR SILT LOAMS, 15 TO 25 PERCENT SLOPES

COMPONENT: GILPIN (50%) HYDROLOGIC SOIL GROUP C

THE GILPIN COMPONENT MAKES UP 50 PERCENT OF THE MAP UNIT. SLOPES ARE 15 TO 25 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM SANDSTONE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 25 TO 37 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 4 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 4E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

COMPONENT: UPSHUR (30%) HYDROLOGIC SOIL GROUP C

THE UPSHUR COMPONENT MAKES UP 30 PERCENT OF THE MAP UNIT. SLOPES ARE 15 TO 25 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM CLAYEY SHALE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 40 TO 59 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS LOW. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS HIGH. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 6E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: ME–MELVIN SILT LOAM, 0 TO 3 PERCENT SLOPES, RARELY FLOODED

COMPONENT: MELVIN (85%) HYDROLOGIC SOIL GROUP B/D

THE MELVIN COMPONENT MAKES UP 85 PERCENT OF THE MAP UNIT. SLOPES ARE 0 TO 3 PERCENT. THIS COMPONENT IS ON FLOOD PLAINS ON VALLEYS. THE PARENT MATERIAL CONSISTS OF FINE-SILTY ALLUVIUM DERIVED FROM INTERBEDDED SEDIMENTARY ROCK. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS POORLY DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS VERY HIGH. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS RARELY FLOODED. IT IS NOT PONDED. A SEASONAL ZONE OF WATER SATURATION IS AT 0 INCHES DURING JANUARY, FEBRUARY, MARCH, APRIL, MAY, NOVEMBER, DECEMBER. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 3W. THIS SOIL MEETS HYDRIC CRITERIA.

MAP UNIT: UD–UDORTHENTS, SMOOTHED

COMPONENT: UDORTHENTS (90%) HYDROLOGIC SOIL GROUP D

SOIL DESCRIPTIONS ARE NOT AVAILABLE FOR MISCELLANEOUS AREAS. UDORTHENTS DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: SEB–SENSABAUGH SILT LOAM, 3 TO 8 PERCENT SLOPES, RARELY FLOODED

COMPONENT: SENSABAUGH (80%) HYDROLOGIC SOIL GROUP A

THE SENSABAUGH COMPONENT MAKES UP 80 PERCENT OF THE MAP UNIT. SLOPES ARE 3 TO 8 PERCENT. THIS COMPONENT IS ON FLOOD PLAINS ON VALLEYS. THE PARENT MATERIAL CONSISTS OF FINE-LOAMY ALLUVIUM DERIVED FROM SEDIMENTARY ROCK. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS MODERATE. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS RARELY FLOODED. IT IS NOT PONDED. A SEASONAL ZONE OF WATER SATURATION IS AT 48 INCHES DURING JANUARY, FEBRUARY, MARCH, APRIL. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 2E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: VSE–VANDALIA SILT LOAM, 15 TO 35 PERCENT SLOPES, VERY STONY

COMPONENT: VANDALIA (80%) HYDROLOGIC SOIL GROUP C

THE VANDALIA COMPONENT MAKES UP 80 PERCENT OF THE MAP UNIT. SLOPES ARE 15 TO 35 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF COLLUVIUM DERIVED FROM SANDSTONE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY LOW. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS HIGH. SHRINK-SWELL POTENTIAL IS MODERATE. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 7S. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: W–WATER

COMPONENT: WATER (100%)

THIS MISCELLANEOUS AREA IS NOT A MAJOR SOIL COMPONENT. THE AREA DOES NOT MEET HYDRIC CRITERIA.

No.	Revision/Issue	Date

Legend

Title
SOILS MAP

Title
SHERWOOD BANK STABILIZATION PROJECT

Project
MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490 Toll Free 1-866-213-2666

Mapping Reference
AERIAL PHOTOGRAPHY PERFORMED BY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC. (UNKNOWN DATE), AND SUPPLEMENTED WITH DODDRIDGE COUNTY NAIP DIGITAL ORTHOPHOTOS PUBLISHED IN 2019 BY THE USDA (DATUM NAD83 WVN). SOILS DATA FROM USDA NRSC WEBSOIL SURVEY.

Graphic Scale
100 50 0 100 200

Scale	Drawn By	Sheet
1" = 200'	NCG	3
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	

WATERSHED MAP

PROJECT STREAM CHANNEL DETAIL MAP (NO SCALE)

SHERWOOD STREAM BANK STABILIZATION PROJECT WATERSHED ANALYSIS

PROJECT WATERSHED SUMMARY

TOTAL AREA (SQ. MI.)	31.54 SQ.MI.
TOTAL AREA (ACRES)	20,188.05 ACRES
AVERAGE ANNUAL RAINFALL	40 TO 50 INCHES
100 YR FLOODPLAIN AREA	0.60 SQ.MI.
PREDOMINATE LAND USE	UNDEVELOPED / WOODED

PROJECT REGIONAL CURVE SUMMARY

BUCKEYE CREEK AT THE DOWNSTREAM END OF PROJECT

BANKFULL DISCHARGE	1139.06 CFS
BANKFULL AREA	240.24 SQ.FT.
BANKFULL WIDTH	75.92 FEET
BANKFULL DEPTH	3.14 FEET

GENERAL SOIL TYPES WITHIN THE WATERSHED

- ACID LOAMS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP MODERATELY WELL AND WELL DRAINED SOILS WITH LOW NATURAL FERTILITY. MODERATE TO HIGH SOIL MOISTURE HOLDING CAPACITY AND PH IS NORMALLY LESS THAN 5.3.
- ALLUVIAL SEDIMENTS THAT ARE VERY DEEP, WELL DRAINED, AND HAVE FORMED IN RECENT ALLUVIAL SEDIMENTS ALONG MAJOR STREAMS. THESE SOILS HAVE A MODERATE PERMEABILITY (0.6 TO 2.0 INCHES PER HOUR). THEY GENERALLY HAVE A MEDIUM SOIL TEXTURE IN THE SURFACE AND SUBSOIL. BEDROCK IS GENERALLY AT DEPTHS GREATER THAN 5 FEET. THESE SOILS ARE GENERALLY SUBJECT TO OCCASIONAL FLOODING. NATURAL FERTILITY IS HIGH AND AVAILABLE WATER CAPACITY IS HIGH.
- DOMINANTLY CLAY TO LOAM SOILS WITH OR WITHOUT ROCK MATERIAL RANGING FROM A FEW GRAVELS TO A MASSIVE BEDROCK ESCARPMENT.
- FERTILE LOAMS AND HILLS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP MODERATELY WELL AND WELL DRAINED SOILS WITH MODERATE NATURAL FERTILITY. MODERATE SOIL MOISTURE HOLDING CAPACITY AND PH IS NORMALLY GREATER THAN 5.3.
- MOIST LOAMS THAT ARE DEEP AND VERY DEEP, WELL DRAINED SOILS WITH HIGH NATURAL FERTILITY. HIGH SOIL MOISTURE HOLDING CAPACITY WITH PH GREATER THAN 5.3.
- UDORTHENTS THAT ARE NOT SUITED TO CULTIVATED CROPS OR HAY, BUT HAVE A LIMITED SUITABILITY FOR PASTURE ON SOME AREAS. THEY ARE BETTER SUITED TO WOODLAND OR WILDLIFE. MOST UDORTHENTS AREAS OF DISTURBED SOIL MATERIAL ARE TOO VARIABLE TO ASSIGN ANY SPECIFIC SOIL PROPERTIES.
- URBAN LAND AND DISTURBED SOIL MATERIAL USUALLY ASSOCIATED WITH DWELLINGS AND ROADS LOCATED IN THE FLOOD PLAIN AND AT THE BASE OF THE HILL ON THE FOOT SLOPE, THESE AREAS ARE TOO VARIABLE TO ASSIGN ANY SPECIFIC VALUES TO THE ASSOCIATED DISTURBED SOILS.
- VERY ROCKY ACID SOILS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP WELL DRAINED SOILS WITH LOW NATURAL FERTILITY. MODERATE TO HIGH SOIL MOISTURE HOLDING CAPACITY WITH PH BELOW 5.3.
- VERY ROCKY LOMY SOILS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP WELL DRAINED SOILS WITH HIGH NATURAL FERTILITY. MODERATE TO HIGH SOIL MOISTURE HOLDING CAPACITY WITH PH ABOVE 5.3. SLOPE RANGES FROM 25 TO 45 PERCENT. SURFACE STONES RANGE FROM 0.1 TO 50%.

PROJECT AREA GENERAL LAND USE SUMMARY

DESCRIPTION	AREA	PERCENT
OPEN WATER (STREAM CHANNEL)	1.75 AC.	4.01%
GRASSLAND AND MISC. HERBACEOUS	12.92 AC.	29.63%
PASTURE - HAY	13.55 AC.	31.08%
ROADS AND GRAVEL	9.46 AC.	21.70%
MISC. DEVELOPED (LOW INTENSITY)	3.46 AC.	7.94%
WOODED, SCRUB - SHRUB	2.46 AC.	5.64%
TOTAL	43.60 AC.	100.00%

No.	Revision/Issue	Date

Legend

Title: WATERSHED MAP

Project: SHERWOOD BANK STABILIZATION PROJECT

Client: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3430, Toll Free 1-866-212-1866

Mapping Reference: BASE MAPPING FROM USGS 2016 SERIES 7.5 MIN. QUADRANGLES (BIG ISAAC WV, NEW MILTON WV, SALEM WV, AND SMITHBURG WV). DETAIL MAP IMAGERY PROVIDED BY CEC, INC. (9/17/21).

Graphic Scale: 4000 2000 0 4000 8000

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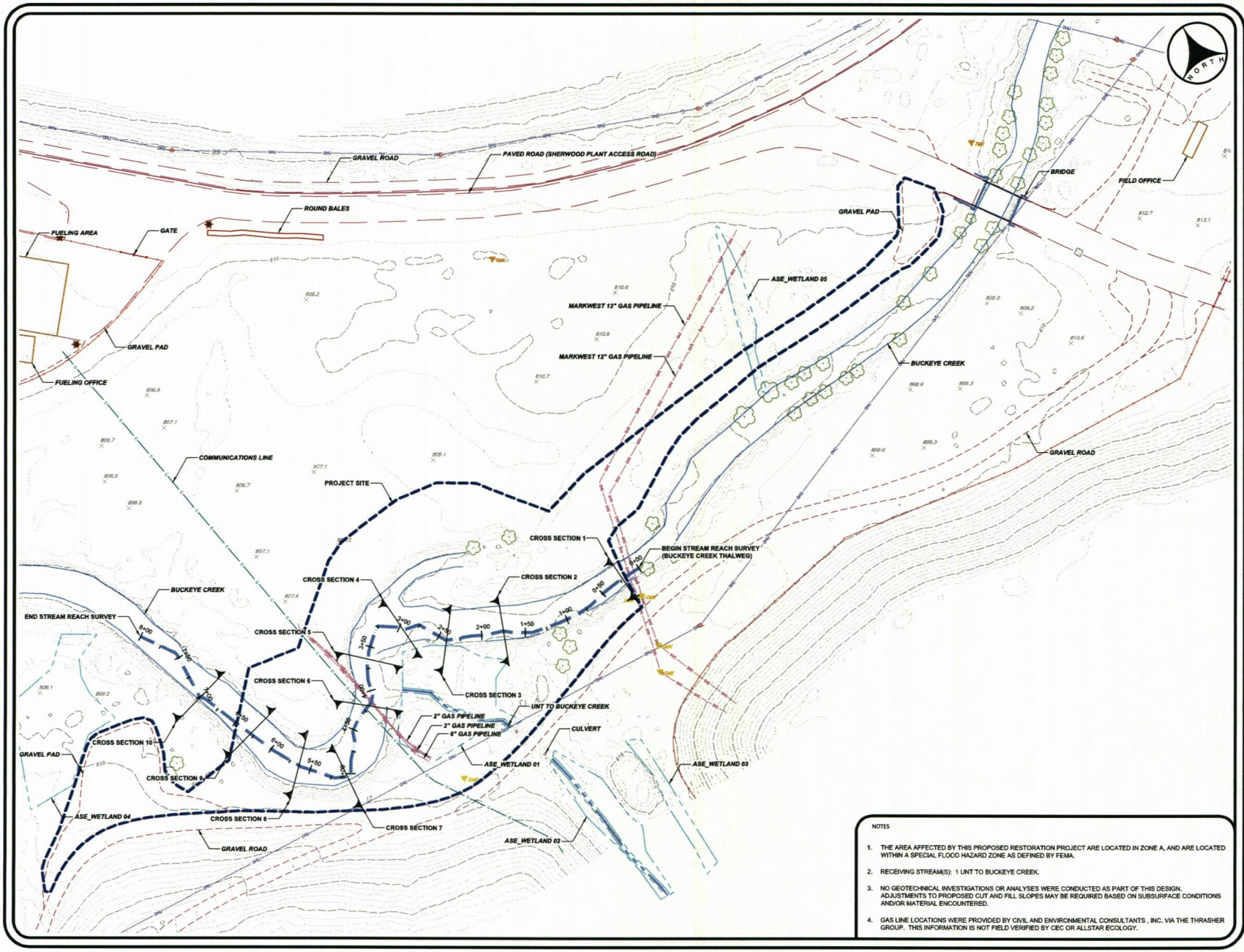
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



NOTES

1. THE AREA AFFECTED BY THIS PROPOSED RESTORATION PROJECT ARE LOCATED IN ZONE A, AND ARE LOCATED WITHIN A SPECIAL FLOOD HAZARD ZONE AS DEFINED BY FEMA.
2. RECEIVING STREAM(S): 1 UNT TO BUCKEYE CREEK.
3. NO GEOTECHNICAL INVESTIGATIONS OR ANALYSES WERE CONDUCTED AS PART OF THIS DESIGN. ADJUSTMENTS TO PROPOSED CUT AND FILL SLOPES MAY BE REQUIRED BASED ON SUBSURFACE CONDITIONS AND/OR MATERIAL ENCOUNTERED.
4. GAS LINE LOCATIONS WERE PROVIDED BY CIVIL AND ENVIRONMENTAL CONSULTANTS , INC. VIA THE THRASHER GROUP. THIS INFORMATION IS NOT FIELD VERIFIED BY CEC OR ALLSTAR ECOLOGY.

No.	Revision/Issue	Date

Legend

- EX. CONTOUR MAJOR
- EX. CONTOUR MINOR
- EX. SPOT ELEVATION
- EX. TREELINE
- EX. TREE
- EX. STRUCTURE
- EX. MISC. STRUCTURE
- EX. STORAGE TANK
- EX. FENCE
- EX. GATE
- EX. UTILITY POLE
- EX. CULVERT
- EX. GAS PIPELINE
- EX. OVERHEAD UTILITY
- EX. COMMUNICATION LINE
- EX. GAS MARKER
- EX. TELEPHONE MARKER
- EX. LIGHT POLE
- EX. GUIDE RAIL
- EX. PAVED ROAD
- EX. GRAVEL ROAD / PAD
- DELINEATED WETLAND
- DELINEATED STREAM
- PROJECT AREA

Title

EXISTING SITE PLAN

Project

SHERWOOD BANK STABILIZATION PROJECT

Client

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1592 Meadowvale Road
Fairmont, WV 26554
304-816-3486 Toll Free - 866-213-2645

Mapping Reference

TOPOGRAPHIC SURVEY PROVIDED TO ALLSTAR ECOLOGY, LLC BY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC. (UNKNOWN DATE), AND SUPPLEMENTED WITH ADDITIONAL FIELD DATA BY ALLSTAR ECOLOGY (NOVEMBER 17 AND 19, 2021).

Graphic Scale

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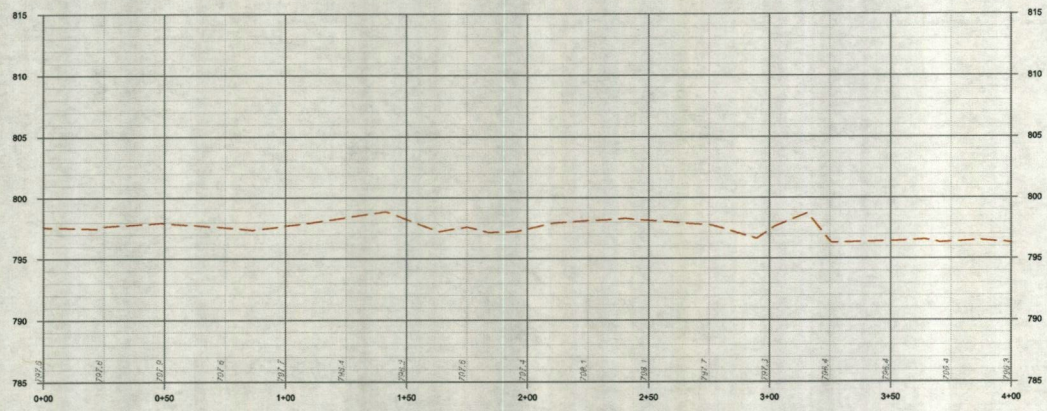
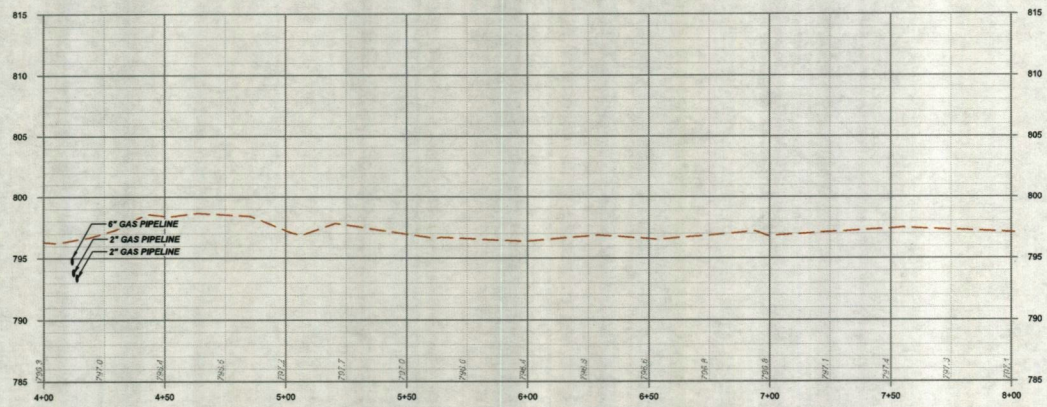
1" = 200'	NCG	5
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



BUCKEYE CREEK THALWEG PROFILE STATION 0+00 TO 4+00



BUCKEYE CREEK THALWEG PROFILE STATION 4+00 TO 8+00

No.	Revision/Issue	Date

Legend

Title
EXISTING STREAM PROFILE

Title
SHERWOOD BANK
STABILIZATION PROJECT

Project
MARKWEST LIBERTY MIDSTREAM
& RESOURCES, LLC

Prepared By
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1562 Meadowdale Road
Fairmont, WV 26554
304-816-3080 Toll Free 1-855-203-7805

Graphic Scale
VERTICAL: 20 10 5 0
HORIZONTAL: 0 25 50 100

Scale	Drawn By	Sheet
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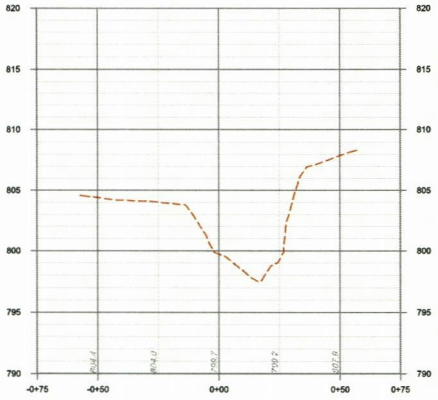
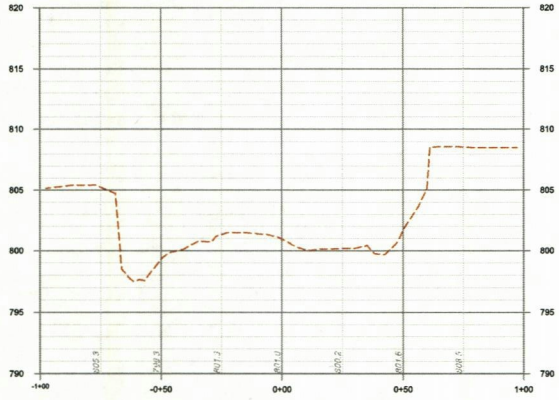
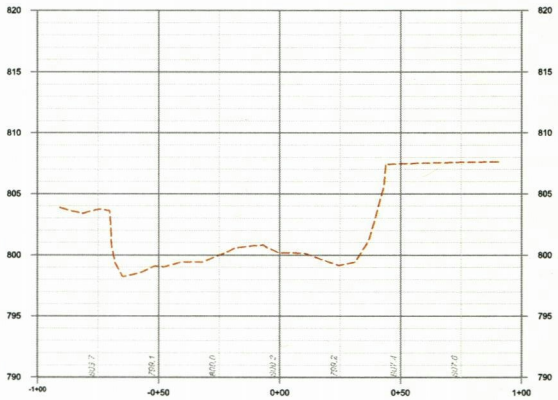
Date	Checked By	
JAN. 2022	NCG	
Project ID	Approved By	
SHERWOOD	RLW	



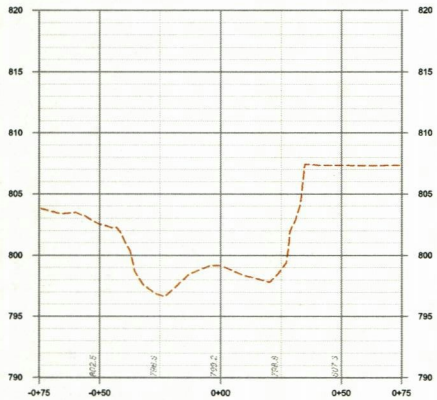
BUCKEYE CREEK CROSS SECTION 1 STA. 0+29.59



BUCKEYE CREEK CROSS SECTION 2 STA. 1+75.86



BUCKEYE CREEK CROSS SECTION 3 STA. 2+36.77



BUCKEYE CREEK CROSS SECTION 4 STA. 2+92.29

No.	Revision/Issue	Date

Legend

Title
EXISTING STREAM
CROSS SECTIONS

Title
SHERWOOD BANK
STABILIZATION PROJECT

Project
MARKWEST LIBERTY MIDSTREAM
& RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1580 Meadowside Road
Fairmont, WV 26554
304-816-3498 Toll Free 1-866-213-3498

Graphic Scale

VERTICAL: 20 10 5 0

HORIZONTAL: 0 25 50 100

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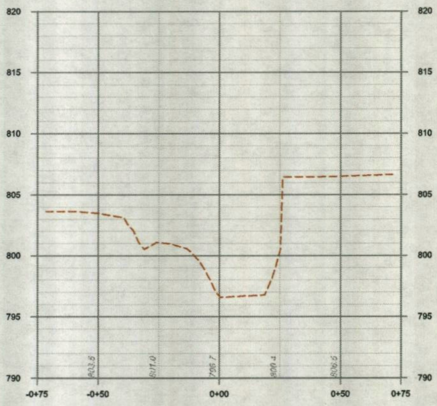
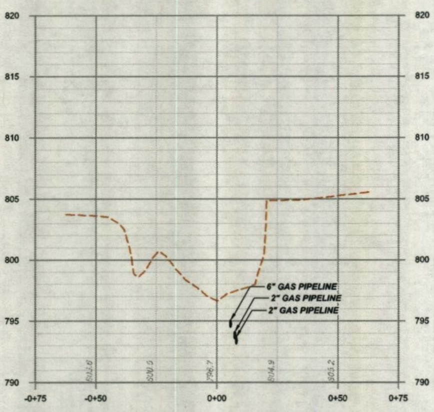
Date JAN. 2022	Checked By NCG	
Project ID SHERWOOD	Approved By RLW	



BUCKEYE CREEK CROSS SECTION 5 STA. 3+55.00



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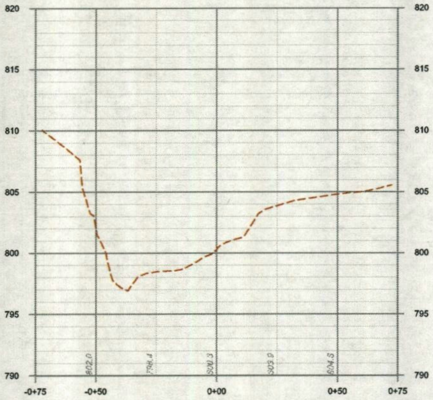

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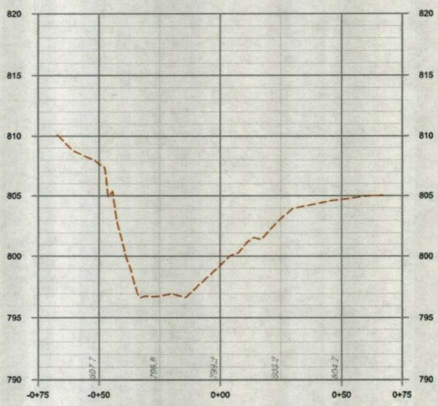
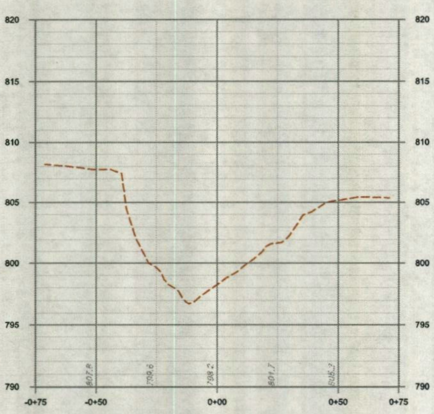
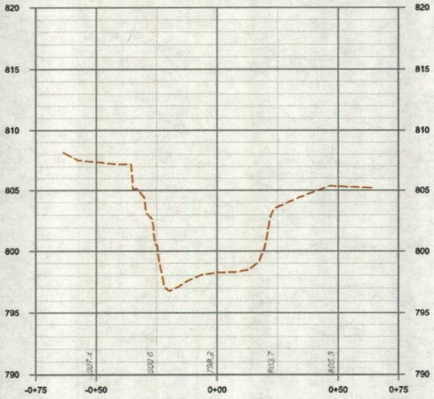


BUCKEYE CREEK CROSS SECTION 8 STA. 5+29.66



BUCKEYE CREEK CROSS SECTION 9 STA. 5+94.25



BUCKEYE CREEK CROSS SECTION 10 STA. 6+64.20

No.	Revision/Issue	Date

Legend

Title: EXISTING BANK CROSS SECTIONS

Title: SHERWOOD STREAM STABILIZATION PROJECT

Project: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

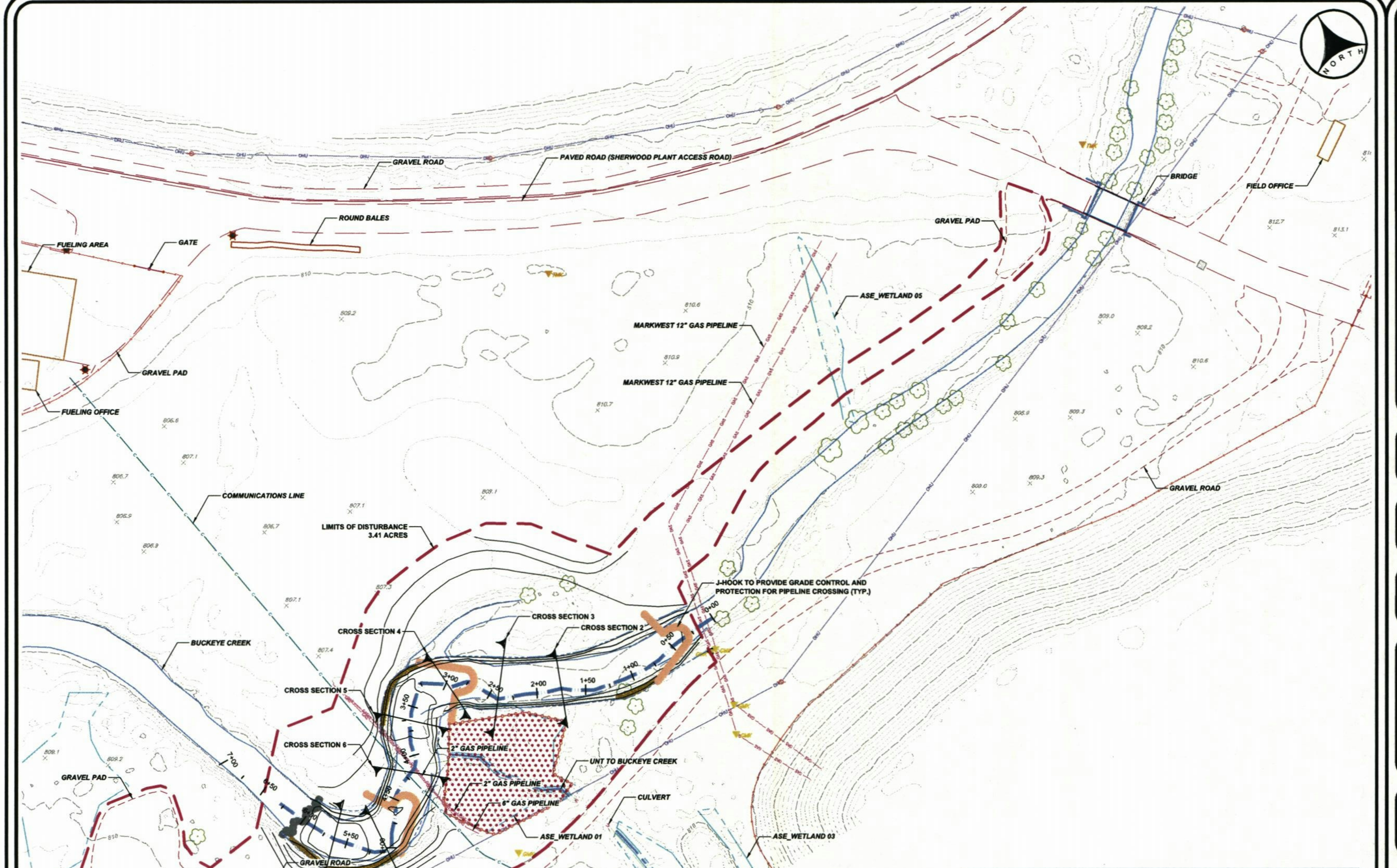
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS

Graphic Scale

VERTICAL: 20 10 5 0

HORIZONTAL: 0 25 50 100

Scale	Drawn By	Sheet
H: 1"=50' V: 1"=10'	NCG	8
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



NOTES

1. THE AREA AFFECTED BY THIS PROPOSED RESTORATION PROJECT ARE LOCATED IN ZONE A, AND ARE LOCATED WITHIN A SPECIAL FLOOD HAZARD ZONE AS DEFINED BY FEMA.
2. RECEIVING STREAM(S): 1 UNT TO BUCKEYE CREEK.
3. NO GEOTECHNICAL INVESTIGATIONS OR ANALYSES WERE CONDUCTED AS PART OF THIS DESIGN. ADJUSTMENTS TO PROPOSED CUT AND FILL SLOPES MAY BE REQUIRED BASED ON SUBSURFACE CONDITIONS AND/OR MATERIAL ENCOUNTERED.
4. GAS LINE LOCATIONS WERE PROVIDED BY CIVIL AND ENVIRONMENTAL CONSULTANTS , INC. VIA THE THRASHER GROUP. THIS INFORMATION IS NOT FIELD VERIFIED BY CEC OR ALLSTAR ECOLOGY.
5. TRANSPLANT AND PRESERVE WOODY PLANT MATERIAL IN WETLAND AREAS FOR REPLANTING AFTER GRADING HAS BEEN COMPLETED.

No.	Revision/Issue	Date

Legend

- EX. CONTOUR MAJOR
- EX. CONTOUR MINOR
- EX. SPOT ELEVATION
- EX. TREELINE
- EX. TREE
- EX. STRUCTURE
- EX. FENCE
- EX. GATE
- EX. UTILITY POLE
- EX. CULVERT
- EX. GAS PIPELINE
- EX. OVERHEAD UTILITY
- EX. COMMUNICATION LINE
- EX. GAS MARKER
- EX. TELEPHONE MARKER
- EX. LIGHT POLE
- EX. GUIDE RAIL
- EX. PAVED ROAD
- EX. GRAVEL ROAD / PAD
- DELINEATED WETLAND
- DELINEATED STREAM
- LIMITS OF DISTURBANCE
- MINIMAL DISTURBANCE AREA
- EXCLUSION FENCING
- ROCK J-HOOK
- ROCK SILL WITH CONVERGING ROCK CLUSTERS
- TOE WOOD

Title

PROPOSED SITE PLAN

Title

SHERWOOD BANK STABILIZATION PROJECT

Project

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490 Toll Free 1-866-213-2666

Mapping Reference

TOPOGRAPHIC SURVEY PROVIDED TO ALLSTAR ECOLOGY, LLC BY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC. (UNKNOWN DATE), AND SUPPLEMENTED WITH ADDITIONAL FIELD DATA BY ALLSTAR ECOLOGY (NOVEMBER 17 AND 19, 2021).

Graphic Scale

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Scale	Drawn By	Sheet
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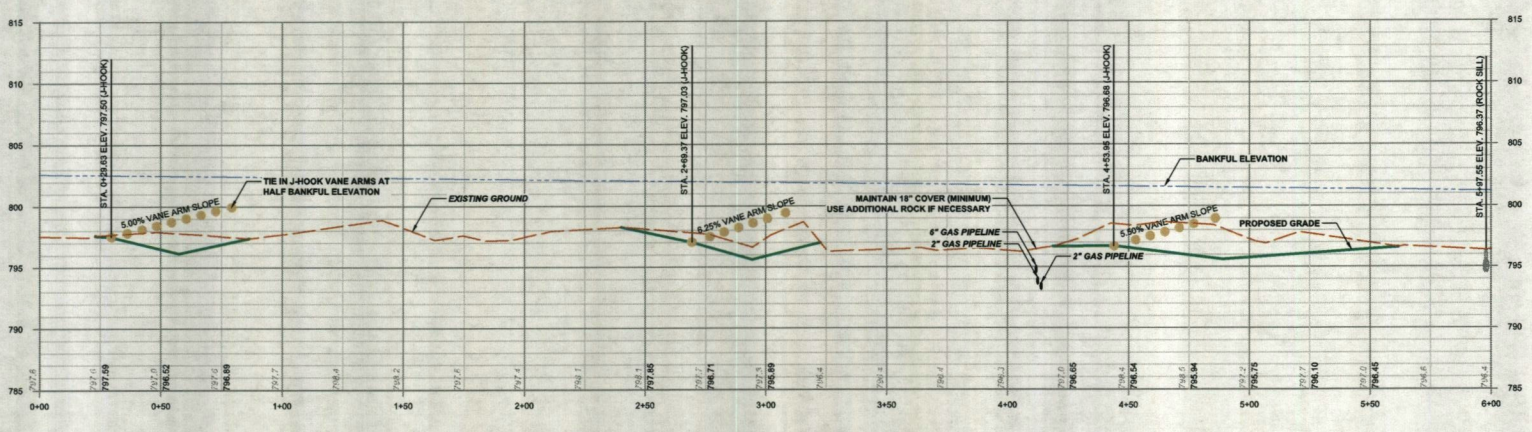
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



BUCKEYE CREEK PROPOSED THALWEG PROFILE

No.	Revision/Issue	Date
	Legend	

Title: PROPOSED STREAM PROFILE

Title: SHERWOOD BANK STABILIZATION PROJECT

Project: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By:

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3408 Toll Free 1-866-213-3808

Graphic Scale

VERTICAL: 20, 10, 5, 0

HORIZONTAL: 0, 25, 50, 100

Scale	Drawn By	Sheet
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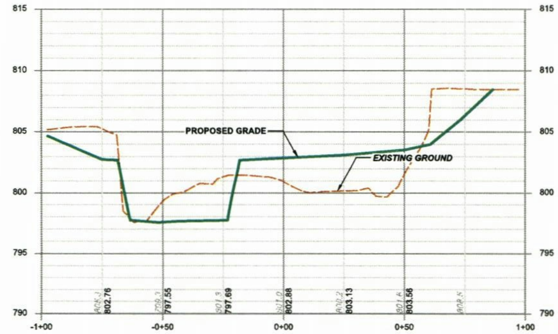
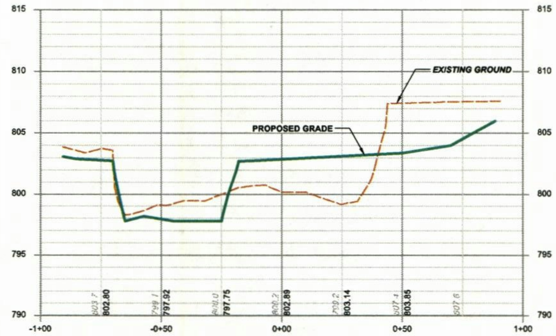
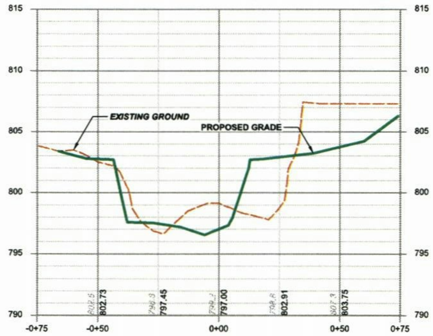
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



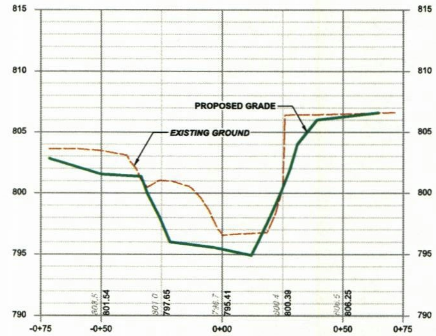
BUCKEYE CREEK CROSS SECTION 2 STA. 1+75.86



BUCKEYE CREEK CROSS SECTION 3 STA. 2+36.77



BUCKEYE CREEK CROSS SECTION 4 STA. 2+92.29



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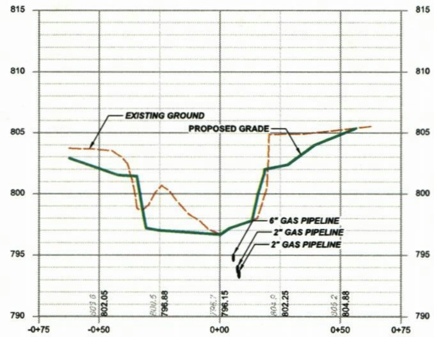

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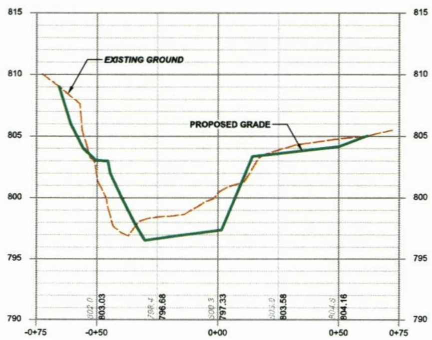

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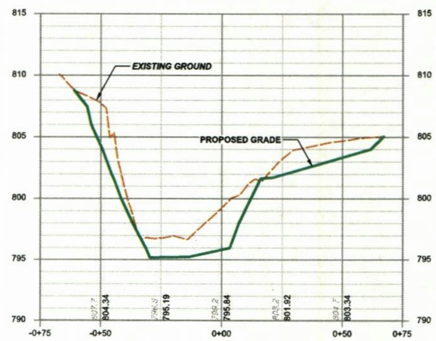

BUCKEYE CREEK CROSS SECTION 8 STA. 5+29.66

No.	Revision/Issue	Date

Legend

Title: PROPOSED CROSS SECTIONS

Title: SHERWOOD BANK STABILIZATION PROJECT

Project: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS

Graphic Scale
VERTICAL: 20 10 5 0
HORIZONTAL: 0 25 50 100

Scale	Drawn By	Sheet
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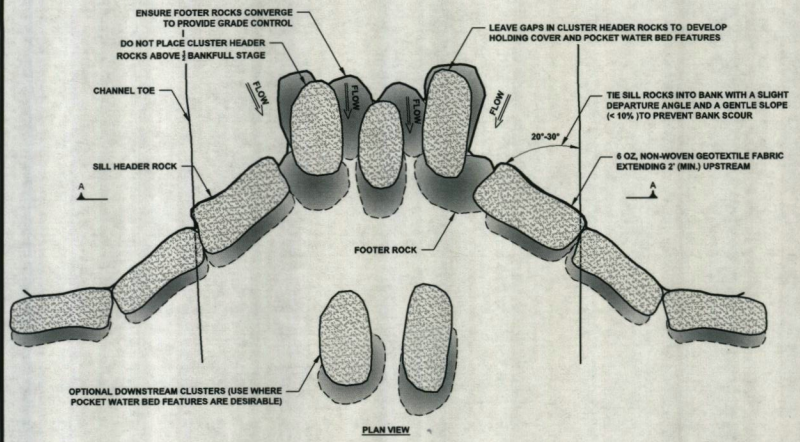
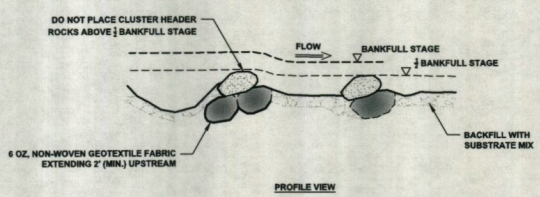
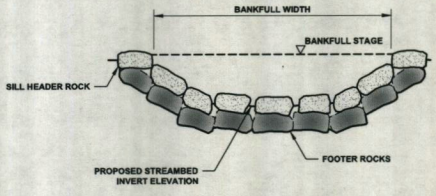
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



PLAN VIEW



PROFILE VIEW



SECTION A

ROCK SILL WITH CONVERGING ROCK CLUSTERS

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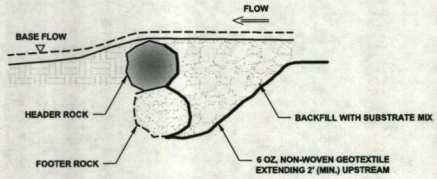

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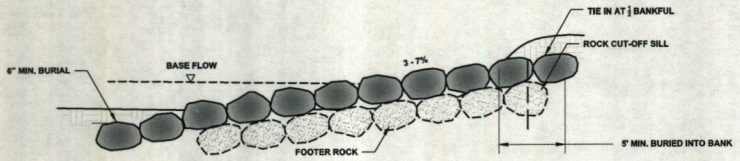

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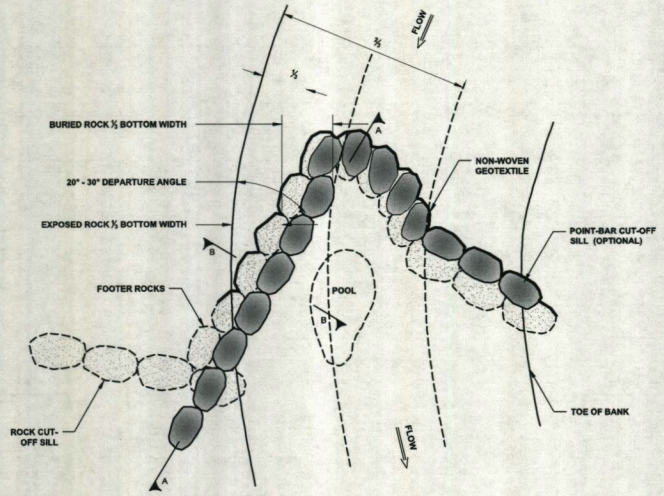

PLAN VIEW

ROCK J-HOOK

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No.	Revision/Issue	Date

Legend

Title: DETAILS

Project: SHERWOOD BANK STABILIZATION PROJECT

Client: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490, Toll Free 1-866-213-2566

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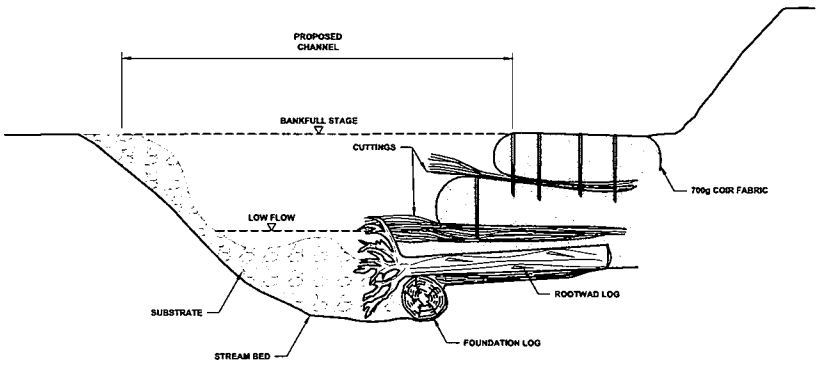
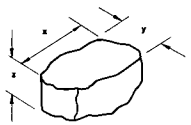
Date: JAN, 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



TOE WOOD STRUCTURE

NO SCALE



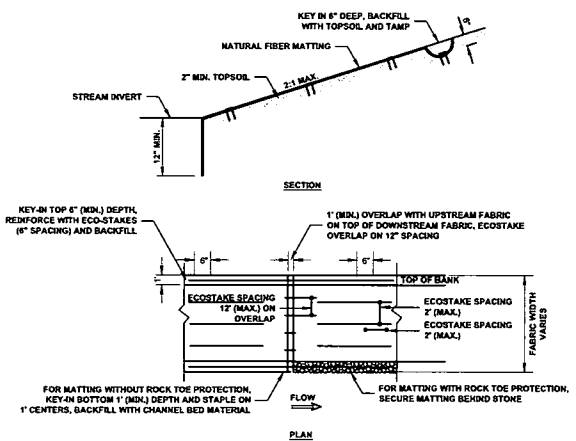
NOTES:

1. SUITABLE ROCKS WILL BE SIZED ACCORDING TO THREE PRIMARY DIMENSIONS (+/- 2").
2. y DIMENSION SHOULD ALWAYS BE AT LEAST 30% LARGER THAN THE x DIMENSION

x (LONGEST DIMENSION) = 4' MINIMUM
y (INTERMEDIATE DIMENSION) = 4' MINIMUM
z (SHORTEST DIMENSION) 3' MINIMUM

SUITABLE ROCK SIZE

NO SCALE

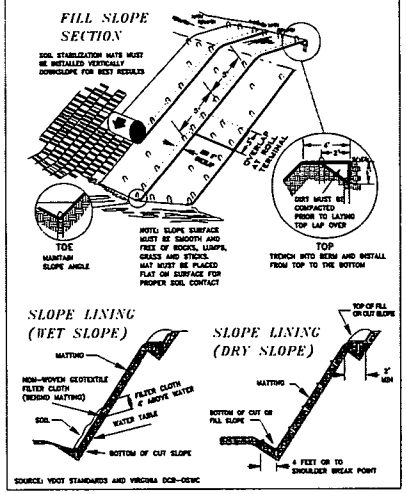


BANK STABILIZATION WITH NATURAL FIBER MATTING

NO SCALE

FIGURE 3.13.2

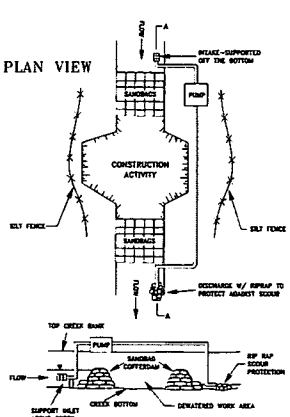
ROLLED EROSION CONTROL PRODUCTS



3.13-13

FIGURE

PUMP AROUND (IF NEEDED)



3.21-12

No. | Revision/Issue | Date

Legend

Title: DETAILS

Project: SHERWOOD BANK STABILIZATION PROJECT

Client: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By: ALLSTAR ECOLOGY LLC

Scale	Drawn By	Sheet
NO SCALE	NCG	13
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	

HYDRAULIC TECHNICAL REPORT

SHERWOOD BANK STABILIZATION PROJECT
DODDRIDGE COUNTY, WEST VIRGINIA

Prepared For:

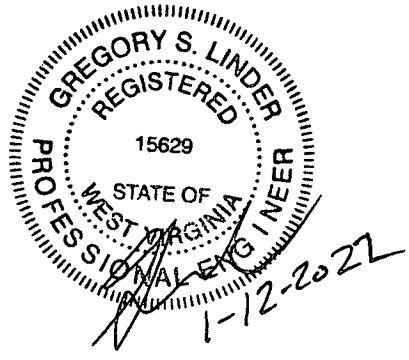
MARKWEST MIDSTREAM AND RESOURCES L.L.C.
4600 J. BARRY COURT, SUITE 500
CANONSBURG, PENNSYLVANIA 15317

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
120 GENESIS BOULEVARD
BRIDGEPORT, WEST VIRGINIA 26330

CEC Project 317-437

JANUARY 2022



Civil & Environmental Consultants, Inc.

TABLE OF CONTENTS

APPENDICES

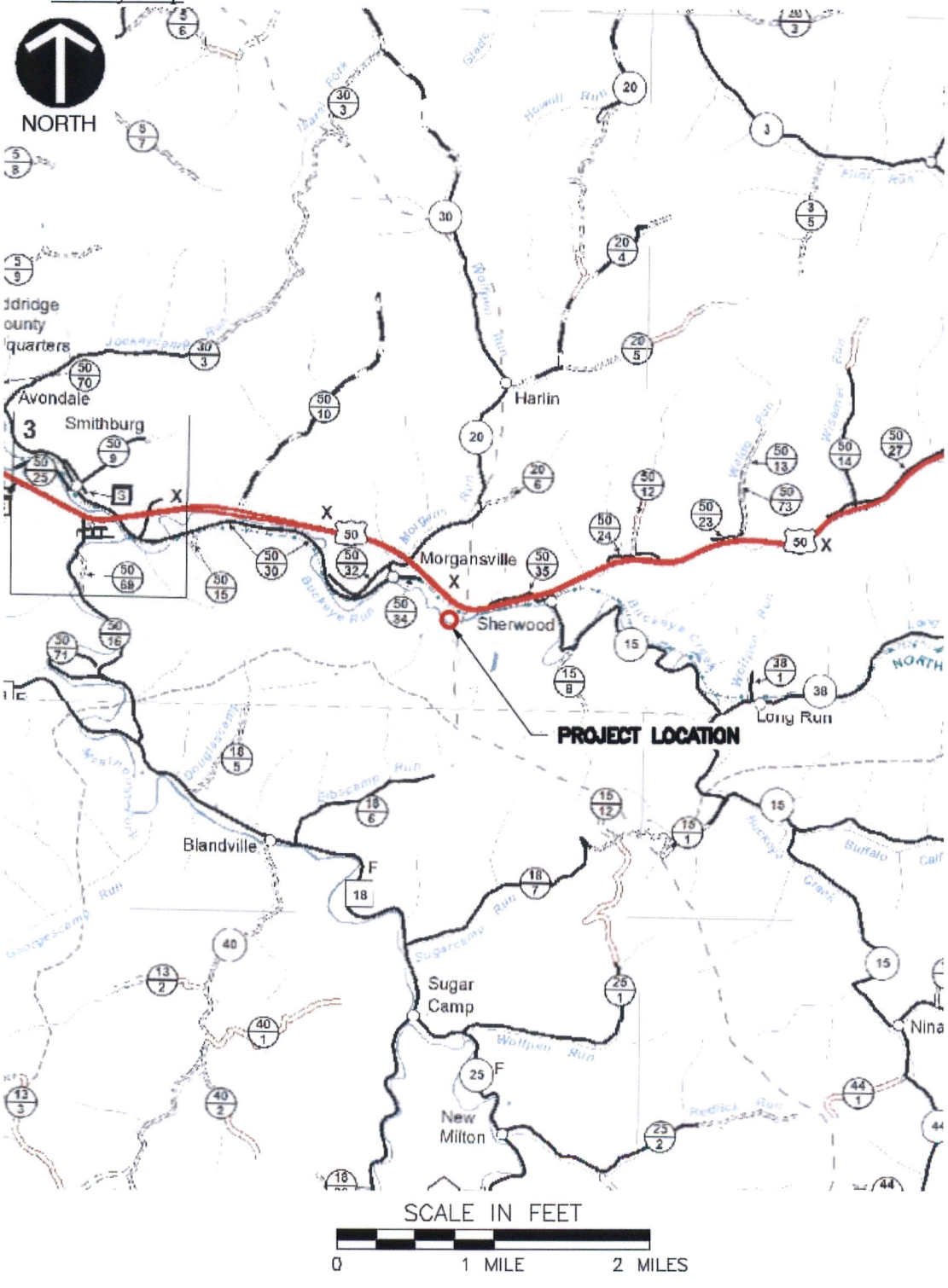
I. PROJECT DESCRIPTION

A. Narrative

The Sherwood Bank Stabilization Project is located approximately 5.9 miles east of West Union, Doddridge County, West Virginia. The purpose of this project is to stabilize 600 feet of Buckeye Creek stream bed and its banks near a farm field. The proposed construction will utilize natural channel design techniques including Rock J-Hooks for pipeline protection, Toe wood structures for streambank protection, and converging rock clusters for downstream grade control. According to the Federal Emergency Management Agency (FEMA), the site is located within the Buckeye Creek Zone AE Flood Hazard Area as designated on the Doddridge County Flood Insurance Rate Map (FIRM) Panel 54017C0140C with an effective date of October 4, 2011. The purpose of this hydraulic study is to determine the potential for adverse effects caused by the proposed stream channel bed and banks stabilization activities to the water surface elevation (WSEL) and floodplain of Buckeye Creek associated with the base flood storm event.

B. Location Maps

1. County Map



2. USGS Topographic Map

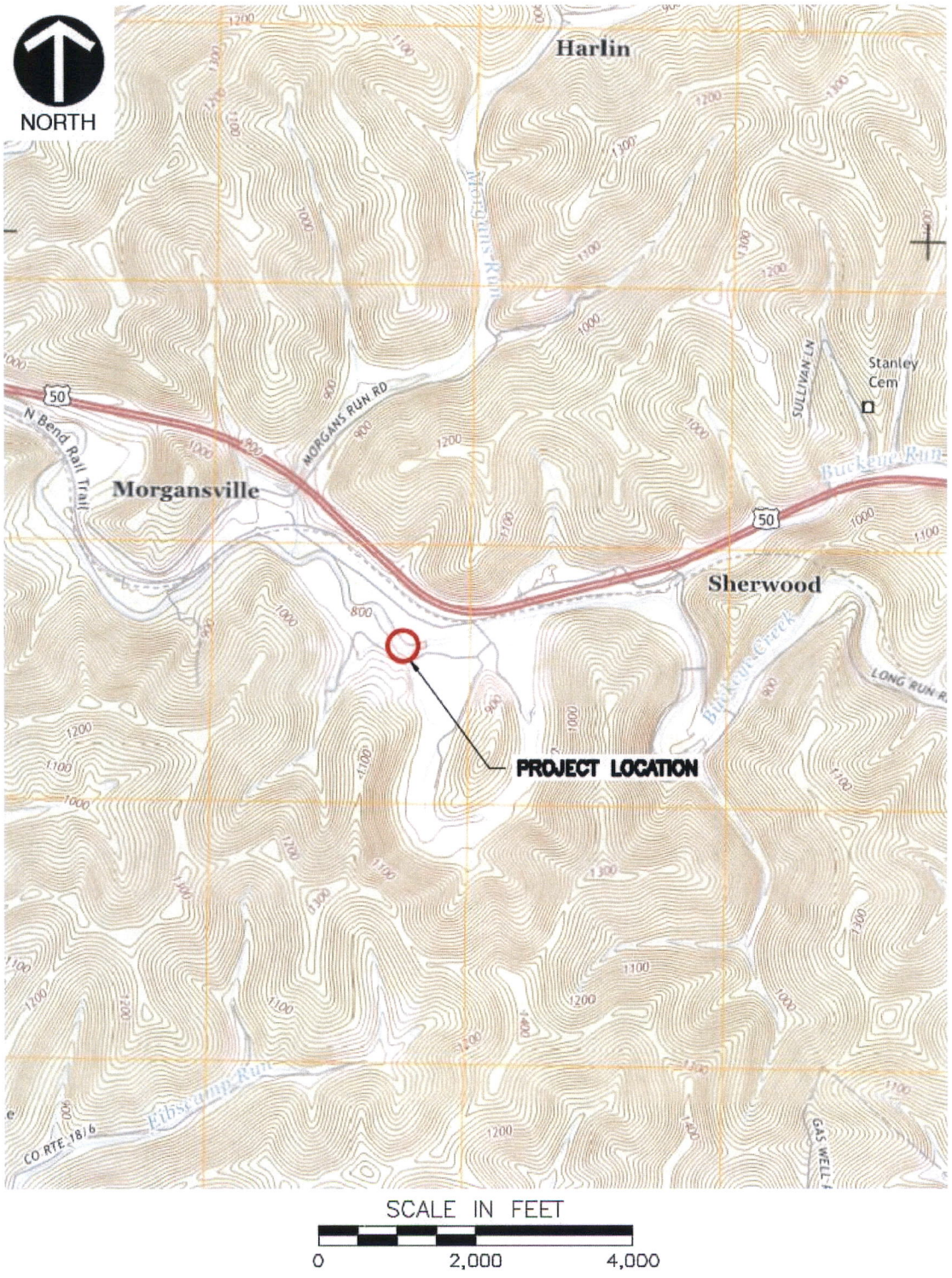


Figure: USGS $7^1/_2$ Minute Topographic Map – Smithburg Quadrangle

C. Field Observations

1. High Water Marks

There are no established landmarks in the project vicinity to determine a historic high water mark for Buckeye Creek.

2. Features Relevant to the Hydraulic Analysis

The hydraulic analyses for the Buckeye Creek have been carried out by FEMA and 100-year flood elevations at 300 feet downstream and 750 feet upstream of the project site are provided in the effective Doddridge County Flood Insurance Study (FIS).

3. Verification of Manning's "n" Values

Manning's 'n' values for Buckeye Creek were obtained from a combination of available aerial imagery and Doddridge County FIS report.

From Table 3.1 of the HEC-RAS Hydraulic Reference Manual:

a) Main Channel:

Clean, winding, some pools & shoals, some weeds, and more stones: 'n' value 0.055

b) Floodplain:

Light brush and trees, in winter: 'n' value 0.050

The Manning's 'n' values assigned to the left overbank (LOB), channel, and right overbank (ROB) for each cross-section of Buckeye Creek are shown in the following table.

Cross-Sections	Friction (n/K)	LOB	Channel	ROB
1370	n	0.05	0.055	0.05
1200	n	0.05	0.055	0.05
1050	n	0.05	0.055	0.05
923.73	n	0.05	0.055	0.05
779.43	n	0.05	0.055	0.05
719.69	n	0.05	0.055	0.05
662.01	n	0.05	0.055	0.05
606.9	n	0.05	0.055	0.05
555.72	n	0.05	0.055	0.05
482.3	n	0.05	0.055	0.05
432.35	n	0.05	0.055	0.05
370	n	0.05	0.055	0.05
300	n	0.05	0.055	0.05
200	n	0.05	0.055	0.05
81.68	n	0.05	0.055	0.05

II. SUMMARY OF RESULTS

A. Analyses Performed

Two analyses were performed in this study: an existing conditions analysis and a proposed conditions analysis. The existing condition model was based on the updated topography and centerline of Buckeye Creek. Light Detection and Ranging (LiDAR) elevation data completed by CEC in September 2021 served as the basis of the terrain model for the entire study area and a supplemental bathymetric survey within the study area was conducted to provide an accurate representation of the stream channel and floodplains. The valley cross-sections of the existing and proposed Buckeye Creek were aligned in such a way as to ensure the same cross-section would pass through both existing and proposed stream centerlines perpendicularly. Refer to Appendix A for the cross-section locations

In the proposed conditions model, the cross-sections from the existing condition geometry have been updated to reflect the proposed grading. The proposed grading includes the construction of a new stream channel and stabilization of stream banks and bed. By comparing the results from the two analyses, the effects of the proposed development on the 100-year water levels of Buckeye Creek were determined, as shown in the following table.

B. Water Surface Elevation Table, Including Existing and Proposed Analyses

Buckeye Creek 100-year Rainfall Event (7,350 cfs)			
Cross-section	Existing (ft)	Proposed (ft)	Difference (ft)
1370	812.48	812.46	-0.02
1200	812.24	812.22	-0.02
1050	811.94	811.91	-0.03
923.73	811.74	811.70	-0.04
779.43	811.65	811.63	-0.02
719.69	811.64	811.63	-0.01
662.01	811.61	811.61	0.00
606.9	811.60	811.60	0.00
555.72	811.59	811.59	0.00
482.3	811.53	811.53	0.00
432.35	811.51	811.51	0.00
370	811.48	811.48	0.00
300	811.42	811.42	0.00
200	811.34	811.34	0.00
81.68	810.99	810.99	0.00

See Appendix D – HEC-RAS Profile Summary Tables.

C. Conclusions

CEC performed a hydraulic analysis of Buckeye Creek for the proposed stream bed and bank stabilization project in general accordance with Doddridge County floodplain requirements, the National Flood Insurance Program, and standard engineering practices. Based on the analysis, our findings indicate that there is no rise to the 100-year water elevations on the

floodplain of Buckeye Creek due to the proposed stream stabilization project. Therefore, the proposed project will not increase the flooding threat to life or property upstream and downstream of the project area.

D. Recommendation

The Sherwood Bank Stabilization Project on Buckeye Creek for MarkWest Midstream and Resources L.L.C. involves construction within the floodplain established by FEMA. The results of the hydraulic study indicate that the construction of the proposed stream channel will not have an adverse impact on the water levels of Buckeye Creek. Therefore, it is recommended that the channel be constructed as designed.

E. Signature Block, Consultant, or In-House Designers

1. Preparer

   Sabin Shrestha, E.I.T.

2. Reviewer

   Gregory S. Linder, P.E. (West Virginia Registered Professional Engineer No. 15629)

3. Date

   January 6, 2022

4. Engineer's Seal on Final Report

   Gregory S. Linder, P.E. (West Virginia Registered Professional Engineer No. 15629)

III. AVAILABLE DATA

A. Flood Insurance Study

The initial countywide Flood Insurance Study (FIS) for Doddridge County had an effective date of October 4, 2011. The final Consultation and Coordination Officer's meeting for the countywide revision to the FIS was held on April 29, 2010. Since detailed hydraulic analyses were performed for Buckeye Creek, Base Flood Elevations (BFEs) or base flood depths are listed in the FIS report. See Appendix B – FEMA FIRMette

B. Existing Hydrologic Data

A detailed hydrologic study has been performed in Buckeye Creek by FEMA within the boundaries of this project site.

C. Existing Hydraulic Model from FEMA, USACE, NRCS, and others

There is no existing hydraulic model for this project site.

IV. HYDROLOGY

A. Design Discharge Calculations

A hydrologic analysis for the Buckeye Creek watershed was not part of this study since the stabilization of Buckeye Creek would not alter how the peak flows had been determined in the FIS. The steady-state flows contained in the hydraulic model which supports the Effective FIS were used for this analysis. Appendix C contains excerpts of the FEMA published Flood Insurance Study (FIS) for Doddridge County, West Virginia.

Buckeye Creek	
Frequency	Discharge (cfs)
100-year	7,350

B. Boundary Conditions

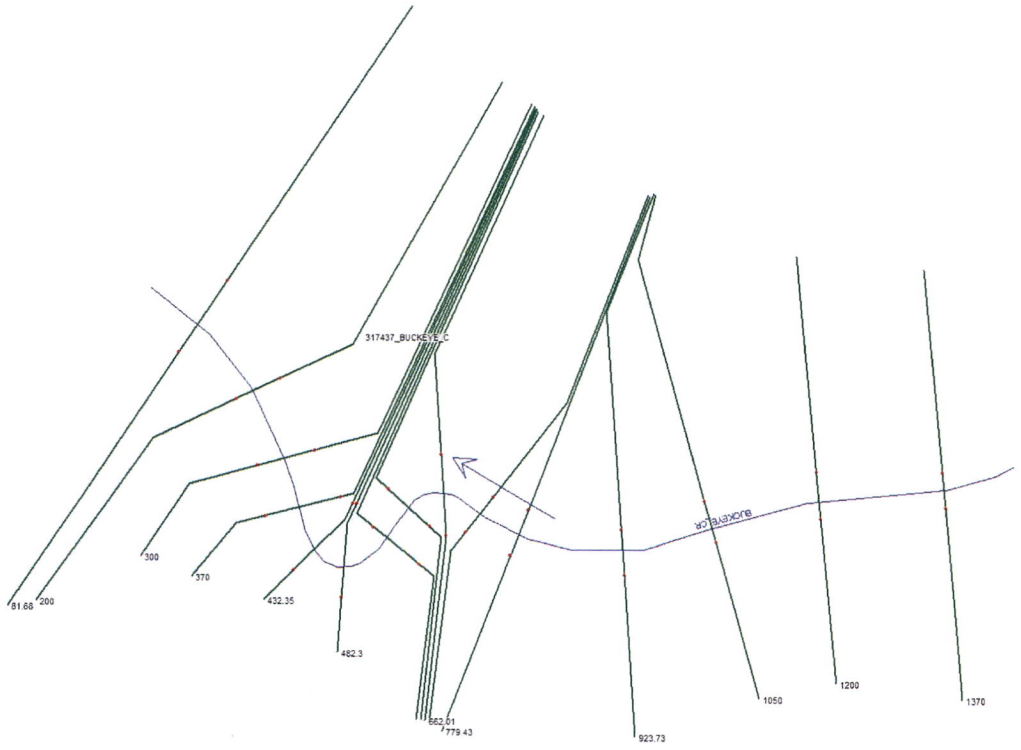
As the cross-sections provided in FEMA FIS Report were not lettered and unmapped within the study area, a downstream boundary condition was set to the normal depth method for all of the steady-state routing simulations. A friction slope of 0.002 ft/ft was selected for each simulation based on the evaluation of the available downstream channel slope data.

V. HYDRAULIC MODELING

A. Source of Model

HEC-RAS Version 6.1.0 was used to perform a hydraulic analysis to determine the potential impacts to the water levels and floodplain of Buckeye Creek. HEC-RAS 6.1.0 is the most current version of the river analysis software available from the Hydraulic Engineering Center of the U.S. Army Corps of Engineers.

B. Site Map with Cross-Sections



C. Explanation of Data and Methods

1. Manning's Values

Manning's roughness coefficients 'n' for the steady flow analysis was estimated at 0.055 for the stream channel and 0.050 for the overbanks in accordance with aerial imagery obtained by CEC, field observations, and values presented in the FEMA FIS Report. See Section I.C.3 for a detailed description of Manning's values used.

2. Ineffective Flow Areas

Ineffective flow areas were incorporated to account for areas in the cross-sectional geometry where ponded water will not be actively conveyed downstream.

3. Any Unusual Circumstances

There are no unusual circumstances specified in correlation with the hydraulic analysis of this project.

4. Table of HEC-RAS Plan Files

Filename	Description
317437 -EXISTING ANALYSIS	Existing Conditions Analysis
317437 -PROPOSED ANALYSIS	Proposed Conditions Analysis

D. HEC-RAS Generated Tables

1. Profile Summary of Existing and Proposed Conditions

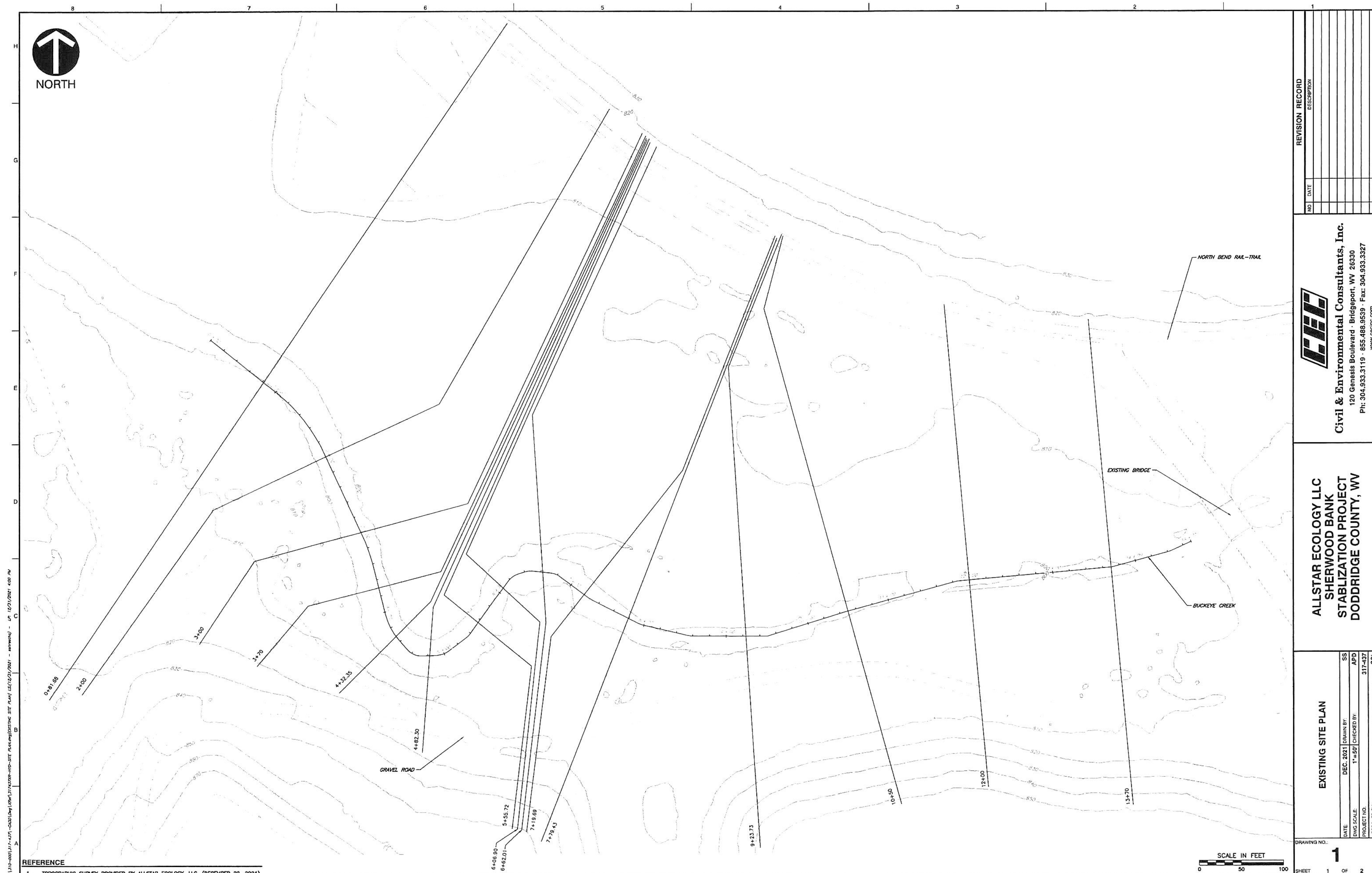
See Appendix D – HEC-RAS Profile Summary Tables

2. Detailed Output Tables

See Appendix F – HEC-RAS Output Files

APPENDIX A

SITE PLAN


NORTH
NORTH BEND RAIL-TRAIL
EXISTING BRIDGE
BUCKEYE CREEK
GRAVEL ROAD
0+81.68
2+00
3+00
3+70
4+32.35
4+82.30
5+55.72
6+06.90
6+62.01
7+19.69
7+79.43
9+23.73
10+50
12+00
13+70
SCALE IN FEET
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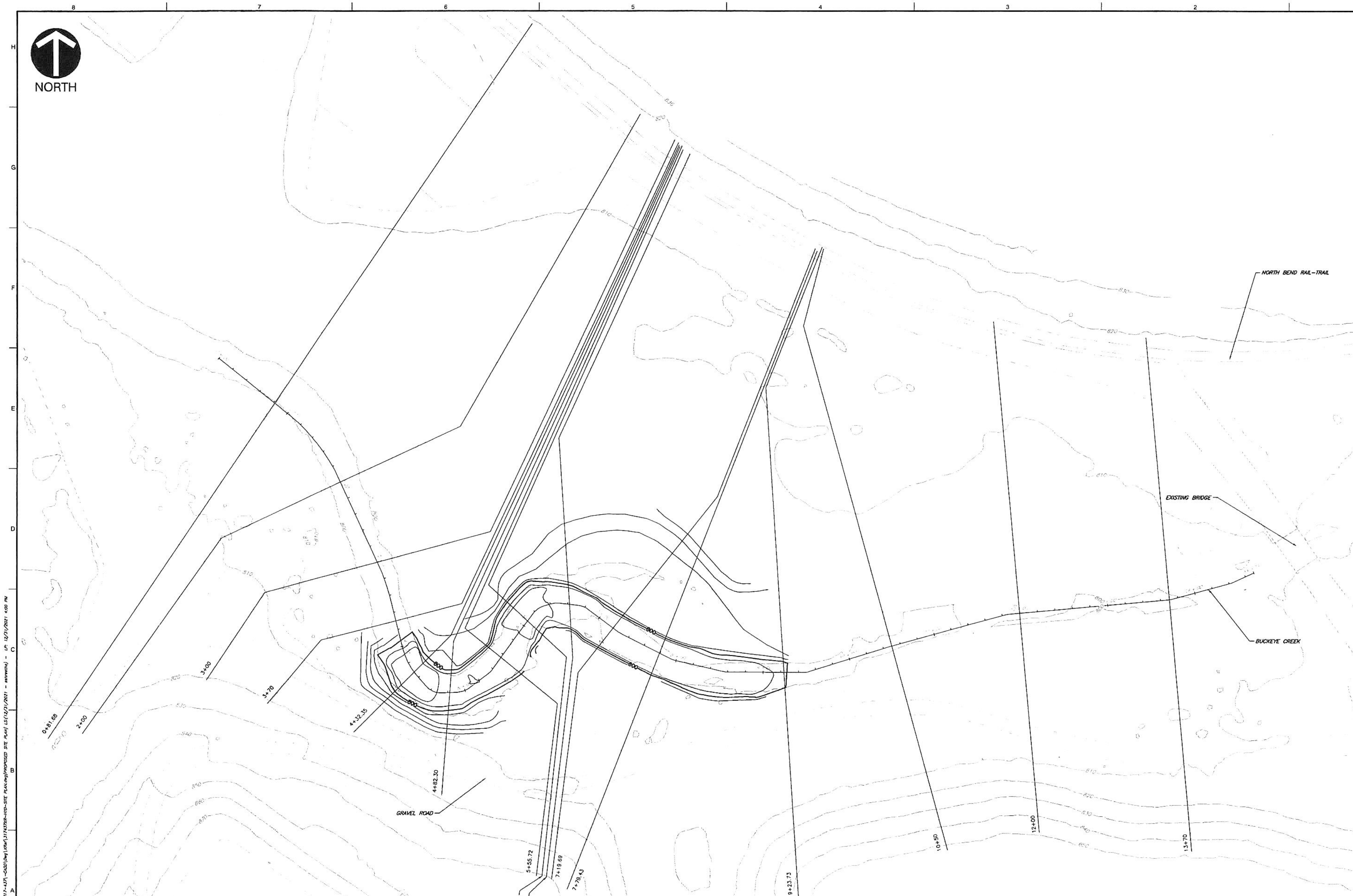
50
100
REFERENCE
1. TOPOGRAPHIC SURVEY PROVIDED BY ALLSTAR ECOLOGY, LLC. (DECEMBER 22, 2021)
REVISION RECORD
NO
DATE
DESCRIPTION
Civil & Environmental Consultants, Inc.
120 Genesis Boulevard · Bridgeport, WV 26330
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com
ALLSTAR ECOLOGY LLC
SHERWOOD BANK
STABLIZATION PROJECT
DODDRIDGE COUNTY, WV
EXISTING SITE PLAN
DATE: DEC. 2021
DRAWN BY: SS
DWG SCALE: 1"=50'
CHECKED BY: APD
PROJECT NO: 317-437
APPROVED BY: GSL
DRAWING NO.: 1
SHEET 1 OF 2



REFERENCE

1. TOPOGRAPHIC SURVEY PROVIDED BY ALLSTAR ECOLOGY, LLC. (DECEMBER 22, 2021)

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
120 Genesis Boulevard · Bridgeport, WV 26330
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com

ALLSTAR ECOLOGY LLC
SHERWOOD BANK
STABLIZATION PROJECT
DODDRIDGE COUNTY, WV

PROPOSED SITE PLAN

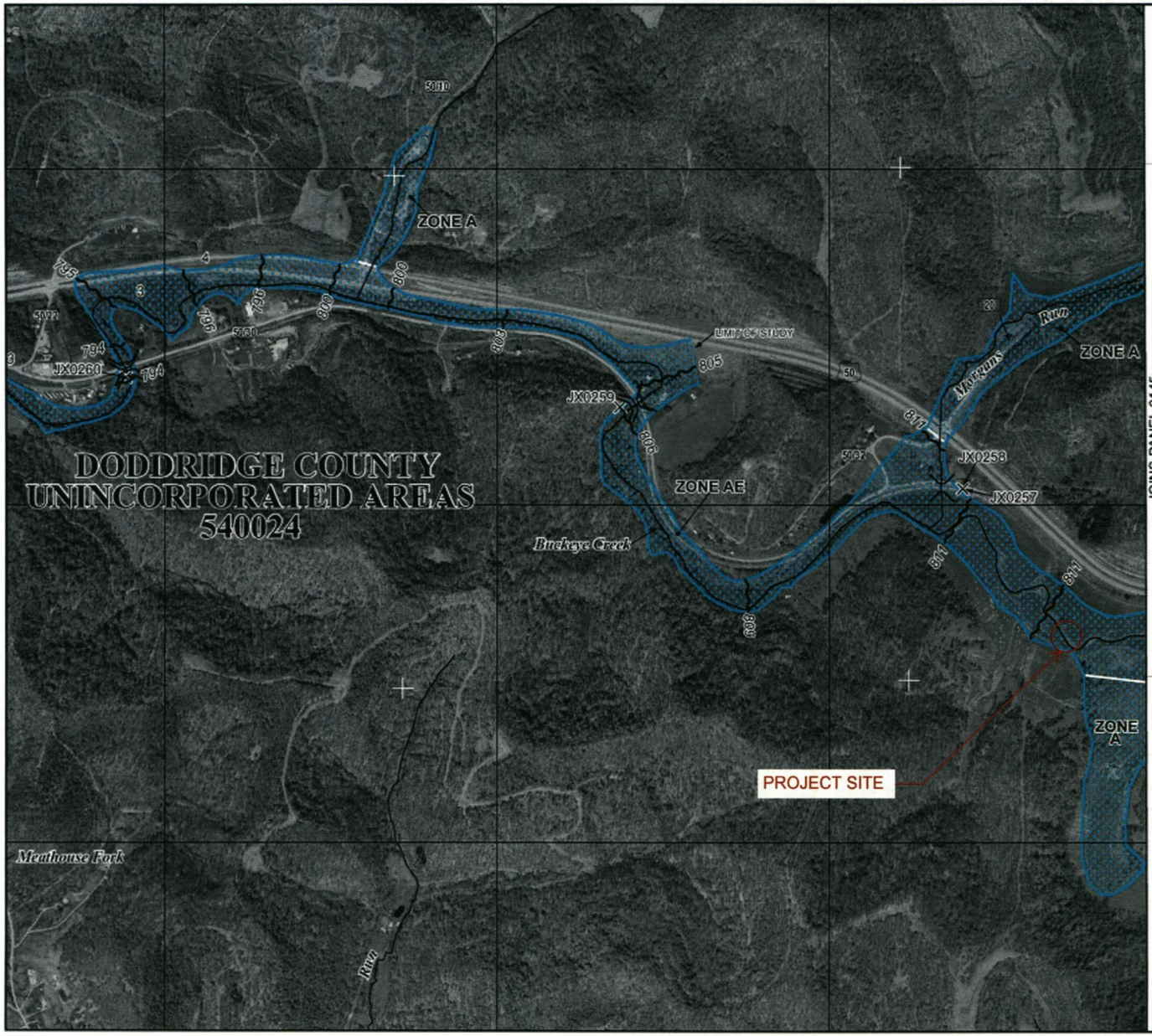
DATE:	DEC. 2021	DRAWN BY:	SS
DWG SCALE:	1"=50'	CHECKED BY:	APD
PROJECT NO.:			317-437
APPROVED BY:			GSL

DRAWING NO.: 2

SHEET 1 OF 2

APPENDIX B

FEMA FIRMETTE



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

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

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

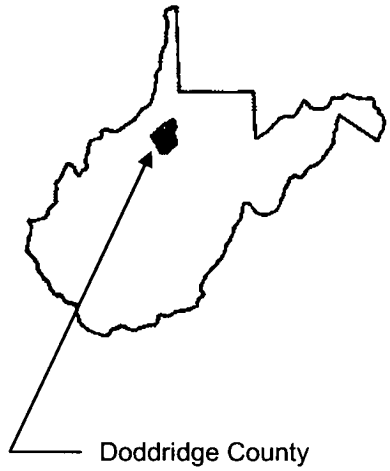
APPENDIX C

FEMA FIS RELEVANT DATA

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

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

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

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.

APPENDIX D

HEC-RAS PROFILE SUMMARY TABLES

HEC-RAS Plan: EXISTING River: BUCKEYE_CR Reach: 317437_BUCKEYE_C Profile: 100-YR

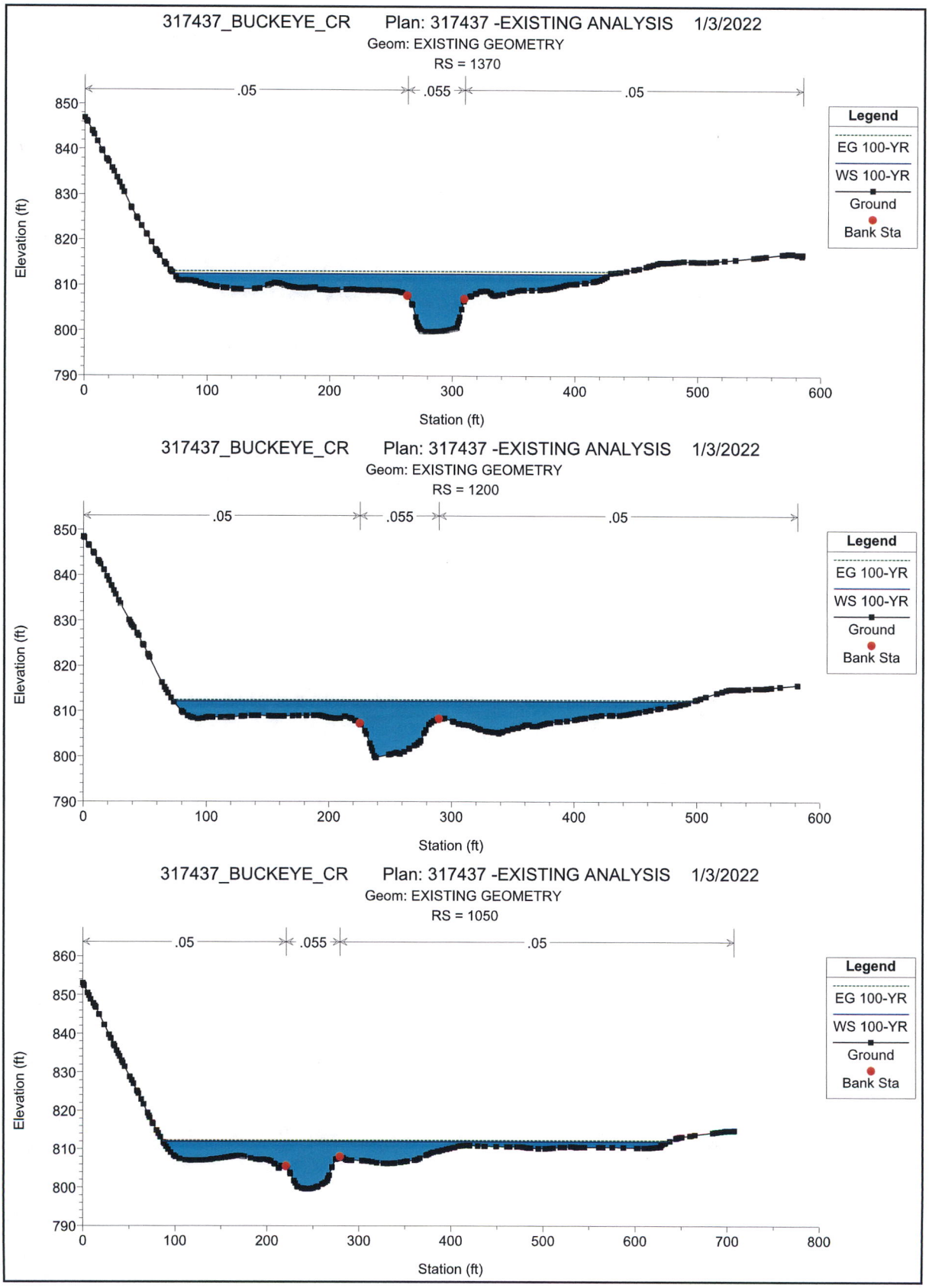
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
317437_BUCKEYE_C	1370	100-YR	7350.00	799.83	812.48		813.03	0.003597	7.44	1456.77	355.50	0.40
317437_BUCKEYE_C	1200	100-YR	7350.00	799.72	812.24		812.50	0.001951	5.11	1948.35	423.22	0.29
317437_BUCKEYE_C	1050	100-YR	7350.00	799.64	811.94		812.21	0.001986	5.38	2050.39	549.25	0.30
317437_BUCKEYE_C	923.73	100-YR	7350.00	797.47	811.74		811.96	0.001746	5.02	2231.41	582.15	0.28
317437_BUCKEYE_C	779.43	100-YR	7350.00	797.59	811.65		811.78	0.000890	3.77	2861.86	624.13	0.20
317437_BUCKEYE_C	719.69	100-YR	7350.00	798.28	811.64	804.99	811.73	0.000604	3.26	3252.78	644.26	0.17
317437_BUCKEYE_C	662.01	100-YR	7350.00	796.71	811.61	805.65	811.69	0.000452	2.73	3618.80	685.22	0.15
317437_BUCKEYE_C	606.9	100-YR	7350.00	796.56	811.60	806.16	811.67	0.000447	2.74	3765.23	742.27	0.15
317437_BUCKEYE_C	555.72	100-YR	7350.00	796.64	811.59	806.32	811.67	0.000469	2.79	3760.28	759.17	0.15
317437_BUCKEYE_C	482.3	100-YR	7350.00	796.91	811.53		811.63	0.000748	3.12	3067.52	649.10	0.18
317437_BUCKEYE_C	432.35	100-YR	7350.00	796.70	811.51		811.61	0.000740	3.20	3060.42	655.77	0.18
317437_BUCKEYE_C	370	100-YR	7350.00	796.86	811.48		811.59	0.000837	3.32	3026.61	703.32	0.19
317437_BUCKEYE_C	300	100-YR	7350.00	796.81	811.42	808.53	811.55	0.000983	3.74	2849.11	735.65	0.21
317437_BUCKEYE_C	200	100-YR	7350.00	797.27	811.34	808.06	811.47	0.000822	3.63	2879.93	620.76	0.19
317437_BUCKEYE_C	81.68	100-YR	7350.00	798.80	810.99	808.06	811.27	0.001997	4.79	1898.51	420.62	0.30

HEC-RAS Plan: PROPOSED River: BUCKEYE_CR Reach: 317437_BUCKEYE_C Profile: 100-YR

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)	
317437_BUCKEYE_C	1370	100-YR	7350.00	799.83	812.46		813.02	0.003633	7.47	1451.56	355.39	0.40
317437_BUCKEYE_C	1200	100-YR	7350.00	799.72	812.22		812.48	0.001973	5.13	1940.99	422.98	0.30
317437_BUCKEYE_C	1050	100-YR	7350.00	799.64	811.91		812.19	0.002021	5.42	2037.32	548.97	0.30
317437_BUCKEYE_C	923.73	100-YR	7350.00	799.46	811.70		811.94	0.001844	5.10	2195.82	581.81	0.29
317437_BUCKEYE_C	779.43	100-YR	7350.00	797.78	811.63		811.76	0.000764	3.71	2961.91	623.95	0.19
317437_BUCKEYE_C	719.69	100-YR	7350.00	797.69	811.63	805.82	811.72	0.000522	3.21	3378.85	644.14	0.16
317437_BUCKEYE_C	662.01	100-YR	7350.00	797.50	811.61	805.48	811.68	0.000398	2.63	3772.63	685.15	0.14
317437_BUCKEYE_C	606.9	100-YR	7350.00	796.00	811.60	805.08	811.67	0.000355	2.77	3956.65	742.19	0.13
317437_BUCKEYE_C	555.72	100-YR	7350.00	797.84	811.59	805.75	811.66	0.000404	2.74	3914.98	759.11	0.14
317437_BUCKEYE_C	482.3	100-YR	7350.00	797.17	811.53		811.63	0.000610	3.06	3208.49	649.06	0.17
317437_BUCKEYE_C	432.35	100-YR	7350.00	796.00	811.51		811.61	0.000548	3.07	3286.24	655.83	0.16
317437_BUCKEYE_C	370	100-YR	7350.00	796.93	811.48		811.59	0.000837	3.32	3026.35	703.31	0.19
317437_BUCKEYE_C	300	100-YR	7350.00	796.81	811.42	808.53	811.55	0.000983	3.74	2849.11	735.65	0.21
317437_BUCKEYE_C	200	100-YR	7350.00	797.27	811.34	808.06	811.47	0.000822	3.63	2879.93	620.76	0.19
317437_BUCKEYE_C	81.68	100-YR	7350.00	798.80	810.99	808.06	811.27	0.001997	4.79	1898.51	420.62	0.30

APPENDIX E

HEC-RAS CROSS-SECTION REPORTS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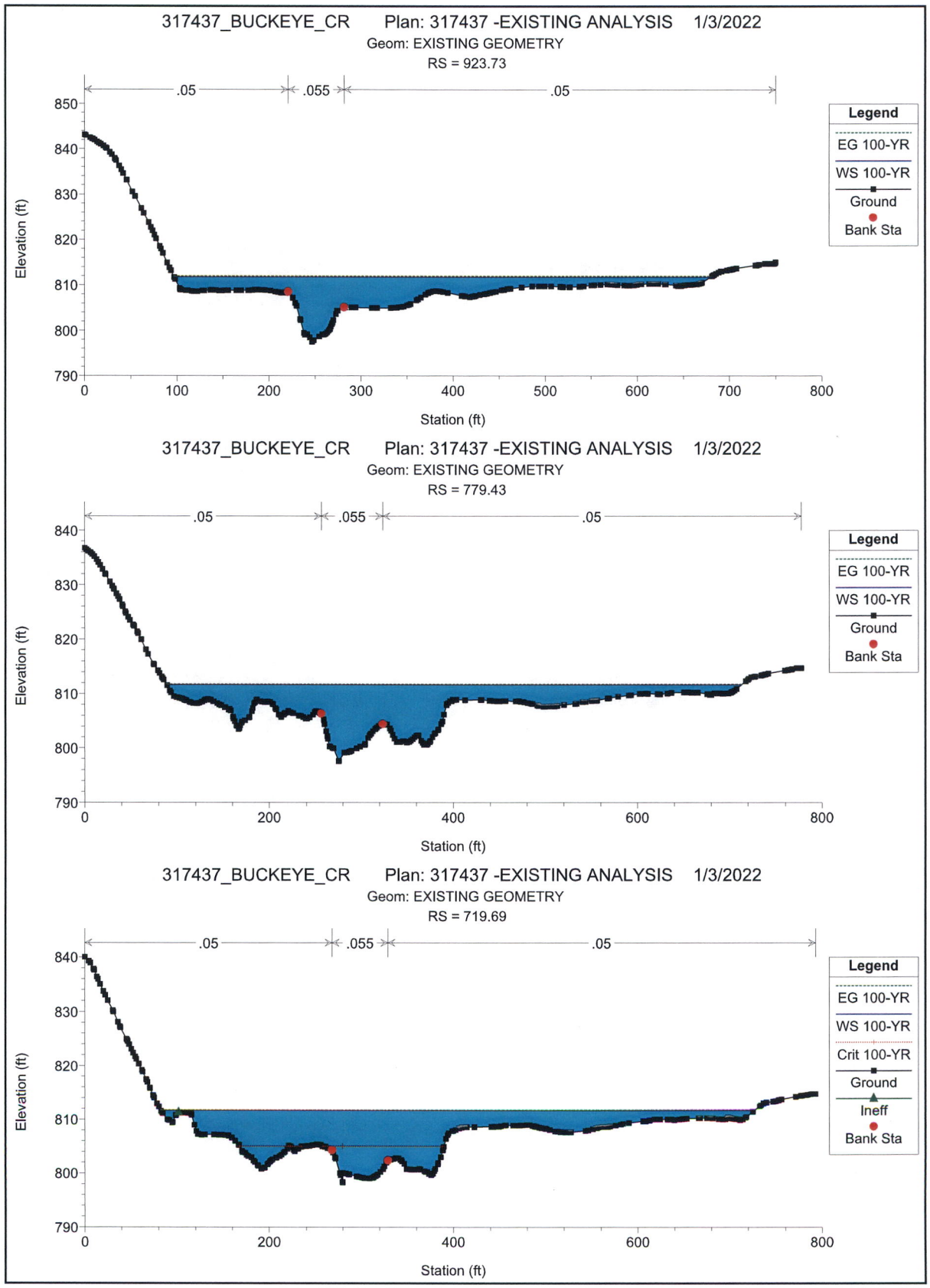
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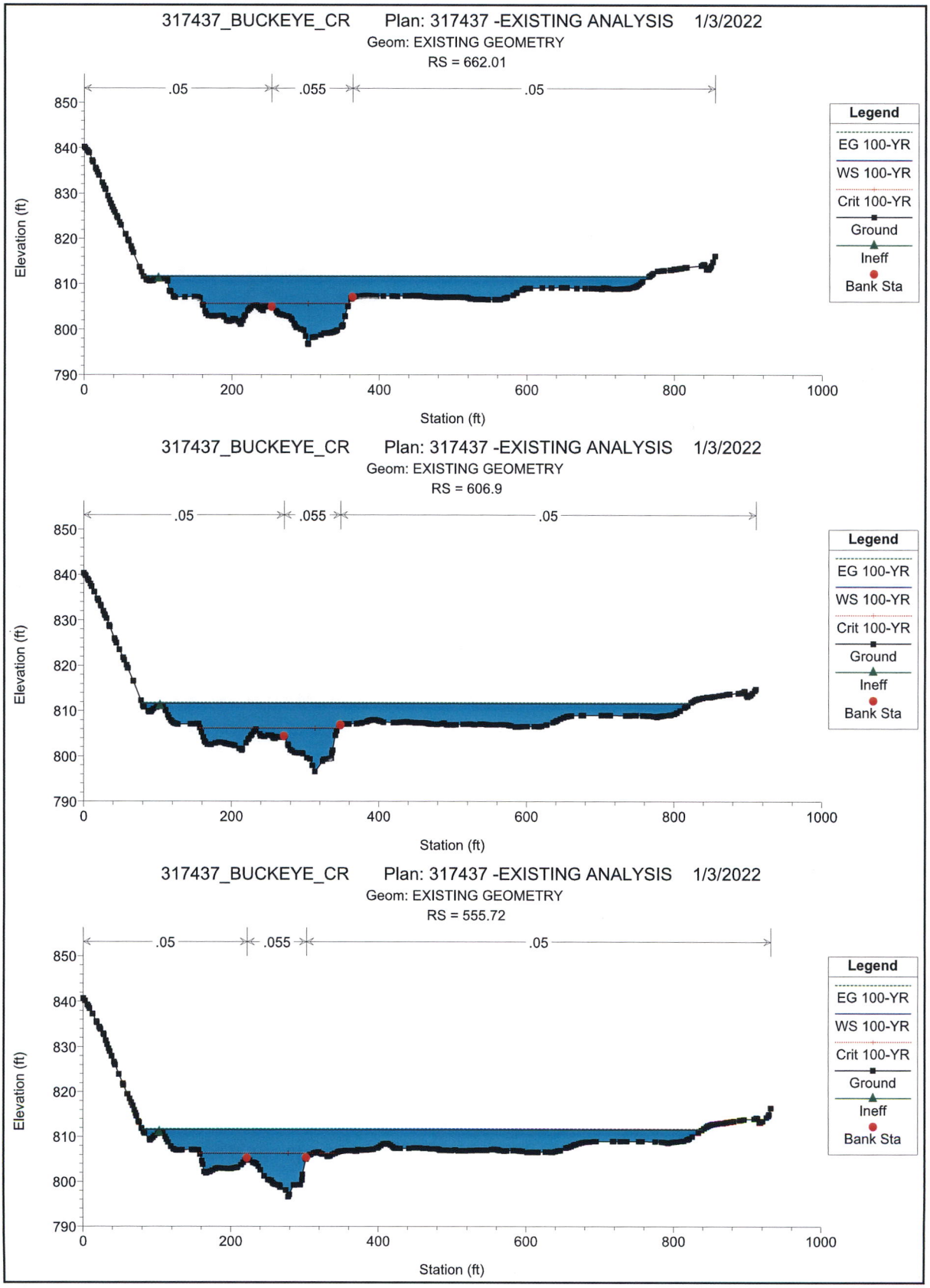
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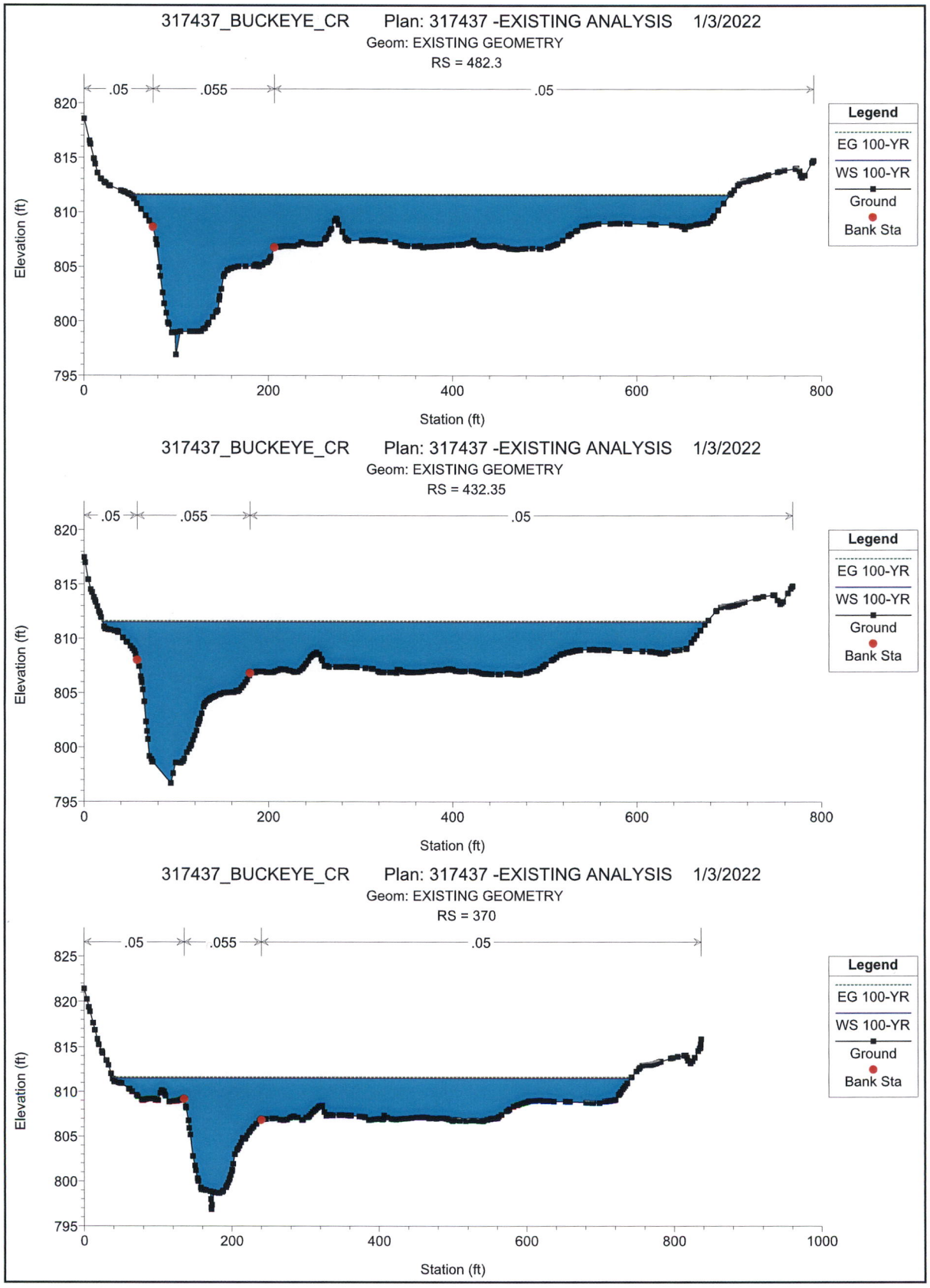
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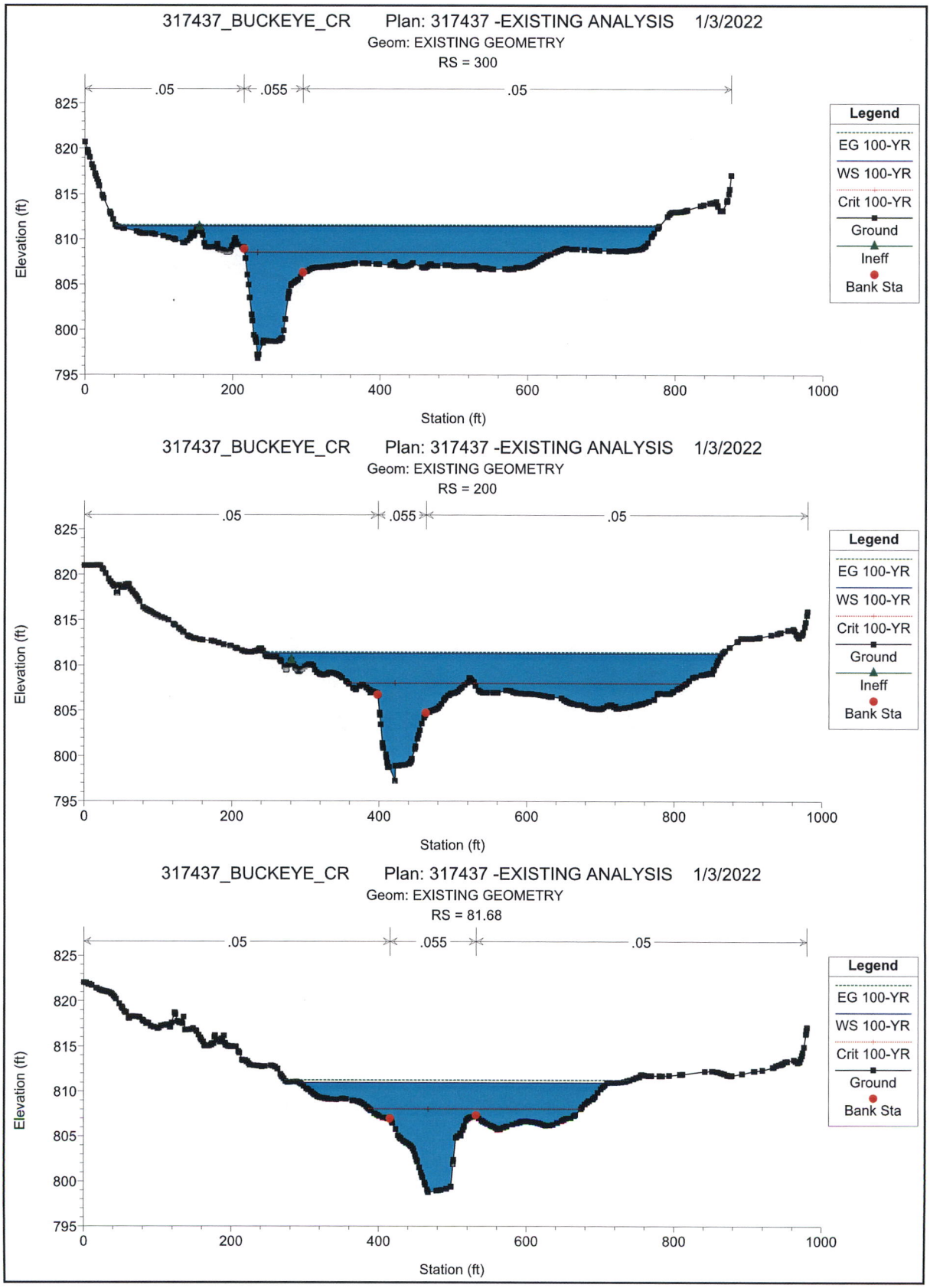
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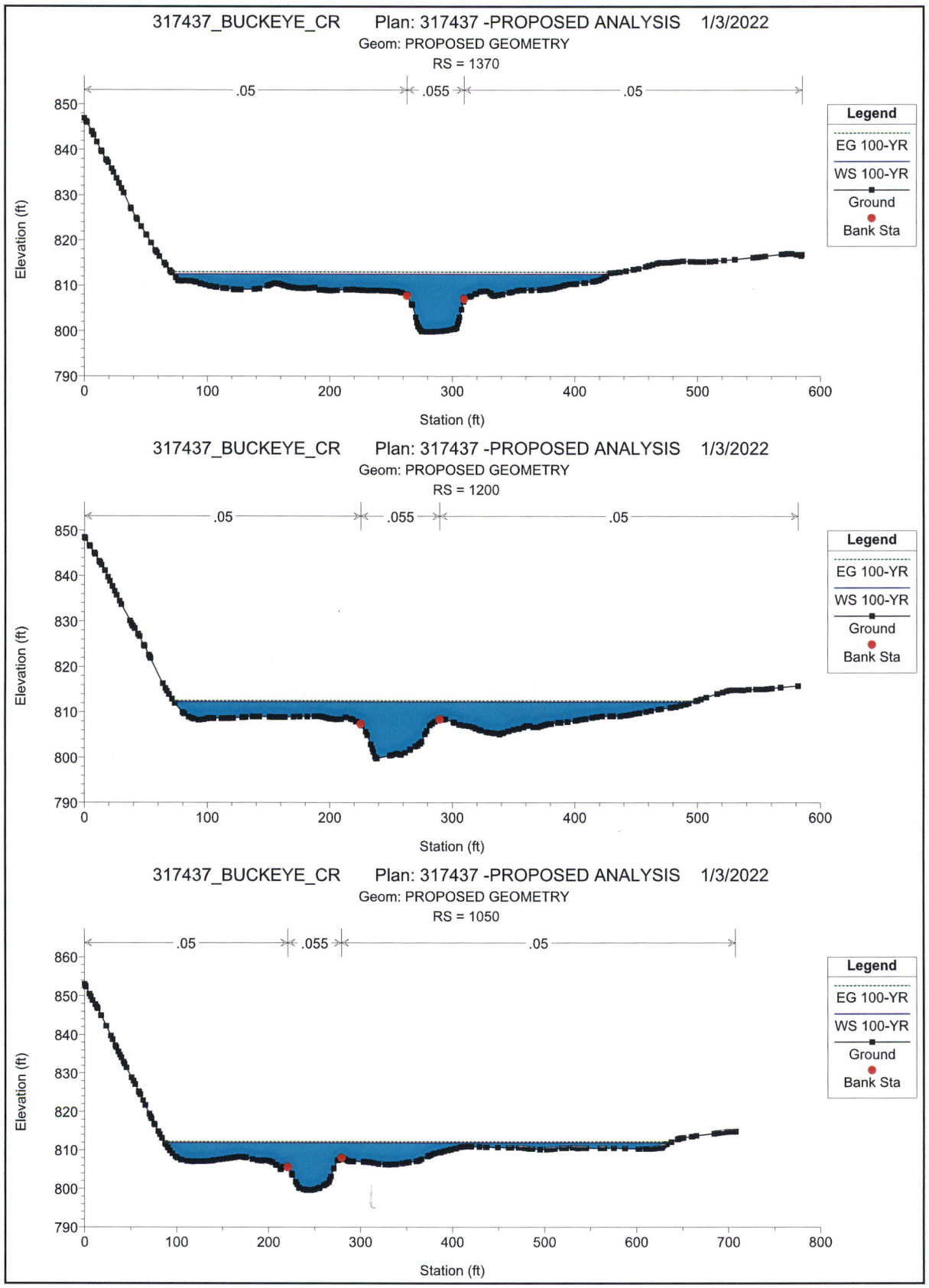
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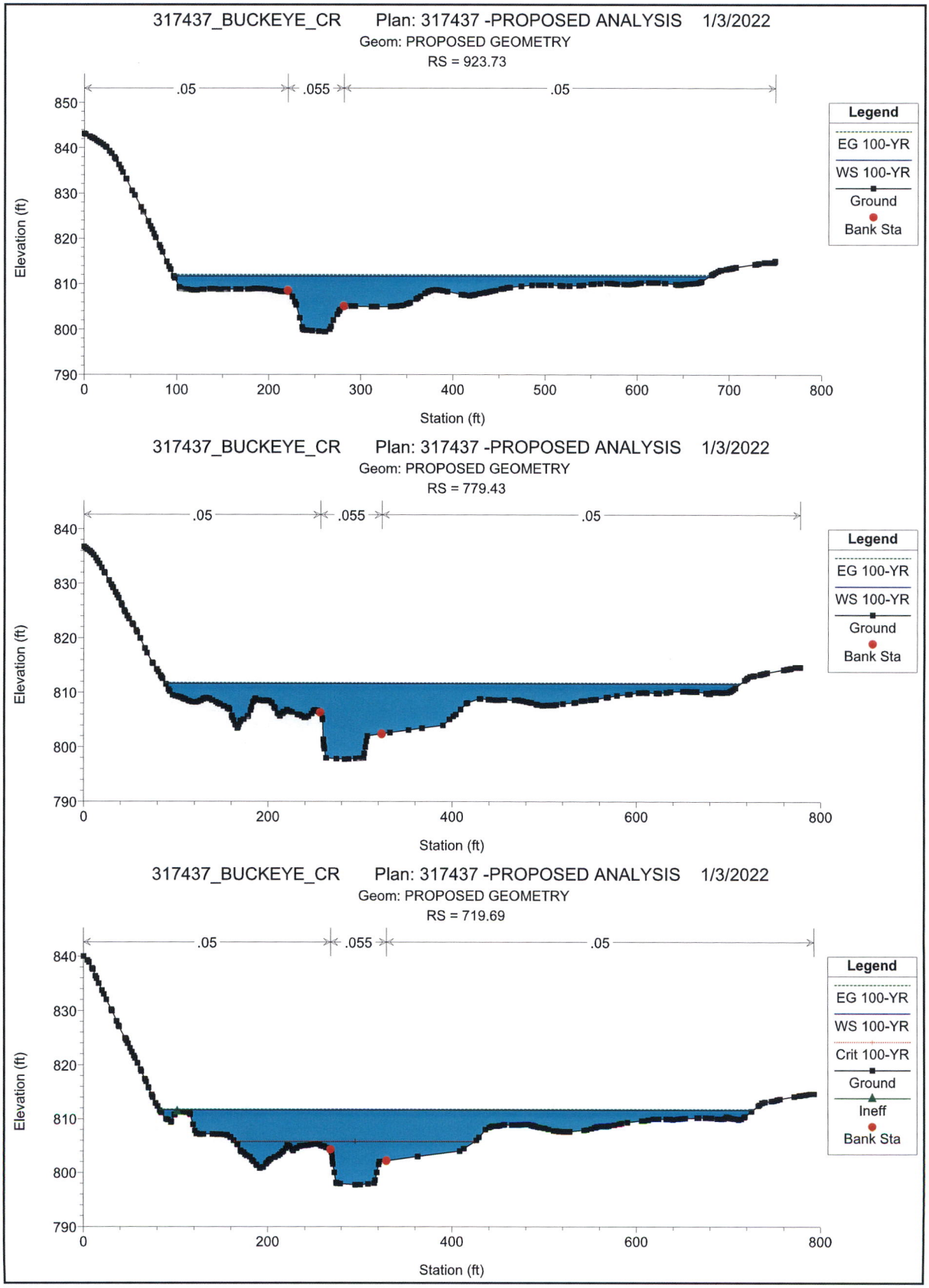
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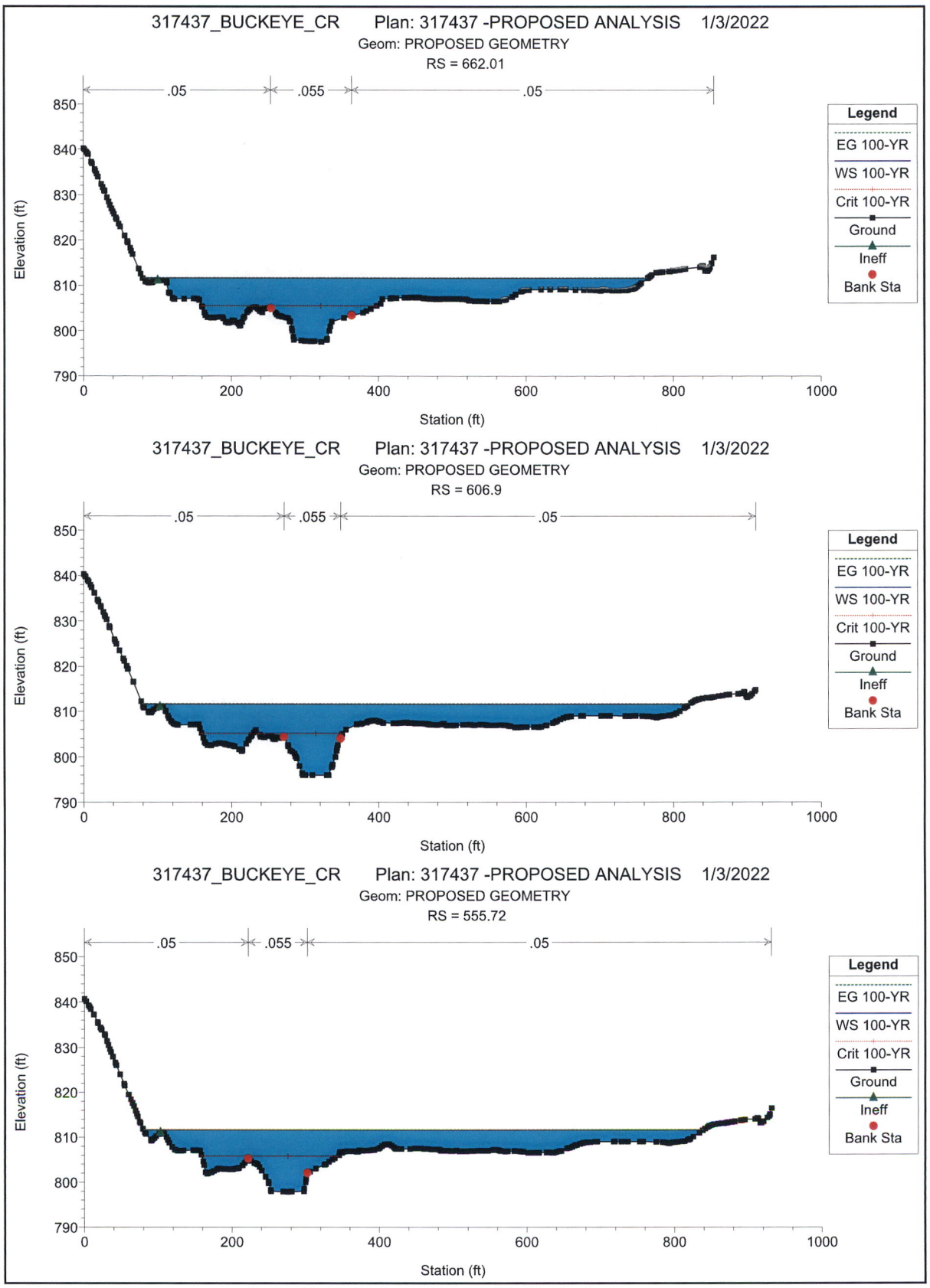
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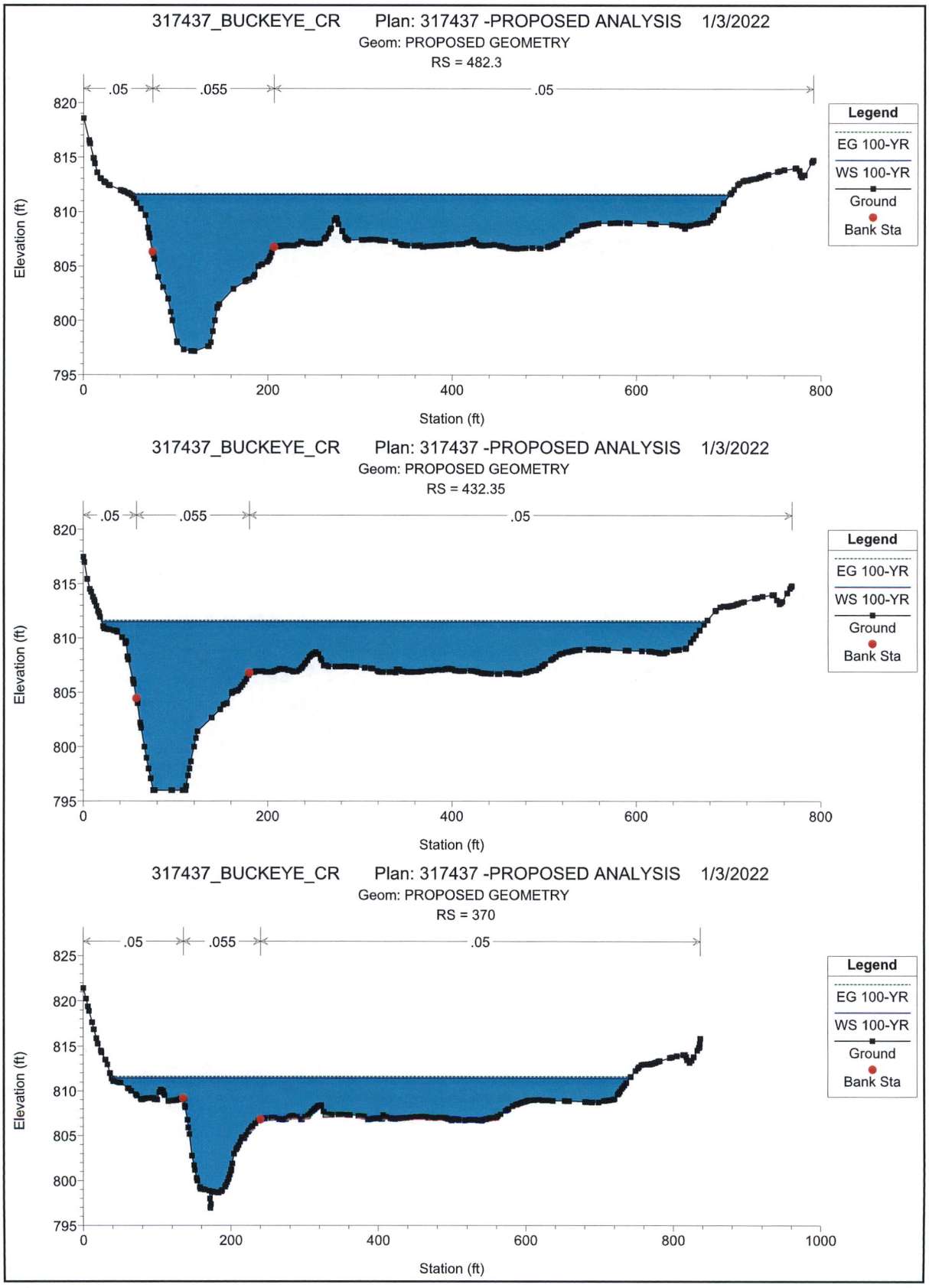
Bank Sta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Bank Sta
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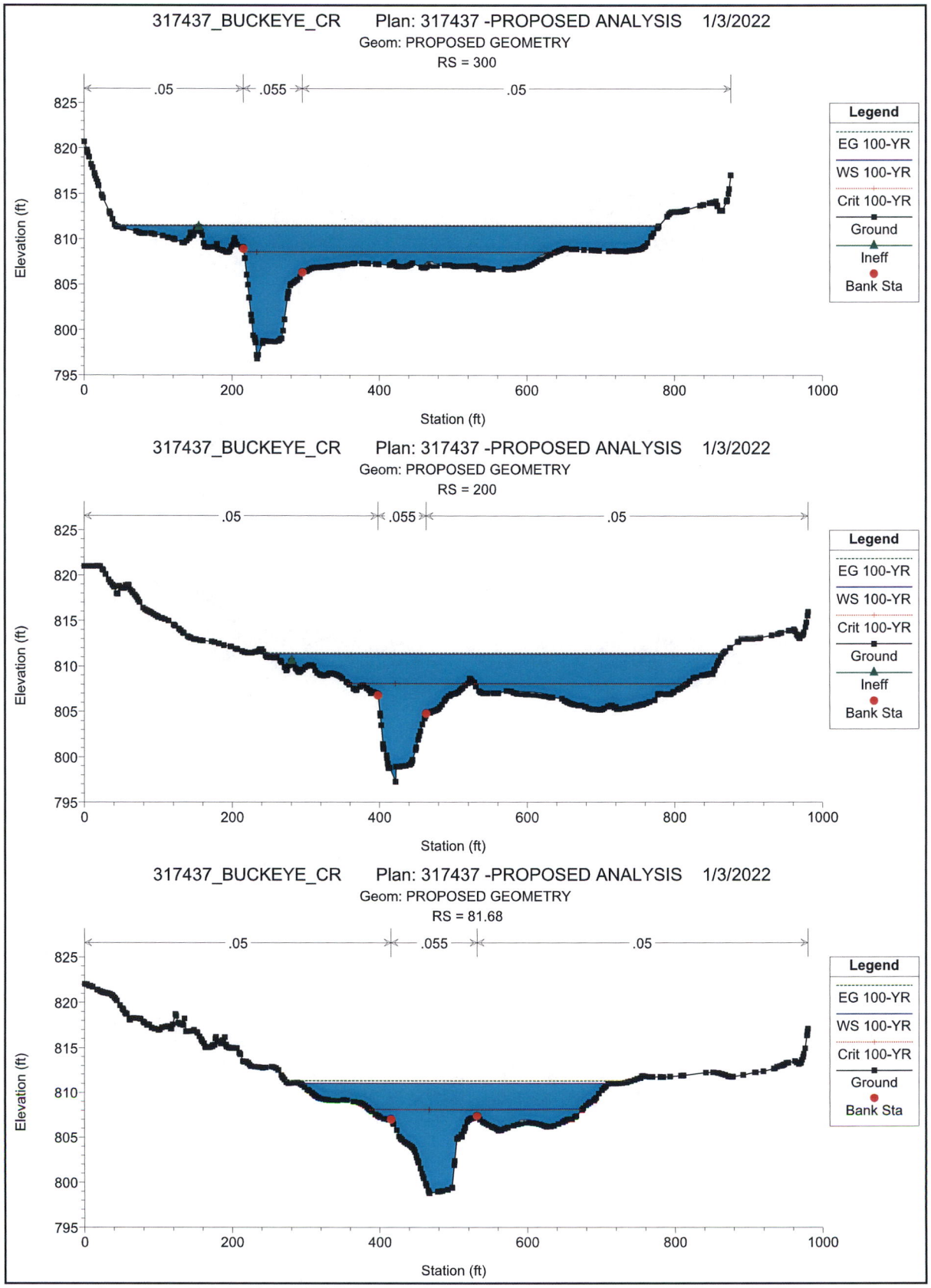
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Elevation (ft)
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Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
317437_BUCKEYE_CR Plan: 317437 -PROPOSED ANALYSIS 1/3/2022
Geom: PROPOSED GEOMETRY
RS = 200
.05
.055
.05
Elevation (ft)
825
820
815
810
805
800
795
0
200
400
600
800
1000
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
317437_BUCKEYE_CR Plan: 317437 -PROPOSED ANALYSIS 1/3/2022
Geom: PROPOSED GEOMETRY
RS = 81.68
.05
.055
.05
Elevation (ft)
825
820
815
810
805
800
795
0
200
400
600
800
1000
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta

APPENDIX F

HEC-RAS OUTPUT FILES

HEC-RAS HEC-RAS 6.1.0 September 2021
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: 317437_BUCKEYE_CR
Project File : 317437_BUCKEYE_CR.prj
Run Date and Time: 1/3/2022 4:58:45 PM

Project in English units

PLAN DATA

Plan Title: 317437 -EXISTING ANALYSIS
Plan File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.p02

Geometry Title: EXISTING GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g03

Flow Title : STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Plan Summary Information:

Number of:	Cross Sections	= 15	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	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: STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Flow Data (cfs)

River	Reach	RS	100-YR
BUCKEYE_CR	317437_BUCKEYE_C	1370	7350

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
BUCKEYE_CR	317437_BUCKEYE_C	100-YR		

Normal S = 0.002

GEOMETRY DATA

Geometry Title: EXISTING GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g03

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 1370

INPUT
Description:
Station Elevation Data   num=   260

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	846.91.609985	846.252.150024		846.026.029968		844.076.109985		844.04	

6.279968	843.95	7.48999	843.25	10.17999	841.69	13.63	839.82	13.84998	839.69	
14.20001	839.53	17.73999	837.82	18.21997	837.62	19.29999	837.17	22.29998	835.82	
23.71997	835	26.25	833.69	28.14001	832.59	30.27002	831.45	32.02997	830.5	
37.59998	827.21	37.95001	827.02	38.08002	826.94	42.32001	824.94	43.07001	824.59	
46.33002	823.05	50.26001	821.24	50.42999	821.16	54.37	819.45	7.77997	817.8	
58.38	817.55	59.09998	817.26	61.02997	816.46	65.14001	814.97	66.41998	814.49	
69.75	813.29	70.52002	813.02	71.37	812.77	74.45001	811.74	76.28	811.1	
76.82999	811	79.16998	810.98	82.48001	810.99	85.63998	810.96	86.5	810.95	
90.06	810.81	90.51999	810.89	0.89999	810.77	94.53	810.43	94.57999	810.43	
95.01999	810.39	98.54999	810.13	101.93	809.87	102.93	809.83	106.58	809.64	
107.75	809.61	112.97	809.4	115.56	809.32	121.44	809.13	122.71	809.07	
125.45	809.08	126.67	809.08	127.48	809.08	138.71	809.2	138.72	809.2	
138.78	809.2	142.62	809.31	142.72	809.3	149.19	809.93	149.6	809.98	
150.41	810.06	151.98	810.23	154.79	810.47	157.12	810.42	158.8	810.36	
160.83	810.15	162.82	809.97	165.25	809.79	166.84	809.67	169.67	809.54	
170.85	809.48	174.1	809.4	174.87	809.37	178.52	809.37	179.19	809.36	
182.54	809.4	182.9	809.4	182.92	809.4	182.94	809.4	184.13	809.42	
187.65	809.49	187.73	809.49	187.81	809.47	191.65	809.02	193.91	809.05	
194.95	809	196.21	808.96	198.41	808.87	200.61	808.84	202.99	808.86	
206.08	808.9	213.24	809.07	217.43	809.09	218.71	809.11	219.06	809.11	
222.75	809.05	223.07	809.04	226.3	808.95	227.09	808.92	227.17	808.93	
231.11	808.88	234.38	808.9	235.54	808.94	236.01	808.89	239.14	808.93	
240.5	808.94	243.16	808.83	247.33	808.81	250.1	808.78	251.19	808.78	
253.71	808.71	255.21	808.67	258.13	808.47	259.22	808.4	262.55	807.83	
263.24	807.73	266.97	805.9	267.26	805.78	267.41	805.71	270.07	803.02	
271.27	801.82	271.97	801.03	272.62	800.87	273.51	800.45	274.56	800.11	
275.19	799.88	278.66	799.83	282.74	799.85	283.32	799.84	283.96	799.84	
286.31	799.88	286.57	799.89	291.36	799.95	293.51	800.02	295.38	800.08	
297.93	800.26	300.61	800.4	301.95	800.46	302.71	800.62	303.5	800.65	
304.37	801.59	305.02	802.22	305.79	803.03	307.43	804.72	309.15	806.46	
309.79	807	314.38	807.54	315.32	807.64	315.46	807.67	319	808.12	
319.48	808.19	322.68	808.63	323.49	808.71	324.32	808.71	326.97	808.78	
327.51	808.7	328.35	808.73	330.91	808.36	331.53	808.12	332.75	807.84	
334.5	807.7	337.74	807.89	341.08	808.03	346.58	808.4	348.03	808.51	
348.9	808.57	352.9	808.84	354.68	808.93	356.64	808.97	358.33	808.97	
364.62	808.98	371.28	809.04	374.19	809.12	375.71	809.14	377.54	809.18	
379.73	809.29	382.9	809.41	385.23	809.59	387.76	809.73	390.81	809.97	
392.52	810.12	395.69	810.27	396.26	810.26	399.81	810.34	401.36	810.38	
407.85	810.58	408.5	810.61	414.66	810.85	415.88	810.93	417.35	811	
419.9	811.18	421.77	811.41	423.91	811.72	425.7	812	428.74	812.71	
429.18	812.79	429.6	812.81	433.05	812.82	435.96	812.93	436.73	812.97	
441.84	813.22	447.77	813.5	448.01	813.51	448.31	813.52	452.03	813.75	
457.75	814.17	460.06	814.35	460.78	814.41	463.43	814.62	467.1	814.87	
469.34	815.05	469.44	815.05	469.63	815.05	472.12	815.03	474.84	815.07	
477.62	815.08	480.15	815.17	482.45	815.24	484.17	815.31	488.11	815.38	
488.14	815.38	488.18	815.38	488.24	815.38	494.46	815.31	496.22	815.28	
499.28	815.25	501.38	815.24	504.61	815.24	509.56	815.29	510.8	815.31	
514.74	815.39	521.75	815.56	530.51	815.77	545.41	816.18	548.17	816.24	
549.51	816.29	552.45	816.38	555.21	816.48	568.56	816.94	570.16	816.98	
573.11	817.05	574.22	817.08	576.55	817.07	576.56	817.07	576.57	817.07	
580.57	816.83	580.84	816.88	584.39	816.54	584.59	816.6	585.06	816.86	

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	263.24	.055	309.79	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
263.24	309.79	170.24	170	171.01	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1200

INPUT
Description:
Station Elevation Data num= 235

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	848.5	4.899902	848.28	4.109985	846.71	4.51001	846.55	7.789978	845.09
8.52002	844.77	11.97998	843.22	12.16003	843.12	12.76001	842.91	13.83002	842.37
16.41998	841.15	19.01001	839.69	20.57001	838.81	22.66998	837.66	24.59003	836.6
26.19	835.73	28.60999	834.42	29.98999	833.73	7.02002	830.07	38.03003	829.54
38.85999	829.12	39.56	828.83	40.66003	828.43	43.58002	827.16	44.66998	826.68
48.26001	824.78	48.69	824.57	52.31	822.59	53	822.23	53.63	821.89
63.83002	816.31	65.85999	815.24	67.08002	814.66	68.78003	813.94	71.32001	812.89
73.55002	811.93	79.89001	809.97	80.77002	809.64	81.37	809.6	84.84	808.94
87.34	808.67	88.86002	808.58	9.01001	808.49	92.88	808.24	93.44	808.24
96.89001	808.34	99.82001	808.53	101.31	808.66	102.14	808.66	104.16	808.66
104.93	808.62	111.61	808.63	114.72	808.62	116.98	808.63	118.16	808.65
120.99	808.68	128.56	808.84	129.03	808.84	129.12	808.85	131.1	808.88
136.83	808.98	137.08	808.99	137.66	808.98	141.08	808.99	142.56	808.98
150.93	808.91	153.13	808.87	154.08	808.87	155.76	808.87	158.97	808.87
163.29	808.87	170.4	808.91	175.21	808.95	181.55	808.96	187.55	809.04
192.08	809.01	193.3	808.99	195.16	808.85	197.31	808.73	199.58	808.58
201.33	808.51	204.01	808.4	205.35	808.36	208.43	808.39	209.36	808.39
212.85	808.79	213.38	808.81	217.27	808.51	217.4	808.5	218.63	808.32
221.41	807.92	221.7	807.88	225.43	807.3	226.12	807	229.45	805.64
230.54	804.89	233.47	802.88	234.73	801.91	235.62	801.24	237.14	800.16
237.83	799.72	238.56	799.76	249	800.39	249.23	800.41	250.61	800.51
253.55	800.71	254.97	800.85	256.44	800.73	257.57	800.54	257.97	800.58
261.58	801.02	265.33	801.68	265.6	801.74	265.78	801.77	269.84	802.38
271.63	802.59	273.06	803.02	273.47	803.03	273.63	803.05	274.08	803.06
274.86	803.42	277.65	805.12	279.19	805.86	281.67	807.06	283.62	807.48
285.68	807.9	288.04	808.15	289.7	808.35	292.46	808.27	294.09	808.42
300.92	807.7	301.75	807.59	305.73	807.22	305.77	807.22	306.15	807.2
309.78	806.99	309.99	807.01	310.15	806.99	313.8	806.89	316.84	806.68
319	806.38	321.84	806.08	323.42	805.92	327.87	805.55	329.87	805.45
332.27	805.41	333.89	805.3	336.69	805.29	338.57	805.04	340.99	805.31
341.92	805.48	345.53	805.78	345.94	805.81	349.91	806.08	349.95	806.09
349.96	806.09	353.97	806.3	354.38	806.31	357.99	806.6	360.08	806.95
361.16	806.97	363.01	806.97	366.02	806.68	367.47	806.66	369.75	806.66
372.07	806.89	374.05	807.03	375.7	807.2	378.07	807.36	379.38	807.42
380.49	807.43	386.1	807.67	388.36	807.68	394.07	807.84	394.14	807.84
394.16	807.84	394.24	807.85	400.47	808.09	402.17	808.19	405.14	808.37
406.19	808.39	409	808.49	414.22	808.75	417.82	808.94	422.26	809.09

428.68	809.1	430.29	809.11	431.3	809.1	436.96	809.07	440.2	809.23
442.34	809.29	444.68	809.4	446.38	809.48	449.34	809.65	452.96	809.79
458.2	810.07	462.42	810.27	468.04	810.58	470.46	810.7	477.88	810.95
478.49	810.99	478.72	811.01	482.51	811.17	486.08	811.43	489.09	811.67
489.76	811.7	490.54	811.76	492.64	811.95	498.57	812.45	500.04	812.6
502.67	812.84	507.13	813.28	516.01	814.03	520.46	814.38	523.7	814.67
526.08	814.8	526.92	814.85	527.89	814.88	530.71	814.88	531.29	814.89
535.07	814.88	535.98	814.85	536.31	814.83	536.7	814.83	537.09	814.84
541.51	815	541.56	815	541.58	815	547.56	815.02	550.18	815.05
554.14	815.06	556.57	815.12	560.36	815.24	567.63	815.44	581.82	815.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	225.43	.055	289.7	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
225.43	289.7	110.41	150	168.17	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1050

INPUT
Description:
Station Elevation Data num= 252

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	853.03.8699951	852.611.059998	852.531.390015	852.375.210022	850.49
6.530029	849.818.400024	848.8611.40002	847.7813.03998	847.213.58002	846.98
13.64001	846.9814.08002	846.7817.65002	844.9523.35004	842.2328.29999	839.72
30.10004	838.81	33.38	837.22	34.25	836.79	36.63	835.6338.40002	834.77
39.87	834.1142.22998	832.97	43.38	832.42	45.37	831.4750.85004	828.87
52.89001	827.9454.77002	827.0758.72003	825.259.15002	825.0160.28003	824.46
63.29999	822.9565.90002	821.62	70.19	819.3971.60004	818.65	72.44	818.19
75.29999	816.85	75.75	816.6475.91998	816.5679.90002	814.8681.66003	814.1
84.04999	813.0987.39001	811.7288.20001	811.3990.32001	810.6292.35004	809.89
95.16003	809.198.85999	808.29	100.65	807.98	104.59	807.48	104.8	807.46
105.34	807.43	111.42	807.16	116.06	807.1	117.56	807.04	120.37	807.05
124.74	807.05	125.55	807.06	125.93	807.06	126.44	807.05	129.22	807.1
133.26	807.14	138	807.2	139.51	807.29	140.69	807.37	146.3	807.5
150.44	807.65	154.6	807.81	158.46	807.92	161.38	808.04	162.9	808.12
166.7	808.22	167.05	808.23	167.66	808.22	171.2	808.21	173.4	808.11
175.35	808.02	182.36	807.65	187.8	807.34	188.73	807.3	191.95	807.25
192.53	807.22	195.48	807.3	196.1	807.31	196.33	807.31	200.25	807.21
202.06	807.05	204.4	806.84	207.8	806.19	208.55	806.09	208.97	806.01
212.68	805.1	213.1	804.99	213.13	804.99	215.47	805.66	219.26	805.48
220.99	805.54	225	803.82	225.14	803.75	225.53	803.56	229.29	801.69
230.83	801.11	232.65	800.27	232.85	800.18	232.92	800.16	233.59	800.12
237.95	799.81	240.08	799.73	240.55	799.71	241.74	799.65	242.2	799.65
245.89	799.64	247.93	799.72	250.04	799.8	253.67	800.05	254.19	800.08
254.49	800.11	255.57	800.24	260.03	800.77	261.65	801.03	263.52	801.29
265.66	801.7	266.58	802.34	267.76	803.1	270.77	805.18	270.79	805.19

```
  270.87  805.22  274.94   807.3   276.6  807.44  279.49  807.95  282.43  807.69
  283.24  807.56  285.62  807.28  287.39   807.1  290.26     807  291.94     807
  292.14     807  303.27  806.97  303.58  806.96  305.27  806.91  309.77   806.8
  314.16  806.63  319.52  806.41  326.67  806.31   328.6  806.27  328.89  806.27
  329.11  806.27  330.95  806.24  335.78  806.27  337.19  806.29  339.03  806.32
   345.4  806.51  345.47  806.51  345.59  806.52  349.59  806.71   352.4   806.8
  360.62  807.06  362.05  807.14  364.14  807.33  366.24   807.6  373.03  808.37
  374.34  808.51  375.76  808.66  378.43  808.95  380.77  809.14  385.54  809.38
  386.99  809.46  390.78  809.69  395.29  809.94  398.36  810.14  402.05  810.36
  404.07  810.45  407.74  810.74  410.45  810.87  413.31  810.94  416.41  810.96
  420.17  810.95  420.37  810.94  429.11  810.83  435.85  810.74  436.78  810.73
  436.85  810.73  437.03  810.73  449.23  810.65  460.86  810.58  463.96  810.64
  471.69  810.62  474.72  810.62  477.75  810.52   478.6  810.48  482.43  810.34
  484.53   810.3  486.39  810.29  494.88  810.11  495.01  810.11  502.39  810.13
  506.51  810.21  507.33  810.22   507.9  810.23  510.97  810.29  519.04  810.46
  523.14   810.5  530.09  810.59  530.88  810.58  534.61  810.52  536.02  810.44
  541.01  810.49  544.37   810.5  544.68   810.5  545.05  810.51  560.57  810.49
  564.68  810.49  575.25  810.47  587.33  810.41  601.81   810.3  602.52  810.29
  603.04  810.29  609.87  810.29  612.67  810.28  615.23  810.32  617.34  810.35
  619.22  810.39  619.37  810.39  619.63   810.4   623.5  810.47  626.15  810.52
  627.52  810.57  628.29  811.04  629.17  811.17  631.77  811.45  632.72  811.58
  637.57  812.09  644.32  812.81  645.25  812.92  646.33  813.01   648.3  813.08
  650.45  813.16  659.52  813.45  660.66  813.52  664.85   813.7  684.21  814.29
  686.67  814.37  688.96  814.44  693.36  814.57  697.34  814.69   699.2  814.76
  699.86  814.76  700.29  814.76  701.27  814.74  704.53  814.74  706.17  814.74
  706.71  814.74  707.57  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  220.99    .055  279.49     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        220.99  279.49           168.68  126.27  101.85             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 923.73

INPUT
Description:
Station Elevation Data    num=     267
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  843.17 1.26001  843.015.950012   842.57.960022  842.29    8.75  842.22
10.67004     84213.29004   841.6   15.44  841.3217.29004  841.0520.17999  840.68
   22.69   840.323.70001   840.127.17004   839.329.32001  838.7732.59003  837.91
33.07001  837.7933.98004  837.4537.34003  836.2739.60004  835.4241.76001  834.59
45.28003  833.1845.40002  833.1445.45001  833.1251.77002  830.5854.42999  829.55
61.39001  826.8964.08002  825.85   69.31  823.7971.79004   822.773.41003  821.97
75.47003  821.0777.42004  820.19   81.31  818.5482.59003  817.9884.65002  817.02
89.45001  814.8891.89001  813.8193.46002   813.296.91003  811.7197.95001  811.25
   102.8  809.29  103.31  809.01  104.34  808.99  109.49  808.84   111.7  808.79
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116.04	808.64	118.15	808.61	120.53	808.61	122.06	808.61	127.71	808.74
129.53	808.78	136.21	808.88	137.66	808.9	140.67	808.88	142.36	808.86
145.57	808.75	148.63	808.75	151.57	808.83	154.11	808.81	155.77	808.83
164.33	808.83	169.45	808.83	169.63	808.83	177.07	808.82	177.63	808.83
178.39	808.84	181.64	808.88	184.46	808.99	187.11	808.99	193.1	808.93
195.54	808.88	201.69	808.74	206.91	808.56	209.7	808.45	212.69	808.36
213.71	808.3	216.98	808.35	217.72	808.3	220.07	808.54	220.53	808.58
220.67	808.57	220.93	808.51	221.73	808.25	225.56	807.25	225.74	807.22
228.31	806.12	229.71	805.53	229.74	805.5	229.84	805.41	233.75	802.54
234.13	802.29	237.76	799.46	238.78	799.12	239.62	799.15	241.44	799.19
244.2	798.47	246.66	797.47	246.68	797.47	246.69	797.47	248.68	797.85
254.52	798.68	257.8	799.15	259.18	799.12	260.36	799.14	261.52	799.3
263.04	799.57	264.64	799.97	265.65	800.19	266	800.27	266.52	800.38
266.55	800.4	267.33	800.85	268.33	801.4	269.03	801.7	269.83	802.27
272.73	803.63	273.96	804.39	274.81	804.38	281.3	805.08	281.97	805.08
282.77	805.09	289.87	805.12	291.24	805.12	292.67	805.09	294.17	805.08
311.77	805	312.75	804.98	313.92	804.99	317.54	805	332.2	805.02
335.02	805.03	339.05	805.07	341.34	805.2	343.74	805.23	345.62	805.29
346.31	805.32	350	805.57	351.98	805.71	353.84	805.9	360.26	806.66
362.03	806.87	365.13	807.29	370.04	807.94	372.65	808.25	373.84	808.4
375.64	808.48	378.06	808.67	379.93	808.67	382.07	808.72	384.22	808.66
386.08	808.62	389.15	808.48	394.09	808.29	409.21	807.69	409.85	807.66
410.04	807.65	410.13	807.65	410.29	807.64	412.71	807.57	418.37	807.39
420.8	807.49	422.15	807.56	422.81	807.57	424.54	807.66	429.1	807.86
434.18	808.02	436.63	808.14	440.26	808.29	443.02	808.44	446.34	808.56
452.48	808.88	454.22	808.94	455.44	808.99	459.11	809.16	462.24	809.22
474.25	809.52	474.26	809.52	485.86	809.72	492.93	809.76	493.67	809.78
494.05	809.78	499.2	809.78	506.33	809.77	516.48	809.63	517.57	809.62
518.07	809.6	518.72	809.58	519.42	809.57	526.37	809.53	526.76	809.53
537.4301	809.64	538.4	809.66	541.99	809.77	550.42	809.95	551.9	809.99
553.28	810.01	560.08	810.08	567.5	810.17	571.08	810.14	571.87	810.17
572.9	810.14	575.86	810.06	578.19	810.03	578.51	810.02	585.69	809.97
588.88	809.92	589.79	809.9	591.42	809.9	595.2	809.96	596.52	809.99
599.03	810.06	600.03	810.14	602.11	810.21	604.33	810.23	612.83	810.29
618.57	810.28	622.73	810.28	629.93	810.2	630.44	810.2	630.92	810.18
642.15	809.94	643.07	809.9	644.11	809.83	645.21	809.86	647.4	809.82
648.31	809.89	650.67	809.97	651.68	810.02	654.47	810.07	655.98	810.08
657.55	810.08	660.29	810.12	663.71	810.17	664.59	810.2	666.79	810.3
668.9	810.45	669.87	810.54	680.93	811.99	682.19	812.16	683.15	812.28
685.27	812.55	688.07	812.8	690.55	813.05	691.43	813.07	697.02	813.25
699.95	813.34	700.97	813.4	701.78	813.43	703.04	813.49	704.31	813.56
707.44	813.69	728.12	814.35	728.76	814.36	728.91	814.37	729.25	814.38
729.41	814.38	729.61	814.39	731.94	814.49	738.34	814.72	741.36	814.73
743.12	814.74	743.86	814.73	746.42	814.72	747.75	814.73	748.2	814.72
749.2	814.84	749.83	815.04						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	220.93	.055	281.97	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
220.93	281.97	209.68	144.3	84.88	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 779.43

INPUT
Description:
Station Elevation Data num= 340

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.73	1.730042	836.48	3.530029	836.21	6.030029	835.97	6.619995	835.87
8.150024	835.61	0.32001	835.22	12.79999	834.63	14.60999	834.14	16.60999	833.58
19.17999	832.85	22.07001	832.02	22.54004	831.89	27.13	830.54	29.73004	829.78
31.34003	829.29	31.78003	829.15	34.42999	828.35	36.07001	827.83	37.52002	827.33
40.35999	826.34	40.47003	826.34	1.23004	826.01	43.70001	825.06	44.66003	824.74
46.79004	824.05	48.95001	823.48	52.26001	822.66	52.97003	822.49	53.23999	822.42
56.67999	821.41	57.65002	821.11	60.89001	819.96	66.12	818.08	68.41998	817.28
74.32001	815.47	74.64001	815.37	74.70001	815.35	74.95001	815.29	78.98999	814.27
80.78003	813.88	3.29004	813.13	84.19	812.88	85.35004	812.55	89.02002	811.5
91.87	810.55	93.13	810.21	96.16003	809.52	96.38	809.5	99.31	809.32
100.46	809.32	102.4	809.21	104.75	809.13	105.49	809.07	107.41	808.91
108.58	808.83	109.04	808.8	110.08	808.72	113.33	808.48	114.76	808.38
117.62	808.26	117.85	808.25	118.44	808.25	120.94	808.21	121.92	808.22
124.03	808.29	126.21	808.47	127.12	808.53	129.47	808.79	130.45	808.91
132.99	808.98	134.79	808.91	136.39	808.85	139.09	808.57	139.48	808.54
143.38	808.24	145.66	808	147.67	807.86	151.52	807.5	151.84	807.48
151.96	807.48	152.24	807.47	155.96	807.05	156.61	807.2	156.98	807.22
158.09	806.9	160.55	805.71	161.11	805.42	162.55	804.89	164.2	804.13
164.84	804.02	166.6	803.46	167.51	803.64	168.4	804.09	169.66	804.63
170.23	804.79	173.42	805.05	173.47	805.07	173.58	805.08	177.72	805.59
178.41	805.69	181	806.77	182.01	807.35	183.28	808.19	184.61	808.38
185.83	808.83	186.3	808.89	188.92	808.6	190.59	808.6	192.01	808.52
194.89	808.42	195.1	808.43	195.64	808.46	198.18	808.56	199.18	808.44
201.28	808.47	203.47	808.12	204.37	808.05	206.67	807.34	207.46	807.12
207.76	807.07	210.55	806.15	212.05	806.04	212.93	805.68	215.82	806.12
216.35	806.29	216.67	806.44	217.7	806.46	220.31	806.81	220.64	806.79
222.9	806.53	224.93	806.42	225.99	806.36	232.01	805.96	233.52	805.9
234.53	805.88	236.68	805.67	239.38	805.43	241.07	805.4	244.02	805.62
247.62	806.1	249.4	806.59	250.7	806.78	250.78	806.77	253.8	806.67
254.98	806.45	256.71	806.35	258.99	805.27	259.27	805.01	259.98	804.39
261.81	803.06	263.07	802.13	263.72	801.66	265.42	800.28	266.25	800.23
268.88	800.03	270.04	799.95	275.49	797.61	275.5	797.59	275.59	797.61
281.61	799.16	283.87	799.19	284.7	799.2	286.93	799.33	287.62	799.37
289.31	799.48	295.01	799.92	298.65	800.25	303.76	800.6	304.17	800.75
307.42	801.84	308.95	802.34	309.99	802.54	310.78	802.65	312.51	803.05
315.07	803.45	315.6	803.56	316.96	803.76	318.69	804.02	319.36	804.08
321.78	804.28	323.65	804.41	324.87	804.4	327.95	804.31	327.96	804.31
327.99	804.3	331.05	803.58	332.24	803.18	334.14	802.43	336.1	801.7
338.42	801.09	339.78	801.09	342.28	801.11	345.11	801.25	346.5	801.24
349.41	801.02	349.58	801.02	350.04	801.05	352.16	801.15	353.7	801.37
355.76	801.62	357.99	801.97	359.57	802.24	361.07	802.27	361.94	802.33
362.28	802.24	365.03	801.33	366.58	800.96	368.12	800.64	370.87	800.64
371.21	800.64	372.1	800.82	374.3	801.1	375.16	801.3	377.39	802.01

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  379.45  802.58  380.48  802.76  383.13  803.28  383.74  803.41  386.66  804.41
  388.04  804.85  389.75  806.17  392.33  807.92  392.52  808.08  394.16  808.29
  395.93  808.65  397.96  808.58  399.21   808.9  401.38  808.88  403.28  808.89
   412.8  808.83  429.92  808.86  430.63  808.86  439.19  808.75  439.45  808.75
  439.73  808.74  440.35  808.72  443.84  808.63  445.37  808.62  447.33  808.58
  450.51   808.6  454.64  808.63  456.68  808.65  467.68   808.6  471.42  808.64
  473.18  808.53  475.27  808.49  477.02  808.43  480.79  808.29  483.89   808.2
  485.53   808.1  491.32  807.84  492.33  807.79  497.89  807.66  499.33  807.64
  503.93  807.67  504.16  807.67  504.45  807.67  508.98  807.68  510.25  807.69
  512.51  807.75  512.99  807.76  520.15  807.93   532.4  808.12  533.97  808.18
  540.36  808.47  541.74  808.52  542.56  808.53  543.77  808.53  550.42  808.67
  552.79  808.72  555.43  808.75  556.11  808.77   567.5  809.12  568.52  809.16
  568.96  809.18  578.86  809.46  590.59  809.69  592.78  809.71  602.47  809.99
  602.95     810  603.71  810.01  609.13  810.04  611.23  810.01  621.79  809.93
  623.53  809.92  624.11  809.92  624.57  809.91  632.69  810.05  636.79  810.15
  636.93  810.15  636.99  810.15   650.3  810.25  652.85  810.24  654.67  810.24
  658.19   810.2  662.74  810.19  665.37  810.19  675.62  809.94   677.1  809.93
  678.44  809.83  679.99   809.8  683.28  810.07   684.2   810.1  686.37  810.09
  688.49  810.09  689.46  810.06  691.94  810.03  692.55  810.03  692.79  810.03
  693.33  810.04  697.08  810.06  698.73  810.09  701.37  810.23  701.82  810.28
  702.97   810.4  704.91  810.59  707.38  810.91  717.27   812.3   719.6  812.58
  720.73  812.76  723.32  813.02  726.54  813.12  727.53  813.15  733.95  813.34
  734.48  813.37  735.77  813.42  737.76  813.51  738.87  813.57  741.61  813.69
  759.59  814.26  762.98  814.34  763.77  814.37  765.65  814.42  766.49  814.44
  767.24  814.49  767.58   814.5  772.32  814.69  775.34   814.7  777.45  814.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  256.71    .055  323.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        256.71  323.65             55.27   59.74   21.26             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 719.69

INPUT
Description:
Station Elevation Data    num=     346
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     8404.030029  839.28 5.77002  838.965.930054   838.99.290039  837.83
9.960022  837.6212.87006  836.3713.99005  835.9616.45001  835.0220.06006  833.75
22.06006  833.0324.84003  832.0430.12006  830.1830.76001  829.9335.79004  828.06
37.91003  827.27   38.19  827.1838.53003  827.0745.07001  824.9545.74005  824.75
   46.25  824.5347.77002  823.9750.28003  823.0852.23004  822.4254.31006  821.71
55.57001  821.2858.35004  820.36   61.63   819.262.59003  818.8866.33002  817.43
66.46002  817.3767.54004  816.9370.12006  815.87   70.44  815.74   73.69  814.49
74.47003  814.1975.07001  813.9878.05005  812.8980.10004  812.3482.54004  811.55
83.46002  811.2984.43005  811.1489.34003     81090.60004  809.8791.58002  809.82
   94.63  809.3795.16003  809.4598.67004  810.7598.74005  810.76101.4901  811.25
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105.15	811.23	106.73	811.2	111.32	811.18	113.7	811.17	115.04	811.03
115.3101	810.99	115.67	810.81	118.83	808.94	120.76	807.82	122.33	807.24
122.86	807.28	126.29	807.14	126.7	807.13	130.14	807.16	140.02	807.17
145.25	807.12	147.05	807.11	148.14	807.1	152.5	807.03	155.1201	807.01
155.98	806.9	159.15	806.65	159.5601	806.53	162.82	806.02	163.14	805.97
163.1801	805.96	166.72	805.27	167.21	805.18	170.3	804.09	171.2401	803.89
173.8701	803.75	175.28	803.37	177.09	803.15	180.78	802.92	182.89	802.34
183.33	802.31	184.61	802.06	187.3701	801.49	188.1801	801.32	191.41	800.85
191.76	800.78	194.57	800.99	195.26	801.04	198.1201	801.63	198.17	801.64
198.85	801.79	200.6801	802.09	201.54	802.27	202.5	802.41	203.5	802.54
207.44	802.86	207.94	802.9	208.22	802.91	211.57	803.15	213.23	803.41
215.6	803.75	216.8101	803.98	219.63	804.51	221.13	805.1	222.98	804.97
223.66	804.75	226.33	804.33	227.5601	804.07	227.69	804.13	231.1201	804.51
231.73	804.61	234.7	804.91	235.27	804.99	236.22	805	236.57	805
240.73	805.03	242.54	805.06	243.7401	805.08	247.14	805.21	250.91	805.29
252.46	805.35	253.6	805.3	254.95	805.28	256	805.24	257.79	805
260.0601	804.93	260.64	804.89	261.1	804.89	263.4901	804.62	265.38	804.61
268.25	804.3	269.19	803.83	271.28	802.94	272.04	802.74	272.23	802.72
276.6201	800.02	277.48	799.61	279.48	798.38	279.6	798.34	279.6801	798.29
279.7	798.28	279.72	798.28	279.77	800.08	282.18	799.97	283.43	799.91
285.92	799.79	286.42	799.77	286.97	799.75	294.82	799.4	296.74	799.31
297.67	799.27	300.42	799.17	301.83	799.13	303.37	799.04	305.31	799.05
309.06	799.02	311.78	799.16	311.91	799.16	311.93	799.16	312.32	799.1
313.08	799.2	313.67	799.3	314.78	799.45	315.6	799.49	317.11	799.68
317.61	799.75	320.54	800.22	323.65	800.77	324.86	801.3	326.83	801.98
327.29	801.97	329	802.37	331.17	802.53	331.85	802.51	332.38	802.59
334.7	802.63	337.48	802.8	337.55	802.8	337.64	802.79	340.39	802.76
342.57	802.47	343.24	802.46	343.98	802.2	346.57	801.78	349.09	800.76
349.18	800.77	352.75	800.7	354.64	800.67	357.03	800.67	357.12	800.66
357.84	800.69	362.81	800.77	363.13	800.78	363.28	800.77	363.57	800.74
364.39	800.67	368.57	800.36	369.96	800.25	371.73	800.22	373.32	799.9
375.76	799.69	376.49	799.83	376.67	799.86	377.98	799.94	379.2	800.45
380.27	800.81	382.88	801.69	383	801.73	383.3	801.87	385.97	802.98
388.4	804.26	388.59	804.35	389.35	804.89	391.66	806.39	393.49	807.06
394.51	807.4	398.58	807.8	399.62	807.87	402.28	808.05	405.91	808.35
408.74	808.48	408.75	808.49	408.84	808.49	413.86	808.55	414.24	808.55
414.59	808.55	422.65	808.57	441.06	808.6	443.46	808.61	444.28	808.62
445.6	808.65	446.58	808.65	449.5	808.66	451.48	808.72	455.98	808.88
456.42	808.9	456.85	808.91	464.77	808.87	465.38	808.86	469.87	808.87
472.34	808.88	473.38	808.9	474.96	808.91	479.85	808.96	480.15	808.96
482.45	808.95	485.95	808.79	487.62	808.72	488.51	808.65	489.13	808.64
490.22	808.59	493.18	808.48	495.36	808.4	499.58	808.29	500.71	808.21
504.66	808.04	510.33	807.78	513.05	807.71	516.01	807.66	516.14	807.66
516.46	807.65	521.03	807.59	524.6	807.6	525.4	807.59	527.42	807.6
543.35	807.86	546.09	807.95	551.0601	808.18	554.6801	808.37	555.6	808.39
557.32	808.5	561.6	808.59	563.27	808.58	565.52	808.59	567.57	808.61
569.97	808.67	575.97	808.85	581.59	809.05	584.04	809.16	590.3	809.34
605.64	809.63	608.5	809.66	612.95	809.79	617.9901	809.97	621.75	809.98
624.16	810	632.2	809.95	636.32	809.93	639.59	809.88	644.91	809.97
647.75	810.04	649.21	810.06	650.33	810.09	652.79	810.13	665.87	810.2
667.37	810.21	674.9901	810.19	681.2	810.18	687.88	810.02	692.0601	809.98
692.1801	809.97	694.73	810.04	696.47	810.18	697.86	810.37	700.02	810.29
700.76	810.21	701.32	810.17	702.72	810.12	704.4	810.07	705.0601	810.06

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  706.57  810.04  709.36  809.98  710.87  809.87  713.66  809.98713.6801  809.98
  716.75   810.3  717.95  810.42  724.63  811.37732.1801  812.44  733.42  812.59
   735.9  812.97  736.09     813  736.44  813.01739.4301  813.12  746.54   813.3
  747.78  813.34  747.86  813.34  749.58  813.41  752.26  813.53  753.22  813.59
  755.59  813.69   771.2  814.18  776.98  814.33  778.33  814.37  781.51  814.46
  782.94  814.49783.4901  814.53  784.73  814.56  787.41  814.67789.1201  814.68
  792.78  814.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  268.25    .055     329     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        268.25     329             7.44   57.68  143.59             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  101.49  811.25       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 662.01

INPUT
Description:
Station Elevation Data    num=     315
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  840.251.290039  839.983.460022  839.484.690002  839.235.929993   838.9
10.42999  837.2411.52002  836.86      15  835.5815.97003  835.2417.67004  834.62
19.57001  833.9324.14001  832.31      26  831.6727.89001     831   28.38  830.81
31.66003  829.4333.97003  828.52   35.87  827.7137.89001  826.9339.71002  826.35
41.17004  825.8143.73999  824.9744.77002   824.647.77002  823.5949.54999  822.99
55.58002     82155.83002  820.9259.17999  819.7560.22003  819.4363.07001  818.29
64.45001  817.6266.11005  816.8974.42999  813.6877.17999  812.5879.98999  811.58
83.57001  810.9283.86005  810.84   84.38  810.7887.36005  810.6487.98004   810.6
88.04999   810.691.58002  810.6492.08002  810.6293.70001  810.8194.85004  810.99
98.78003  810.99  100.14  811.08  104.19  811.07  108.19  811.07  110.43  811.05
  112.33  811.04  112.38  810.99  112.56   810.6  115.24  808.44  116.25  808.36
  116.78  808.26  120.28  807.28  120.38  807.27  122.19  806.99  122.75  806.97
  136.05  807.05  149.18  807.12   153.4  807.09  153.62  807.09  153.69  807.09
  156.39  806.82  156.53  806.79  159.98  805.43  160.56  805.27  163.58  804.02
  164.69  803.45  167.69  802.96  170.43  802.94  172.64  802.86  175.89  802.88
  177.14  802.95  177.99  802.97  184.73  803.04  185.19  803.03  187.79  802.99
  188.75  802.77  188.79  802.77  189.05  802.72  192.39  802.01  192.78  801.92
  195.99  801.78  196.81  801.83  199.59  801.92   201.2  802.26   204.2  802.23
  208.02  801.81  210.04  801.49  211.14  801.06  212.52  801.18  214.76  801.99
  216.45  802.78  217.59   803.1  220.98  804.06  221.19  804.11  222.94  804.41
  224.79  804.74  225.01  804.74  228.39  805.16  229.04  805.17  231.99  805.27
  233.06  805.23  235.59  804.87  237.09  804.74  239.19  804.31  241.12  804.27
  241.93  804.04  244.51  804.89  244.63  804.94  244.81  804.97  249.18  805.01
  249.99  805.05  250.28  805.05  253.19  804.99  254.22  804.97  259.82  804.07
  261.21  803.77  261.83  803.57  264.21  803.25  265.21  803.33  267.06   803.2
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  269.22  803.13  273.77  802.92  277.24  802.83   279.9  802.34  281.25  802.05
  284.18  801.27  285.26   800.9  286.81  800.45  286.97  800.41  287.83  800.37
  292.74  800.03  293.27  799.99  297.16  799.78  299.53  798.47   302.6  796.85
  303.24  796.71  309.25  798.22  311.03  798.28  312.74  798.33  320.74  798.71
  324.83  799.15  326.99  799.16  329.34  799.16  331.27  799.19  333.35  799.22
  335.55  799.29  337.36  799.36  339.83  799.51  341.37  799.64  342.72   799.8
  348.39  800.57  349.58   800.7  350.17  800.78  350.38  800.94  353.22  802.83
  353.39   802.9  356.95  805.01   357.4  805.14  357.59  805.11   361.3  806.68
  361.41  806.84  363.98  807.04  365.42  807.14   369.1  807.23  372.37  807.27
  373.43  807.27  377.03  807.36  378.36  807.37  381.45  807.43  382.64  807.43
  385.46  807.41   389.2  807.37  395.87  807.31  405.15  807.32  416.88  807.29
  417.81  807.29  418.34  807.29  424.21  807.27  435.24  807.34  437.56  807.36
  438.65  807.37  440.69  807.37  445.58  807.38  448.26  807.39  449.59  807.37
     452  807.36   453.6  807.35   454.8  807.38  460.82  807.24  461.61  807.22
  466.67  807.14  469.63  807.11  476.81  807.02  478.02  807.01  481.65     807
  481.91  807.01  482.58  807.01  488.36  807.06  491.03  807.04  493.68  807.07
  493.94  807.07  494.08  807.07  500.28  807.04  500.71  807.04  506.23  807.02
   509.7  807.04  513.32  807.01  516.47     807  517.69  806.98  519.98  806.88
  522.96  806.68  523.83  806.68  530.64  806.56  532.01  806.56     533  806.55
  540.01  806.56   547.1  806.52  556.55  806.53  561.47  806.49  562.47  806.49
  563.44  806.54  569.02  806.77  571.23  806.85  572.24  806.89   573.2  806.96
  581.36  807.49  585.96  807.99586.3101  808.02  593.19  808.65  594.25  808.73
  595.37  808.81  597.24  808.98  597.79  809.01  600.54     809  602.35  809.03
  604.22  809.04  620.53  809.13  632.82  809.15  646.82  809.17  651.12  809.17
  654.09  809.16  667.42  809.02  678.65  809.01  686.59  809.02  689.77     809
  694.64  808.99  695.46  808.98  697.94  808.98  701.26  808.82  701.41  808.82
  701.49  808.81  701.95  808.95  702.99  809.04  704.05  809.17  704.26  809.15
  706.99  809.15  708.66  809.09  710.24  809.04   717.6  808.87  724.52  808.87
  726.26  808.86  728.11  808.93  733.08  808.99  735.93  808.99  736.55  808.99
  737.07     809  739.22  809.07   743.2  809.21  744.82  809.27  747.27  809.38
  748.06  809.44  749.39  809.59  751.58  809.87  754.32  810.23  756.62  810.55
  765.39  811.65  766.72  811.78  769.03  812.08  770.97  812.33  776.91  812.83
  777.48  812.82  781.62  812.88  783.47  812.95  785.74  813.01  794.36  813.09
  795.83  813.12  799.69  813.29  799.86  813.27   802.1  813.33  806.55   813.4
  809.08  813.48   813.8  813.63  814.42  813.65  814.69  813.67  816.36   813.7
  836.13  814.02  836.47  814.05  838.01  814.18  838.15  814.23  838.36  814.25
  839.76  814.35  840.68  814.22  843.15  813.25  845.08  813.34  846.18  813.18
  847.27  813.51  848.79  813.75  849.48  814.06  851.81  814.86  854.58  816.19

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  254.22    .055  363.98     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        254.22  363.98             6.58   55.11   38.66            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  100.14  811.08       F

CROSS SECTION


RIVER: BUCKEYE_CR
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REACH: 317437_BUCKEYE_C RS: 606.9

INPUT
Description:
Station Elevation Data num= 331

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840.35	1.630005	839.96	2.469971	839.77	5.25	839.05	6.5	838.71
8.880005	837.96	10.52002	837.39	14.13	836.21	18.57001	834.67	19.75	834.29
22.59998	833.33	23.38	833.09	26.62	831.95	28.14996	831.26	28.81	831
30.59998	830.36	30.64001	830.35	34.26001	828.89	34.66998	828.72	35.17999	828.53
41.51001	825.97	42.71997	825.53	44.22998	824.99	48.20001	823.48	53.40997	821.72
54.78998	821.22	57.78998	820.12	59.63	819.44	66.83997	816.59	66.85999	816.58
66.88	816.57	66.89996	816.57	77.5	812.24	80.09998	811.16	80.38	811.06
80.60999	810.99	81.37	810.81	86.97998	809.98	87.96997	809.76	90.46002	809.74
90.89996	809.74	92.26001	810.09	94.32001	810.43	98.48999	810.75	99.51001	810.88
103.08	810.99	103.13	810.99	103.63	810.98	107.1	810.92	110.38	810.19
111.13	810.02	114.01	809.05	115.15	808.52	117.63	807.94	119.18	807.64
121.26	807.37	123.2	807.17	125.62	807.09	127.22	807	144.2	807.08
151.37	807.1	152.75	807.15	155.39	807.16	157.27	806.23	159.42	805.28
161.8	804.18	163.44	803.26	164.76	803.03	167.47	802.6	168.39	802.61
171.49	802.5	172.01	802.54	172.44	802.58	178.15	802.88	182.89	803
183.56	803.01	184.4	802.99	190.14	802.89	191.61	802.76	193.45	802.68
196.81	802.6	198.81	802.56	199.66	802.52	202.49	802.39	204.64	802.3
210.23	801.68	211.91	801.64	213.36	801.42	213.92	801.31	214.63	801.5
219.78	802.92	222.76	803.66	223.8	803.89	226.39	804.49	227.83	804.76
230.01	805.3	231.85	805.56	232.86	805.87	238.38	804.86	239.65	804.45
239.9	804.43	240.89	804.37	243.92	804.27	245	804.25	249.93	804.56
250.01	804.56	252.92	804.58	254.2	804.57	255.39	804.35	256.5	803.93
258.32	803.91	258.98	803.84	260.84	804.26	264.69	804.13	266.29	804.18
270.58	804.34	271.34	804.35	271.74	804.19	276.47	802.58	277.19	802.27
279.68	801.37	282.36	801.14	285.34	800.77	288.1	800.72	288.25	800.72
291	800.65	294.64	800.7	295.83	800.71	297.03	800.51	302.32	799.64
306.16	799.35	306.32	799.33	306.41	799.33	306.49	799.33	309.89	797.97
313.35	796.58	313.39	796.58	313.39	796.56	323.58	798.9	325.4	799.3
328.54	799.37	331.7	799.41	332.86	799.42	334.42	799.49	335.2	799.49
336.4	800.73	337.15	801.31	341.25	804.58	342.6	805.51	347.14	806.64
348.05	806.81	353.03	807.08	353.35	807.09	359.34	807.11	369.85	807.15
369.93	807.15	370.09	807.15	370.37	807.15	370.46	807.16	370.83	807.17
375.8	807.26	377.26	807.34	383.63	807.54	385.53	807.78	388.01	807.89
388.56	807.92	389.8	807.95	391.59	808.01	392.38	808.01	394.62	808.01
396.76	807.95	397.65	807.91	399.65	807.78	400.68	807.73	402.32	807.67
405.97	807.47	406.24	807.47	419.93	807.41	424.15	807.42	429.21	807.47
434.02	807.51	436.85	807.58	437.79	807.58	440.53	807.47	443.11	807.45
448.92	807.38	449.15	807.37	449.34	807.37	452.15	807.36	458.26	807.33
458.64	807.33	462.94	807.31	465.99	807.24	466.79	807.19	468.63	807.15
470.39	807.09	477.2	807.02	478.6	807	480.44	807.05	485.54	807.14
487.95	807.31	488.29	807.32	488.45	807.32	491.6	806.95	492.73	806.87
494.4	806.91	500.69	806.9	501.8	806.91	504.74	806.94	514.09	807.03
517.9	807.02	519.31	807.04	520.44	807.04	523.69	807.07	527.75	806.97
528.06	806.96	529.59	806.93	530.05	806.93	537.61	807.07	540.09	807.1
544.06	807.02	545.57	806.99	546.15	806.96	547.04	806.95	552.35	806.92
554.21	806.95	556.13	806.95	558.7	806.94	565.14	806.99	567.46	806.96
570.35	806.92	572.78	806.91	576.21	806.81	576.46	806.8	579.03	806.71

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  584.83  806.48  586.34  806.46  589.58  806.48  592.86  806.54  594.64  806.55
  600.62  806.55  610.63  806.57   611.8  806.56  612.55  806.55  617.38  806.49
   620.4  806.61   626.5  806.87  627.98  806.91  636.15  807.47  639.58  807.69
  640.82  807.83  641.86  807.93     646  808.23  646.24  808.25  646.43  808.26
  650.62  808.54  654.75  808.74   655.1  808.76  655.86  808.79  658.29  808.87
  661.12  808.93  674.49  809.01  676.55  809.02  677.43  809.02  701.71  809.05
  709.38  809.04   710.2  809.04  713.82     809  734.82  808.97  740.47  808.98
  746.71  809.02  748.79     809  757.62  808.97  764.25  808.92  766.66  808.92
  772.41  808.84  773.17  808.83  773.67  808.84  775.61  808.77  777.39  808.65
  780.29   808.8  781.92  808.85  782.55  808.86  783.96   808.9  785.62  808.95
   786.3  808.96  793.81  809.06  794.67  809.06  796.04  809.12  800.73  809.35
  803.67   809.6  803.77  809.61  803.91  809.63  808.18  810.09  814.27  810.75
  816.13  810.96  818.44  811.24  823.48  811.88  825.69  812.11  828.01  812.35
  830.06   812.5  831.04  812.58  833.23   812.7  834.07  812.75  834.44  812.76
  838.99  812.89  844.56  813.03  849.73  813.07  852.13  813.13  854.98  813.25
  861.31  813.41  866.12  813.53  871.46  813.68  872.68  813.71  875.38  813.76
  887.46  813.93  892.04  814.01  892.09  814.01  892.33  814.03  892.35  814.04
  892.52  814.06  895.47  814.38   896.3  814.29  898.16  813.39     900  813.13
  902.21  813.38     904   813.5  904.47  813.62  906.28  813.95  909.84  814.52
  910.93  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  271.34    .055  348.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        271.34  348.05             5.06   51.18    4.03             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  103.08  810.99       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 555.72

INPUT
Description:
Station Elevation Data    num=     349
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  840.72.159973  840.175.549988  839.296.899963  838.948.429993  838.45
12.39996  837.2317.66998  835.5618.27002  835.3621.52997  834.3722.29999  834.13
23.27997  833.8427.35999  832.9327.89996  832.7130.35999  831.3832.32001  830.53
34.39001  829.6335.90997  828.9938.41998  827.94   41.62  826.6442.20001   826.4
43.09998  826.0348.45996   823.953.60999  821.8254.53998  821.4859.83002  819.46
62.59998  818.4565.03998  817.5966.83002   816.969.02002  815.9470.64996  815.17
71.84998  814.6374.67999  813.41   75.44  813.1578.70996   811.979.02997  811.82
   81.69  811.07   82.69  810.7882.89001  810.7389.82001  809.3990.35999  809.23
90.70996  809.23   92.06  809.5494.83002  809.82      97  810.22  101.23  810.71
  102.86  810.96  105.88  810.93  107.28  810.91  107.78  810.73  110.95  810.04
  112.83   809.4  114.98  808.74  118.57  807.88  119.01  807.78  122.16   807.3
  123.03   807.2  125.75  807.06  127.06  806.99  130.94  807.01  133.99  807.02
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147.07	807.07	148.87	807.06	150.3	807.07	152.96	807.06	155.27	807.05
156.44	807.04	158.52	806.08	160.99	804.63	162.16	803.82	164.18	802.19
166.45	801.87	167.36	801.95	168.88	802.13	171.39	802.14	172.47	802.29
175.41	802.5	179.17	802.81	179.56	802.85	181.8	803	185.76	802.94
189.5	802.91	191.53	802.89	196.05	802.87	196.63	802.86	197.41	802.87
200.25	802.88	200.61	802.88	201.27	802.9	204.87	803.03	208.09	803.09
208.25	803.11	208.54	803.13	209.32	803.15	213.91	803.69	214.49	803.76
217.06	804.29	219.65	804.77	220.23	804.85	222.18	805.23	224.82	804.74
225.73	804.73	229.97	804.28	231.29	804.2	232.87	804.09	234.89	803.95
237.4	803.39	240.32	802.57	245.47	801.24	245.49	801.23	245.51	801.23
250.65	800.4	251.83	800.36	254.03	800.2	255.2	800.23	256.58	799.76
257.14	799.54	257.55	799.5	259.43	799.34	260.99	799.28	264.47	799.18
265.4	799.16	266.15	799.16	266.97	798.74	274.5	798.11	277.87	796.64
278.05	796.69	279.25	797.11	285.3	799.18	286.82	799.19	293.95	799.25
294.06	799.25	294.08	799.26	294.16	799.3	294.46	799.26	296.65	800.31
297.18	801.55	301.98	805.01	302.32	805.29	302.39	805.31	307.48	805.92
308.71	806.02	312.65	806.29	313.72	806.35	314.77	806.45	318.88	806.58
321.35	806.3	322.4	806.23	322.98	806.18	324.11	806.09	330.78	805.63
331.63	805.57	333.27	805.62	334.8	805.69	338.22	806.04	340.86	806.24
342.03	806.31	345.12	806.53	346.42	806.65	346.91	806.68	348.02	806.71
349.94	806.79	353.05	806.83	355.99	806.88	362.89	806.86	365.08	806.86
368.97	806.77	370.44	806.76	371.18	806.77	372.96	807.07	373.25	806.99
376.95	807.02	377.09	807.01	377.4	807.01	381.47	807.06	384.17	807.06
387.89	807.11	391.11	807.15	393.26	807.19	398.05	807.44	399	807.47
400.64	807.68	403.38	808.02	406.78	808.33	407.46	808.37	407.77	808.38
410.49	808.47	412.15	808.43	413.52	808.35	416.53	808.12	416.54	808.12
416.57	808.12	419.57	807.79	421.14	807.52	422.67	807.43	423.7	807.44
429.7	807.42	441.61	807.43	448.23	807.49	451.59	807.51	455.74	807.51
455.92	807.51	455.97	807.51	456.16	807.51	460.78	807.43	462.28	807.42
465.54	807.39	470.81	807.32	475.33	807.32	477.09	807.31	478.23	807.32
480.31	807.27	482.26	807.15	483.23	807.04	483.97	807.01	485.26	807
491.03	806.98	492.86	806.97	496.36	806.95	499.14	806.95	504.18	807.04
504.35	807.04	504.71	807.02	508.56	806.87	510.4	806.87	515.31	806.86
518.6	806.88	524.29	806.92	525.24	806.93	526.6	806.94	527.54	806.94
534.47	806.98	538.36	806.97	539.19	806.98	543.88	807	546.72	807
547.18	806.99	553.97	807.14	556.76	807.19	559.26	807.13	561.38	807.15
562.1	807.03	563.47	806.99	564.89	806.92	570.5699	806.85	571.14	806.85
573.88	806.89	574.05	806.89	574.29	806.89	583.05	806.94	583.06	806.94
590.22	806.89	591.8199	806.84	595.16	806.78	601.71	806.53	604.33	806.53
605.64	806.55	613.33	806.59	616.38	806.59	626.71	806.62	629.31	806.6
634.39	806.52	636.44	806.56	640.14	806.72	643.93	806.88	646.63	806.95
654.44	807.49	656.44	807.59	657.95	807.67	661.4	807.9	664.8	808.13
666.3199	808.23	667.74	808.3	672.03	808.52	675.08	808.65	676.98	808.78
680.98	808.84	682.21	808.87	686.16	808.89	692.61	808.95	695.07	808.98
717.89	808.99	718.54	808.99	718.86	809	719.09	808.99	719.19	808.99
727.89	808.99	728.49	808.99	736.61	808.98	752.85	808.95	754.74	808.96
756.84	808.97	757.55	808.96	775.45	808.91	783.92	808.85	785.9	808.81
788.71	808.77	789.02	808.77	789.1	808.77	791.03	808.7	792.65	808.62
794.33	808.71	797.78	808.81	801.03	808.87	803.29	808.93	804.06	808.94
810.93	809.03	813.41	809.06	818.09	809.38	819.2	809.43	819.69	809.47
821	809.61	825.25	810.07	833.49	810.97	838.17	811.49	840.89	811.83
841.61	811.91	844.79	812.23	846.45	812.41	847.47	812.48	849.47	812.63
850.37	812.68	852.5	812.8	853.62	812.83	855.13	812.82	859.18	812.93

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  863.38  813.03  867.29  813.07  870.01  813.14  872.39  813.24  877.68  813.37
   881.7  813.47  889.66  813.69  891.46  813.73  895.45  813.81  909.55  814.01
  909.72  814.01  909.87  814.01  909.89  814.01  910.03  814.02  912.18  814.25
  913.72  814.14  916.04  813.23   916.1   813.2  917.79  813.17  920.49  813.48
  925.81  814.28  928.19  814.66  929.25  814.97  931.49  816.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  222.18    .055  302.32     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        222.18  302.32           126.35   73.42    4.69             .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  102.86  810.96       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 482.3

INPUT
Description:
Station Elevation Data    num=     284
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  818.575.879944  816.536.449951  816.336.799988  816.2110.60999  814.91
10.71997  814.8812.15997   814.414.64996  813.5817.85999  813.0618.34998  813.05
18.62994  813.0221.89996  812.7422.63995  812.68    23.5  812.6326.64996  812.45
28.04999  812.3939.83997  811.9742.69995  811.8944.26996  811.8347.60999  811.73
   48.56  811.6749.87994  811.6151.85999  811.4953.89996  811.2157.20996  810.78
61.57996  810.2766.76996  809.6870.35999  809.2370.77997  809.1874.08997  808.68
74.78998   808.6   77.81  807.5178.79999  806.9981.53998  804.92   82.81  804.12
85.26996  802.5986.82996  801.63      89  800.7490.83997  799.8891.90997  799.73
94.85999  798.9495.60999  798.9597.57996  798.9698.85999  798.9999.50995  796.94
99.53998  796.9199.53998  796.92   99.56  796.92  104.54  799.05  114.69  799.04
  116.71  799.04  118.92  799.05123.3799  799.06  126.94  799.08   129.4  799.28
  130.95  799.36  133.73  799.69  134.96  799.85  139.62  800.37  142.83  800.82
   143.6  800.88   144.8  800.99   146.4  801.95     147   802.3  148.64  802.95
151.0099   804.1  152.37  804.31  155.02  804.64   156.1  804.71  159.03  804.82
159.8199  804.85  163.05  804.92   166.8     805  167.06  805.01  167.28  805.01
  167.47  805.01     175  805.01  175.39  805.01  183.83  805.03  183.85  805.03
183.8799  805.03  185.65  805.17  186.87  805.22  189.42  804.99  189.67  804.99
192.7599  805.14  193.44  805.17  195.93  805.36  197.06  805.38  198.86  805.38
  200.56  805.53  201.46  805.75  201.97  805.82202.3799   805.9  206.61  806.73
  209.69  806.81  211.03  806.81  212.75  806.84  214.05  806.87  216.22  806.89
  219.39  806.91  220.09   806.9  222.41   806.9227.8199  806.89232.0699     807
   232.2  807.01  232.22  807.01  232.24  807.01  235.47  807.26  236.61  807.19
  241.73  807.11  244.25  807.07  248.47  807.06   249.8  807.05  250.29  807.04
251.3799  807.05  256.33   807.1  261.04   807.5  262.37  807.58  262.98  807.67
  265.39     808267.3799  808.35  268.42  808.49  271.94  809.23  273.74  809.43
  274.66  809.33  276.17  808.85  280.36  808.23   280.5  808.21  280.56   808.2
  283.52  807.66  284.96  807.51  287.01   807.4  301.66  807.41  303.79  807.41
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  309.33  807.44  311.32  807.45  311.91  807.45  318.11  807.44  321.63  807.38
  326.96  807.34  337.73  807.25   337.8  807.25   338.3  807.23  343.92  807.03
  345.22  806.95  347.01  806.93  350.88  806.92  358.69  806.89  359.18  806.89
  361.38  806.88  364.06  806.88  365.06  806.93  367.93  806.77  368.23  806.77
  368.34  806.77  368.68  806.77  372.85  806.84  374.12  806.84  376.93  806.84
  380.77  806.86  383.03  806.88  389.03  806.92  393.92  806.96  396.08  806.95
  399.08  806.99  405.92  807.02  407.25  807.03  409.17  807.05  411.07  807.04
  415.56  807.15   416.8  807.18  419.43  807.23  422.23  807.42  422.85  807.43
  424.91  807.16  425.51  807.07  425.59  807.07  428.49  806.95  429.98  806.92
  431.51  806.91  433.05   806.9  434.37  806.92  440.24  806.93  445.21  806.97
   451.3  806.89  451.95  806.88  452.37  806.87  453.02  806.86  454.19  806.83
  458.69  806.75  461.17  806.65  462.67  806.65  466.69  806.62  469.97  806.61
  475.64  806.64  479.33  806.68  486.62   806.7  494.43  806.65  495.61  806.63
  503.26  806.77  504.69  806.83  506.54  806.89  509.65  806.97  512.13  807.04
  513.88  807.13519.3099  807.43  525.48 807.83525.8099  807.86  526.66  807.91
528.9399  808.03  533.65  808.29  535.45  808.36  540.43   808.7  542.36  808.73
  544.24  808.76  547.35   808.8  550.76  808.87  553.03  808.89  558.36  808.95
571.0599  808.96  576.46  808.98  579.03     809580.9399  808.97  581.72  808.97
  589.26  808.97  592.13  808.95  614.24  808.93  614.87  808.92  615.53  808.92
620.5599   808.9  637.92  808.85  643.23  808.81  648.97  808.72  649.71  808.71
  651.87 808.51652.0699   808.5  652.23  808.49  656.43  808.72   658.5  808.78
664.0699  808.88  665.38  808.92  667.09 808.93671.6899 808.99676.6899  809.05
  679.65 809.25682.1899  809.53  683.64  809.71  688.23   810.2  694.13  810.84
  701.22  811.63  702.45  811.76  705.28  812.05  709.38  812.48  711.24  812.61
714.9399  812.82  715.42  812.84   717.6  812.91  720.52  812.88  723.49  812.96
  726.59  813.04  729.48  813.06  732.47  813.14  734.47  813.22  738.95  813.34
  742.36  813.42  752.33  813.69  754.58  813.75  759.53  813.85  771.53  814.02
  771.98  814.02  772.39  814.02  772.45     814   772.8 814.04772.8799  814.03
  776.11   813.8  777.16  813.39  778.84  813.19  781.56  813.37  781.86  813.39
   789.8  814.56  790.69  814.68  791.09  814.74  791.41  814.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .0574.78998    .055  206.61     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      74.78998  206.61             58.55   49.95    4.42             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 432.35

INPUT
Description:
Station Elevation Data    num=     301
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  817.471.039978  816.994.169983  815.43 6.98999  814.518.419983  814.25
10.14996   813.811.42999  813.5112.33997  813.3314.07996  812.9515.81995  812.48
16.90997  812.3117.98999  811.9421.48999  811.08   22.56  810.8823.63995  810.87
25.97998   810.828.21997  810.7832.81995  810.7133.87994   810.735.31995  810.67
36.03998  810.6436.69995  810.56   42.06  810.0745.53998  809.7146.22998  809.65
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49.81	809.31	52.25995	809.07	54.15997	808.87	55.63995	808.52	57.51996	807.99
59.32996	807.43	61.14996	806.56	61.98999	806.18	62.15997	805.94	63.16998	805.28
64.98999	804.18	66.81	802.34	67.81995	801.47	68.81995	800.72	70.31995	799.18
72.81995	798.92	73.41998	798.65	73.77997	798.68	73.94995	798.68	93.81995	796.7
93.87	796.79	3.88995	796.79	3.89996	796.79	4.04999	796.73	96.37994	797.62
98.95996	798.6	104.59	798.58	106.47	798.71	107.2	798.72	108.35	798.97
111.21	799.53	113.71	799.86	115.25	800.11	115.9	800.24	117.8	800.67
119.65	801.07	121.56	801.52	123.47	802.12	124.39	802.38	125.3	802.61
127.21	803.11	129.14	803.71	130.04	803.94	130.95	804.05	132.87	804.25
134.8	804.34	135.7	804.44	136.59	804.49	138.53	804.55	140.47	804.63
141.36	804.69	142.24	804.72	146.1299	804.83	147.0099	804.87	147.89	804.9
151.08	805	155	805.01	161.11	805.03	161.33	805.03	161.56	805.04
162.05	805.05	164.5699	805.17	165.08	805.12	166.59	805.13	167.99	805.23
170.14	805.47	172.2	805.67	174.55	805.95	176.62	806.21	178.96	806.59
180.0099	806.79	185.33	806.85	187.1899	806.95	189.08	806.96	191.42	806.94
194.04	806.96	197.71	806.87	201	806.87	203.74	806.86	205.41	806.89
207	806.98	209.8199	807.04	212.77	807.17	215.61	807.13	218.6299	807.15
221.81	807.04	223.04	807.02	226.39	806.95	227.89	806.9	231.45	806.92
233.86	807.05	236.27	807.22	236.9	807.25	238.1899	807.4	239.89	807.58
240.67	807.69	242.9	807.93	245.08	808.26	245.91	808.33	247.71	808.45
249.3199	808.58	249.49	808.57	251.9399	808.72	253.9	808.52	254.93	808.54
257.23	808.14	258.31	807.96	260.82	807.46	263.21	807.49	265.67	807.37
273.41	807.37	279.58	807.38	284.76	807.4	289.08	807.38	293.9	807.37
296.14	807.34	305.09	807.26	311.93	807.21	313.58	807.19	318.87	806.97
320.46	806.88	321.23	806.89	323.85	806.86	324.25	806.86	324.43	806.86
324.94	806.86	331.8	806.87	333.25	806.87	333.28	806.87	333.36	806.87
336.3	806.86	337.66	806.86	338.92	806.83	339.63	807.13	342.01	807.13
342.88	807.08	345.37	806.94	346.47	806.95	349.57	806.91	351.36	806.87
355.29	806.87	356.54	806.86	358.48	806.88	363.16	806.9	366.02	806.92
367.12	806.93	367.61	806.93	372.68	806.99	376.59	807.01	379.88	807.04
384.59	807.08	389.22	807.07	392.33	807.14	393.54	807.15	394.96	807.19
396.55	807.2	399.37	807.15	399.98	807.13	402.58	807.02	403.78	806.99
407.06	806.97	408.82	806.96	409.5	806.96	412.87	806.97	420.02	806.99
420.96	806.99	422.14	806.98	425.82	806.94	428.12	806.86	431.7	806.79
434.64	806.74	435.62	806.77	438.05	806.74	442.44	806.71	449.54	806.69
451.39	806.7	458.92	806.77	460.28	806.78	462.73	806.76	468.03	806.7
469.9	806.69	472.45	806.67	473.13	806.71	480.11	806.83	482.05	806.86
485.39	806.96	487.54	807.02	489.95	807.02	491.21	807.04	494.34	807.21
497.36	807.41	498.31	807.48	500.76	807.62	507.22	807.98	508.92	808.07
509.58	808.1	512.45	808.29	516.38	808.51	518.36	808.58	520.08	808.6
523.71	808.71	525.53	808.73	527.21	808.77	530.1	808.83	533.22	808.9
535.14	808.92	538.45	808.93	548.35	808.97	553	809	556.42	808.95
557.8199	808.95	564.3099	808.95	569.2	808.91	588.0099	808.9	589.85	808.89
591.74	808.88	605.98	808.82	613.96	808.8	616.47	808.78	620.5699	808.72
624.1899	808.7	625.35	808.6	630.15	808.62	632.14	808.72	633.0099	808.75
640.59	808.89	641.09	808.91	643.6	808.93	646.23	808.96	653.14	809.04
653.28	809.05	653.35	809.05	653.39	809.05	653.85	809.1	658.66	809.63
661.6899	809.99	664.6899	810.31	668.58	810.74	673.34	811.26	677.09	811.68
685.5	812.52	685.78	812.55	685.91	812.55	686.2599	812.57	690.83	812.88
694.68	812.96	694.8199	812.96	694.93	812.96	695.02	812.97	698.92	812.93
701.0099	812.99	703.21	813.04	705.27	813.06	708.48	813.14	710.17	813.21
713.97	813.31	716.87	813.38	728.5099	813.7	731.11	813.76	736.8199	813.88
747.14	814.02	747.81	814.03	748.43	814.02	748.5099	814	748.84	814.04

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  749.05  814.04  752.03  813.54  752.06  813.54  752.12  813.53755.0699  813.18
756.4399  813.27  758.09   813.4  763.48  814.19  766.37   814.6  767.67  814.78
  768.47  814.84

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .0557.51996    .055180.0099     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      57.51996180.0099             83.86   62.35    3.34             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 370

INPUT
Description:
Station Elevation Data    num=     340
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.423.559998  820.256.219971  819.397.820007  818.8811.77997  817.62
14.21002  816.8517.48999  815.8519.46002  815.2523.65997  814.4924.22998   814.4
24.71997  814.3229.83002   813.529.90997  813.4929.96997  813.4832.73999  812.96
36.01001  811.9938.41998  811.4140.46997  811.1340.72998  811.0841.54999  811.09
46.51001  810.9948.34998  810.9449.77002  810.9150.46002  810.9160.58997  810.32
60.90997  810.29   61.31  810.2664.54999  810.0170.70001   809.672.46997  809.46
77.33997   809.178.51001  809.0279.27002     80980.97998  809.0683.34998   809.1
83.82001  809.13   85.38  809.1686.65997  809.19    89.5  809.17      93  809.21
94.70001   809.2   95.25  809.1896.71997  809.0499.17999  809.0499.89001  809.02
   102.6  809.85  104.73  810.05  104.98  810.11   105.1  810.12  105.54  810.08
  107.82  810.01  109.11  809.68  110.09  809.51  115.23  808.86  121.48  808.89
  121.51  808.89  121.52  808.89  125.64  808.94  128.09     809  129.77  809.03
  131.38  809.12   133.9  809.04  135.25  809.15  137.62  808.29  138.03  808.17
  141.23  806.77  142.16  805.91  143.74  805.17  147.08  802.75  149.95  801.71
  151.08  801.16  153.65  800.28  154.37  800.03  154.55  799.99  157.65  799.26
  158.66  799.07  159.61  799.07  161.22  799.06  162.07  799.05  164.62     799
   170.6  798.86  171.41  797.99  171.77  797.06     172  796.96  172.03  796.86
  172.07  796.93  172.67  797.34   175.2  798.78  177.12  798.72  180.64   798.7
   182.2  798.67  183.11  798.65  187.02  798.79  187.37  798.84   187.6  798.86
  188.24  798.93  191.95  799.31  192.87  799.51  194.72   799.8  196.34  800.14
  197.21   800.3  198.36  800.66  199.99   801.1  200.35  801.24  201.76  801.91
   203.8  802.97  204.12  802.96  206.92  803.46  208.25  803.64   210.2  803.95
  212.38   804.3   214.7  804.79  216.22   804.8  217.02  804.69  217.65  804.69
  218.15  804.75  220.64   805.1  223.34  805.43  224.77  805.59  227.19  805.84
   228.9  806.02  229.46  806.05  233.03  806.38   233.2  806.39  237.31  806.71
  239.04  806.81  240.44  806.82  243.05  806.88  246.51  806.91  254.79  806.98
  257.03     807  258.52  806.99  258.92  806.99  259.31  806.99  259.67  806.99
  265.48  806.85  265.54  806.85  265.74  806.85  269.96  806.79  274.04  806.85
  274.41  806.85  274.76  806.87  278.79  807.04  280.52  807.14  283.21   807.2
  283.44  807.22   284.2   807.2  287.63  807.11  289.54  807.09  294.95  806.81
  296.44  806.82  300.88   807.1  303.08  807.11  304.67  807.17  305.29  807.27
  307.59  807.47  309.71  807.69   310.6  807.76  312.51  807.88  313.61  807.98
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  314.12  808.01  316.62  808.18  318.54  808.29  319.63  808.35  321.95  808.36
  322.61   808.4  322.96  808.29  325.64  807.69  328.23  807.33  328.32  807.32
  328.55  807.32  333.39  807.38  334.22  807.34  336.84  807.34  346.03  807.35
  349.45  807.37  357.57  807.33  360.34  807.32  361.64   807.3  373.28  807.21
   377.2  807.17  380.03  807.14  380.92  807.11  386.24  806.81  388.82  806.83
   389.2  806.83  393.19   806.9  398.03  806.91  400.86  806.95  402.45  806.92
  404.19  806.87  405.55  806.89  406.87  807.32  410.64   807.1  416.32  806.95
  418.91   806.9  420.12  806.89  422.98  806.86  427.41  806.92  430.04  806.93
  434.46  806.96  437.47     807  439.09     807  443.89  807.04  450.77  807.11
  457.47  807.09  458.76  807.12  459.86  807.13  463.51  807.11  464.03  807.11
  464.28  807.11  464.96  807.09  467.91     807  470.05  807.01  471.67  807.01
  477.59  806.98  482.38  807.02  486.36  807.02  489.86  806.99  490.78  806.97
  491.01  806.98  491.82  806.94  494.55  806.86  498.16  806.79  499.42  806.72
  500.14  806.76  500.72  806.79  502.81  806.85  507.26   806.8  508.44  806.76
  509.53  806.74  517.28  806.71  523.26  806.76  527.78  806.77  529.71  806.76
  530.82  806.75  534.94  806.71  540.51  806.68  541.98  806.77  546.63  806.85
  550.59  806.91  551.82  806.94  552.61  806.96  556.26  806.98  557.88  806.99
  558.41  806.99  559.75  807.01   560.2  807.03  560.63  807.06   562.1  807.17
  565.85  807.38  572.87  807.77  574.69  807.87  575.08  807.89  576.76  807.98
  582.52   808.3  587.03  808.46  587.38  808.47  589.47  808.53  592.97  808.63
  593.07  808.63  595.63  808.72   598.5  808.78  601.19  808.85  603.34  808.92
  605.07  808.93  611.53  808.96  617.94     809  622.63  808.94  624.55  808.94
  630.16  808.93  636.75  808.88  652.75  808.87  655.63  808.85  658.58  808.84
  680.51  808.76  680.65  808.76   680.7  808.76  680.78  808.76  682.31  808.75
  689.42  808.72  689.63  808.72  689.83  808.72  690.31  808.73  698.76  808.73
  706.01  808.88  707.18  808.88  708.88  808.91  710.73  808.92  711.59  808.94
  713.89  808.96   717.5     809  719.27  809.04  720.31  809.09  724.84   809.6
  725.39  809.66  726.25  809.77  727.75  809.95  730.22  810.24  731.79  810.41
  733.84  810.64  736.36  810.92  742.51  811.59   749.2  812.26  752.24  812.54
  753.61  812.69  756.83  812.91  759.26  812.96  761.87  812.97  764.02  812.97
   765.5     813  767.87  812.98  769.15  813.01   770.5  813.05  771.77  813.06
  775.18  813.14  776.57   813.2  779.71  813.28  782.11  813.34  795.39   813.7
  798.35  813.77  804.82   813.9  813.47  814.03  814.37  814.04  815.19  814.02
  815.31  813.99  815.61  814.03  816.02  814.05  817.58  813.78  819.03  813.46
     822  813.17  822.01  813.16  822.13  813.17  825.05   813.4  827.73  813.79
  832.76  814.52  835.01  814.82  835.74  814.88  836.08  815.24  836.87  815.82

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  135.25    .055  240.44     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        135.25  240.44             71.45      70    5.34             .1      .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 300

INPUT
Description:
Station Elevation Data    num=     334
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	820.71	3.440002	819.79	3.880005	819.68	4.609985	819.48	6.330017	819.05
9.419983	818.24	11.09003	817.86	13.60004	817.21	14.83002	816.95	16.41003	816.58
17.85999	816.26	19.06	815.88	23.23999	814.89	23.88	814.76	25.16998	814.53
33.51001	813.02	34.01001	812.93	35.15002	812.76	38.10004	812.24	1.10999	811.57
43.04004	811.39	45.35999	811.33	51.95001	811.19	52.63	811.18	53.20001	811.17
69.73999	810.85	73.63	810.72	74.60999	810.68	77.28003	810.62	79.91003	810.63
81.85004	810.64	90.16998	810.64	91.40002	810.61	95.01001	810.53	105.78	810.36
112.97	810.16	119.66	810.04	121.48	809.99	122.28	809.94	132.61	809.62
133.71	809.6	135.11	809.59	138.23	809.79	138.56	809.79	141.5	810.05
142.7	810.15	143.48	810.69	144.5	810.71	147.29	810.33	148.03	810.52
150.24	810.87	150.99	811.05	151.3	811.11	152.49	811.13	154.9	811.33
155.13	811.26	157.84	810.82	159.27	810.41	161.6	809.55	163.09	809.13
167.12	809.09	167.48	809.1	167.7	809.1	167.99	809.1	174.17	809.11
175.83	809.14	178.74	809.45	179.35	809.46	179.47	809.46	180.24	808.92
183.49	808.82	186.59	808.76	188.25	808.71	191.59	808.6	193.58	808.55
195.91	808.62	197.05	808.77	198.99	809.19	200.8	809.36	202.39	809.87
203.36	810.11	204.81	809.7	206.85	809.37	212.58	809.13	213.09	809.09
214.05	809.12	215.15	809.09	215.63	808.89	217.23	807.88	219.92	806.05
221.37	804.96	223.19	803.52	225.51	801.67	226.45	800.98	228.46	799.38
230.66	799.12	231.11	798.94	231.22	798.89	232.09	798.57	233.27	797.23
233.81	796.83	233.88	796.83	233.89	796.81	233.9	796.82	233.94	796.82
234.01	796.83	235.67	797.24	241.41	798.52	242.07	798.79	242.79	798.77
245.49	798.75	246.2	798.74	246.32	798.74	250.7	798.71	251.17	798.7
252.16	798.7	258.25	798.68	263.14	798.75	263.65	798.81	264.39	798.84
265.66	799	267.15	799.06	269.18	799.91	271.05	801.14	274.72	803.46
275.41	803.95	275.53	803.97	276.49	804.19	278.73	804.89	279.33	805.03
282	805.11	283.47	805.23	285.27	805.32	287.61	805.45	288.54	805.53
291.75	805.79	291.89	805.82	291.99	805.83	295.07	806.27	295.72	806.3
297.31	806.39	300.03	806.43	301.61	806.47	304.17	806.62	307.49	806.75
308.31	806.78	311.41	806.84	312.45	806.87	314.26	806.89	315.61	806.89
317.94	806.86	322.99	806.92	324.14	806.92	324.87	806.9	327.75	806.94
329.03	806.88	331.21	806.99	333.15	806.96	334.28	806.94	337.3	807.04
337.55	807.04	338.49	807.05	341.44	807.1	342.51	807.1	349.65	807.1
353.02	807.17	356.6	807.22	364.01	807.31	366.28	807.33	376.4	807.33
379.21	807.33	382.84	807.3	383.59	807.3	384.66	807.31	384.76	807.31
394.8	807.26	396.81	807.26	398.01	807.25	399.08	807.24	413.64	807.12
414.12	807.15	416.49	807.24	418.23	807.31	419.45	807.46	420.09	807.3
422.51	807.06	424.51	807	425.51	806.97	432.2	806.96	434.05	806.96
437.09	807.03	437.76	807.04	440.55	807.13	442.18	807.2	444.07	807.35
444.31	807.36	444.58	807.36	456.77	806.92	459.31	806.85	460.87	806.84
461.63	806.83	463.89	806.94	464.67	807.05	465.38	807.07	467.63	807.24
468.68	807.26	470.64	807.09	473.1	807.05	473.64	807.05	474.81	807.05
476.29	807.04	477.79	807.06	488.25	807.16	493.72	807.14	495.18	807.13
499.76	807.04	501.91	807	503.46	807	509.74	807.01	516.59	807.03
519.54	807.02	523.53	807.05	526.1	807.01	528.09	807.09	529.17	807.09
531.79	806.95	534.32	806.68	538.06	806.81	539.82	806.81	540.82	806.8
542.7	806.82	543.77	806.79	545.84	806.75	550.25	806.7	551.47	806.68
552.6	806.68	553.48	806.68	569.71	806.71	569.9	806.71	570.27	806.71
574.27	806.66	578.54	806.71	581.47	806.69	584.42	806.87	584.73	806.88
585.21	806.88	589.74	806.85	594.91	806.89	599.98	806.96	602.26	807.05
603.92	807.09	606.83	807.22	610.03	807.39	613	807.54	616.77	807.74
618.77	807.84	621.04	807.96	625.53	808.14	627.06	808.19	630.89	808.3

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  631.39  808.32  637.22  808.53  640.41  808.64   643.2  808.74  645.36  808.76
  648.11  808.89  650.53  808.99  652.78     809  660.11   808.9  663.12   808.9
  666.88   808.9   677.1  808.82  686.95  808.81  692.14  808.78  697.45  808.75
   710.8   808.7  718.58  808.72  722.28   808.7   728.2   808.7  733.99  808.68
  738.68  808.74  742.54  808.76  744.96  808.79  750.39  808.85  751.37  808.86
  754.09  808.94  755.79  808.98  757.72   809.1   759.5   809.2  760.21  809.28
  763.31  809.61  768.12  810.26  769.04  810.37  771.44  810.68  776.58  811.23
  777.87  811.37  778.46  811.43  790.15  812.51  792.17  812.74  793.95  812.89
   795.9     813  800.26  813.02  802.33  813.01  804.87  813.03  807.98  813.02
  808.79  813.05  811.55  813.09  813.92  813.15   814.5  813.17   815.8  813.21
   816.8  813.23  834.69  813.72  838.67  813.81  847.39  813.99  851.17  814.04
  852.75  814.07   854.2  814.04  854.41  813.99  854.63  814.01  855.17  814.03
  855.67  814.01  856.09  814.19  857.55  813.76  857.84  813.64  861.53  813.17
   861.8  813.19  864.69  813.17  870.41  814.19  870.51   814.2  870.63  814.24
  870.91  814.33  873.06  815.03  873.84  815.55   876.2  817.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  215.63    .055  295.72     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        215.63  295.72             88.38     100   89.28             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0   154.9  811.33       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 200

INPUT
Description:
Station Elevation Data    num=     437
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.014.700012     8216.570007  821.0110.65002  821.0112.32001  821.01
17.31006  821.0219.15002  821.0221.28003  820.9924.33002  820.66      25   820.6
25.47003  820.5628.79004  820.1132.90002  819.5135.29004  819.2335.76001  819.17
   38.13  818.9439.34003  818.8240.20001  818.6943.87006  817.9645.02002  817.95
45.07001  817.9445.11005  817.9447.23004  818.8149.65002  818.6550.81006  818.54
51.92004  818.5953.68005  818.5454.93005  818.6456.05005  818.8859.28003  818.97
60.47003  818.9162.28003  818.38   64.75  818.2165.15002  818.1565.71002  818.08
68.02002  817.8569.66003  817.6970.89001  817.5472.61005  817.2974.57001  817.02
79.43005   816.479.49005  816.39    79.5  816.3982.36005  816.2284.39001  816.11
85.23004  816.0886.40002  816.0388.09003  815.9889.30005  815.9390.96002  815.85
93.29004  815.7293.83002   815.796.48004  815.5799.12006  815.4599.57001  815.42
99.86005  815.39  104.57  815.28   105.3  815.27  108.94  815.16  113.91  814.98
  120.88  814.56  121.77   814.5  122.94  814.42  128.11   814.1128.4301  814.08
  130.59  813.93   133.5  813.72  134.19  813.67  134.67  813.64  139.72   813.3
  141.57   813.2  142.59  813.15  143.86  813.12  148.23  812.99  150.92  812.94
  156.47  812.86157.2401  812.83  158.05  812.82  160.48  812.79  172.29  812.71
     176  812.65  181.98  812.47  188.66  812.31  197.55  812.18  198.72  812.14
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204.55	811.94	205.69	811.9	206.89	811.85	213.52	811.65	216.97	811.55
217.16	811.54	217.42	811.54	220.65	811.47	224.7	811.47	225.77	811.48
226.8	811.47	231.21	811.57	231.71	811.57	234.3701	811.62	236.6201	811.75
237.44	811.86	238.11	811.84	240.11	811.85	241.53	811.61	242.28	811.6
245.01	811.22	245.48	811.16	246.64	811.12	247.5	811	251.35	810.98
251.67	810.96	256.9301	810.95	258.8	810.95	260.7401	810.97	265.38	810.62
265.92	810.56	266.08	810.54	267.03	810.41	271.09	809.89	271.66	809.87
272.29	809.87	272.48	809.85	273.64	809.51	274.47	809.61	276.9	810.04
279.6801	810.45	280.59	810.57	280.96	810.54	283.66	810.12	285.72	809.79
286.67	809.68	288.71	809.52	289.6201	809.37	290.7401	809.32	292.69	809.42
294.55	809.62	295.7	809.64	298.97	809.87	302.09	810	303.64	810.06
304.73	810.12	307.63	810.12	307.7401	810.12	307.79	810.12	310.75	810
312.8	809.53	315.09	809.24	318.58	809.12	319.78	809.04	321.04	809.01
324.1201	808.95	326.55	809.02	328.8101	809.02	329.86	809.07	331.46	809.18
334.07	809.22	336.01	809.18	338.1801	809.15	338.69	809.15	341.76	809.07
343.11	809.01	345.34	808.92	347.52	808.79	349.88	808.65	354.9301	808.27
356.35	808.17	358.91	807.96	364.39	807.54	364.84	807.51	365.1801	807.52
365.82	807.46	368.44	807.33	368.98	807.37	373.72	807.73	373.96	807.75
374	807.75	376.97	807.88	378.42	807.85	382.41	807.6	382.98	807.59
383.3101	807.55	385.9901	807.35	387.2401	807.31	388.23	807.03	390.38	807.06
391.66	807.16	392.01	807.12	392.78	807.07	395.02	807.06	396.07	806.94
397.03	806.95	397.95	806.76	400.4901	804.81	401.04	804.53	402.2401	803.49
404.46	801.42	404.9	801.05	404.9901	800.98	405.38	800.89	409.3101	800.17
409.76	799.86	410.91	799.29	411.32	799.19	411.96	798.75	413.4901	798.82
421.29	797.27	422.11	798.91	422.22	798.92	422.29	798.92	422.3701	798.92
422.8101	798.92	426.97	798.93	430.04	799	431.71	799	435.32	799.02
439.8	799.12	440.66	799.13	440.9901	799.15	441.88	799.25	443.19	799.34
443.33	799.38	444.15	799.58	444.63	799.71	448.6	800.77	449.2	800.96
449.54	801.07	452.14	801.9	453.45	802.34	455.22	802.85	457.8701	803.6
461.2401	804.25	462.28	804.5	463.5	804.76	468.46	804.86	470.08	805.02
471.11	805.02	473.28	805.07	475.52	805.11	476.29	805.14	477.92	805.23
479.3	805.29	479.79	805.29	481.7	805.51	484.35	805.77	487.38	806.16
488.33	806.27	489.97	806.44	493.18	806.72	494.05	806.71	494.95	806.74
496.85	806.89	497.35	806.91	497.54	806.93	498.24	806.93	502.01	806.98
503.37	807.03	506.31	807.13	506.41	807.13	508.82	807.36	510.83	807.49
512.4	807.6	515.77	807.89	519.66	808.12	522.21	808.66	523.11	808.61
524.46	808.45	524.72	808.44	525.23	808.37	527.4501	808.23	528.49	808.19
530.46	807.77	534.6901	807.29	536.48	807.14	537.3201	807.1	540.62	807.03
546.15	807.02	554.4	807.01	556.5601	807.01	560.92	807.03	572.28	807.27
572.52	807.28	572.91	807.27	578.4501	807.22	581.63	807.07	585.13	807.02
586.72	806.98	592.8	806.94	598.4501	806.9	601.3	806.91	606.5601	806.88
609.3	806.85	615.62	806.81	618.52	806.77	622.41	806.71	624.61	806.69
629.48	806.6	632.36	806.55	634.13	806.54	647.29	806.43	647.3101	806.43
647.3201	806.43	650.8	806.21	651.71	806.17	653.29	806.11	654.64	806.03
655.77	805.99	658.27	805.91	660.03	805.85	660.5	805.84	661.33	805.83
664.11	805.76	669.09	805.7	669.25	805.7	669.29	805.7	669.36	805.7
673.86	805.68	678.08	805.57	678.47	805.57	679.91	805.51	683.08	805.36
683.9401	805.33	685.4401	805.3	688.64	805.25	690.78	805.25	695.0701	805.22
698.59	805.2	699.37	805.19	702.11	805.24	704.4501	805.37	709.55	805.55
710.75	805.59	713.25	805.7	715.36	805.77	718.4401	805.43	720.26	805.52
721.66	805.27	724.59	805.29	724.97	805.28	732.66	805.36	733.66	805.37
733.76	805.37	733.8101	805.37	733.87	805.37	738.42	805.43	740.34	805.46
745.48	805.61	747.65	805.62	749.7401	805.67	751.34	805.72	752.26	805.71

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  754.27  805.78  756.87  805.77  757.47  805.81  757.78  805.82  761.65  805.93
  765.78  806.06  766.07  806.06  766.21  806.07   773.2  806.26  777.35   806.9
  778.21  806.96   779.4  806.97  780.72  806.96  788.27  806.92  791.12  806.94
  794.46  806.92  795.29  806.93  797.97  807.11  798.37  807.15798.9301  807.17
  804.09  807.42     806  807.51  807.02  807.54   807.6  807.57  811.04  807.75
  814.04  807.93815.8101  808.01  816.82  808.06820.1901  808.35825.0601   808.7
  825.84  808.75  828.96  808.81  836.88     809  839.88  809.03843.8101  809.09
844.4901  809.11846.1901  809.14   849.1  809.19  849.83  809.14  851.46  809.15
  853.55  809.55   853.9   809.6  854.23  809.66  856.83  810.11  858.33  810.39
  859.76  810.63  862.26  811.03  862.83  811.13  865.33  811.39   866.7  811.51
   868.8  811.64  875.33  812.05  885.48  812.67     886   812.7  886.13   812.7
  886.38  812.72  890.37  813.02  890.95  813.03     892  813.03   893.8  813.03
  897.86  813.03  905.35  813.03911.9301  813.08  913.57  813.08  914.02  813.09
  915.82  813.13  931.26  813.41  939.38  813.53  942.66  813.65  944.38  813.69
  954.25  813.92  961.19  814.06  961.98  813.94  962.97  813.83  965.26  813.49
  965.65  813.46  966.75  813.32968.1801  813.12  969.13  813.09  972.04  813.38
973.6201  813.48  974.04  813.55  974.79  813.74  976.97   814.3  978.23   814.8
  979.91  815.57  980.53  815.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  397.95    .055   463.5     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        397.95   463.5             79.15  118.32  197.15             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  280.59  810.57       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 81.68

INPUT
Description:
Station Elevation Data    num=     420
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  822.042.440002  822.02    2.75     8222.960022  822.015.630005  821.85
7.800049  821.8310.54004  821.7316.70001  821.4317.15002  821.4117.46002   821.4
   21.12  821.2423.82001  821.1625.23004  821.11   27.13  821.0828.67004  821.05
30.95001  821.0231.55005  821.0134.08002  820.9436.79004  820.84   37.31   820.8
38.08002  820.7340.41003  820.56   41.62  820.42   43.44  820.23   47.94  819.69
51.29004  819.3251.71002  819.2752.33002  819.1754.59003  818.87   56.12  818.74
57.10004  818.7860.89001  818.0961.48004  818.0763.23004  818.2765.79004  818.26
66.11005  818.2966.59003  818.2768.98999  818.2570.41003  818.2574.58002  818.23
   74.75  818.2175.45001  818.1779.11005  817.8980.29004  817.8480.79004  817.75
84.14001   817.5   85.12   817.6   87.31  817.5590.47003  817.22   94.44  817.11
94.78003  817.1295.10004  817.1199.76001  816.97  101.65  817.03  104.45  817.25
  109.36  817.33  112.19  817.39  116.63  817.11  116.97  817.11  117.21  817.13
  118.95  817.57  122.82  818.69  123.02  818.74  123.33  818.67  123.78  818.52
  126.59  817.77  128.61  817.69  129.47  817.58  130.74  817.69  132.35  817.59
```

133.45	817.49	135.1	818.22	136.93	816.82	137.12	816.79	138.28	816.79
141.5	816.81	145	816.84	147.8	816.97	152.15	816.73	152.51	816.65
152.78	816.63	155.39	816.24	157.61	815.94	158.27	815.84	159.25	815.7
161.15	815.48	163.26	815.13	163.84	815.05	165.32	815.04	166.91	815.05
167.27	815.05	169.79	815.08	172.11	815.14	172.67	815.14	173.51	815.27
175.77	815.31	176.97	816.02	177.69	816.19	180.64	815.66	181.35	815.66
181.77	815.71	184.19	815.46	186.61	815.82	187.07	815.8	187.76	815.77
189.63	816.18	191.44	815.32	191.93	815.12	194.89	815.05	195.71	814.96
196.27	814.97	198.59	814.93	201.1	814.98	205.83	814.96	206.18	814.93
209.15	814.45	210.11	814.32	210.77	814.25	214.5	813.49	215.76	813.43
216.27	813.45	218.75	813.47	220.43	813.28	221.63	813.31	223.4	813.11
225.09	812.92	225.27	812.94	230.53	812.87	234.93	812.85	237.19	812.82
241.41	812.75	244.56	812.79	244.6	812.79	244.67	812.79	244.79	812.79
245.31	812.8	253.31	812.87	254.26	812.87	256.19	812.82	259.04	812.74
259.07	812.73	259.1	812.74	261.95	812.51	262.58	812.5	266.69	811.92
267.71	811.73	268.76	811.62	270.59	811.45	273.3	811.16	273.62	811.12
276.03	811.01	277.13	811.02	279.92	811.04	283.26	811.06	287.87	811.09
288.09	811.09	289.23	811.05	292.93	810.92	293.63	810.91	294.68	810.81
298.04	810.58	301.81	810.31	302.27	810.29	302.59	810.28	304.24	810.17
307.69	809.97	308.03	809.96	308.94	809.9	310.91	809.76	312.26	809.64
313.79	809.58	316.06	809.46	316.67	809.42	317.09	809.4	319.55	809.32
323.19	809.28	325.31	809.24	326.93	809.17	328.97	809.17	329.93	809.21
331.12	809.1	335.78	809.11	342.6	809.09	350.51	809.17	350.92	809.17
351.25	809.18	351.7	809.17	355	809.13	355.75	809.13	364.27	808.98
365.55	808.95	365.73	808.95	365.96	808.95	371.4	808.88	373.09	808.84
374.28	808.81	375.08	808.78	377.16	808.69	379.91	808.54	380.04	808.53
380.21	808.51	382.92	808.33	384.75	808.22	385.8	808.13	387.34	808.03
388.68	807.93	389.58	807.85	394.29	807.55	394.42	807.54	394.47	807.54
397.32	807.4	398.04	807.35	400.31	807.24	405.44	807.07	408.91	807.04
411.72	806.97	413.7	807	415.28	806.96	417.48	806.62	418.58	806.46
422.98	805.78	426.31	805.09	428.24	804.88	429	804.8	430.11	804.73
433.07	804.51	434.76	804.42	437.24	804.29	437.64	804.26	437.91	804.24
440.52	804.11	442.74	803.98	443.4	803.95	444.37	803.82	446.28	803.62
447.57	803.38	449.16	802.99	450	802.77	451.49	802.39	452.04	802.26
452.4	802.18	454.92	801.54	457.24	800.99	458.62	800.65	459.55	800.44
462.07	799.85	463.16	799.63	465.56	799.09	466.24	798.93	466.82	798.8
467.25	798.8	478.29	798.95	481.05	798.98	484.34	799.05	491.87	799.19
497.85	799.38	497.87	799.38	497.92	799.42	500.73	801.9	501	802.17
501.39	802.4	504.48	804.82	505.56	804.85	506.76	805.03	510.4	805.31
511.41	805.06	513.96	805.69	515.23	806.03	515.4	806.07	515.64	806.13
518.28	806.745	20.0601	806.92	521.16	807	522.77	807.07	524.29	807.1
524.9	807.14	526.92	807.14	531.5	807.365	31.6801	807.35	531.88	807.34
535.5601	806.99	539.39	806.73	541.32	806.62	544.23	806.49	547.08	806.37
551.28	806.22	552.39	806.16	553.89	806.1	555.72	806.05	558.41	805.92
558.72	805.9	560.78	805.75	561.48	805.885	64.0601	805.77	564.7	805.79
569.47	805.97	572.67	806.07	573	806.09	573.34	806.1	581.41	806.32
587.26	806.45	591.09	806.53	592.55	806.62	594.05	806.65	598.92	806.67
601.1801	806.66	607.05	806.66	07.5601	806.59	611.88	806.546	15.4301	806.47
616.72	806.46	619.08	806.396	22.5601	806.29	624.84	806.23	626.38	806.19
629.6901	806.2	630.6	806.2	631.21	806.2	632	806.22	636.05	806.28
641.82	806.49	647.88	806.716	50.6801	806.84	651.07	806.85	653.78	806.97
658.33	807.02	659.7	807.01	660.41	807.016	64.4401	807.25	665	807.27
665.33	807.3	666.13	807.38	674.14	808.07	675.86	808.24	679.45	808.56

679.55	808.57	679.5601	808.57	679.58	808.57	682.4401	808.78	684.37	808.94
685.32	808.94	690.24	809.12	691.32	809.23	693	809.4	696.84	809.86
700.97	810.25	703.71	810.5	705.48	810.66	706.71	810.74	709.86	810.97
712.87	811.01	714.8	811	720.42	811	724.11	811.01	728.52	811.04
732.7	811.09	734.28	811.11	736.61	811.19	740.04	811.26	745.32	811.41
748.6801	811.55	753.19	811.61	753.29	811.61	755.35	811.82	756.86	811.86
759.7	811.81	765.72	811.75	766.29	811.75	769.5	811.75	780.4301	811.74
780.55	811.73	784.47	811.73	793.61	811.77	807.89	811.87	809.61	811.88
810.36	811.89	811.6	811.9	841.97	812.23	851.87	812.25	852.63	812.25
858.06	812.2	858.35	812.2	859.55	812.17	863.1801	812.1	864.91	812.05
868.02	811.96	872.04	811.82	872.52	811.81	874.4301	811.78	876.25	811.77
877.01	811.76	878.4	811.77	892.57	811.95	908.4301	812.24	909.58	812.24
919.59	812.39	933.92	812.67	935.39	812.68	938.15	812.87	942.15	812.96
944.73	813.01	946.31	813.06	946.92	813.11	947.8	813.14	950.76	813.3
953.22	813.32	962.45	813.5	964.68	813.35	964.7	813.35	967.56	813.19
969.5	813.26	970.44	813.33	971.83	813.64	973.32	813.96	974.34	814.3
976.2	814.91	978.95	816.36	979.08	816.42	979.62	816.8	980.02	817.08

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	415.28	.055	531.88	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
415.28	531.88	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:BUCKEYE_CR

Reach	River Sta.	n1	n2	n3
317437_BUCKEYE_C	1370	.05	.055	.05
317437_BUCKEYE_C	1200	.05	.055	.05
317437_BUCKEYE_C	1050	.05	.055	.05
317437_BUCKEYE_C	923.73	.05	.055	.05
317437_BUCKEYE_C	779.43	.05	.055	.05
317437_BUCKEYE_C	719.69	.05	.055	.05
317437_BUCKEYE_C	662.01	.05	.055	.05
317437_BUCKEYE_C	606.9	.05	.055	.05
317437_BUCKEYE_C	555.72	.05	.055	.05
317437_BUCKEYE_C	482.3	.05	.055	.05
317437_BUCKEYE_C	432.35	.05	.055	.05
317437_BUCKEYE_C	370	.05	.055	.05
317437_BUCKEYE_C	300	.05	.055	.05
317437_BUCKEYE_C	200	.05	.055	.05
317437_BUCKEYE_C	81.68	.05	.055	.05

SUMMARY OF REACH LENGTHS

River: BUCKEYE_CR

Reach	River Sta.	Left	Channel	Right
317437_BUCKEYE_C	1370	170.24	170	171.01
317437_BUCKEYE_C	1200	110.41	150	168.17
317437_BUCKEYE_C	1050	168.68	126.27	101.85
317437_BUCKEYE_C	923.73	209.68	144.3	84.88
317437_BUCKEYE_C	779.43	55.27	59.74	21.26
317437_BUCKEYE_C	719.69	7.44	57.68	143.59
317437_BUCKEYE_C	662.01	6.58	55.11	38.66
317437_BUCKEYE_C	606.9	5.06	51.18	4.03
317437_BUCKEYE_C	555.72	126.35	73.42	4.69
317437_BUCKEYE_C	482.3	58.55	49.95	4.42
317437_BUCKEYE_C	432.35	83.86	62.35	3.34
317437_BUCKEYE_C	370	71.45	70	5.34
317437_BUCKEYE_C	300	88.38	100	89.28
317437_BUCKEYE_C	200	79.15	118.32	197.15
317437_BUCKEYE_C	81.68	0		0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: BUCKEYE_CR

Reach	River Sta.	Contr.	Expan.
317437_BUCKEYE_C	1370	.1	.3
317437_BUCKEYE_C	1200	.1	.3
317437_BUCKEYE_C	1050	.1	.3
317437_BUCKEYE_C	923.73	.1	.3
317437_BUCKEYE_C	779.43	.1	.3
317437_BUCKEYE_C	719.69	.1	.3
317437_BUCKEYE_C	662.01	.1	.3
317437_BUCKEYE_C	606.9	.1	.3
317437_BUCKEYE_C	555.72	.1	.3
317437_BUCKEYE_C	482.3	.1	.3
317437_BUCKEYE_C	432.35	.1	.3
317437_BUCKEYE_C	370	.1	.3
317437_BUCKEYE_C	300	.1	.3
317437_BUCKEYE_C	200	.1	.3
317437_BUCKEYE_C	81.68	.1	.3

HEC-RAS HEC-RAS 6.1.0 September 2021
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: 317437_BUCKEYE_CR
Project File : 317437_BUCKEYE_CR.prj
Run Date and Time: 1/3/2022 5:10:13 PM

Project in English units

PLAN DATA

Plan Title: 317437 -PROPOSED ANALYSIS
Plan File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.p01

Geometry Title: PROPOSED GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g04

Flow Title : STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Plan Summary Information:

Number of:	Cross Sections	= 15	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	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: STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Flow Data (cfs)

  River           Reach           RS                  100-YR
  BUCKEYE_CR      317437_BUCKEYE_C1370                  7350


Boundary Conditions


  River           Reach           Profile                       Upstream
    Downstream


  BUCKEYE_CR      317437_BUCKEYE_C100-YR
 Normal S = 0.002




GEOMETRY DATA

Geometry Title: PROPOSED GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g04

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 1370

INPUT
Description:
Station Elevation Data    num=     260
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   846.91.609985  846.252.150024  846.026.029968  844.076.109985  844.04
```

6.279968	843.95	7.48999	843.25	10.17999	841.69	13.63	839.82	13.84998	839.69
14.20001	839.53	17.73999	837.82	18.21997	837.62	19.29999	837.17	22.22998	835.82
23.71997	835	26.25	833.69	28.14001	832.59	30.27002	831.45	32.02997	830.5
37.59998	827.21	37.95001	827.02	38.08002	826.94	42.32001	824.94	43.07001	824.59
46.33002	823.05	50.26001	821.24	50.42999	821.16	54.37	819.45	7.77997	817.8
58.38	817.55	59.09998	817.26	61.02997	816.46	65.14001	814.97	66.41998	814.49
69.75	813.29	70.52002	813.02	71.37	812.77	74.45001	811.74	76.28	811.1
76.82999	81	179.16998	810.98	82.48001	810.99	85.63998	810.96	86.5	810.95
90.06	810.81	90.51999	810.8	90.89999	810.77	94.53	810.43	94.57999	810.43
95.01999	810.39	98.54999	810.13	101.93	809.87	102.93	809.83	106.58	809.64
107.75	809.61	112.97	809.4	115.56	809.32	121.44	809.13	122.71	809.07
125.45	809.08	126.67	809.08	127.48	809.08	138.71	809.2	138.72	809.2
138.78	809.2	142.62	809.31	142.72	809.3	149.19	809.93	149.6	809.98
150.41	810.06	151.98	810.23	154.79	810.47	157.12	810.42	158.8	810.36
160.83	810.15	162.82	809.97	165.25	809.79	166.84	809.67	169.67	809.54
170.85	809.48	174.1	809.4	174.87	809.37	178.52	809.37	179.19	809.36
182.54	809.4	182.9	809.4	182.92	809.4	182.94	809.4	184.13	809.42
187.65	809.49	187.73	809.49	187.81	809.47	191.65	809.02	193.91	809.05
194.95	809	196.21	808.96	198.41	808.87	200.61	808.84	202.99	808.86
206.08	808.9	213.24	809.07	217.43	809.09	218.71	809.11	219.06	809.11
222.75	809.05	223.07	809.04	226.3	808.95	227.09	808.92	227.17	808.93
231.11	808.88	234.38	808.9	235.54	808.94	236.01	808.89	239.14	808.93
240.5	808.94	243.16	808.83	247.33	808.81	250.1	808.78	251.19	808.78
253.71	808.71	255.21	808.67	258.13	808.47	259.22	808.4	262.55	807.83
263.24	807.73	266.97	805.9	267.26	805.78	267.41	805.71	270.07	803.02
271.27	801.82	271.97	801.03	272.62	800.87	273.51	800.45	274.56	800.11
275.19	799.88	278.66	799.83	282.74	799.85	283.32	799.84	283.96	799.84
286.31	799.88	286.57	799.89	291.36	799.95	293.51	800.02	295.38	800.08
297.93	800.26	300.61	800.4	301.95	800.46	302.71	800.62	303.5	800.65
304.37	801.59	305.02	802.22	305.79	803.03	307.43	804.72	309.15	806.46
309.79	807	314.38	807.54	315.32	807.64	315.46	807.67	319	808.12
319.48	808.19	322.68	808.63	323.49	808.71	324.32	808.71	326.97	808.78
327.51	808.7	328.35	808.73	330.91	808.36	331.53	808.12	332.75	807.84
334.5	807.7	337.74	807.89	341.08	808.03	346.58	808.4	348.03	808.51
348.9	808.57	352.9	808.84	354.68	808.93	356.64	808.97	358.33	808.97
364.62	808.98	371.28	809.04	374.19	809.12	375.71	809.14	377.54	809.18
379.73	809.29	382.9	809.41	385.23	809.59	387.76	809.73	390.81	809.97
392.52	810.12	395.69	810.27	396.26	810.26	399.81	810.34	401.36	810.38
407.85	810.58	408.5	810.61	414.66	810.85	415.88	810.93	417.35	811
419.9	811.18	421.77	811.41	423.91	811.72	425.7	812	428.74	812.71
429.18	812.79	429.6	812.81	433.05	812.82	435.96	812.93	436.73	812.97
441.84	813.22	447.77	813.5	448.01	813.51	448.31	813.52	452.03	813.75
457.75	814.17	460.06	814.35	460.78	814.41	463.43	814.62	467.1	814.87
469.34	815.05	469.44	815.05	469.63	815.05	472.12	815.03	474.84	815.07
477.62	815.08	480.15	815.17	482.45	815.24	484.17	815.31	488.11	815.38
488.14	815.38	488.18	815.38	488.24	815.38	494.46	815.31	496.22	815.28
499.28	815.25	501.38	815.24	504.61	815.24	509.56	815.29	510.8	815.31
514.74	815.39	521.75	815.56	530.51	815.77	545.41	816.18	548.17	816.24
549.51	816.29	552.45	816.38	555.21	816.48	568.56	816.94	570.16	816.98
573.11	817.05	574.22	817.08	576.55	817.07	576.56	817.07	576.57	817.07
580.57	816.83	580.84	816.88	584.39	816.54	584.59	816.6	585.06	816.86

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	263.24	.055	309.79	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
263.24	309.79	170.24	170	171.01	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1200

INPUT
Description:
Station Elevation Data num= 235

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	848.5	4.4899902	848.2	84.109985	846.71	4.51001	846.5	57.789978	845.09
8.52002	844.7	711.97998	843.2	12.16003	843.1	212.76001	842.9	113.83002	842.37
16.41998	841.1	519.01001	839.6	920.57001	838.8	122.66998	837.6	624.59003	836.6
26.19	835.7	328.60999	834.4	229.98999	833.7	37.02002	830.0	738.03003	829.54
38.85999	829.12	39.56	828.8	340.66003	828.4	343.58002	827.1	644.66998	826.68
48.26001	824.78	48.69	824.57	52.31	822.59	53	822.23	53.63	821.89
63.83002	816.3	165.85999	815.2	467.08002	814.6	668.78003	813.9	471.32001	812.89
73.55002	811.9	379.89001	809.9	780.77002	809.64	81.37	809.6	84.84	808.94
87.34	808.6	788.86002	808.5	89.01001	808.49	92.88	808.24	93.44	808.24
96.89001	808.3	499.82001	808.53	101.31	808.66	102.14	808.66	104.16	808.66
104.93	808.62	111.61	808.63	114.72	808.62	116.98	808.63	118.16	808.65
120.99	808.68	128.56	808.84	129.03	808.84	129.12	808.85	131.1	808.88
136.83	808.98	137.08	808.99	137.66	808.98	141.08	808.99	142.56	808.98
150.93	808.91	153.13	808.87	154.08	808.87	155.76	808.87	158.97	808.87
163.29	808.87	170.4	808.91	175.21	808.95	181.55	808.96	187.55	809.04
192.08	809.01	193.3	808.99	195.16	808.85	197.31	808.73	199.58	808.58
201.33	808.51	204.01	808.4	205.35	808.36	208.43	808.39	209.36	808.39
212.85	808.79	213.38	808.81	217.27	808.51	217.4	808.5	218.63	808.32
221.41	807.92	221.7	807.88	225.43	807.3	226.12	807	229.45	805.64
230.54	804.89	233.47	802.88	234.73	801.91	235.62	801.24	237.14	800.16
237.83	799.72	238.56	799.76	249	800.39	249.23	800.41	250.61	800.51
253.55	800.71	254.97	800.85	256.44	800.73	257.57	800.54	257.97	800.58
261.58	801.02	265.33	801.68	265.6	801.74	265.78	801.77	269.84	802.38
271.63	802.59	273.06	803.02	273.47	803.03	273.63	803.05	274.08	803.06
274.86	803.42	277.65	805.12	279.19	805.86	281.67	807.06	283.62	807.48
285.68	807.9	288.04	808.15	289.7	808.35	292.46	808.27	294.09	808.42
300.92	807.7	301.75	807.59	305.73	807.22	305.77	807.22	306.15	807.2
309.78	806.99	309.99	807.01	310.15	806.99	313.8	806.89	316.84	806.68
319	806.38	321.84	806.08	323.42	805.92	327.87	805.55	329.87	805.45
332.27	805.41	333.89	805.3	336.69	805.29	338.57	805.04	340.99	805.31
341.92	805.48	345.53	805.78	345.94	805.81	349.91	806.08	349.95	806.09
349.96	806.09	353.97	806.3	354.38	806.31	357.99	806.6	360.08	806.95
361.16	806.97	363.01	806.97	366.02	806.68	367.47	806.66	369.75	806.66
372.07	806.89	374.05	807.03	375.7	807.2	378.07	807.36	379.38	807.42
380.49	807.43	386.1	807.67	388.36	807.68	394.07	807.84	394.14	807.84
394.16	807.84	394.24	807.85	400.47	808.09	402.17	808.19	405.14	808.37
406.19	808.39	409	808.49	414.22	808.75	417.82	808.94	422.26	809.09

428.68	809.1	430.29	809.11	431.3	809.1	436.96	809.07	440.2	809.23
442.34	809.29	444.68	809.4	446.38	809.48	449.34	809.65	452.96	809.79
458.2	810.07	462.42	810.27	468.04	810.58	470.46	810.7	477.88	810.95
478.49	810.99	478.72	811.01	482.51	811.17	486.08	811.43	489.09	811.67
489.76	811.7	490.54	811.76	492.64	811.95	498.57	812.45	500.04	812.6
502.67	812.84	507.13	813.28	516.01	814.03	520.46	814.38	523.7	814.67
526.08	814.8	526.92	814.85	527.89	814.88	530.71	814.88	531.29	814.89
535.07	814.88	535.98	814.85	536.31	814.83	536.7	814.83	537.09	814.84
541.51	815	541.56	815	541.58	815	547.56	815.02	550.18	815.05
554.14	815.06	556.57	815.12	560.36	815.24	567.63	815.44	581.82	815.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	225.43	.055	289.7	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
225.43	289.7	110.41	150	168.17	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1050

INPUT
Description:
Station Elevation Data num= 252

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	853.03	8699951	852.61	1.059998	852.53	1.390015	852.375	.210022	850.49
6.530029	849.81	8.400024	848.86	11.40002	847.78	13.03998	847.213	.58002	846.98
13.64001	846.98	14.08002	846.78	17.65002	844.95	23.35004	842.232	8.29999	839.72
30.10004	838.81	33.38	837.22	34.25	836.79	36.63	835.633	8.40002	834.77
39.87	834.11	42.22998	832.97	43.38	832.42	45.37	831.475	0.85004	828.87
52.89001	827.94	54.77002	827.07	58.72003	825.25	9.15002	825.016	0.28003	824.46
63.29999	822.95	65.90002	821.62	70.19	819.39	71.60004	818.65	72.44	818.19
75.29999	816.85	75.75	816.64	75.91998	816.56	79.90002	814.86	1.66003	814.1
84.04999	813.09	87.39001	811.72	88.20001	811.39	90.32001	810.629	2.35004	809.89
95.16003	809.19	8.85999	808.29	100.65	807.98	104.59	807.48	104.8	807.46
105.34	807.43	111.42	807.16	116.06	807.1	117.56	807.04	120.37	807.05
124.74	807.05	125.55	807.06	125.93	807.06	126.44	807.05	129.22	807.1
133.26	807.14	138	807.2	139.51	807.29	140.69	807.37	146.3	807.5
150.44	807.65	154.6	807.81	158.46	807.92	161.38	808.04	162.9	808.12
166.7	808.22	167.05	808.23	167.66	808.22	171.2	808.21	173.4	808.11
175.35	808.02	182.36	807.65	187.8	807.34	188.73	807.3	191.95	807.25
192.53	807.22	195.48	807.3	196.1	807.31	196.33	807.31	200.25	807.21
202.06	807.05	204.4	806.84	207.8	806.19	208.55	806.09	208.97	806.01
212.68	805.1	213.1	804.99	213.13	804.99	215.47	805.66	219.26	805.48
220.99	805.54	225	803.82	225.14	803.75	225.53	803.56	229.29	801.69
230.83	801.11	232.65	800.27	232.85	800.18	232.92	800.16	233.59	800.12
237.95	799.81	240.08	799.73	240.55	799.71	241.74	799.65	242.2	799.65
245.89	799.64	247.93	799.72	250.04	799.8	253.67	800.05	254.19	800.08
254.49	800.11	255.57	800.24	260.03	800.77	261.65	801.03	263.52	801.29
265.66	801.7	266.58	802.34	267.76	803.1	270.77	805.18	270.79	805.19

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  270.87  805.22  274.94   807.3   276.6  807.44  279.49  807.95  282.43  807.69
  283.24  807.56  285.62  807.28  287.39   807.1  290.26     807  291.94     807
  292.14     807  303.27  806.97  303.58  806.96  305.27  806.91  309.77   806.8
  314.16  806.63  319.52  806.41  326.67  806.31   328.6  806.27  328.89  806.27
  329.11  806.27  330.95  806.24  335.78  806.27  337.19  806.29  339.03  806.32
   345.4  806.51  345.47  806.51  345.59  806.52  349.59  806.71   352.4   806.8
  360.62  807.06  362.05  807.14  364.14  807.33  366.24   807.6  373.03  808.37
  374.34  808.51  375.76  808.66  378.43  808.95  380.77  809.14  385.54  809.38
  386.99  809.46  390.78  809.69  395.29  809.94  398.36  810.14  402.05  810.36
  404.07  810.45  407.74  810.74  410.45  810.87  413.31  810.94  416.41  810.96
  420.17  810.95  420.37  810.94  429.11  810.83  435.85  810.74  436.78  810.73
  436.85  810.73  437.03  810.73  449.23  810.65  460.86  810.58  463.96  810.64
  471.69  810.62  474.72  810.62  477.75  810.52   478.6  810.48  482.43  810.34
  484.53   810.3  486.39  810.29  494.88  810.11  495.01  810.11  502.39  810.13
  506.51  810.21  507.33  810.22   507.9  810.23  510.97  810.29  519.04  810.46
  523.14   810.5  530.09  810.59  530.88  810.58  534.61  810.52  536.02  810.44
  541.01  810.49  544.37   810.5  544.68   810.5  545.05  810.51  560.57  810.49
  564.68  810.49  575.25  810.47  587.33  810.41  601.81   810.3  602.52  810.29
  603.04  810.29  609.87  810.29  612.67  810.28  615.23  810.32  617.34  810.35
  619.22  810.39  619.37  810.39  619.63   810.4   623.5  810.47  626.15  810.52
  627.52  810.57  628.29  811.04  629.17  811.17  631.77  811.45  632.72  811.58
  637.57  812.09  644.32  812.81  645.25  812.92  646.33  813.01   648.3  813.08
  650.45  813.16  659.52  813.45  660.66  813.52  664.85   813.7  684.21  814.29
  686.67  814.37  688.96  814.44  693.36  814.57  697.34  814.69   699.2  814.76
  699.86  814.76  700.29  814.76  701.27  814.74  704.53  814.74  706.17  814.74
  706.71  814.74  707.57  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  220.99    .055  279.49     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        220.99  279.49           168.68  126.27  101.85             .1        .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 923.73

INPUT
Description:
Station Elevation Data    num=     254
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  843.17 1.26001  843.015.950012   842.57.960022  842.29    8.75  842.22
10.67004     84213.29004   841.6   15.44  841.3217.29004  841.0520.17999  840.68
   22.69   840.323.70001   840.127.17004   839.329.32001  838.7732.59003  837.91
33.07001  837.7933.98004  837.4537.34003  836.2739.60004  835.4241.76001  834.59
45.28003  833.1845.40002  833.1445.45001  833.1251.77002  830.5854.42999  829.55
61.39001  826.8964.08002  825.85   69.31  823.7971.79004   822.773.41003  821.97
75.47003  821.0777.42004  820.19   81.31  818.5482.59003  817.9884.65002  817.02
89.45001  814.8891.89001  813.8193.46002   813.296.91003  811.7197.95001  811.25
   102.8  809.29  103.31  809.01  104.34  808.99  109.49  808.84   111.7  808.79
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  116.04  808.64  118.15  808.61  120.53  808.61  122.06  808.61  127.71  808.74
  129.53  808.78  136.21  808.88  137.66   808.9  140.67  808.88  142.36  808.86
  145.57  808.75  148.63  808.75  151.57  808.83  154.11  808.81  155.77  808.83
  164.33  808.83  169.45  808.83  169.63  808.83  177.07  808.82  177.63  808.83
  178.39  808.84  181.64  808.88  184.46  808.99  187.11  808.99   193.1  808.93
  195.54  808.88  201.69  808.74  206.91  808.56   209.7  808.45  212.69  808.36
  213.71   808.3  216.98  808.35  217.72   808.3  220.07  808.54  220.53  808.58
  220.67  808.57  220.93  808.51  221.73  808.25  225.56  807.25  225.74  807.22
  228.31  806.12  229.71  805.53  229.74   805.5  229.84  805.41  229.86  805.39
  233.74  802.55  236.33  800.52  236.92     800  238.37  799.84  241.07  799.79
  247.42  799.69  254.52  799.57  260.97  799.46  261.69  799.46  266.39     800
  267.66  800.63  270.27     802  274.62  803.32   276.6     804  277.44   804.3
   281.3  805.08  281.97  805.08  282.77  805.09  289.87  805.12  291.24  805.12
  292.67  805.09  294.17  805.08  311.77     805  312.75  804.98  313.92  804.99
  317.54     805   332.2  805.02  335.02  805.03  339.05  805.07  341.34   805.2
  343.74  805.23  345.62  805.29  346.31  805.32     350  805.57  351.98  805.71
  353.84   805.9  360.26  806.66  362.03  806.87  365.13  807.29  370.04  807.94
  372.65  808.25  373.84   808.4  375.64  808.48  378.06  808.67  379.93  808.67
  382.07  808.72  384.22  808.66  386.08  808.62  389.15  808.48  394.09  808.29
  409.21  807.69  409.85  807.66  410.04  807.65  410.13  807.65  410.29  807.64
  412.71  807.57  418.37  807.39   420.8  807.49  422.15  807.56  422.81  807.57
  424.54  807.66   429.1  807.86  434.18  808.02  436.63  808.14  440.26  808.29
  443.02  808.44  446.34  808.56  452.48  808.88  454.22  808.94  455.44  808.99
  459.11  809.16  462.24  809.22  474.25  809.52  474.26  809.52  485.86  809.72
  492.93  809.76  493.67  809.78  494.05  809.78   499.2  809.78  506.33  809.77
  516.48  809.63  517.57  809.62  518.07   809.6  518.72  809.58  519.42  809.57
  526.37  809.53  526.76  809.53537.4301  809.64   538.4  809.66  541.99  809.77
  550.42  809.95   551.9  809.99  553.28  810.01  560.08  810.08   567.5  810.17
  571.08  810.14  571.87  810.17   572.9  810.14  575.86  810.06  578.19  810.03
  578.51  810.02  585.69  809.97  588.88  809.92  589.79   809.9  591.42   809.9
   595.2  809.96  596.52  809.99  599.03  810.06  600.03  810.14  602.11  810.21
  604.33  810.23  612.83  810.29  618.57  810.28  622.73  810.28  629.93   810.2
  630.44   810.2  630.92  810.18  642.15  809.94  643.07   809.9  644.11  809.83
  645.21  809.86   647.4  809.82  648.31  809.89  650.67  809.97  651.68  810.02
  654.47  810.07  655.98  810.08  657.55  810.08  660.29  810.12  663.71  810.17
  664.59   810.2  666.79   810.3   668.9  810.45  669.87  810.54  680.93  811.99
  682.19  812.16  683.15  812.28  685.27  812.55  688.07   812.8  690.55  813.05
  691.43  813.07  697.02  813.25  699.95  813.34  700.97   813.4  701.78  813.43
  703.04  813.49  704.31  813.56  707.44  813.69  728.12  814.35  728.76  814.36
  728.91  814.37  729.25  814.38  729.41  814.38  729.61  814.39  731.94  814.49
  738.34  814.72  741.36  814.73  743.12  814.74  743.86  814.73  746.42  814.72
  747.75  814.73   748.2  814.72   749.2  814.84  749.83  815.04

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  220.93    .055  281.97     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        220.93  281.97           209.68   144.3   84.88             .1      .3

CROSS SECTION
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RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 779.43

INPUT
Description:
Station Elevation Data num= 285

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.73	1.730042	836.48	3.530029	836.21	6.030029	835.97	6.619995	835.87
8.150024	835.61	0.32001	835.22	12.79999	834.63	14.60999	834.14	16.60999	833.58
19.17999	832.85	22.07001	832.02	22.54004	831.89	27.13	830.54	29.73004	829.78
31.34003	829.29	31.78003	829.15	34.42999	828.35	36.07001	827.83	37.52002	827.33
40.35999	826.34	40.47003	826.34	1.23004	826.01	43.70001	825.06	44.66003	824.74
46.79004	824.05	48.95001	823.48	52.26001	822.66	52.97003	822.49	53.23999	822.42
56.67999	821.41	57.65002	821.11	60.89001	819.96	66.12	818.08	68.41998	817.28
74.32001	815.47	74.64001	815.37	74.70001	815.35	74.95001	815.29	78.98999	814.27
80.78003	813.88	3.29004	813.13	84.19	812.88	85.35004	812.55	89.02002	811.5
91.87	810.55	93.13	810.21	96.16003	809.52	96.38	809.5	99.31	809.32
100.46	809.32	102.4	809.21	104.75	809.13	105.49	809.07	107.41	808.91
108.58	808.83	109.04	808.8	110.08	808.72	113.33	808.48	114.76	808.38
117.62	808.26	117.85	808.25	118.44	808.25	120.94	808.21	121.92	808.22
124.03	808.29	126.21	808.47	127.12	808.53	129.47	808.79	130.45	808.91
132.99	808.98	134.79	808.91	136.39	808.85	139.09	808.57	139.48	808.54
143.38	808.24	145.66	808	147.67	807.86	151.52	807.5	151.84	807.48
151.96	807.48	152.24	807.47	155.96	807.05	156.61	807.2	156.98	807.22
158.09	806.9	160.55	805.71	161.11	805.42	162.55	804.89	164.2	804.13
164.84	804.02	166.6	803.46	167.52	803.64	168.4	804.09	169.66	804.63
170.23	804.79	173.42	805.05	173.47	805.07	173.58	805.08	177.72	805.59
178.41	805.69	181	806.77	182.01	807.35	183.28	808.19	184.61	808.38
185.83	808.83	186.3	808.89	188.92	808.6	190.59	808.6	192.01	808.52
194.89	808.42	195.1	808.43	195.64	808.46	198.18	808.56	199.18	808.44
201.28	808.47	203.47	808.12	204.37	808.05	206.67	807.34	207.46	807.12
207.76	807.07	210.55	806.15	212.05	806.04	212.93	805.68	215.82	806.12
216.35	806.29	216.67	806.44	217.7	806.46	220.31	806.81	220.64	806.79
222.9	806.53	224.93	806.42	225.99	806.36	232.01	805.96	233.52	805.9
234.53	805.88	236.68	805.67	239.38	805.43	241.07	805.4	244.02	805.62
247.62	806.1	249.4	806.59	250.71	806.78	250.78	806.77	253.8	806.67
254.98	806.45	256.71	806.35	05	256.72	806.35	258.99	805.27	259.27	805.01
260.36	801.36	260.73	800.31	261.04	800	261.31	799.72	263.07	798
274.47	797.88	283.44	797.78	287.62	797.83	295.78	797.91	300.2	797.96
303.83	798	304.72	798.89	305.88	800	306.9	801.05	307.86	802
323.65	802.4041	332.48	802.63	352.89	803.11	367.27	803.47	389.79	804
397.17	805.08	401.03	805.65	403.92	806	409.05	806.91	415.2	808
416.5	808.08	429.92	808.86	430.63	808.86	439.19	808.75	439.45	808.75
439.73	808.74	440.35	808.72	443.84	808.63	445.37	808.62	447.33	808.58
450.51	808.6	454.64	808.63	456.68	808.65	467.68	808.6	471.42	808.64
473.18	808.53	475.27	808.49	477.02	808.43	480.79	808.29	483.89	808.2
485.53	808.1	491.32	807.84	492.33	807.79	497.89	807.66	499.33	807.64
503.93	807.67	504.16	807.67	504.45	807.67	508.98	807.68	510.25	807.69
512.51	807.75	512.99	807.76	520.15	807.93	532.4	808.12	533.97	808.18
540.36	808.47	541.74	808.52	542.56	808.53	543.77	808.53	550.42	808.67
552.79	808.72	555.43	808.75	556.11	808.77	567.5	809.12	568.52	809.16
568.96	809.18	578.86	809.46	590.59	809.69	592.78	809.71	602.47	809.99
602.95	810	603.71	810.01	609.13	810.04	611.23	810.01	621.79	809.93

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  623.53  809.92  624.11  809.92  624.57  809.91  632.69  810.05  636.79  810.15
  636.93  810.15  636.99  810.15   650.3  810.25  652.85  810.24  654.67  810.24
  658.19   810.2  662.74  810.19  665.37  810.19  675.62  809.94   677.1  809.93
  678.44  809.83  679.99   809.8  683.28  810.07   684.2   810.1  686.37  810.09
  688.49  810.09  689.46  810.06  691.94  810.03  692.55  810.03  692.79  810.03
  693.33  810.04  697.08  810.06  698.73  810.09  701.37  810.23  701.82  810.28
  702.97   810.4  704.91  810.59  707.38  810.91  717.27   812.3   719.6  812.58
  720.73  812.76  723.32  813.02  726.54  813.12  727.53  813.15  733.95  813.34
  734.48  813.37  735.77  813.42  737.76  813.51  738.87  813.57  741.61  813.69
  759.59  814.26  762.98  814.34  763.77  814.37  765.65  814.42  766.49  814.44
  767.24  814.49  767.58   814.5  772.32  814.69  775.34   814.7  777.45  814.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  256.71    .055  323.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        256.71  323.65             55.27   59.74   21.26             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 719.69

INPUT
Description:
Station Elevation Data    num=     276
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     8404.030029  839.28 5.77002  838.965.930054   838.99.290039  837.83
9.960022  837.6212.87006  836.3713.99005  835.9616.45001  835.0220.06006  833.75
22.06006  833.0324.84003  832.0430.12006  830.1830.76001  829.9335.79004  828.06
37.91003  827.27   38.19  827.1838.53003  827.0745.07001  824.9545.74005  824.75
   46.25  824.5347.77002  823.9750.28003  823.0852.23004  822.4254.31006  821.71
55.57001  821.2858.35004  820.36   61.63   819.262.59003  818.8866.33002  817.43
66.46002  817.3767.54004  816.9370.12006  815.87   70.44  815.74   73.69  814.49
74.47003  814.1975.07001  813.9878.05005  812.8980.10004  812.3482.54004  811.55
83.46002  811.2984.43005  811.1489.34003     81090.60004  809.8791.58002  809.82
   94.63  809.3795.16003  809.4598.67004  810.7598.74005  810.76101.4901  811.25
  105.15  811.23  106.73   811.2  111.32  811.18   113.7  811.17  115.04  811.03
115.3101  810.99  115.67  810.81  118.83  808.94  120.76  807.82  122.33  807.24
  122.86  807.28  126.29  807.14   126.7  807.13  130.14  807.16  140.02  807.17
  145.25  807.12  147.05  807.11  148.14   807.1   152.5  807.03155.1201  807.01
  155.98   806.9  159.15  806.65159.5601  806.53  162.82  806.02  163.14  805.97
163.1801  805.96  166.72  805.27  167.21  805.18   170.3  804.09171.2401  803.89
173.8701  803.75  175.28  803.37  177.09  803.15  180.78  802.92  182.89  802.34
  183.33  802.31  184.61  802.06187.3701  801.49188.1801  801.32  191.41  800.85
  191.76  800.78  194.57  800.99  195.26  801.04198.1201  801.63  198.17  801.64
  198.85  801.79200.6801  802.09  201.54  802.27   202.5  802.41   203.5  802.54
  207.44  802.86  207.94   802.9  208.22  802.91  211.57  803.15  213.23  803.41
   215.6  803.75216.8101  803.98  219.63  804.51  221.13   805.1  222.98  804.97
  223.66  804.75  226.33  804.33227.5601  804.07  227.69  804.13231.1201  804.51
  231.73  804.61   234.7  804.91  235.27  804.99  236.22     805  236.57     805
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  240.73  805.03  242.54  805.06243.7401  805.08  247.14  805.21  250.91  805.29
  252.46  805.35   253.6   805.3  254.95  805.28     256  805.24  257.79     805
260.0601  804.93  260.64  804.89   261.1  804.89263.4901  804.62  265.38  804.61
  268.25   804.3  269.19  803.83  270.15  802.83  270.45     802  270.89  801.57
272.4901     800274.4901  798.16  274.66     798  275.83  797.98  276.57  797.97
  278.66  797.94  295.22  797.69  300.42  797.77  309.02   797.9  315.77     798
  316.48  798.59  318.15     800  320.35   801.5  321.02     802     329802.1833
  362.82  802.96   408.3     804  412.57  804.48  426.17     806  429.01  806.57
  436.18     808  440.38  808.36  442.03  808.51  443.46  808.61  444.28  808.62
   445.6  808.65  446.58  808.65   449.5  808.66  451.48  808.72  455.98  808.88
  456.42   808.9  456.85  808.91  464.77  808.87  465.38  808.86  469.87  808.87
  472.34  808.88  473.38   808.9  474.96  808.91  479.85  808.96  480.15  808.96
  482.45  808.95  485.95  808.79  487.62  808.72  488.51  808.65  489.13  808.64
  490.22  808.59  493.18  808.48  495.36   808.4  499.58  808.29  500.71  808.21
  504.66  808.04  510.33  807.78  513.05  807.71  516.01  807.66  516.14  807.66
  516.46  807.65  521.03  807.59   524.6   807.6   525.4  807.59  527.42   807.6
  543.35  807.86  546.09  807.95551.0601  808.18554.6801  808.37   555.6  808.39
  557.32   808.5   561.6  808.59  563.27  808.58  565.52  808.59  567.57  808.61
  569.97  808.67  575.97  808.85  581.59  809.05  584.04  809.16   590.3  809.34
  605.64  809.63   608.5  809.66  612.95  809.79617.9901  809.97  621.75  809.98
  624.16     810   632.2  809.95  636.32  809.93  639.59  809.88  644.91  809.97
  647.75  810.04  649.21  810.06  650.33  810.09  652.79  810.13  665.87   810.2
  667.37  810.21674.9901  810.19   681.2  810.18  687.88  810.02692.0601  809.98
692.1801  809.97  694.73  810.04  696.47  810.18  697.86  810.37  700.02  810.29
  700.76  810.21  701.32  810.17  702.72  810.12   704.4  810.07705.0601  810.06
  706.57  810.04  709.36  809.98  710.87  809.87  713.66  809.98713.6801  809.98
  716.75   810.3  717.95  810.42  724.63  811.37732.1801  812.44  733.42  812.59
   735.9  812.97  736.09     813  736.44  813.01739.4301  813.12  746.54   813.3
  747.78  813.34  747.86  813.34  749.58  813.41  752.26  813.53  753.22  813.59
  755.59  813.69   771.2  814.18  776.98  814.33  778.33  814.37  781.51  814.46
  782.94  814.49783.4901  814.53  784.73  814.56  787.41  814.67789.1201  814.68
  792.78  814.69

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  268.25    .055     329     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        268.25     329             7.44   57.68  143.59             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  101.49  811.25       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 662.01

INPUT
Description:
Station Elevation Data    num=     294
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
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0	840.25	1.290039	839.98	3.460022	839.48	4.690002	839.23	5.929993	838.9
10.42999	837.24	11.52002	836.86	15	835.58	15.97003	835.24	17.67004	834.62
19.57001	833.93	24.14001	832.31	26	831.67	27.89001	831	28.38	830.81
31.66003	829.43	33.97003	828.52	35.87	827.71	37.89001	826.93	39.71002	826.35
41.17004	825.81	43.73999	824.97	44.77002	824.64	7.77002	823.59	49.54999	822.99
55.58002	82	155.83002	820.92	59.17999	819.75	60.22003	819.43	63.07001	818.29
64.45001	817.62	66.11005	816.89	74.42999	813.68	77.17999	812.58	79.98999	811.58
83.57001	810.92	83.86005	810.84	84.38	810.78	87.36005	810.64	87.98004	810.6
88.04999	810.69	1.58002	810.64	92.08002	810.62	93.70001	810.81	94.85004	810.99
98.78003	810.99	100.14	811.08	104.19	811.07	108.19	811.07	110.43	811.05
112.33	811.04	112.38	810.99	112.56	810.6	115.24	808.44	116.25	808.36
116.78	808.26	120.28	807.28	120.38	807.27	122.19	806.99	122.75	806.97
136.05	807.05	149.18	807.12	153.4	807.09	153.62	807.09	153.69	807.09
156.39	806.82	156.53	806.79	159.98	805.43	160.56	805.27	163.58	804.02
164.69	803.45	167.69	802.96	170.43	802.94	172.64	802.86	175.89	802.88
177.14	802.95	177.99	802.97	184.73	803.04	185.19	803.03	187.79	802.99
188.75	802.77	188.79	802.77	189.05	802.72	192.39	802.01	192.78	801.92
195.99	801.78	196.81	801.83	199.59	801.92	201.2	802.26	204.2	802.23
208.02	801.81	210.04	801.49	211.14	801.06	212.52	801.18	214.76	801.99
216.45	802.78	217.59	803.1	220.98	804.06	221.19	804.11	222.94	804.41
224.79	804.74	225.01	804.74	228.39	805.16	229.04	805.17	231.99	805.27
233.06	805.23	235.59	804.87	237.09	804.74	239.19	804.31	241.12	804.27
241.93	804.04	244.51	804.89	244.63	804.94	244.81	804.97	249.18	805.01
249.99	805.05	250.28	805.05	253.19	804.99	254.22	804.97	259.82	804.07
261.21	803.77	261.83	803.57	264.21	803.25	265.21	803.33	267.06	803.2
269.22	803.13	273.77	802.92	277.24	802.83	279.19	802.19	279.95	802
281.86	800.49	282.53	800	283.88	798.69	284.66	798	294.74	797.83
299.67	797.75	303.58	797.68	307.6	797.61	310.32	797.65	311.03	797.66
313.01	797.7	321.6	797.5	322.62	797.52	329.34	797.97	329.83	798
330.18	798.21	332.97	800	334.49	800.9	336.35	802	352.84	802.88
363.98	803.36	17 378.74	804	383.37	804.36	389.33	804.83	397.56	805.52
402.74	806	405.18	806.99	415.89	807.13	417.01	807.22	417.81	807.29
418.34	807.29	424.21	807.27	435.24	807.34	437.56	807.36	438.65	807.37
440.69	807.37	445.58	807.38	448.26	807.39	449.59	807.37	452	807.36
453.6	807.35	454.8	807.38	460.82	807.24	461.61	807.22	466.67	807.14
469.63	807.11	476.81	807.02	478.02	807.01	481.65	807	481.91	807.01
482.58	807.01	488.36	807.06	491.03	807.04	493.68	807.07	493.94	807.07
494.08	807.07	500.28	807.04	500.71	807.04	506.23	807.02	509.7	807.04
513.32	807.01	516.47	807	517.69	806.98	519.98	806.88	522.96	806.68
523.83	806.68	530.64	806.56	532.01	806.56	533	806.55	540.01	806.56
547.1	806.52	556.55	806.53	561.47	806.49	562.47	806.49	563.44	806.54
569.02	806.77	571.23	806.85	572.24	806.89	573.2	806.96	581.36	807.49
585.96	807.99	586.3101	808.02	593.19	808.65	594.25	808.73	595.37	808.81
597.24	808.98	597.79	809.01	600.54	809	602.35	809.03	604.22	809.04
620.53	809.13	632.82	809.15	646.82	809.17	651.12	809.17	654.09	809.16
667.42	809.02	678.65	809.01	686.59	809.02	689.77	809	694.64	808.99
695.46	808.98	697.94	808.98	701.26	808.82	701.41	808.82	701.49	808.81
701.95	808.95	702.99	809.04	704.05	809.17	704.26	809.15	706.99	809.15
708.66	809.09	710.24	809.04	717.6	808.87	724.52	808.87	726.26	808.86
728.11	808.93	733.08	808.99	735.93	808.99	736.55	808.99	737.07	809
739.22	809.07	743.2	809.21	744.82	809.27	747.27	809.38	748.06	809.44
749.39	809.59	751.58	809.87	754.32	810.23	756.62	810.55	765.39	811.65
766.72	811.78	769.03	812.08	770.97	812.33	776.91	812.83	777.48	812.82

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  781.62  812.88  783.47  812.95  785.74  813.01  794.36  813.09  795.83  813.12
  799.69  813.29  799.86  813.27   802.1  813.33  806.55   813.4  809.08  813.48
   813.8  813.63  814.42  813.65  814.69  813.67  816.36   813.7  836.13  814.02
  836.47  814.05  838.01  814.18  838.15  814.23  838.36  814.25  839.76  814.35
  840.68  814.22  843.15  813.25  845.08  813.34  846.18  813.18  847.27  813.51
  848.79  813.75  849.48  814.06  851.81  814.86  854.58  816.19

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  254.22    .055  363.98     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        254.22  363.98             6.58   55.11   38.66            .1        .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  100.14  811.08       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 606.9

INPUT
Description:
Station Elevation Data    num=     323
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  840.351.630005  839.962.469971  839.77    5.25  839.05     6.5  838.71
8.880005  837.9610.52002  837.39   14.13  836.2118.57001  834.67   19.75  834.29
22.59998  833.33   23.38  833.09   26.62  831.9528.14996  831.26   28.81     831
30.59998  830.3630.64001  830.3534.26001  828.8934.66998  828.7235.17999  828.53
41.51001  825.9742.71997  825.5344.22998  824.9948.20001  823.4853.40997  821.72
54.78998  821.2257.78998  820.12   59.63  819.4466.83997  816.5966.85999  816.58
   66.88  816.5766.89996  816.57    77.5  812.2480.09998  811.16   80.38  811.06
80.60999  810.99   81.37  810.8186.97998  809.9887.96997  809.7690.46002  809.74
90.89996  809.7492.26001  810.0994.32001  810.4398.48999  810.7599.51001  810.88
  103.08  810.99  103.13  810.99  103.63  810.98   107.1  810.92  110.38  810.19
  111.13  810.02  114.01  809.05  115.15  808.52  117.63  807.94  119.18  807.64
  121.26  807.37   123.2  807.17  125.62  807.09  127.22     807   144.2  807.08
  151.37   807.1  152.75  807.15  155.39  807.16  157.27  806.23  159.42  805.28
  161.79  804.18  163.44  803.26  164.76  803.03  167.47   802.6  168.39  802.61
  171.49   802.5  172.01  802.54  172.44  802.58  178.15  802.88  182.89     803
  183.56  803.01   184.4  802.99  190.14  802.89  191.61  802.76  193.45  802.68
  196.81   802.6  198.81  802.56  199.66  802.52  202.49  802.39  204.64   802.3
  210.23  801.68  211.91  801.64  213.36  801.42  213.92  801.31  214.63   801.5
  219.78  802.92  222.76  803.66   223.8  803.89  226.39  804.49  227.83  804.76
  230.01   805.3  231.85  805.56  232.86  805.87  238.38  804.86  239.65  804.45
   239.9  804.43  240.89  804.37  243.92  804.27     245  804.25  249.93  804.56
  250.01  804.56  252.92  804.58   254.2  804.57  255.39  804.35   256.5  803.93
  258.32  803.91  258.98  803.84  260.84  804.26  264.69  804.13  266.29  804.18
  270.58  804.34  271.34  804.35  271.74  804.19  276.47  802.58  277.19  802.27
  279.68  801.37  282.36  801.14  285.34  800.77  286.54  800.18   287.2  800.05
  287.24     800  288.16  799.65  292.09     798  295.74   796.4   296.5     796
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300.05	796	309.89	796	329.18	796	331.99	796	336.15	797.76
336.72	798	337.42	798.3	341.27	800	342.63	801.36	343.28	802
344.42	802.57	348.03	804	348.05	804.0087	350.37	805.02	355.49	806
355.66	806.01	369.85	807.15	369.93	807.15	370.09	807.15	370.38	807.14
370.44	807.14	370.83	807.17	375.8	807.26	377.26	807.34	383.63	807.54
385.53	807.78	388.01	807.89	388.56	807.92	389.8	807.95	391.59	808.01
392.38	808.01	394.62	808.01	396.76	807.95	397.65	807.91	399.65	807.78
400.68	807.73	402.32	807.67	405.97	807.47	406.24	807.47	419.93	807.41
424.15	807.42	429.21	807.47	434.02	807.51	436.85	807.58	437.79	807.58
440.53	807.47	443.11	807.45	448.92	807.38	449.15	807.37	449.34	807.37
452.15	807.36	458.26	807.33	458.64	807.33	462.94	807.31	465.99	807.24
466.79	807.19	468.63	807.15	470.39	807.09	477.2	807.02	478.6	807
480.44	807.05	485.54	807.14	487.95	807.31	488.29	807.32	488.45	807.32
491.6	806.95	492.73	806.87	494.4	806.91	500.69	806.9	501.8	806.91
504.74	806.94	514.09	807.03	517.9	807.02	519.31	807.04	520.44	807.04
523.69	807.07	527.75	806.97	528.06	806.96	529.59	806.93	530.05	806.93
537.61	807.07	540.09	807.1	544.06	807.02	545.57	806.99	546.15	806.96
547.04	806.95	552.35	806.92	554.21	806.95	556.13	806.95	558.7	806.94
565.14	806.99	567.46	806.96	570.35	806.92	572.78	806.91	576.21	806.81
576.46	806.8	579.03	806.71	584.83	806.48	586.34	806.46	589.58	806.48
592.86	806.54	594.64	806.55	600.62	806.55	610.63	806.57	611.8	806.56
612.55	806.55	617.38	806.49	620.4	806.61	626.5	806.87	627.98	806.91
636.15	807.47	639.58	807.69	640.82	807.83	641.86	807.93	646	808.23
646.24	808.25	646.43	808.26	650.62	808.54	654.75	808.74	655.1	808.76
655.86	808.79	658.29	808.87	661.12	808.93	674.49	809.01	676.55	809.02
677.43	809.02	701.71	809.05	709.38	809.04	710.2	809.04	713.82	809
734.82	808.97	740.47	808.98	746.71	809.02	748.79	809	757.62	808.97
764.25	808.92	766.66	808.92	772.41	808.84	773.17	808.83	773.67	808.84
775.61	808.77	777.39	808.65	780.29	808.8	781.92	808.85	782.55	808.86
783.96	808.9	785.62	808.95	786.3	808.96	793.81	809.06	794.67	809.06
796.04	809.12	800.73	809.35	803.67	809.6	803.77	809.61	803.91	809.63
808.18	810.09	814.27	810.75	816.13	810.96	818.44	811.24	823.48	811.88
825.69	812.11	828.01	812.35	830.06	812.5	831.04	812.58	833.23	812.7
834.07	812.75	834.44	812.76	838.99	812.89	844.56	813.03	849.73	813.07
852.13	813.13	854.98	813.25	861.31	813.41	866.12	813.53	871.46	813.68
872.68	813.71	875.38	813.76	887.46	813.93	892.04	814.01	892.09	814.01
892.33	814.03	892.35	814.04	892.52	814.06	895.47	814.38	896.3	814.29
898.16	813.39	900	813.13	902.21	813.38	904	813.5	904.47	813.62
906.28	813.95	909.84	814.52	910.93	814.84				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	271.34	.055	348.05	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
271.34	348.05	5.06	51.18	4.03	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	102.62	810.98	F

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 555.72

INPUT
Description:
Station Elevation Data num= 329

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840.72	.159973	840.17	5.549988	839.29	6.899963	838.94	8.429993	838.45
12.39996	837.23	17.66998	835.56	18.27002	835.36	21.52997	834.37	22.29999	834.13
23.27997	833.84	27.35999	832.93	27.89996	832.71	30.35999	831.38	32.32001	830.53
34.39001	829.63	35.90997	828.99	38.41998	827.94	41.62	826.64	42.20001	826.4
43.09998	826.03	48.45996	823.95	3.60999	821.82	54.53998	821.48	59.83002	819.46
62.59998	818.45	65.03998	817.59	66.83002	816.96	9.02002	815.94	70.64996	815.17
71.84998	814.63	74.67999	813.41	75.44	813.15	78.70996	811.97	9.02997	811.82
81.69	811.07	82.69	810.78	82.89001	810.73	89.82001	809.39	90.35999	809.23
90.70996	809.23	92.06	809.54	94.83002	809.82	97	810.22	101.23	810.71
102.86	810.96	105.88	810.93	107.28	810.91	107.78	810.73	110.95	810.04
112.83	809.4	114.98	808.74	118.57	807.88	119.01	807.78	122.16	807.3
123.03	807.2	125.75	807.06	127.06	806.99	130.94	807.01	133.99	807.02
147.07	807.07	148.87	807.06	150.3	807.07	152.96	807.06	155.27	807.05
156.44	807.04	158.52	806.08	160.99	804.63	162.16	803.82	164.18	802.19
166.45	801.87	167.36	801.95	168.88	802.13	171.39	802.14	172.47	802.29
175.41	802.5	179.17	802.81	179.56	802.85	181.8	803	185.76	802.94
189.5	802.91	191.53	802.89	196.05	802.87	196.63	802.86	197.41	802.87
200.25	802.88	200.61	802.88	201.27	802.9	204.87	803.03	208.09	803.09
208.25	803.11	208.54	803.13	209.32	803.15	213.91	803.69	214.49	803.76
217.06	804.29	219.65	804.77	220.23	804.85	222.18	805.23	224.82	804.74
225.73	804.73	229.97	804.28	231.29	804.2	232.87	804.09	234.89	803.95
237.4	803.39	240.32	802.57	245.47	801.24	245.49	801.23	245.51	801.23
245.81	801.14	249.49	800.02	249.54	800	250.02	799.71	252.6	798.27
253.04	798	269.57	797.88	275.76	797.84	279.25	797.87	280.94	797.88
297.44	798	298.01	798.59	299.72	800	300.36	800.64	301.8	802
302.32	802.04	47	305.87	802.35	313.76	803.04	325.49	803.86	326.23	803.92
327.44	804	331.63	804.52	336.22	805	339.43	805.34	345.23	806
346.06	806.58	346.42	806.65	346.91	806.68	348.02	806.71	349.18	806.52
350.56	806.7	353.05	806.83	355.99	806.88	362.89	806.86	365.08	806.86
368.97	806.77	370.44	806.76	371.18	806.77	372.96	807.07	373.25	806.99
376.95	807.02	377.09	807.01	377.4	807.01	381.47	807.06	384.17	807.06
387.89	807.11	391.11	807.15	393.26	807.19	398.05	807.44	399	807.47
400.64	807.68	403.38	808.02	406.78	808.33	407.46	808.37	407.77	808.38
410.49	808.47	412.15	808.43	413.52	808.35	416.53	808.12	416.54	808.12
416.57	808.12	419.57	807.79	421.14	807.52	422.67	807.43	423.7	807.44
429.7	807.42	441.61	807.43	448.23	807.49	451.59	807.51	455.74	807.51
455.92	807.51	455.97	807.51	456.16	807.51	460.78	807.43	462.28	807.42
465.54	807.39	470.81	807.32	475.33	807.32	477.09	807.31	478.23	807.32
480.31	807.27	482.26	807.15	483.23	807.04	483.97	807.01	485.26	807
491.03	806.98	492.86	806.97	496.36	806.95	499.14	806.95	504.18	807.04
504.35	807.04	504.71	807.02	508.56	806.87	510.4	806.87	515.31	806.86
518.6	806.88	524.29	806.92	525.24	806.93	526.6	806.94	527.54	806.94
534.47	806.98	538.36	806.97	539.19	806.98	543.88	807	546.72	807
547.18	806.99	553.97	807.14	556.76	807.19	559.26	807.13	561.38	807.15
562.1	807.03	563.47	806.99	564.89	806.92	570.5699	806.85	571.14	806.85
573.88	806.89	574.05	806.89	574.29	806.89	583.05	806.94	583.06	806.94

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  590.22  806.89591.8199  806.84  595.16  806.78  601.71  806.53  604.33  806.53
  605.64  806.55  613.33  806.59  616.38  806.59  626.71  806.62  629.31   806.6
  634.39  806.52  636.44  806.56  640.14  806.72  643.93  806.88  646.63  806.95
  654.44  807.49  656.44  807.59  657.95  807.67   661.4   807.9   664.8  808.13
666.3199  808.23  667.74   808.3  672.03  808.52  675.08  808.65  676.98  808.78
  680.98  808.84  682.21  808.87  686.16  808.89  692.61  808.95  695.07  808.98
  717.89  808.99  718.54  808.99  718.86     809  719.09  808.99  719.19  808.99
  727.89  808.99  728.49  808.99  736.61  808.98  752.85  808.95  754.74  808.96
  756.84  808.97  757.55  808.96  775.45  808.91  783.92  808.85   785.9  808.81
  788.71  808.77  789.02  808.77   789.1  808.77  791.03   808.7  792.65  808.62
  794.33  808.71  797.78  808.81  801.03  808.87  803.29  808.93  804.06  808.94
  810.93  809.03  813.41  809.06  818.09  809.38   819.2  809.43  819.69  809.47
     821  809.61  825.25  810.07  833.49  810.97  838.17  811.49  840.89  811.83
  841.61  811.91  844.79  812.23  846.45  812.41  847.47  812.48  849.47  812.63
  850.37  812.68   852.5   812.8  853.62  812.83  855.13  812.82  859.18  812.93
  863.38  813.03  867.29  813.07  870.01  813.14  872.39  813.24  877.68  813.37
   881.7  813.47  889.66  813.69  891.46  813.73  895.45  813.81  909.55  814.01
  909.72  814.01  909.87  814.01  909.89  814.01  910.03  814.02  912.18  814.25
  913.72  814.14  916.04  813.23   916.1   813.2  917.79  813.17  920.49  813.48
  925.81  814.28  928.19  814.66  929.25  814.97  931.49  816.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  222.18    .055  302.32     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        222.18  302.32           126.35   73.42    4.69             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  102.86  810.96       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 482.3

INPUT
Description:
Station Elevation Data    num=     263
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  818.575.869995  816.536.440002  816.336.790039  816.2110.60004  814.91
10.71002  814.8812.15002   814.414.64001  813.5817.86005  813.0618.34003  813.05
   18.62  813.0221.89001  812.74   22.63  812.6823.49005  812.6326.64001  812.45
28.04004  812.3939.83002  811.97   42.69  811.8944.26001  811.8347.60004  811.73
48.55005  811.67   49.87  811.6151.85004  811.4953.89001  811.2157.20001  810.78
61.57001  810.2766.76001  809.68   69.44  808.5270.55005     80871.54004   807.6
74.78998806.303375.55005     80676.45001  805.6480.55005     80486.05005  803.03
91.60004     80294.41003  800.7996.26001     800  101.19  798.07  101.36     798
   101.4     798  101.42  797.99  108.62  797.32   116.7  797.21  120.42  797.17
  135.03  797.63135.9901  797.62  138.05     798  140.14  799.01  142.34     800
  144.73  801.14  145.17  801.24  146.89  801.49  162.28   802.9     175  803.59
  176.25  803.65   177.2  803.69  177.96  803.72  179.48  803.76184.1801     804
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  185.28  804.19  189.11  804.98  189.41  804.99  189.66  804.99  192.75  805.14
193.4301  805.17  198.85  805.38  200.55  805.53  201.45  805.75  201.96  805.82
  202.37   805.9  204.14  806.25   206.6  806.73  206.61806.7302209.6801  806.81
  211.02  806.81212.7401  806.84  214.04  806.87  216.21  806.89  219.38  806.91
  220.08   806.9   222.4   806.9  227.81  806.89  232.06     807  232.19  807.01
  232.21  807.01  232.23  807.01  235.46  807.26   236.6  807.19  241.72  807.11
244.2401  807.07  248.46  807.06  249.79  807.05  250.28  807.04  251.37  807.05
  256.32   807.1  261.03   807.5  262.36  807.58  262.97  807.67  265.38     808
  267.37  808.35  268.41  808.49271.9301  809.23  273.73  809.43  274.65  809.33
  276.16  808.85  280.35  808.23  280.49  808.21  280.55   808.2  283.51  807.66
  284.95  807.51     287   807.4  301.65  807.41  303.78  807.41  309.32  807.44
  311.31  807.45   311.9  807.45   318.1  807.44  321.62  807.38  326.95  807.34
  337.72  807.25  337.79  807.25  338.29  807.23  343.91  807.03  345.21  806.95
     347  806.93  350.87  806.92  358.68  806.89  359.17  806.89  361.37  806.88
  364.05  806.88  365.05  806.93  367.92  806.77  368.22  806.77  368.33  806.77
  368.67  806.77  372.84  806.84  374.11  806.84  376.92  806.84  380.76  806.86
  383.02  806.88  389.02  806.92  393.91  806.96  396.07  806.95  399.07  806.99
  405.91  807.02  407.24  807.03  409.16  807.05  411.06  807.04  415.55  807.15
  416.79  807.18  419.42  807.23  422.22  807.42  422.84  807.43   424.9  807.16
   425.5  807.07  425.58  807.07  428.48  806.95  429.97  806.92   431.5  806.91
  433.04   806.9  434.36  806.92  440.23  806.93   445.2  806.97  451.29  806.89
  451.94  806.88  452.36  806.87  453.01  806.86  454.18  806.83  458.68  806.75
  461.16  806.65  462.66  806.65  466.68  806.62  469.96  806.61  475.63  806.64
  479.32  806.68  486.61   806.7  494.42  806.65   495.6  806.63  503.25  806.77
  504.68  806.83  506.53  806.89  509.64  806.97  512.12  807.04  513.87  807.13
   519.3  807.43  525.47  807.83   525.8  807.86  526.65  807.91528.9301  808.03
  533.64  808.29  535.44  808.36  540.42   808.7  542.35  808.73  544.23  808.76
  547.34   808.8  550.75  808.87  553.02  808.89  558.35  808.95  571.05  808.96
  576.45  808.98  579.02     809580.9301  808.97  581.71  808.97  589.25  808.97
  592.12  808.95  614.23  808.93  614.86  808.92  615.52  808.92  620.55   808.9
  637.91  808.85  643.22  808.81  648.96  808.72   649.7  808.71  651.86  808.51
652.0601   808.5  652.22  808.49  656.42  808.72  658.49  808.78664.0601  808.88
  665.37  808.92  667.08  808.93671.6801  808.99676.6801  809.05  679.64  809.25
682.1801  809.53  683.63  809.71  688.22   810.2  694.12  810.84  701.21  811.63
  702.44  811.76  705.27  812.05  709.37  812.48  711.23  812.61714.9301  812.82
  715.41  812.84  717.59  812.91  720.51  812.88  723.48  812.96  726.58  813.04
  729.47  813.06  732.46  813.14  734.46  813.22  738.94  813.34  742.35  813.42
  752.32  813.69  754.57  813.75  759.52  813.85  771.52  814.02  771.97  814.02
  772.38  814.02  772.44     814  772.79  814.04  772.87  814.03   776.1   813.8
  777.15  813.39  778.83  813.19  781.55  813.37  781.85  813.39  789.79  814.56
790.6801  814.68  791.08  814.74   791.4  814.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .057 4.78998    .055  206.61     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      74.78998  206.61             58.55   49.95    4.42             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
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REACH: 317437_BUCKEYE_C RS: 432.35

INPUT
Description:
Station Elevation Data num= 278

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	817.47	1.039978	816.99	4.169983	815.43	6.98999	814.51	8.419983	814.25
10.14996	813.81	1.42999	813.51	2.33997	813.33	14.07996	812.95	15.81995	812.48
16.90997	812.31	17.98999	811.94	21.48999	811.08	22.56	810.88	23.63995	810.87
25.97998	810.82	8.21997	810.78	32.81995	810.71	33.87994	810.73	5.31995	810.67
36.03998	810.64	36.69995	810.56	42.06	810.07	45.18994	809.74	45.58997	809.5
46.22998	809.65	47.94995	808.31	48.56995	808	53.5	806.17	53.93994	806
54.45996	805.79	57.51996	804.46	0558.57996	804	61.53998	802.21	62.01996	802
62.58997	801.72	65.93994	800	68.29999	798.99	70.68994	798	72.89996	797.08
75.60999	796	75.97998	796	77.22998	796	95.31	796	96.37994	796
107.45	796	110.61	796	111.36	796.39	113.46	797.35	114.83	798
116.47	798.66	119.73	800	121.79	800.79	123.6	801.43	138.99	802.66
148.22	803.42	151.68	803.86	155	803.97	155.66	804	160.7599	804.94
161.11	805.03	161.33	805.03	161.56	805.04	162.05	805.05	165.08	805.12
166.59	805.13	167.99	805.23	170.14	805.47	172.2	805.67	174.55	805.95
176.62	806.21	178.96	806.59	180.0099	806.79	185.33	806.85	187.1899	806.95
189.08	806.96	191.42	806.94	194.04	806.96	197.71	806.87	201	806.87
203.74	806.86	205.41	806.89	207	806.98	209.8199	807.04	212.77	807.17
215.61	807.13	218.6299	807.15	221.81	807.04	223.04	807.02	226.39	806.95
227.89	806.9	231.45	806.92	233.86	807.05	236.27	807.22	236.9	807.25
238.1899	807.4	239.89	807.58	240.67	807.69	242.9	807.93	245.08	808.26
245.91	808.33	247.71	808.45	249.3199	808.58	249.49	808.57	251.9399	808.72
253.9	808.52	254.93	808.54	257.23	808.14	258.31	807.96	260.82	807.46
263.21	807.49	265.67	807.37	273.41	807.37	279.58	807.38	284.76	807.4
289.08	807.38	293.9	807.37	296.14	807.34	305.09	807.26	311.93	807.21
313.58	807.19	318.87	806.97	320.46	806.88	321.23	806.89	323.85	806.86
324.25	806.86	324.43	806.86	324.94	806.86	331.8	806.87	333.25	806.87
333.28	806.87	333.36	806.87	336.3	806.86	337.66	806.86	338.92	806.83
339.63	807.13	342.01	807.13	342.88	807.08	345.37	806.94	346.47	806.95
349.57	806.91	351.36	806.87	355.29	806.87	356.54	806.86	358.48	806.88
363.16	806.9	366.02	806.92	367.12	806.93	367.61	806.93	372.68	806.99
376.59	807.01	379.88	807.04	384.59	807.08	389.22	807.07	392.33	807.14
393.54	807.15	394.96	807.19	396.55	807.2	399.37	807.15	399.98	807.13
402.58	807.02	403.78	806.99	407.06	806.97	408.82	806.96	409.5	806.96
412.87	806.97	420.02	806.99	420.96	806.99	422.14	806.98	425.82	806.94
428.12	806.86	431.7	806.79	434.64	806.74	435.62	806.77	438.05	806.74
442.44	806.71	449.54	806.69	451.39	806.7	458.92	806.77	460.28	806.78
462.73	806.76	468.03	806.7	469.9	806.69	472.45	806.67	473.13	806.71
480.11	806.83	482.05	806.86	485.39	806.96	487.54	807.02	489.95	807.02
491.21	807.04	494.34	807.21	497.36	807.41	498.31	807.48	500.76	807.62
507.22	807.98	508.92	808.07	509.58	808.1	512.45	808.29	516.38	808.51
518.36	808.58	520.08	808.6	523.71	808.71	525.53	808.73	527.21	808.77
530.1	808.83	533.22	808.9	535.14	808.92	538.45	808.93	548.35	808.97
553	809	556.42	808.95	557.8199	808.95	564.3099	808.95	569.2	808.91
588.0099	808.9	589.85	808.89	591.74	808.88	605.98	808.82	613.96	808.8
616.47	808.78	620.5699	808.72	624.1899	808.7	625.35	808.6	630.15	808.62
632.14	808.72	633.0099	808.75	640.59	808.89	641.09	808.91	643.6	808.93
646.23	808.96	653.14	809.04	653.28	809.05	653.35	809.05	653.39	809.05

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  653.85   809.1  658.66  809.63661.6899  809.99664.6899  810.31  668.58  810.74
  673.34  811.26  677.09  811.68   685.5  812.52  685.78  812.55  685.91  812.55
686.2599  812.57  690.83  812.88  694.68  812.96694.8199  812.96  694.93  812.96
  695.02  812.97  698.92  812.93701.0099  812.99  703.21  813.04  705.27  813.06
  708.48  813.14  710.17  813.21  713.97  813.31  716.87  813.38728.5099   813.7
  731.11  813.76736.8199  813.88  747.14  814.02  747.81  814.03  748.43  814.02
748.5099     814  748.84  814.04  749.05  814.04  752.03  813.54  752.06  813.54
  752.12  813.53755.0699  813.18756.4399  813.27  758.09   813.4  763.48  814.19
  766.37   814.6  767.67  814.78  768.47  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .0557.51996   .055180.0099     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
     57.51996180.0099             83.86   62.35    3.34             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 370

INPUT
Description:
Station Elevation Data    num=     339
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.423.559998  820.256.219971  819.397.820007  818.8811.77997  817.62
14.21002  816.8517.48999  815.8519.46002  815.2523.65997  814.4924.22998   814.4
24.71997  814.3229.83002   813.529.90997  813.4929.96997  813.4832.73999  812.96
36.01001  811.9938.41998  811.4140.46997  811.1340.72998  811.0841.54999  811.09
46.51001  810.9948.34998  810.9449.77002  810.9150.46002  810.9160.58997  810.32
60.90997  810.29   61.31  810.2664.54999  810.0170.70001   809.672.46997  809.46
77.33997   809.178.51001  809.0279.27002     80980.97998  809.0683.34998   809.1
83.82001  809.13   85.38  809.1686.65997  809.19    89.5  809.17      93  809.21
94.70001   809.2   95.25  809.1896.71997  809.0499.17999  809.0499.89001  809.02
   102.6  809.85  104.73  810.05  104.98  810.11   105.1  810.12  105.54  810.08
  107.82  810.01  109.11  809.68  110.09  809.51  115.23  808.86  121.48  808.89
  121.51  808.89  121.52  808.89  125.64  808.94  128.09     809  129.77  809.03
  131.38  809.12   133.9  809.04  135.25  809.15  137.62  808.29  138.03  808.17
  141.23  806.77  142.16  805.91  143.74  805.17  147.08  802.75  149.95  801.71
  151.08  801.16  153.65  800.28  154.37  800.03  154.55  799.99  157.65  799.26
  158.66  799.07  161.22  799.06  162.07  799.05  164.62     799   170.6  798.86
  171.41  797.99  171.77  797.06     172  796.96  172.03  797.03  172.07  796.93
  172.67  797.34   175.2  798.78  177.12  798.72  180.64   798.7   182.2  798.67
  183.11  798.65  187.02  798.79  187.37  798.84   187.6  798.86  188.24  798.93
  191.95  799.31  192.87  799.51  194.72   799.8  196.34  800.14  197.21   800.3
  198.36  800.66  199.99   801.1  200.35  801.24  201.76  801.91   203.8  802.97
  204.12  802.96  206.92  803.46  208.25  803.64   210.2  803.95  212.38   804.3
   214.7  804.79  216.22   804.8  217.02  804.69  217.65  804.69  218.15  804.75
  220.64   805.1  223.34  805.43  224.77  805.59  227.19  805.84   228.9  806.02
  229.46  806.05  233.03  806.38   233.2  806.39  237.31  806.71  239.04  806.81
  240.44  806.82  243.05  806.88  246.51  806.91  254.79  806.98  257.03     807
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258.52	806.99	258.92	806.99	259.31	806.99	259.67	806.99	265.48	806.85
265.54	806.85	265.74	806.85	269.96	806.79	274.04	806.85	274.41	806.85
274.76	806.87	278.79	807.04	280.52	807.14	283.21	807.2	283.44	807.22
284.2	807.2	287.63	807.11	289.54	807.09	294.95	806.81	296.44	806.82
300.88	807.1	303.08	807.11	304.67	807.17	305.29	807.27	307.59	807.47
309.71	807.69	310.6	807.76	312.51	807.88	313.61	807.98	314.12	808.01
316.62	808.18	318.54	808.29	319.63	808.35	321.95	808.36	322.61	808.4
322.96	808.29	325.64	807.69	328.23	807.33	328.32	807.32	328.55	807.32
333.39	807.38	334.22	807.34	336.84	807.34	346.03	807.35	349.45	807.37
357.57	807.33	360.34	807.32	361.64	807.3	373.28	807.21	377.2	807.17
380.03	807.14	380.92	807.11	386.24	806.81	388.82	806.83	389.2	806.83
393.19	806.9	398.03	806.91	400.86	806.95	402.45	806.92	404.19	806.87
405.55	806.89	406.87	807.32	410.64	807.1	416.32	806.95	418.91	806.9
420.12	806.89	422.98	806.86	427.41	806.92	430.04	806.93	434.46	806.96
437.47	807	439.09	807	443.89	807.04	450.77	807.11	457.47	807.09
458.76	807.12	459.86	807.13	463.51	807.11	464.03	807.11	464.28	807.11
464.96	807.09	467.91	807	470.05	807.01	471.67	807.01	477.59	806.98
482.38	807.02	486.36	807.02	489.86	806.99	490.78	806.97	491.01	806.98
491.82	806.94	494.55	806.86	498.16	806.79	499.42	806.72	500.14	806.76
500.72	806.79	502.81	806.85	507.26	806.8	508.44	806.76	509.53	806.74
517.28	806.71	523.26	806.76	527.78	806.77	529.71	806.76	530.82	806.75
534.94	806.71	540.51	806.68	541.98	806.77	546.63	806.85	550.59	806.91
551.82	806.94	552.61	806.96	556.26	806.98	557.88	806.99	558.41	806.99
559.75	807.01	560.2	807.03	560.63	807.06	562.1	807.17	565.85	807.38
572.87	807.77	574.69	807.87	575.08	807.89	576.76	807.98	582.52	808.3
587.03	808.46	587.38	808.47	589.47	808.53	592.97	808.63	593.07	808.63
595.63	808.72	598.5	808.78	601.19	808.85	603.34	808.92	605.07	808.93
611.53	808.96	617.94	809	622.63	808.94	624.55	808.94	630.16	808.93
636.75	808.88	652.75	808.87	655.63	808.85	658.58	808.84	680.51	808.76
680.65	808.76	680.7	808.76	680.78	808.76	682.31	808.75	689.42	808.72
689.63	808.72	689.83	808.72	690.31	808.73	698.76	808.73	706.01	808.88
707.18	808.88	708.88	808.91	710.73	808.92	711.59	808.94	713.89	808.96
717.5	809	719.27	809.04	720.31	809.09	724.84	809.6	725.39	809.66
726.25	809.77	727.75	809.95	730.22	810.24	731.79	810.41	733.84	810.64
736.36	810.92	742.51	811.59	749.2	812.26	752.24	812.54	753.61	812.69
756.83	812.91	759.26	812.96	761.87	812.97	764.02	812.97	765.5	813
767.87	812.98	769.15	813.01	770.5	813.05	771.77	813.06	775.18	813.14
776.57	813.2	779.71	813.28	782.11	813.34	795.39	813.7	798.35	813.77
804.82	813.9	813.47	814.03	814.37	814.04	815.19	814.02	815.31	813.99
815.61	814.03	816.02	814.05	817.58	813.78	819.03	813.46	822	813.17
822.01	813.16	822.13	813.17	825.05	813.4	827.73	813.79	832.76	814.52
835.01	814.82	835.74	814.88	836.08	815.24	836.87	815.82		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	135.25	.055	240.44	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.25	240.44	71.45	70	5.34	.1 .3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 300

INPUT
Description:
Station Elevation Data num= 334

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	820.71	3.440002	819.79	3.880005	819.68	4.609985	819.48	6.330017	819.05
9.419983	818.24	11.09003	817.86	13.60004	817.21	14.83002	816.95	16.41003	816.58
17.85999	816.26	19.06	815.88	23.23999	814.89	23.88	814.76	25.16998	814.53
33.51001	813.02	34.01001	812.93	35.15002	812.76	38.10004	812.24	1.10999	811.57
43.04004	811.39	45.35999	811.33	51.95001	811.19	52.63	811.18	53.20001	811.17
69.73999	810.85	73.63	810.72	74.60999	810.68	77.28003	810.62	79.91003	810.63
81.85004	810.64	90.16998	810.64	91.40002	810.61	95.01001	810.53	105.78	810.36
112.97	810.16	119.66	810.04	121.48	809.99	122.28	809.94	132.61	809.62
133.71	809.6	135.11	809.59	138.23	809.79	138.56	809.79	141.5	810.05
142.7	810.15	143.48	810.69	144.5	810.71	147.29	810.33	148.03	810.52
150.24	810.87	150.99	811.05	151.3	811.11	152.49	811.13	154.9	811.33
155.13	811.26	157.84	810.82	159.27	810.41	161.6	809.55	163.09	809.13
167.12	809.09	167.48	809.1	167.7	809.1	167.99	809.1	174.17	809.11
175.83	809.14	178.74	809.45	179.35	809.46	179.47	809.46	180.24	808.92
183.49	808.82	186.59	808.76	188.25	808.71	191.59	808.6	193.58	808.55
195.91	808.62	197.05	808.77	198.99	809.19	200.8	809.36	202.39	809.87
203.36	810.11	204.81	809.7	206.85	809.37	212.58	809.13	213.09	809.09
214.05	809.12	215.15	809.09	215.63	808.89	217.23	807.88	219.92	806.05
221.37	804.96	223.19	803.52	225.51	801.67	226.45	800.98	228.46	799.38
230.66	799.12	231.11	798.94	231.22	798.89	232.09	798.57	233.27	797.23
233.81	796.83	233.88	796.83	233.89	796.81	233.9	796.82	233.94	796.82
234.01	796.83	235.67	797.24	241.41	798.52	242.07	798.79	242.79	798.77
245.49	798.75	246.2	798.74	246.32	798.74	250.7	798.71	251.17	798.7
252.16	798.7	258.25	798.68	263.14	798.75	263.65	798.81	264.39	798.84
265.66	799	267.15	799.06	269.18	799.91	271.05	801.14	274.72	803.46
275.41	803.95	275.53	803.97	276.49	804.19	278.73	804.89	279.33	805.03
282	805.11	283.47	805.23	285.27	805.32	287.61	805.45	288.54	805.53
291.75	805.79	291.89	805.82	291.99	805.83	295.07	806.27	295.72	806.3
297.31	806.39	300.03	806.43	301.61	806.47	304.17	806.62	307.49	806.75
308.31	806.78	311.41	806.84	312.45	806.87	314.26	806.89	315.61	806.89
317.94	806.86	322.99	806.92	324.14	806.92	324.87	806.9	327.75	806.94
329.03	806.88	331.21	806.99	333.15	806.96	334.28	806.94	337.3	807.04
337.55	807.04	338.49	807.05	341.44	807.1	342.51	807.1	349.65	807.1
353.02	807.17	356.6	807.22	364.01	807.31	366.28	807.33	376.4	807.33
379.21	807.33	382.84	807.3	383.59	807.3	384.66	807.31	384.76	807.31
394.8	807.26	396.81	807.26	398.01	807.25	399.08	807.24	413.64	807.12
414.12	807.15	416.49	807.24	418.23	807.31	419.45	807.46	420.09	807.3
422.51	807.06	424.51	807	425.51	806.97	432.2	806.96	434.05	806.96
437.09	807.03	437.76	807.04	440.55	807.13	442.18	807.2	444.07	807.35
444.31	807.36	444.58	807.36	456.77	806.92	459.31	806.85	460.87	806.84
461.63	806.83	463.89	806.94	464.67	807.05	465.38	807.07	467.63	807.24
468.68	807.26	470.64	807.09	473.1	807.05	473.64	807.05	474.81	807.05
476.29	807.04	477.79	807.06	488.25	807.16	493.72	807.14	495.18	807.13
499.76	807.04	501.91	807	503.46	807	509.74	807.01	516.59	807.03
519.54	807.02	523.53	807.05	526.1	807.01	528.09	807.09	529.17	807.09
531.79	806.95	534.32	806.68	538.06	806.81	539.82	806.81	540.82	806.8

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  542.7  806.82  543.77  806.79  545.84  806.75  550.25   806.7  551.47  806.68
  552.6  806.68  553.48  806.68  569.71  806.71   569.9  806.71  570.27  806.71
 574.27  806.66  578.54  806.71  581.47  806.69  584.42  806.87  584.73  806.88
 585.21  806.88  589.74  806.85  594.91  806.89  599.98  806.96  602.26  807.05
 603.92  807.09  606.83  807.22  610.03  807.39     613  807.54  616.77  807.74
 618.77  807.84  621.04  807.96  625.53  808.14  627.06  808.19  630.89   808.3
 631.39  808.32  637.22  808.53  640.41  808.64   643.2  808.74  645.36  808.76
 648.11  808.89  650.53  808.99  652.78     809  660.11   808.9  663.12   808.9
 666.88   808.9   677.1  808.82  686.95  808.81  692.14  808.78  697.45  808.75
  710.8   808.7  718.58  808.72  722.28   808.7   728.2   808.7  733.99  808.68
 738.68  808.74  742.54  808.76  744.96  808.79  750.39  808.85  751.37  808.86
 754.09  808.94  755.79  808.98  757.72   809.1   759.5   809.2  760.21  809.28
 763.31  809.61  768.12  810.26  769.04  810.37  771.44  810.68  776.58  811.23
 777.87  811.37  778.46  811.43  790.15  812.51  792.17  812.74  793.95  812.89
  795.9     813  800.26  813.02  802.33  813.01  804.87  813.03  807.98  813.02
 808.79  813.05  811.55  813.09  813.92  813.15   814.5  813.17   815.8  813.21
  816.8  813.23  834.69  813.72  838.67  813.81  847.39  813.99  851.17  814.04
 852.75  814.07   854.2  814.04  854.41  813.99  854.63  814.01  855.17  814.03
 855.67  814.01  856.09  814.19  857.55  813.76  857.84  813.64  861.53  813.17
  861.8  813.19  864.69  813.17  870.41  814.19  870.51   814.2  870.63  814.24
 870.91  814.33  873.06  815.03  873.84  815.55   876.2  817.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  215.63    .055  295.72     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        215.63  295.72             88.38     100   89.28             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0   154.9  811.33       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 200

INPUT
Description:
Station Elevation Data    num=     437
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.014.700012    8216.570007  821.0110.65002  821.0112.32001  821.01
17.31006  821.0219.15002  821.0221.28003  820.9924.33002  820.66      25   820.6
25.47003  820.5628.79004  820.1132.90002  819.5135.29004  819.2335.76001  819.17
   38.13  818.9439.34003  818.8240.20001  818.6943.87006  817.9645.02002  817.95
45.07001  817.9445.11005  817.9447.23004  818.8149.65002  818.6550.81006  818.54
51.92004  818.5953.68005  818.5454.93005  818.6456.05005  818.8859.28003  818.97
60.47003  818.9162.28003  818.38   64.75  818.2165.15002  818.1565.71002  818.08
68.02002  817.8569.66003  817.6970.89001  817.5472.61005  817.2974.57001  817.02
79.43005   816.479.49005  816.39    79.5  816.3982.36005  816.2284.39001  816.11
85.23004  816.0886.40002  816.0388.09003  815.9889.30005  815.9390.96002  815.85
93.29004  815.7293.83002   815.796.48004  815.5799.12006  815.4599.57001  815.42
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99.86005	815.39	104.57	815.28	105.3	815.27	108.94	815.16	113.91	814.98
120.88	814.56	121.77	814.5	122.94	814.42	128.11	814.1128.4301		814.08
130.59	813.93	133.5	813.72	134.19	813.67	134.67	813.64	139.72	813.3
141.57	813.2	142.59	813.15	143.86	813.12	148.23	812.99	150.92	812.94
156.47	812.86157.2401		812.83	158.05	812.82	160.48	812.79	172.29	812.71
176	812.65	181.98	812.47	188.66	812.31	197.55	812.18	198.72	812.14
204.55	811.94	205.69	811.9	206.89	811.85	213.52	811.65	216.97	811.55
217.16	811.54	217.42	811.54	220.65	811.47	224.7	811.47	225.77	811.48
226.8	811.47	231.21	811.57	231.71	811.57234.3701		811.62236.6201		811.75
237.44	811.86	238.11	811.84	240.11	811.85	241.53	811.61	242.28	811.6
245.01	811.22	245.48	811.16	246.64	811.12	247.5	811	251.35	810.98
251.67	810.96256.9301		810.95	258.8	810.95260.7401		810.97	265.38	810.62
265.92	810.56	266.08	810.54	267.03	810.41	271.09	809.89	271.66	809.87
272.29	809.87	272.48	809.85	273.64	809.51	274.47	809.61	276.9	810.04
279.6801	810.45	280.59	810.57	280.96	810.54	283.66	810.12	285.72	809.79
286.67	809.68	288.71	809.5289.6201		809.37290.7401		809.32	292.69	809.42
294.55	809.62	295.7	809.64	298.97	809.87	302.09	810	303.64	810.06
304.73	810.12	307.63	810.12307.7401		810.12	307.79	810.12	310.75	810
312.8	809.53	315.09	809.24	318.58	809.12	319.78	809.04	321.04	809.01
324.1201	808.95	326.55	809.02328.8101		809.02	329.86	809.07	331.46	809.18
334.07	809.22	336.01	809.18338.1801		809.15	338.69	809.15	341.76	809.07
343.11	809.01	345.34	808.92	347.52	808.79	349.88	808.65354.9301		808.27
356.35	808.17	358.91	807.96	364.39	807.54	364.84	807.51365.1801		807.52
365.82	807.46	368.44	807.33	368.98	807.37	373.72	807.73	373.96	807.75
374	807.75	376.97	807.88	378.42	807.85	382.41	807.6	382.98	807.59
383.3101	807.55385.9901		807.35387.2401		807.31	388.23	807.03	390.38	807.06
391.66	807.16	392.01	807.12	392.78	807.07	395.02	807.06	396.07	806.94
397.03	806.95	397.95	806.76400.4901		804.81	401.04	804.53402.2401		803.49
404.46	801.42	404.9	801.05404.9901		800.98	405.38	800.89409.3101		800.17
409.76	799.86	410.91	799.29	411.32	799.19	411.96	798.75413.4901		798.82
421.29	797.27	422.11	798.91	422.22	798.92	422.29	798.92422.3701		798.92
422.8101	798.92	426.97	798.93	430.04	799	431.71	799	435.32	799.02
439.8	799.12	440.66	799.13440.9901		799.15	441.88	799.25	443.19	799.34
443.33	799.38	444.15	799.58	444.63	799.71	448.6	800.77	449.2	800.96
449.54	801.07	452.14	801.9	453.45	802.34	455.22	802.85457.8701		803.6
461.2401	804.25	462.28	804.5	463.5	804.76	468.46	804.86	470.08	805.02
471.11	805.02	473.28	805.07	475.52	805.11	476.29	805.14	477.92	805.23
479.3	805.29	479.79	805.29	481.7	805.51	484.35	805.77	487.38	806.16
488.33	806.27	489.97	806.44	493.18	806.72	494.05	806.71	494.95	806.74
496.85	806.89	497.35	806.91	497.54	806.93	498.24	806.93	502.01	806.98
503.37	807.03	506.31	807.13	506.41	807.13	508.82	807.36	510.83	807.49
512.4	807.6	515.77	807.89	519.66	808.12	522.21	808.66	523.11	808.61
524.46	808.45	524.72	808.44	525.23	808.37527.4501		808.23	528.49	808.19
530.46	807.77534.6901		807.29	536.48	807.14537.3201		807.1	540.62	807.03
546.15	807.02	554.4	807.01556.5601		807.01	560.92	807.03	572.28	807.27
572.52	807.28	572.91	807.27578.4501		807.22	581.63	807.07	585.13	807.02
586.72	806.98	592.8	806.94598.4501		806.9	601.3	806.91606.5601		806.88
609.3	806.85	615.62	806.81	618.52	806.77	622.41	806.71	624.61	806.69
629.48	806.6	632.36	806.55	634.13	806.54	647.29	806.43647.3101		806.43
647.3201	806.43	650.8	806.21	651.71	806.17	653.29	806.11	654.64	806.03
655.77	805.99	658.27	805.91	660.03	805.85	660.5	805.84	661.33	805.83
664.11	805.76	669.09	805.7	669.25	805.7	669.29	805.7	669.36	805.7
673.86	805.68	678.08	805.57	678.47	805.57	679.91	805.51	683.08	805.36

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683.9401  805.33685.4401   805.3  688.64  805.25  690.78  805.25695.0701  805.22
  698.59   805.2  699.37  805.19  702.11  805.24704.4501  805.37  709.55  805.55
  710.75  805.59  713.25   805.7  715.36   805.7718.4401  805.43  720.26  805.52
  721.66  805.27  724.59  805.29  724.97  805.28  732.66  805.36  733.66  805.37
  733.76  805.37733.8101  805.37  733.87  805.37  738.42  805.43  740.34  805.46
  745.48  805.61  747.65  805.62749.7401  805.67  751.34  805.72  752.26  805.71
  754.27  805.78  756.87  805.77  757.47  805.81  757.78  805.82  761.65  805.93
  765.78  806.06  766.07  806.06  766.21  806.07   773.2  806.26  777.35   806.9
  778.21  806.96   779.4  806.97  780.72  806.96  788.27  806.92  791.12  806.94
  794.46  806.92  795.29  806.93  797.97  807.11  798.37  807.15798.9301  807.17
  804.09  807.42     806  807.51  807.02  807.54   807.6  807.57  811.04  807.75
  814.04  807.93815.8101  808.01  816.82  808.06820.1901  808.35825.0601   808.7
  825.84  808.75  828.96  808.81  836.88     809  839.88  809.03843.8101  809.09
844.4901  809.11846.1901  809.14   849.1  809.19  849.83  809.14  851.46  809.15
  853.55  809.55   853.9   809.6  854.23  809.66  856.83  810.11  858.33  810.39
  859.76  810.63  862.26  811.03  862.83  811.13  865.33  811.39   866.7  811.51
   868.8  811.64  875.33  812.05  885.48  812.67     886   812.7  886.13   812.7
  886.38  812.72  890.37  813.02  890.95  813.03     892  813.03   893.8  813.03
  897.86  813.03  905.35  813.03911.9301  813.08  913.57  813.08  914.02  813.09
  915.82  813.13  931.26  813.41  939.38  813.53  942.66  813.65  944.38  813.69
  954.25  813.92  961.19  814.06  961.98  813.94  962.97  813.83  965.26  813.49
  965.65  813.46  966.75  813.32968.1801  813.12  969.13  813.09  972.04  813.38
973.6201  813.48  974.04  813.55  974.79  813.74  976.97   814.3  978.23   814.8
  979.91  815.57  980.53  815.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  397.95    .055   463.5     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        397.95   463.5             79.15  118.32  197.15             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  280.59  810.57       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 81.68

INPUT
Description:
Station Elevation Data    num=     420
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  822.042.440002  822.02    2.75    8222.960022  822.015.630005  821.85
7.800049  821.8310.54004  821.7316.70001  821.4317.15002  821.4117.46002   821.4
   21.12  821.2423.82001  821.1625.23004  821.11   27.13  821.0828.67004  821.05
30.95001  821.0231.55005  821.0134.08002  820.9436.79004  820.84   37.31   820.8
38.08002  820.7340.41003  820.56   41.62  820.42   43.44  820.23   47.94  819.69
51.29004  819.3251.71002  819.2752.33002  819.1754.59003  818.87   56.12  818.74
57.10004  818.7860.89001  818.0961.48004  818.0763.23004  818.2765.79004  818.26
66.11005  818.2966.59003  818.2768.98999  818.2570.41003  818.2574.58002  818.23
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74.75	818.2175.45001	818.1779.11005	817.8980.29004	817.8480.79004	817.75
84.14001	817.5	85.12	817.6	87.31	817.5590.47003	817.22	94.44	817.11
94.78003	817.1295.10004	817.1199.76001	816.97	101.65	817.03	104.45	817.25
109.36	817.33	112.19	817.39	116.63	817.11	116.97	817.11	117.21	817.13
118.95	817.57	122.82	818.69	123.02	818.74	123.33	818.67	123.78	818.52
126.59	817.77	128.61	817.69	129.47	817.58	130.74	817.69	132.35	817.59
133.45	817.49	135.1	818.22	136.93	816.82	137.12	816.79	138.28	816.79
141.5	816.81	145	816.84	147.8	816.97	152.15	816.73	152.51	816.65
152.78	816.63	155.39	816.24	157.61	815.94	158.27	815.84	159.25	815.7
161.15	815.48	163.26	815.13	163.84	815.05	165.32	815.04	166.91	815.05
167.27	815.05	169.79	815.08	172.11	815.14	172.67	815.14	173.51	815.27
175.77	815.31	176.97	816.02	177.69	816.19	180.64	815.66	181.35	815.66
181.77	815.71	184.19	815.46	186.61	815.82	187.07	815.8	187.76	815.77
189.63	816.18	191.44	815.32	191.93	815.12	194.89	815.05	195.71	814.96
196.27	814.97	198.59	814.93	201.1	814.98	205.83	814.96	206.18	814.93
209.15	814.45	210.11	814.32	210.77	814.25	214.5	813.49	215.76	813.43
216.27	813.45	218.75	813.47	220.43	813.28	221.63	813.31	223.4	813.11
225.09	812.92	225.27	812.94	230.53	812.87	234.93	812.85	237.19	812.82
241.41	812.75	244.56	812.79	244.6	812.79	244.67	812.79	244.79	812.79
245.31	812.8	253.31	812.87	254.26	812.87	256.19	812.82	259.04	812.74
259.07	812.73	259.1	812.74	261.95	812.51	262.58	812.5	266.69	811.92
267.71	811.73	268.76	811.62	270.59	811.45	273.3	811.16	273.62	811.12
276.03	811.01	277.13	811.02	279.92	811.04	283.26	811.06	287.87	811.09
288.09	811.09	289.23	811.05	292.93	810.92	293.63	810.91	294.68	810.81
298.04	810.58	301.81	810.31	302.27	810.29	302.59	810.28	304.24	810.17
307.69	809.97	308.03	809.96	308.94	809.9	310.91	809.76	312.26	809.64
313.79	809.58	316.06	809.46	316.67	809.42	317.09	809.4	319.55	809.32
323.19	809.28	325.31	809.24	326.93	809.17	328.97	809.17	329.93	809.21
331.12	809.1	335.78	809.11	342.6	809.09	350.51	809.17	350.92	809.17
351.25	809.18	351.7	809.17	355	809.13	355.75	809.13	364.27	808.98
365.55	808.95	365.73	808.95	365.96	808.95	371.4	808.88	373.09	808.84
374.28	808.81	375.08	808.78	377.16	808.69	379.91	808.54	380.04	808.53
380.21	808.51	382.92	808.33	384.75	808.22	385.8	808.13	387.34	808.03
388.68	807.93	389.58	807.85	394.29	807.55	394.42	807.54	394.47	807.54
397.32	807.4	398.04	807.35	400.31	807.24	405.44	807.07	408.91	807.04
411.72	806.97	413.7	807	415.28	806.96	417.48	806.62	418.58	806.46
422.98	805.78	426.31	805.09	428.24	804.88	429	804.8	430.11	804.73
433.07	804.51	434.76	804.42	437.24	804.29	437.64	804.26	437.91	804.24
440.52	804.11	442.74	803.98	443.4	803.95	444.37	803.82	446.28	803.62
447.57	803.38	449.16	802.99	450	802.77	451.49	802.39	452.04	802.26
452.4	802.18	454.92	801.54	457.24	800.99	458.62	800.65	459.55	800.44
462.07	799.85	463.16	799.63	465.56	799.09	466.24	798.93	466.82	798.8
467.25	798.8	478.29	798.95	481.05	798.98	484.34	799.05	491.87	799.19
497.85	799.38	497.87	799.38	497.92	799.42	500.73	801.9	501	802.17
501.39	802.4	504.48	804.82	505.56	804.85	506.76	805.03	510.4	805.31
511.41	805.06	513.96	805.69	515.23	806.03	515.4	806.07	515.64	806.13
518.28	806.74520.0601	806.92	521.16	807	522.77	807.07	524.29	807.1
524.9	807.14	526.92	807.14	531.5	807.36531.6801	807.35	531.88	807.34
535.5601	806.99	539.39	806.73	541.32	806.62	544.23	806.49	547.08	806.37
551.28	806.22	552.39	806.16	553.89	806.1	555.72	806.05	558.41	805.92
558.72	805.9	560.78	805.75	561.48	805.88564.0601	805.77	564.7	805.79
569.47	805.97	572.67	806.07	573	806.09	573.34	806.1	581.41	806.32
587.26	806.45	591.09	806.53	592.55	806.62	594.05	806.65	598.92	806.67

601.1801	806.66	607.05	806.66	607.5601	806.59	611.88	806.54	615.4301	806.47
616.72	806.46	619.08	806.39	622.5601	806.29	624.84	806.23	626.38	806.19
629.6901	806.2	630.6	806.2	631.21	806.2	632	806.22	636.05	806.28
641.82	806.49	647.88	806.71	650.6801	806.84	651.07	806.85	653.78	806.97
658.33	807.02	659.7	807.01	660.41	807.01	664.4401	807.25	665	807.27
665.33	807.3	666.13	807.38	674.14	808.07	675.86	808.24	679.45	808.56
679.55	808.57	679.5601	808.57	679.58	808.57	682.4401	808.78	684.37	808.94
685.32	808.94	690.24	809.12	691.32	809.23	693	809.4	696.84	809.86
700.97	810.25	703.71	810.5	705.48	810.66	706.71	810.74	709.86	810.97
712.87	811.01	714.8	811	720.42	811	724.11	811.01	728.52	811.04
732.7	811.09	734.28	811.11	736.61	811.19	740.04	811.26	745.32	811.41
748.6801	811.55	753.19	811.61	753.29	811.61	755.35	811.82	756.86	811.86
759.7	811.81	765.72	811.75	766.29	811.75	769.5	811.75	780.4301	811.74
780.55	811.73	784.47	811.73	793.61	811.77	807.89	811.87	809.61	811.88
810.36	811.89	811.6	811.9	841.97	812.23	851.87	812.25	852.63	812.25
858.06	812.2	858.35	812.2	859.55	812.17	863.1801	812.1	864.91	812.05
868.02	811.96	872.04	811.82	872.52	811.81	874.4301	811.78	876.25	811.77
877.01	811.76	878.4	811.77	892.57	811.95	908.4301	812.24	909.58	812.24
919.59	812.39	933.92	812.67	935.39	812.68	938.15	812.87	942.15	812.96
944.73	813.01	946.31	813.06	946.92	813.11	947.8	813.14	950.76	813.3
953.22	813.32	962.45	813.5	964.68	813.35	964.7	813.35	967.56	813.19
969.5	813.26	970.44	813.33	971.83	813.64	973.32	813.96	974.34	814.3
976.2	814.91	978.95	816.36	979.08	816.42	979.62	816.8	980.02	817.08

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	415.28	.055	531.88	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
415.28	531.88	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:BUCKEYE_CR

Reach	River Sta.	n1	n2	n3
317437_BUCKEYE_C	1370	.05	.055	.05
317437_BUCKEYE_C	1200	.05	.055	.05
317437_BUCKEYE_C	1050	.05	.055	.05
317437_BUCKEYE_C	923.73	.05	.055	.05
317437_BUCKEYE_C	779.43	.05	.055	.05
317437_BUCKEYE_C	719.69	.05	.055	.05
317437_BUCKEYE_C	662.01	.05	.055	.05
317437_BUCKEYE_C	606.9	.05	.055	.05
317437_BUCKEYE_C	555.72	.05	.055	.05
317437_BUCKEYE_C	482.3	.05	.055	.05
317437_BUCKEYE_C	432.35	.05	.055	.05
317437_BUCKEYE_C	370	.05	.055	.05
317437_BUCKEYE_C	300	.05	.055	.05
317437_BUCKEYE_C	200	.05	.055	.05

317437_BUCKEYE_C	81.68	.05	.055	.05

SUMMARY OF REACH LENGTHS

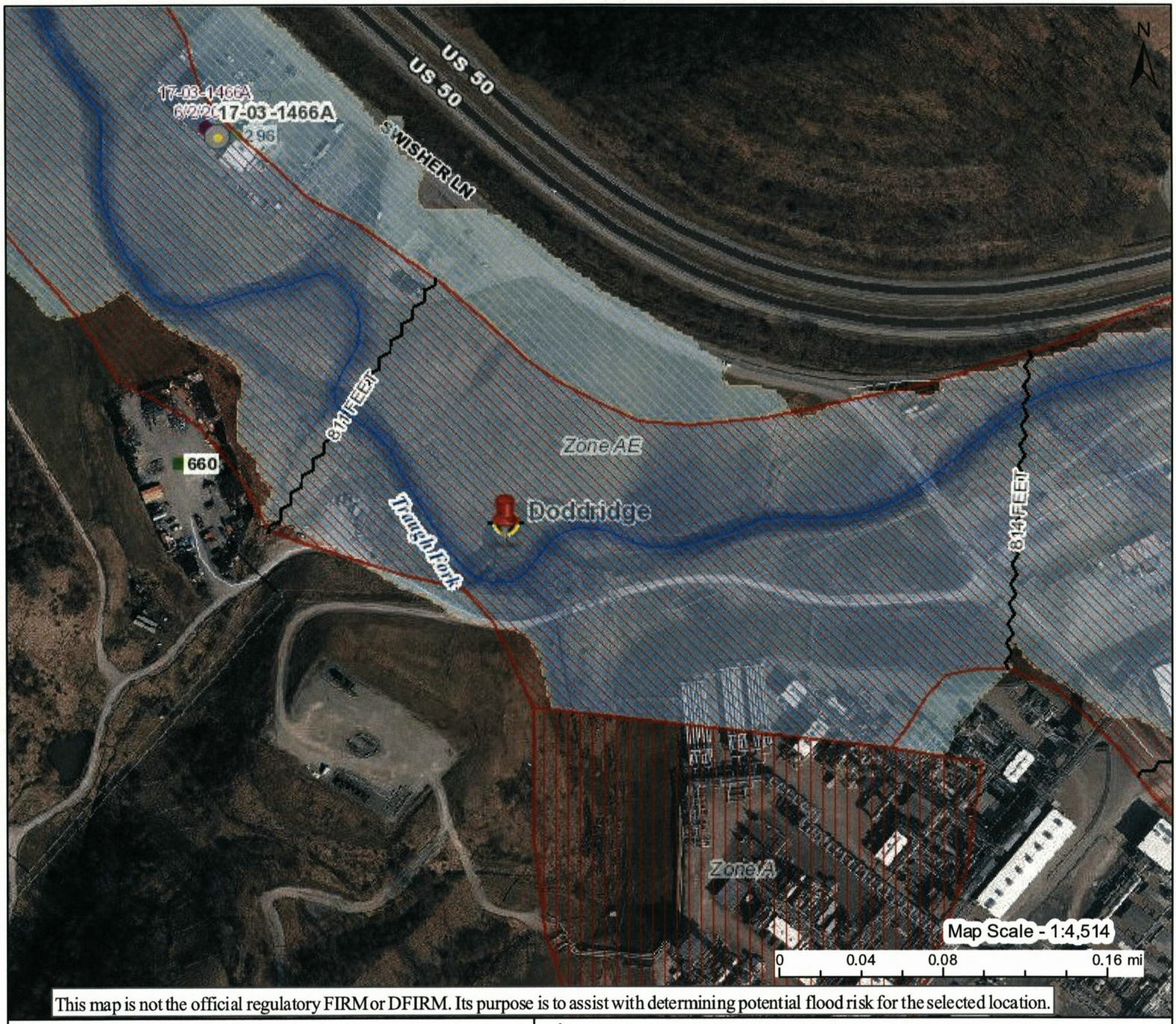
River: BUCKEYE_CR

Reach	River Sta.	Left	Channel	Right
317437_BUCKEYE_C	1370	170.24	170	171.01
317437_BUCKEYE_C	1200	110.41	150	168.17
317437_BUCKEYE_C	1050	168.68	126.27	101.85
317437_BUCKEYE_C	923.73	209.68	144.3	84.88
317437_BUCKEYE_C	779.43	55.27	59.74	21.26
317437_BUCKEYE_C	719.69	7.44	57.68	143.59
317437_BUCKEYE_C	662.01	6.58	55.11	38.66
317437_BUCKEYE_C	606.9	5.06	51.18	4.03
317437_BUCKEYE_C	555.72	126.35	73.42	4.69
317437_BUCKEYE_C	482.3	58.55	49.95	4.42
317437_BUCKEYE_C	432.35	83.86	62.35	3.34
317437_BUCKEYE_C	370	71.45	70	5.34
317437_BUCKEYE_C	300	88.38	100	89.28
317437_BUCKEYE_C	200	79.15	118.32	197.15
317437_BUCKEYE_C	81.68	0		0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: BUCKEYE_CR

Reach	River Sta.	Contr.	Expan.
317437_BUCKEYE_C	1370	.1	.3
317437_BUCKEYE_C	1200	.1	.3
317437_BUCKEYE_C	1050	.1	.3
317437_BUCKEYE_C	923.73	.1	.3
317437_BUCKEYE_C	779.43	.1	.3
317437_BUCKEYE_C	719.69	.1	.3
317437_BUCKEYE_C	662.01	.1	.3
317437_BUCKEYE_C	606.9	.1	.3
317437_BUCKEYE_C	555.72	.1	.3
317437_BUCKEYE_C	482.3	.1	.3
317437_BUCKEYE_C	432.35	.1	.3
317437_BUCKEYE_C	370	.1	.3
317437_BUCKEYE_C	300	.1	.3
317437_BUCKEYE_C	200	.1	.3
317437_BUCKEYE_C	81.68	.1	.3

WV Flood Map



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

HIGH RISK

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

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

Disclaimer:
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. WV Flood Tool (*https://www.mapwv.gov/flood*) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

Flood Info Location — *Map created on 1/13/2022*

User Notes	
Flood Hazard Area	Location is **WITHIN** the FEMA 100-year floodplain.
Flood Zone	AE
Stream	Unnamed Tributary 1 to Buckeye Creek
Watershed (HUC8)	Little Musringum-Middle Island (5030201)
Flood Height	Flood Height 2 811.8 ft (Source: BFE - Non-Restudy) NA
Water Depth	About 3.9 ft (Source: HEC-RAS)
Elevation	799.6 ft (Source: FEMA 2018-20) (NAVD88)
Community & ID	Doddridge County (ID: 540024)
FEMA Map & Date	54017C0145C; Effective Date: 10/4/2011
Location (lat, long)	(39.277436, -80.689872) (WGS84)
Parcel ID	09-03-0019-0032-0000
E-911 Address	662 SWISHER LN , WEST UNION, WV, 26456

Gmail George Eidel <doddridgecountyfpm@gmail.com>

Sherwood Bank Stabilization Floodplain Permit Application

2 messages

ernie@allstarecology.com <ernie@allstarecology.com> Thu, Jan 13, 2022 at 1:56 PM
To: "doddridgecountyfpm@gmail.com" <doddridgecountyfpm@gmail.com>
Cc: Richard Lowry <RALowry@marathonpetroleum.com>

Hey George,

Please see attached Floodplain Permit Application to begin your review a hard copy with the check is in the mail to the Church Street address. Let me know if you have any questions or need any additional information. Much obliged.

Ernie Smith, M.S., PWS
Stream and Wetland Restoration Specialist
Pollinator Specialist
Project Manager

AllStar Ecology, LLC.
1582 Meadowdale Rd.
Fairmont, WV 26554
Office: 304-816-3490
Toll-Free: 866-213-2666
Cell: 304-694-6476
ernie@allstarecology.com

ALLSTAR ECOLOGY
Natural Resource Specialists

Floodplain_Application_SherwoodBank_Stabilization_Combined 20220113.pdf
16751K

George Eidel <doddridgecountyfpm@gmail.com> Thu, Jan 13, 2022 at 2:50 PM
To: ernie@allstarecology.com

Ernie,

Thank you for sending this over, I will need all of the other permits before it can be approved so as soon as you get them send a copy to me. If you have any questions or need help let me know.

George

[Quoted text hidden]

--

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

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

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Permit# 22-606
Project Name: Sherwood Bank Stabilization
Permittees Name: Mark West (MPLX)

JAN 14 22 2:07PM

Doddridge County, WV

Floodplain Development Permit Application

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

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

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

APPLICANT'S SIGNATURE Sam Schuplock

DATE 1/13/2022

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: MarkWest Liberty Midstream and Resources L.L.C.		
Corporate Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	**State:** PA	**Zip:** 15317
Corporate Point of Contact (POC): Richard Lowry		
Corporate POC Title: Adv HES Professional G&P - HES&S - Environmental		
Corporate POC Primary Phone: 724-416-0520		
Corporate POC Primary Email: 412-925-8165		
Corporate FEIN: 30-0528059	**Corporate DUNS:**	
Corporate Website: https://www.mplx.com		
Local Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	**State:** PA	**Zip:** 15317
Local Project Manager (PM): Mike Hoy		
Local PM Primary Phone: 724-416-0520		
Local PM Secondary Phone:		
Local PM Primary Email: MWHoy@marathonpetroleum.com		
Person Filing Application: Ernie Smith		
Applicant Title: Project Manager		
Applicant Primary Phone: 304-816-3490		
Applicant Secondary Phone: 304-694-6476		
Applicant Primary Email: ernie@allstarecology.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Project Narrative:

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

Project Narrative:
The Sherwood Bank Stabilization Project is located approximately 5.9 miles east of West Union near the
intersection of County Route 50/30 and 50/34 in Doddridge County, West Virginia. According to the
Federal Emergency Management Agency (FEMA), the site is located within the Buckeye Creek Zone AE
Flood Hazard Area as designated on the Doddridge County Flood Insurance Rate Map (FIRM) Panel
54017C0140C with an effective date of October 4, 2011. The proposed work that will take place in the
floodplain consists of stabilization of 600 feet streambed and banks of Buckeye Creek. The project will
utilize the natural channel design techniques which include 3 Rock J-Hooks for pipeline protection,
3 Toe wood structures totaling 265 feet for streambank protection, and 1 converging rock cluster
for downstream grade control. Please see the included hydraulic study and compliance certificate.
The project has been submitted to U.S. Fish and Wildlife Service, WVDNR, WVDNR Office of Land and
Streams, and is being submitted to U.S. Army Corps of Engineers and WV DEP. All responses can
be forwarded upon receipt.

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVELOPLMENT ACTIVITIES:

[] Fill [] Mining [] Drilling [] Pipelining
[] Grading
[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
[x] Watercourse Alteration (including dredging and channel modification)
[] Drainage Improvements (including culvert work)
[] Road, Street, or Bridge Construction
[] Subdivision (including new expansion)
[] Individual Water or Sewer System
[x] Other (please specify)

Stream-bank and bed Stabilization

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

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

Property Designation: 1 **of** 1

Site/Property Information		
Legal Description: BUCKEYE 178.48 AC		
Physical Address/911 Address: ROUTE 50		
Decimal Latitude/Longitude: 39.277436, -80.689872		
DMS Latitude/Longitude: 39°16'38.77" N, 80°41' 23.54" W		
District: 3	**Map:** 19	**Parcel:** 31
Land Book Description: N/A		
Deed Book Reference: Deed Book 304, Page 355		
Tax Map Reference: 03-19-0031-0000-0000		
Existing Buildings/Use of Property: Farm		

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

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

Property Designation: 1 of 1		

Property Owner Data:		
Name of Primary Owner (PO): D&M POWELL LLC		
PO Address: 304 Stuart St.		
City: West Union	**State:** WV	**Zip:** 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO):		
PO Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

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

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

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

Property Designation: ___ of ___

Contractor/Sub-Contractor (C/SC) Information		
C/SC Company Name: AllStar Ecology LLC		
C/SC WV License Number: WV046329		
C/SC FEIN: 26-1557130	**C/SC DUNS:** 829007876	
Local C/SC Point of Contact (POC): Ernie Smith		
Local C/SC POC Title: Project Manager		
C/SC Mailing Address: 1582 Meadowdale Road		
City: Fairmont	**State:** WV	**Zip-Code:** 26591
Local C/SC Office Phone: 304-816-3490		
Local C/SC POC Phone: 304-694-6476		
Local C/SC POC E-Mail: emie@allstarecology.com		

Engineer Firm Information:		
Engineer Firm Name: AllStar Ecology LLC		
Engineer WV License Number: Licensed Landscape Architect WV #280		
Engineer Firm FEIN: 26-1557130	**Engineer Firm DUNS:** 829007876	
Engineer Firm Primary Point of Contact (POC): Ernie Smith		
Engineer Firm Primary POC Title: Project Manager		
Engineer Firm Mailing Address: 1582 Meadowdale Road		
City: Fairmont	**State:** WV	**Zip-Code:** 26591
Engineer Firm Office Phone: 304-816-3490		
Engineer Firm Primary POC Phone: 304-694-6476		
Engineer Firm Primary POC E-Mail: ernie@allstarecology.com		

Adjacent and/or Affected Landowners Data

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

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): SHERWOOD MIDSTREAM HOLDINGS LLC		
Physical Address: 539 South Main St.		
City: Findlay	**State:** OH	**Zip:** 45840
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): MARKWEST LIBERTY MIDSTREAM & RESOURCES LLC		
Physical Address: 539 South Main St.		
City: Findlay	**State:** OH	**Zip:** 45840
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): D&M POWELL LLC		
Physical Address: 304 Stuart St.		
City: West Union	**State:** WV	**Zip:** 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): SHERWOOD MIDSTREAM HOLDINGS LLC		
Physical Address: 539 South Main St.		
City: Findlay	**State:** OH	**Zip:** 45840
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

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

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

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

Applicant

Please read print name, sign and date below:

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

Applicant Signature: Sam Schupbach Date: 1/13/2022

Applicant Printed Name: Sam Schupbach

January 12, 2022

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

Subject: MarkWest Midstream and Resources L.L.C.
Sherwood Bank Stabilization Project
Compliance Certificate
Doddridge County, West Virginia
CEC Project 317-437

Civil & Environmental Consultants, Inc. (CEC) is pleased to evaluate the potential floodplain impacts for the above-referenced project on behalf of MarkWest Midstream and Resources L.L.C., 4600 J. Barry Court, Suite 500, Canonsburg, Pennsylvania 15317. The proposed project involves the stabilization of 600 linear feet of streambed and banks of Buckeye Creek in Doddridge County, West Virginia. According to the Federal Emergency Management Agency (FEMA), the site is located within the Buckeye Creek Zone AE Flood Hazard Area as designated on the Doddridge County Flood Insurance Rate Map (FIRM) Panel 54017C0140C with an effective date of October 4, 2011. The proposed construction will utilize natural channel design techniques including Rock J-Hooks for pipeline protection, Toe wood structures for streambank protection, and converging rock clusters for downstream grade control.

A detailed hydraulic study was performed in HEC-RAS to analyze the potential for adverse effects to the water level and floodplain of Buckeye Creek. Two analyses were performed in this study: an existing conditions analysis and a proposed conditions analysis. The existing conditions model was created using cross-sections based on existing topography along the centerline of Buckeye Creek. The flow rate for the 100-year storm event was obtained from FEMA Flood Insurance Study (FIS) report for Doddridge County. Based on the existing topography, the average slope of the stream channel was determined to be approximately 0.002 ft/ft. These values were used as the flow rate and boundary condition in the steady flow data for the model. In the proposed conditions model, the geometries of the cross-sections were modified to reflect the proposed stream channel associated with the stabilization of Buckeye Creek streambed and banks. By comparing the results from the two analyses, the effects of the proposed work on the 100-year water levels of Buckeye Creek were determined. The results indicate that the proposed stabilization project will not increase the base flood elevation in Buckeye Creek. Thus, the project is in compliance with FEMA criteria as well as the Doddridge County Floodplain Ordinance.

This compliance certificate is provided in support of the floodplain development permit application. Your time and effort in reviewing this floodplain development permit application are appreciated.

Please feel free to contact Mr. Gregory S. Linder at 304-933-3119 or via e-mail at glinder@cecinc.com or contact Mr. Sam Schupbach or Mr. Rick Lowry at 724-416-0520 or via e-mail at ssschupbach@marathonpetroleum.com or ralowry@marathonpetroleum.com if you have questions or need additional information.

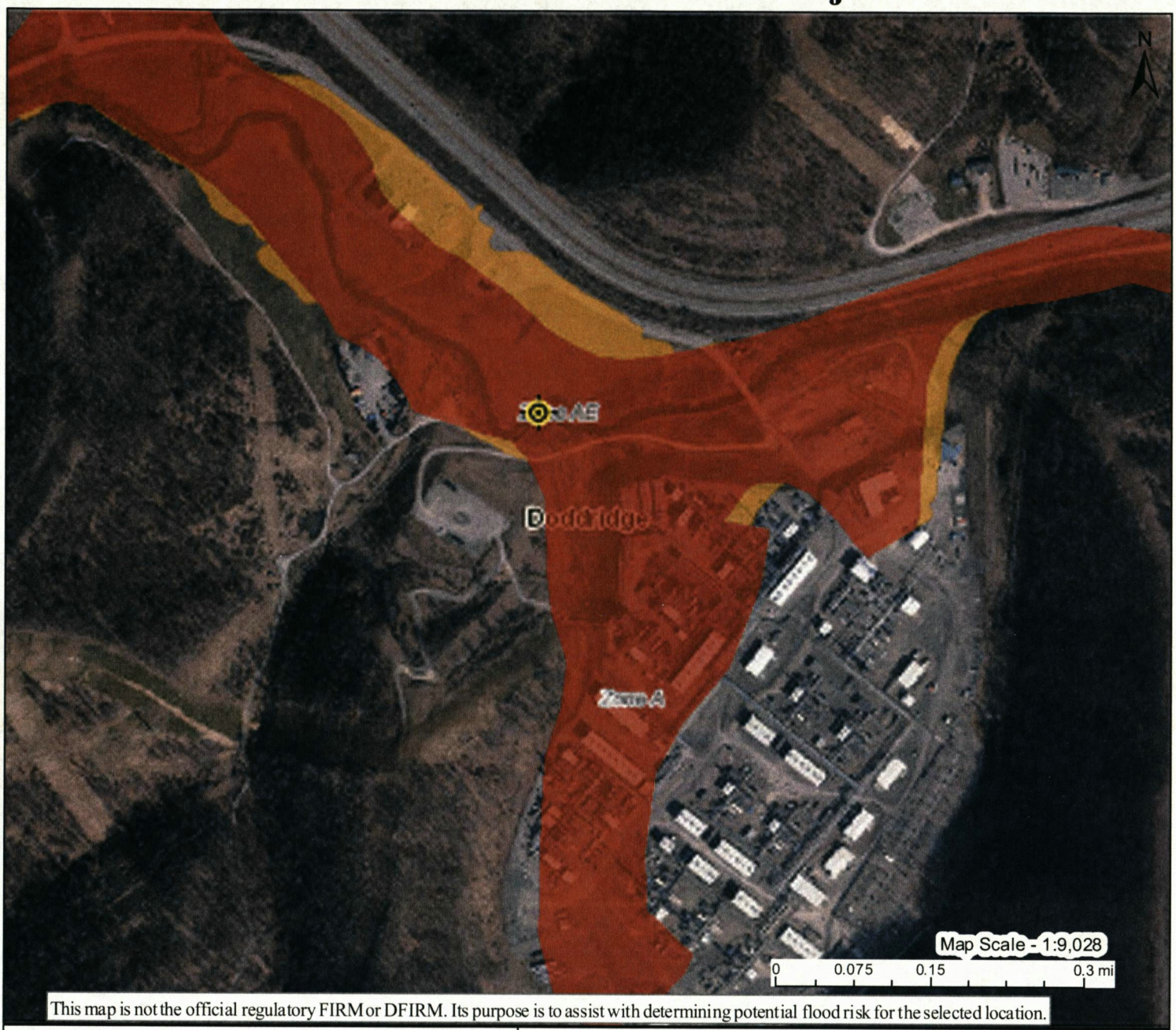
Respectfully submitted,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Sabin Shrestha, E.I.T.
Assistant Project Manager

Gregory S. Linder, P.E.
Principal

Sherwood Bank Stabilization Project



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

HIGH RISK

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

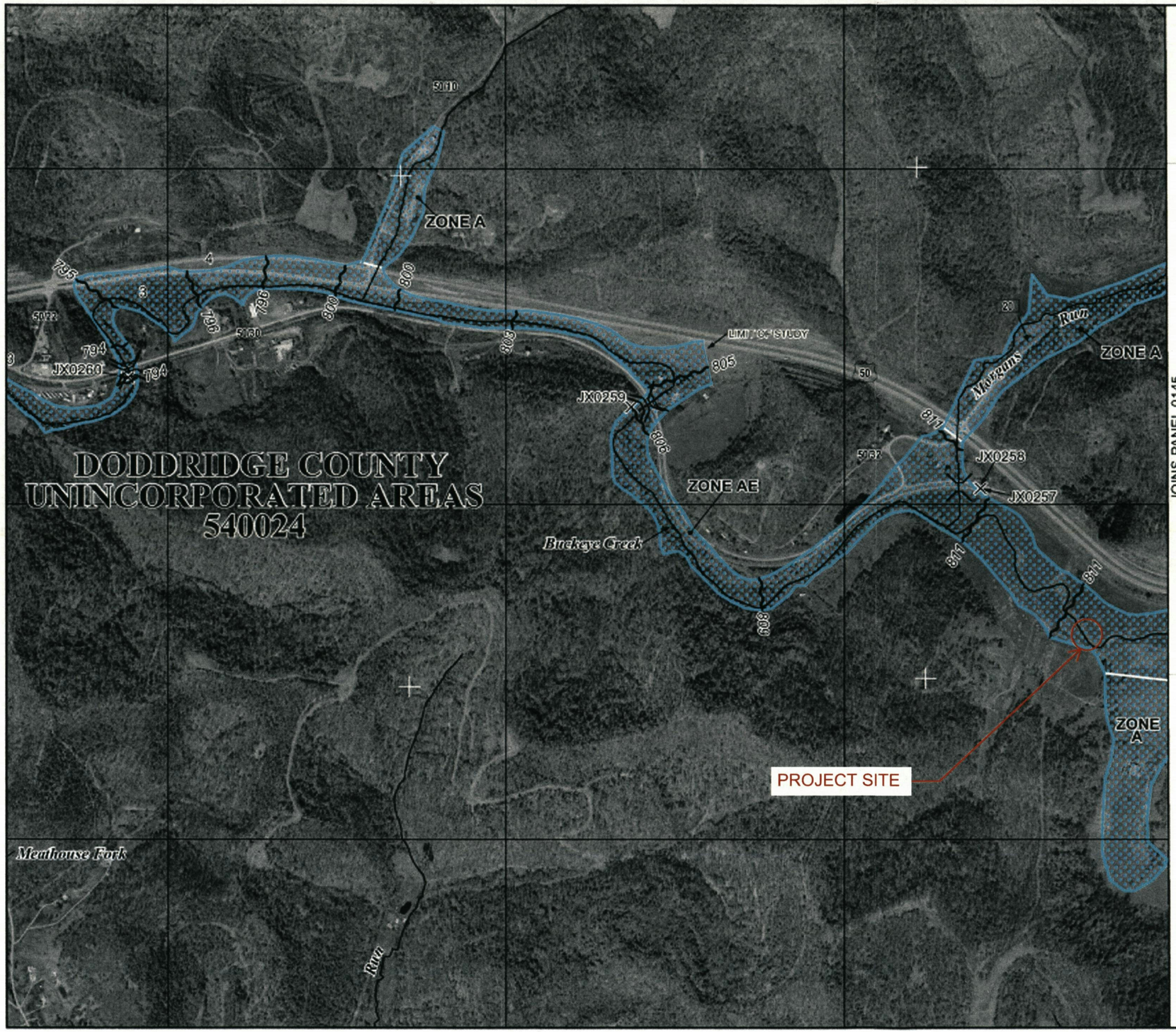
Download the Full Legend for all flood tool symbols
https://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf

Disclaimer:
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. WV Flood Tool (*https://www.MapWV.gov/flood*) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

Flood Info Location — *Map created on 1/6/2022*

User Notes

Flood Hazard Area	Location is **WITHIN** the FEMA 100-year floodplain.
Flood Zone	AE
Stream	Buckeye Creek
Watershed (HUC8)	Little Musringum-Middle Island (5030201)
Flood Height	Flood Height 2 811.9 ft (Source: BFE - Non-Restudy) NAVD8
Water Depth	About 3.6 ft (Source: HEC-RAS)
Elevation	801.1 ft (Source: FEMA 2018-20) (NAVD88)
Community & ID	Doddridge County (ID: 540024)
FEMA Map & Date	54017C0140C; Effective Date: 10/4/2011
Location (lat, long)	(39.277376, -80.689799) (WGS84)
Parcel ID	09-03-0019-0031-0000
E-911 Address	660 SWISHER LN , WEST UNION, WV, 26456



MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

ME

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

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

SHERWOOD BANK STABILIZATION PROJECT

LOCATED IN

WEST UNION DISTRICT, DODDRIDGE COUNTY, WV

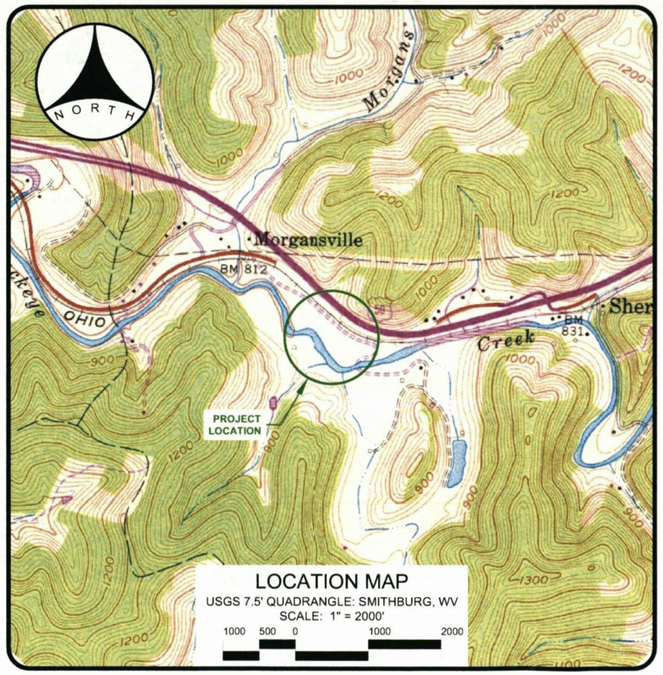
PREPARED FOR

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

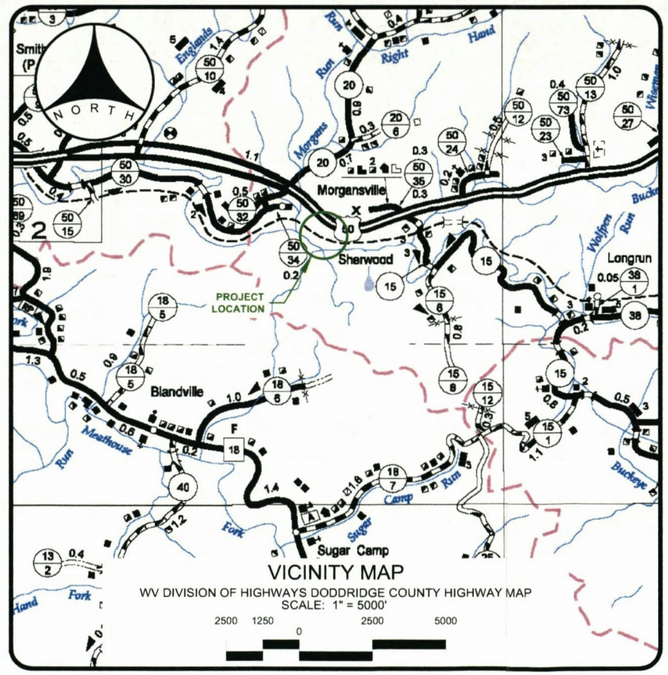
4600 J BARRY CT. SUITE 500

CANONSBURG, PA 15317

WEST VIRGINIA
NO SCALE



LOCATION MAP
USGS 7.5' QUADRANGLE: SMITHBURG, WV
SCALE: 1" = 2000'
1000 500 0 1000 2000



VICINITY MAP
WV DIVISION OF HIGHWAYS DODDRIDGE COUNTY HIGHWAY MAP
SCALE: 1" = 5000'
2500 1250 0 2500 5000

No	Revision/Issue	Date

Drawing Index

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10	PROPOSED PROFILE
11	PROPOSED CROSS SECTIONS
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Seal

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Scale	Drawn By	Sheet
AS NOTED	ENC	1
Date	Checked By	
JAN. 2022	NCG	
Project ID	Approved By	
SHERWOOD	RLW	

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION

THE PURPOSE OF THE PROJECT INVOLVES PIPELINE MAINTENANCE TO ENSURE INTEGRITY OF EXISTING BURIED PIPELINES AT THE SITE THAT ARE BECOMING EXPOSED DUE TO HEAVY STREAMBANK EROSION ON BUCKEYE CREEK. MARKWEST LIBERTY MIDSTREAM AND RESOURCES, LLC PROPOSES STREAMBANK STABILIZATION ON BUCKEYE CREEK UTILIZING NATURAL CHANNEL DESIGN INCLUDING ROCK J-HOOKS TO SERVE AS GRADE CONTROL TO PROTECT EXISTING PIPELINE CROSSINGS AND TOEWOOD STRUCTURES TO REDUCE BANK EROSION. THE PROJECT LOD IS PROPOSED TO BE 3.41 ACRES. THE PROJECT IS LOCATED IN DODDRIDGE COUNTY, WEST VIRGINIA, APPROXIMATELY 5.9 MILES EAST OF WEST UNION, WEST VIRGINIA.

EXISTING SITE CONDITIONS

THE EXISTING PARCEL CONSISTS OF MOSTLY OPEN MOWED VALLEY SURROUNDED BY INDUSTRIAL AREAS AND STEEPLY SLOPING WOODLANDS. THE SITE DRAINS INTO DIRECTLY BUCKEYE CREEK WHICH THEN FLOWS WESTWARDLY INTO MEATHOUSE FORK.

THE SITE AND ADJACENT PARCELS ARE USED FOR INDUSTRIAL, AGRICULTURAL, AND RESIDENTIAL PURPOSES.

SOILS

THE SITE IS VERY GENTLY SLOPED, RANGING IN ELEVATION FROM 814 AT THE NORTHERN EDGE OF THE SITE TO 800 AT THE BOTTOM OF THE DRAINAGE. PREDOMINANT SOILS ON SITE ARE CHAGRIN SILT LOAM, GILPIN-PEABODY COMPLEX, AND SENSABAUGH SILT LOAM. REFER TO DRAWING 3 FOR DETAILED SOILS INFORMATION.

CRITICAL EROSION AREAS

EARLY ESTABLISHMENT AND PROPER MAINTENANCE OF PERIMETER CONTROLS WILL PROVIDE SEDIMENTATION CONTROL. STABILIZE AND MAINTAIN DITCHES AND FILL SLOPES THROUGHOUT PROJECT CONSTRUCTION TO CONTROL EROSION.

EROSION AND SEDIMENT CONTROL MEASURES

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO STANDARDS AND SPECIFICATIONS OF THE WEST VIRGINIA BEST MANAGEMENT PRACTICE MANUAL, THE STANDARDS OF THE WVBMP MANUAL SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE BY LOCAL AUTHORITIES HAVING JURISDICTION. TEMPORARY SEEDING OR OTHER STABILIZATION SHALL OCCUR IMMEDIATELY AFTER GRADING AND ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE MAINTAINED UNTIL THEY ARE NO LONGER REQUIRED TO COMPLY WITH THE CONTRACT DOCUMENTS OR STATE LAW.

STRUCTURAL PRACTICES

1. **SMART FENCE 42 SILT FENCE AND COMPOST FILTER SOCK**
   SILT FENCE AND / OR COMPOST FILTER SOCK SEDIMENT BARRIERS SHALL BE INSTALLED DOWN-SLOPE OF AREAS WITH MINIMAL GRADES TO FILTER SEDIMENT-LADEN RUNOFF FROM SHEET FLOW AS INDICATED.
2. **PUMP AROUND**
   PROVIDE ADEQUATE SEDIMENT AND EROSION CONTROL ON THE APPROACHES. CONSTRUCTION SHOULD BE PREFORMED IN LOW FLOW PERIODS. USE A PUMP OR PUMPS SUFFICIENTLY LARGE TO PUMP THE MAJORITY OF STREAM FLOW AROUND THE SITE. CONSTRUCT A DAM IMPERVIOUS TO WATER. THE INLET OF THE PUMP IS TO BE SUSPENDED ABOVE THE STREAMBED IN ORDER TO PREVENT SUCKING MUD AND SEDIMENT. THE DISCHARGE POINT MUST BE STABILIZED WITH ROCK TO DISPERSE THE ENERGY AND PREVENT EROSION.
3. **PUMPED WATER FILTER BAG**
   USE FILTER BAGS FOR DEWATERING OPERATIONS THAT DO NOT DISCHARGE TO SEDIMENT DAMS OR SEDIMENT BASINS. FILTER BAGS ARE FABRICATED FROM NON-WOVEN GEOTEXTILE MATERIALS THAT FILTER SEDIMENT-LADEN WATER FROM DEWATERING OPERATIONS. SEDIMENT LADEN WATER IS PUMPED INTO THE NON-WOVEN GEOTEXTILE FABRIC BAG THAT ALLOWS FILTERED WATER TO PASS THROUGH.
4. **ROLLED EROSION CONTROL PRODUCTS**
   ROLLED EROSION CONTROL PRODUCTS (RECPS) ARE TEMPORARY OR PERMANENT EROSION CONTROL NETS, BLANKETS AND THREE-DIMENSIONAL MATRIXES MADE FROM A WIDE VARIETY OF NATURAL (SUCH AS JUTE, COIR AND STRAW) AND MAN-MADE MATERIALS ALONE OR IN COMBINATION. THERE ARE NUMEROUS COMMERCIALLY AVAILABLE PRODUCTS SO GREAT CARE MUST BE USED TO CHOOSE THE CORRECT PRODUCT FOR THE APPLICATION. COIR FIBER MATTING AND CURLEX® NETFREE EC BLANKET SHALL BE USED FOR THIS.
5. **STABILIZED CONSTRUCTION ENTRANCE**
   LARGE QUANTITIES OF MUD CAN BE TRACKED ONTO PUBLIC AND PRIVATE ROADS CAUSING DANGEROUS DRIVING CONDITIONS AND MUDDY RUNOFF WHEN IT RAINS. CONSTRUCTION ENTRANCES ARE STABILIZED TO REDUCE THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PAVED ROADS BY VEHICLES OR EQUIPMENT BY CONSTRUCTING A STABILIZED PAD OF STONE AT ENTRANCES TO CONSTRUCTION SITE.
6. **TEMPORARY ACCESS ROADS**
   THE TEMPORARY STABILIZATION OF ACCESS ROADS, HAUL ROADS, PARKING AREAS, LAYDOWN, MATERIAL STORAGE AND OTHER ONSITE VEHICLE TRANSPORTATION ROUTES WITH STONE IMMEDIATELY AFTER GRADING. THIS PRACTICE IS USED TO REDUCE THE EROSION AND SUBSEQUENT REGRADING OF TEMPORARY AND PERMANENT ROADBEDS, WORK AREAS AND PARKING AREAS RUTTED BY CONSTRUCTION TRAFFIC DURING WET WEATHER. PROVIDES EASIER ACCESS IN ALL WEATHER AND REDUCES TRACKING MUD ONTO PUBLIC ROADS.

VEGETATIVE PRACTICES

1. **TOPSOILING (TEMPORARY STOCKPILE):** PRESERVING AND USING TOPSOIL TO PROVIDE A SUITABLE GROWTH MEDIUM FOR VEGETATION USED TO STABILIZE DISTURBED AREAS. APPLICABLE WHERE PRESERVATION OR IMPORTATION OF TOPSOIL IS MOST COST-EFFECTIVE METHOD OF PROVIDING A SUITABLE GROWTH MEDIUM, NOT RECOMMENDED FOR SLOPES STEEPER THAN 2:1 UNLESS OTHER MEASURES ARE TAKEN TO PREVENT EROSION AND SLOUGHING.
2. **TEMPORARY SEEDING:** ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR MORE THAN 14 DAYS SHALL BE SEEDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING OF THOSE AREAS. SELECTION OF THE SEED MIXTURE SHALL DEPEND ON THE TIME OF YEAR IT IS APPLIED.
3. **PERMANENT SEEDING:** ESTABLISHMENT OF PERENNIAL VEGETATIVE COVER BY PLANTING SEED ON ROUGH-GRADED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A YEAR OR MORE OR WHERE PERMANENT, LONG-LIVED VEGETATIVE COVER IS NEEDED ON FINE-GRADED AREAS. ALL NON-PAVED AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING. STRAW OR FIBER SHALL BE USED ON ALL SEEDED SURFACES. IN ALL SEEDING OPERATIONS SEED, FERTILIZER AND LIME SHALL BE APPLIED PRIOR TO MULCHING.

MAINTENANCE

ALL EROSION AND SEDIMENT CONTROL MEASURES AT A MINIMUM, PERFORMED ONCE EVERY FOUR CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY RAIN EVENT GREATER THAN 0.25 INCHES PER 24 HOUR PERIOD. THE FOLLOWING ITEMS SHALL BE CHECKED IN PARTICULAR:

1. CHECK THE SILT FENCE BARRIER FOR UNDERMINING OR DETERIORATION OF THE FABRIC. REMOVE SEDIMENT WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER.
2. CHECK THE SEEDING AREAS TO ENSURE THAT A STAND OF GRASS IS MAINTAINED. FERTILIZE AND RESEED AS NEEDED.
3. ESTABLISH TEMPORARY FILL DIVERSIONS AT THE TOP OF FILL SLOPES, AS REQUIRED, AT THE END OF EACH WORKING DAY.

EROSION CONTROL NOTES

1. THE DESIGN BUILDER SHALL INSPECT ALL EROSION CONTROL DEVICES TWICE WEEKLY AND AFTER EVERY RAIN. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICAL IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 7 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE CONSTRUCTION ACTIVITY WILL RESUME ON A PORTION OF THE SITE WITHIN 14 DAYS FROM WHEN ACTIVITIES CEASED (I.E. THE TOTAL TIME PERIOD THAT CONSTRUCTION ACTIVITY IS TEMPORARILY CEASED IS LESS THAN 14 DAYS), THEN STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE BY THE 7TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY CEASED.
3. ALL EROSION AND SILTATION MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING OPERATIONS.
4. ALL TEMPORARY EARTH BERMS, DIVERSIONS AND SILT DAMS ARE TO BE MULCHED AND SEEDED FOR VEGETATIVE COVER IMMEDIATELY AFTER GRADING. STRAW OR HAY MULCH IS AS NEEDED FOR STABILIZATION. MULCH AND SEED ALL SOIL STOCKPILES.
5. ALL EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
6. THE DESIGN BUILDER MUST BE NOTIFIED 48 HOURS PRIOR TO THE PRE-CONSTRUCTION CONFERENCE AND 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY LAND DISTURBING ACTIVITY.
7. THE DESIGN BUILDER IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
8. ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING A LIVE WATERCOURSE SHALL BE MET.
9. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.
10. THE DESIGN BUILDER SHALL BE RESPONSIBLE FOR MAINTAINING AN "INSPECTION REPORT" THROUGHOUT THE COURSE OF THE WORK ASSOCIATED WITH THESE PLANS. THE REPORT SHALL INCLUDE, BUT NOT BE LIMITED TO, DESCRIPTIONS AND DATES OF MAJOR ACTIVITIES, WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON ANY PORTION OF THE SITE, WHEN STABILIZATION MEASURES ARE APPLIED, CONTRACTOR AND SUBCONTRACTOR CERTIFICATION SHEETS, DETAILS OF INSPECTIONS OF EROSION AND SEDIMENT CONTROL DEVICES, AND ACTIONS TAKEN TO MODIFY AND/OR IMPROVE ANY SUCH EROSION AND SEDIMENT CONTROL DEVICES. PROVIDE MAINTENANCE PLAN AND INSPECTION REPORTS TO THE ON-SITE STAFF.

EROSION CONTROL GENERAL CONSTRUCTION SEQUENCE

1. INSTALLATION OF E&S CONTROLS.
2. ESTABLISH ACTIVE WORK ZONES.
3. AMOUNT OF TIME IN EACH WORK ZONE WILL VARY DEPENDING ON THE WORK ZONE. STREAM REACHES RANGING FROM 100-150' WILL STABILIZED AT THE END OF EACH DAY.
4. STABILIZATION WILL BE PERFORMED AS WORK ZONES ARE COMPLETED.
5. REMOVAL OF REMAINING E&S CONTROLS UPON FINAL STABILIZATION.

SEQUENCE OF CONSTRUCTION

1. THE DESIGN LANDSCAPE ARCHITECT SHALL BE NOTIFIED AND GENERAL METHODS OF CONSTRUCTION SHALL BE APPROVED PRIOR TO BEGINNING ANY LAND DISTURBANCE ACTIVITIES. THE DESIGN BUILDER SHALL BE RESPONSIBLE FOR DETERMINING THE MOST EFFICIENT AND PRACTICABLE METHODS FOR CONSTRUCTION IN ACCORDANCE WITH THE PLANS. A WORKFLOW PLAN SHALL BE SUBMITTED TO THE DESIGN LANDSCAPE ARCHITECT PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. THE DESIGN BUILDER SHALL BE RESPONSIBLE FOR IDENTIFYING EXISTING UNDERGROUND AND OVERHEAD SERVICES AND UTILITIES WITHIN LIMITS OF CONSTRUCTION PRIOR TO ANY CONSTRUCTION WORK; ALL EXISTING UTILITIES SHALL BE CLEARLY IDENTIFIED AND MARKED PRIOR TO CONSTRUCTION.
3. PLACE ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO ANY LAND DISTURBANCE.
4. A TEMPORARY WETLAND CROSSING WILL BE MAINTAINED AND USED THROUGHOUT CONSTRUCTION. THE CROSSING WILL BE INSTALLED TO MANUFACTURERS SPECIFICATIONS IN ORDER TO ACCESS BOTH SIDES OF THE STREAM.
5. MATERIALS WILL BE STOCKPILED IN STAGING AREA.
6. SEEDING AND MULCHING WILL BE COMPLETED AS GRADING PROGRESSES.
7. GRADING AS SHOWN ON THE PROPOSED SITE PLAN SHALL BE CONSTRUCTED BY MOVING FROM UPSTREAM TO DOWNSTREAM. STABILIZING TO INCLUDE BUT NOT LIMITED TO SEEDING AND MATTING.
8. CONSTRUCTION IN THE STREAM SHALL BE COMPLETED ONE SPECIFIED SEGMENT OF THE PROPOSED CHANNEL AT A TIME. SPOIL MATERIAL SHALL BE STAGED OUTSIDE OF THE ACTIVE STREAM CHANNEL. PUMP ANY BASE STREAM FLOW FROM UPSTREAM OF THE ACTIVE WORK AREA TO DOWNSTREAM OF THE ACTIVE WORK AREA USING A PUMPED WATER FILTER BAG TO CONTORL EXCESS SEDIMENT. EACH SECTION SHALL BE ROUGH GRADED FIRST ALONG THE SPECIFIED SEGMENT. THEN HAVE STRUCTURES INSTALLED WHILE SIMULTANEOUSLY FINAL GRADING THE BED AND BANKS AS WORK PROCEEDS DOWNSTREAM. FILL SECTIONS SHALL BE INSTALLED IN 6" LIFTS WITH EACH LIFT BEING COMPACTED. CUT MATERIALS SHALL BE STOCKPILED BETWEEN PROPOSED AND EXISTING STREAM CHANNELS FOR EFFICIENT MOVEMENT INTO EXISTING STREAM. FINAL GRADE OF THE PROPOSED CHANNEL SHALL UTILIZE STOCKPILED BED SUBSTRATE MATERIAL FROM THE EXISTING CHANNEL WHERE POSSIBLE AS FINAL LAYER IN THE PROPOSED CHANNEL. COIR FABRIC ALONG THE BANKS SHALL BE INSTALLED USING ECOSTAKES AS PER THE DETAIL. EACH SECTION SHALL BE BROUGHT TO FINAL GRADE AND STABILIZED BEFORE CONTINUING TO NEXT SECTION TAKING SPECIAL CARE TO HAVE THE SITE STABILIZED AT THE END OF EACH DAY. AS FINAL GRADE AND STABILIZATION OF THE BANKS PROGRESS, THE BANKS SHALL BE SEEDED AND THE 700 GRAM COIR FABRIC (OR APPROVED EQUAL) SHALL BE INSTALLED OVERTOP THE NEWLY SEEDED BANKS IN ACCORDANCE WITH THE TYPICAL CROSS-SECTION DETAILS.
9. UPON COMPLETION OF 70% STABILIZATION, CLEAN UP ALL TEMPORARY EROSION CONTROL MEASURES ON SITE.

STRUCTURAL SOILS NOTES

1.EXCAVATION

- CONSISTS OF REMOVAL OF SOIL MATERIALS FROM A PARTICULAR LOCATION. UNAUTHORIZED EXCAVATION CONSISTS OF REMOVAL OF MATERIALS BEYOND INDICATED SUBGRADE ELEVATIONS OR DIMENSIONS WITHOUT SPECIFIC DIRECTION FROM THE OWNER.
- DEWATERING: PREVENT SURFACE AND SUBSURFACE WATER FROM FLOWING INTO EXCAVATIONS. IF WATER ACCUMULATES IN EXCAVATIONS OR OTHER AREAS THAT COULD BECOME DELETERIOUSLY AFFECTED, REMOVE WATER BY AN APPROVED DEWATERING SYSTEM. DEWATERING SHALL CONTINUE UNTIL ACCEPTANCE OF THE WORK.

2. SOIL MOISTURE CONTROL

- FILL MATERIAL SHALL HAVE A MOISTURE CONTENT THAT IS CONSISTENT WITH GOOD COMPACTION.
- DO NOT PLACE BACKFILL OR FILL SOIL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
- THE CONTRACTOR SHALL SCARIFY AND AIR DRY OTHERWISE SATISFACTORY SOIL MATERIAL THAT EXCEEDS OPTIMUM MOISTURE CONTENT.
- STOCKPILE OR SPREAD SOIL MATERIAL THAT HAS BEEN REMOVED BECAUSE IT IS TOO WET TO PERMIT COMPACTION. ASSIST DRYING BY DISCING, HARROWING, OR PULVERIZING UNTIL MOISTURE CONTENT IS REDUCED TO A SATISFACTORY VALUE.

TOPSOIL NOTES

1. TOPSOIL SHALL CONSIST OF STOCKPILED MATERIAL OBTAINED FROM AREAS WITHIN THE GRADING LIMITS OF THE SITE. VERIFY SUITABILITY OF STOCKPILED SOIL TO PRODUCE TOPSOIL, WHICH SHALL BE FERTILE, FRIABLE, REASONABLY FREE FROM CLAY, LUMPS, COARSE SANDS, STONES, PLANTS, ROOTS, STICKS AND OTHER EXTRANEOUS MATERIALS HARMFUL TO PLANT GROWTH.

TOPSOIL NOTES

1. TOPSOIL SHALL CONSIST OF STOCKPILED MATERIAL OBTAINED FROM AREAS WITHIN THE GRADING LIMITS OF THE SITE. VERIFY SUITABILITY OF STOCKPILED SOIL TO PRODUCE TOPSOIL, WHICH SHALL BE FERTILE, FRIABLE, REASONABLY FREE FROM CLAY, LUMPS, COARSE SANDS, STONES, PLANTS, ROOTS, STICKS AND OTHER EXTRANEOUS MATERIALS HARMFUL TO PLANT GROWTH.

No.	Revision/Issue	Date

Legend

Title
SHERWOOD BANK STABILIZATION PROJECT

Project
GENERAL NOTES

Client
MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By
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Scale	Drawn By	Sheet
NO SCALE	NCG	2
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	

MAP UNIT: CH - CHAGRIN SILT LOAM, 0 TO 3 PERCENT SLOPES, OCCASIONALLY FLOODED

COMPONENT: CHAGRIN (85%) HYDROLOGIC SOIL GROUP B

THE CHAGRIN COMPONENT MAKES UP 85 PERCENT OF THE MAP UNIT. SLOPES ARE 0 TO 3 PERCENT. THIS COMPONENT IS ON FLOOD PLAINS ON VALLEYS. THE PARENT MATERIAL CONSISTS OF FINE-LOAMY ALLUVIUM DERIVED FROM SEDIMENTARY ROCK. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS HIGH. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS OCCASIONALLY FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 2W. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

COMPONENT: HOLLY (5%) HYDROLOGIC SOIL GROUP B

SOIL DESCRIPTIONS FOR MINOR COMPONENTS ARE NOT INCLUDED IN THIS REPORT.

MAP UNIT: GSF--GILPIN-PEABODY SILT LOAMS, 35 TO 70 PERCENT SLOPES, VERY STONY

COMPONENT: GILPIN (50%) HYDROLOGIC SOIL GROUP C

THE GILPIN COMPONENT MAKES UP 50 PERCENT OF THE MAP UNIT. SLOPES ARE 35 TO 70 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM SANDSTONE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 25 TO 37 INCHES (DEPTH FROM THE MINERAL SURFACE IS 24 TO 35 INCHES). THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 69 PERCENT. BELOW THIS THIN ORGANIC HORIZON THE ORGANIC MATTER CONTENT IS ABOUT 4 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 7E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

COMPONENT: PEABODY (30%) HYDROLOGIC SOIL GROUP C

THE PEABODY COMPONENT MAKES UP 30 PERCENT OF THE MAP UNIT. SLOPES ARE 35 TO 70 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM SHALE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 20 TO 40 INCHES (DEPTH FROM THE MINERAL SURFACE IS 19 TO 39 INCHES). THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS LOW. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS MODERATE. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 69 PERCENT. BELOW THIS THIN ORGANIC HORIZON THE ORGANIC MATTER CONTENT IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 7E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: GUD--GILPIN-UPSHUR SILT LOAMS, 15 TO 25 PERCENT SLOPES

COMPONENT: GILPIN (50%) HYDROLOGIC SOIL GROUP C

THE GILPIN COMPONENT MAKES UP 50 PERCENT OF THE MAP UNIT. SLOPES ARE 15 TO 25 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM SANDSTONE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 25 TO 37 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 4 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 4E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

COMPONENT: UPSHUR (30%) HYDROLOGIC SOIL GROUP C

THE UPSHUR COMPONENT MAKES UP 30 PERCENT OF THE MAP UNIT. SLOPES ARE 15 TO 25 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF RESIDUUM WEATHERED FROM CLAYEY SHALE. DEPTH TO A ROOT RESTRICTIVE LAYER, BEDROCK, PARALITHIC, IS 40 TO 59 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS LOW. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS LOW. SHRINK-SWELL POTENTIAL IS HIGH. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 6E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: ME--MELVIN SILT LOAM, 0 TO 3 PERCENT SLOPES, RARELY FLOODED

COMPONENT: MELVIN (85%) HYDROLOGIC SOIL GROUP B/D

THE MELVIN COMPONENT MAKES UP 85 PERCENT OF THE MAP UNIT. SLOPES ARE 0 TO 3 PERCENT. THIS COMPONENT IS ON FLOOD PLAINS ON VALLEYS. THE PARENT MATERIAL CONSISTS OF FINE-SILTY ALLUVIUM DERIVED FROM INTERBEDDED SEDIMENTARY ROCK. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS POORLY DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS VERY HIGH. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS RARELY FLOODED. IT IS NOT PONDED. A SEASONAL ZONE OF WATER SATURATION IS AT 0 INCHES DURING JANUARY, FEBRUARY, MARCH, APRIL, MAY, NOVEMBER, DECEMBER. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 3W. THIS SOIL MEETS HYDRIC CRITERIA.

MAP UNIT: UD--UDORTHENTS, SMOOTHED

COMPONENT: UDORTHENTS (90%) HYDROLOGIC SOIL GROUP D

SOIL DESCRIPTIONS ARE NOT AVAILABLE FOR MISCELLANEOUS AREAS. UDORTHENTS DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: SEB--SENSABAUGH SILT LOAM, 3 TO 8 PERCENT SLOPES, RARELY FLOODED

COMPONENT: SENSABAUGH (80%) HYDROLOGIC SOIL GROUP A

THE SENSABAUGH COMPONENT MAKES UP 80 PERCENT OF THE MAP UNIT. SLOPES ARE 3 TO 8 PERCENT. THIS COMPONENT IS ON FLOOD PLAINS ON VALLEYS. THE PARENT MATERIAL CONSISTS OF FINE-LOAMY ALLUVIUM DERIVED FROM SEDIMENTARY ROCK. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY HIGH. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS MODERATE. SHRINK-SWELL POTENTIAL IS LOW. THIS SOIL IS RARELY FLOODED. IT IS NOT PONDED. A SEASONAL ZONE OF WATER SATURATION IS AT 48 INCHES DURING JANUARY, FEBRUARY, MARCH, APRIL. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 2E. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: VSE--VANDALIA SILT LOAM, 15 TO 35 PERCENT SLOPES, VERY STONY

COMPONENT: VANDALIA (80%) HYDROLOGIC SOIL GROUP C

THE VANDALIA COMPONENT MAKES UP 80 PERCENT OF THE MAP UNIT. SLOPES ARE 15 TO 35 PERCENT. THIS COMPONENT IS ON HILLSLOPES ON HILLS. THE PARENT MATERIAL CONSISTS OF COLLUVIUM DERIVED FROM SANDSTONE AND SILTSTONE. DEPTH TO A ROOT RESTRICTIVE LAYER IS GREATER THAN 60 INCHES. THE NATURAL DRAINAGE CLASS IS WELL DRAINED. WATER MOVEMENT IN THE MOST RESTRICTIVE LAYER IS MODERATELY LOW. AVAILABLE WATER TO A DEPTH OF 60 INCHES (OR RESTRICTED DEPTH) IS HIGH. SHRINK-SWELL POTENTIAL IS MODERATE. THIS SOIL IS NOT FLOODED. IT IS NOT PONDED. THERE IS NO ZONE OF WATER SATURATION WITHIN A DEPTH OF 72 INCHES. ORGANIC MATTER CONTENT IN THE SURFACE HORIZON IS ABOUT 2 PERCENT. NONIRRIGATED LAND CAPABILITY CLASSIFICATION IS 7S. THIS SOIL DOES NOT MEET HYDRIC CRITERIA.

MAP UNIT: W--WATER

COMPONENT: WATER (100%)

THIS MISCELLANEOUS AREA IS NOT A MAJOR SOIL COMPONENT. THE AREA DOES NOT MEET HYDRIC CRITERIA.

No	Revision/Issue	Date

Legend

Title

SOILS MAP

Title

SHERWOOD BANK STABILIZATION PROJECT

Project

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

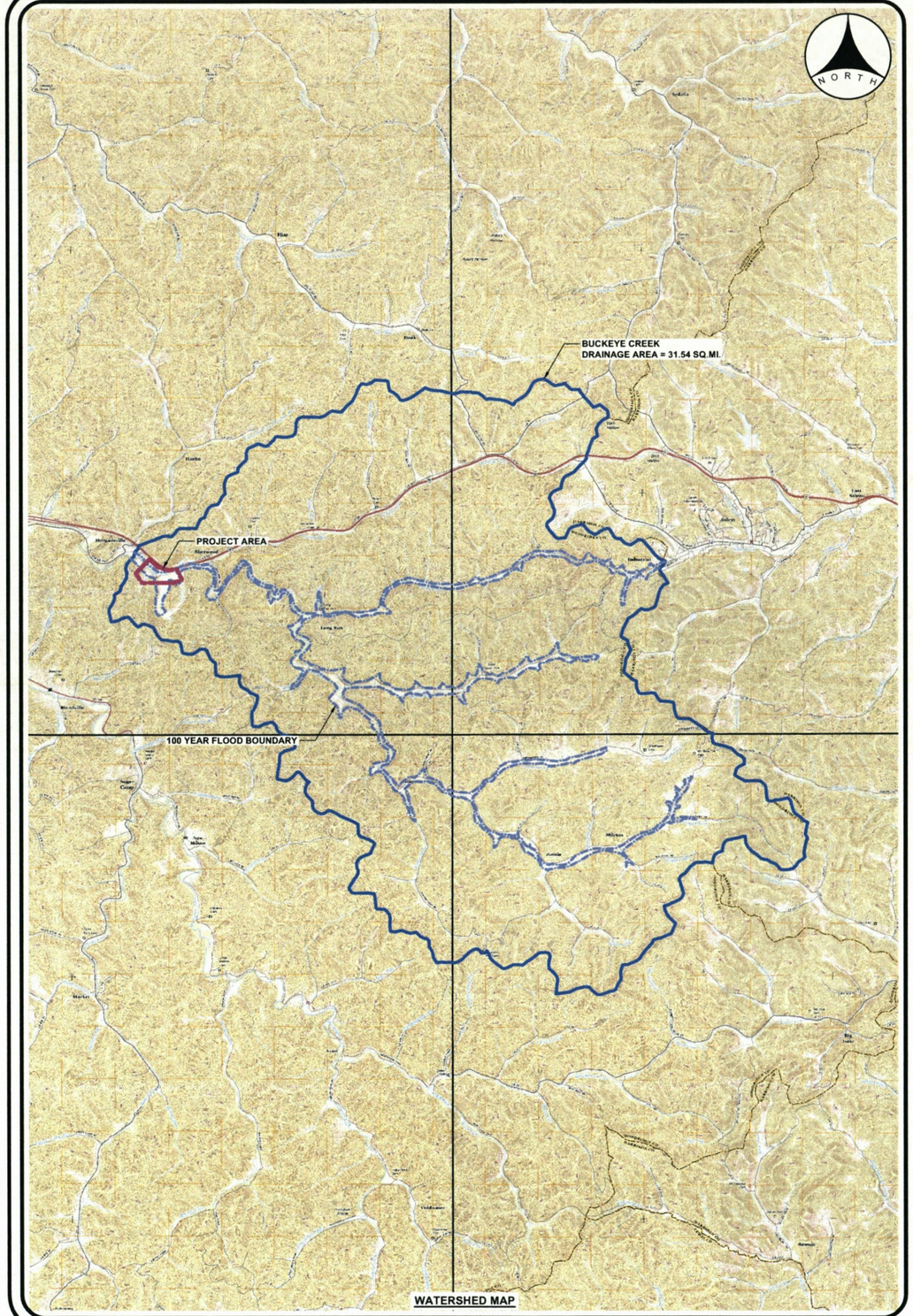
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490, Toll Free 1-866-213-2666

Mapping Reference

AERIAL PHOTOGRAPHY PERFORMED BY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC. (UNKNOWN DATE), AND SUPPLEMENTED WITH DODDRIDGE COUNTY NAIP DIGITAL ORTHOPHOTOS PUBLISHED IN 2019 BY THE USDA (DATUM NAD83 WVN). SOILS DATA FROM USDA NRSC WEBSOIL SURVEY.

Graphic Scale

Scale	Drawn By	Sheet
1" = 200'	NCG	3
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



WATERSHED MAP

PROJECT STREAM CHANNEL DETAIL MAP (NO SCALE)

SHERWOOD STREAM BANK STABILIZATION PROJECT WATERSHED ANALYSIS

PROJECT WATERSHED SUMMARY

- TOTAL AREA (SQ. MI.) 31.54 SQ.MI.
- TOTAL AREA (ACRES) 20,188.05 ACRES
- AVERAGE ANNUAL RAINFALL 40 TO 50 INCHES
- 100 YR FLOODPLAIN AREA 0.60 SQ.MI.
- PREDOMINATE LAND USE UNDEVELOPED / WOODED

PROJECT REGIONAL CURVE SUMMARY

- BUCKEYE CREEK AT THE DOWNSTREAM END OF PROJECT
- BANKFULL DISCHARGE 1139.06 CFS
- BANKFULL AREA 240.24 SQ.FT.
- BANKFULL WIDTH 75.92 FEET
- BANKFULL DEPTH 3.14 FEET

GENERAL SOIL TYPES WITHIN THE WATERSHED

- ACID LOAMS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP MODERATELY WELL AND WELL DRAINED SOILS WITH LOW NATURAL FERTILITY. MODERATE TO HIGH SOIL MOISTURE HOLDING CAPACITY AND PH IS NORMALLY LESS THAN 5.3.
- ALLUVIAL SEDIMENTS THAT ARE VERY DEEP, WELL DRAINED, AND HAVE FORMED IN RECENT ALLUVIAL SEDIMENTS ALONG MAJOR STREAMS. THESE SOILS HAVE A MODERATE PERMEABILITY (0.6 TO 2.0 INCHES PER HOUR). THEY GENERALLY HAVE A MEDIUM SOIL TEXTURE IN THE SURFACE AND SUBSOIL. BEDROCK IS GENERALLY AT DEPTHS GREATER THAN 5 FEET. THESE SOILS ARE GENERALLY SUBJECT TO OCCASIONAL FLOODING. NATURAL FERTILITY IS HIGH AND AVAILABLE WATER CAPACITY IS HIGH.
- DOMINANTLY CLAY TO LOAM SOILS WITH OR WITHOUT ROCK MATERIAL RANGING FROM A FEW GRAVELS TO A MASSIVE BEDROCK ESCARPMENT.
- FERTILE LOAMS AND HILLS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP MODERATELY WELL AND WELL DRAINED SOILS WITH MODERATE NATURAL FERTILITY. MODERATE SOIL MOISTURE HOLDING CAPACITY AND PH IS NORMALLY GREATER THAN 5.3.
- MOIST LOAMS THAT ARE DEEP AND VERY DEEP, WELL DRAINED SOILS WITH HIGH NATURAL FERTILITY. HIGH SOIL MOISTURE HOLDING CAPACITY WITH PH GREATER THAN 5.3.
- UDORTHENTS THAT ARE NOT SUITED TO CULTIVATED CROPS OR HAY, BUT HAVE A LIMITED SUITABILITY FOR PASTURE ON SOME AREAS. THEY ARE BETTER SUITED TO WOODLAND OR WILDLIFE. MOST UDORTHENTS AREAS OF DISTURBED SOIL MATERIAL ARE TOO VARIABLE TO ASSIGN ANY SPECIFIC SOIL PROPERTIES.
- URBAN LAND AND DISTURBED SOIL MATERIAL USUALLY ASSOCIATED WITH DWELLINGS AND ROADS LOCATED IN THE FLOOD PLAIN AND AT THE BASE OF THE HILL ON THE FOOT SLOPE; THESE AREAS ARE TOO VARIABLE TO ASSIGN ANY SPECIFIC VALUES TO THE ASSOCIATED DISTURBED SOILS.
- VERY ROCKY ACID SOILS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP WELL DRAINED SOILS WITH LOW NATURAL FERTILITY. MODERATE TO HIGH SOIL MOISTURE HOLDING CAPACITY WITH PH BELOW 5.3.
- VERY ROCKY LIMY SOILS THAT ARE MODERATELY DEEP, DEEP, AND VERY DEEP WELL DRAINED SOILS WITH HIGH NATURAL FERTILITY. MODERATE TO HIGH SOIL MOISTURE HOLDING CAPACITY WITH PH ABOVE 5.3. SLOPE RANGES FROM 25 TO 45 PERCENT. SURFACE STONES RANGE FROM 0.1 TO 50%.

PROJECT AREA GENERAL LAND USE SUMMARY

DESCRIPTION	AREA	PERCENT
OPEN WATER (STREAM CHANNEL)	1.75 AC.	4.01%
GRASSLAND AND MISC. HERBACEOUS	12.92 AC.	29.63%
PASTURE - HAY	13.55 AC.	31.08%
ROADS AND GRAVEL	9.46 AC.	21.70%
MISC. DEVELOPED (LOW INTENSITY)	3.46 AC.	7.94%
WOODED, SCRUB - SHRUB	2.46 AC.	5.64%
TOTAL	43.60 AC.	100.00%

No.	Revision/Issue	Date

Legend

Title
WATERSHED MAP

Project
SHERWOOD BANK
STABILIZATION PROJECT

Client
MARKWEST LIBERTY MIDSTREAM
& RESOURCES, LLC

Prepared By
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304.816.3490; Toll Free 1.866.213.2666

Mapping Reference
BASE MAPPING FROM USGS 2016 SERIES 7.5 MIN. QUADRANGLES (BIG ISAAC WV, NEW MILTON WV, SALEM WV, AND SMITHBURG WV). DETAIL MAP IMAGERY PROVIDED BY CEC, INC. (9/17/21).

Graphic Scale
4000 2000 0 4000 8000

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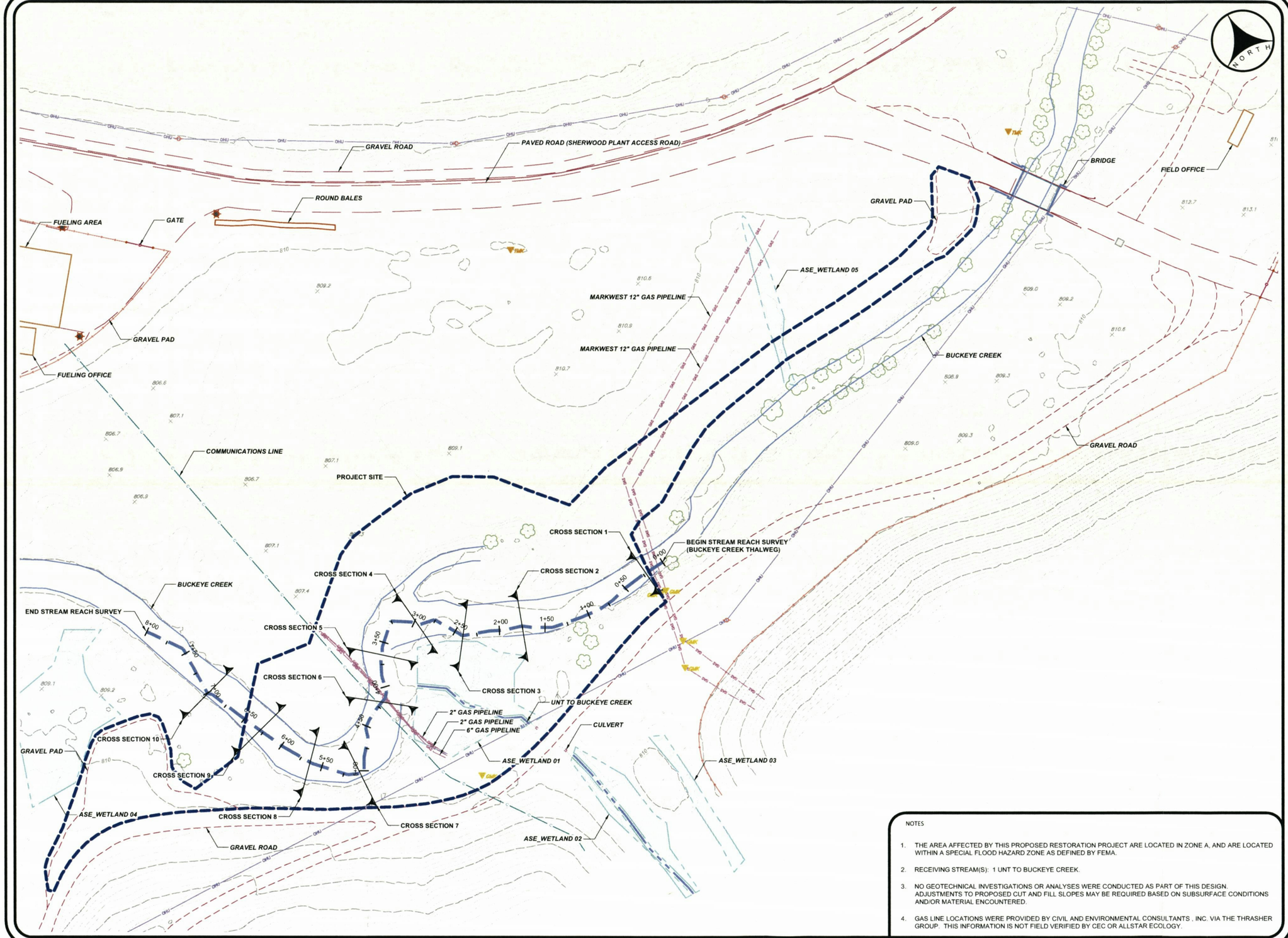
1" = 8000'	NCG	4
Date	Checked By	
JAN. 2022	NCG	
Project ID	Approved By	
SHERWOOD	RLW	



No	Revision/Issue	Date

Legend

- EX. CONTOUR MAJOR
- EX. CONTOUR MINOR
- EX. SPOT ELEVATION
- EX. TREELINE
- EX. TREE
- EX. STRUCTURE
- EX. MISC. STRUCTURE
- EX. STORAGE TANK
- EX. FENCE
- EX. GATE
- EX. UTILITY POLE
- EX. CULVERT
- EX. GAS PIPELINE
- EX. OVERHEAD UTILITY
- EX. COMMUNICATION LINE
- EX. GAS MARKER
- EX. TELEPHONE MARKER
- EX. LIGHT POLE
- EX. GUIDE RAIL
- EX. PAVED ROAD
- EX. GRAVEL ROAD / PAD
- DELINEATED WETLAND
- DELINEATED STREAM
- PROJECT AREA

Title

EXISTING SITE PLAN

Poject

SHERWOOD BANK STABILIZATION PROJECT

Client

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC

NATURAL RESOURCE SPECIALISTS

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Fairmont, WV 26554

304.816.0446, Toll Free - 866.213.0966

Mapping Reference

TOPOGRAPHIC SURVEY PROVIDED TO ALLSTAR ECOLOGY, LLC BY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC. (UNKNOWN DATE). AND SUPPLEMENTED WITH ADDITIONAL FIELD DATA BY ALLSTAR ECOLOGY (NOVEMBER 17 AND 19, 2021).

Graphic Scale

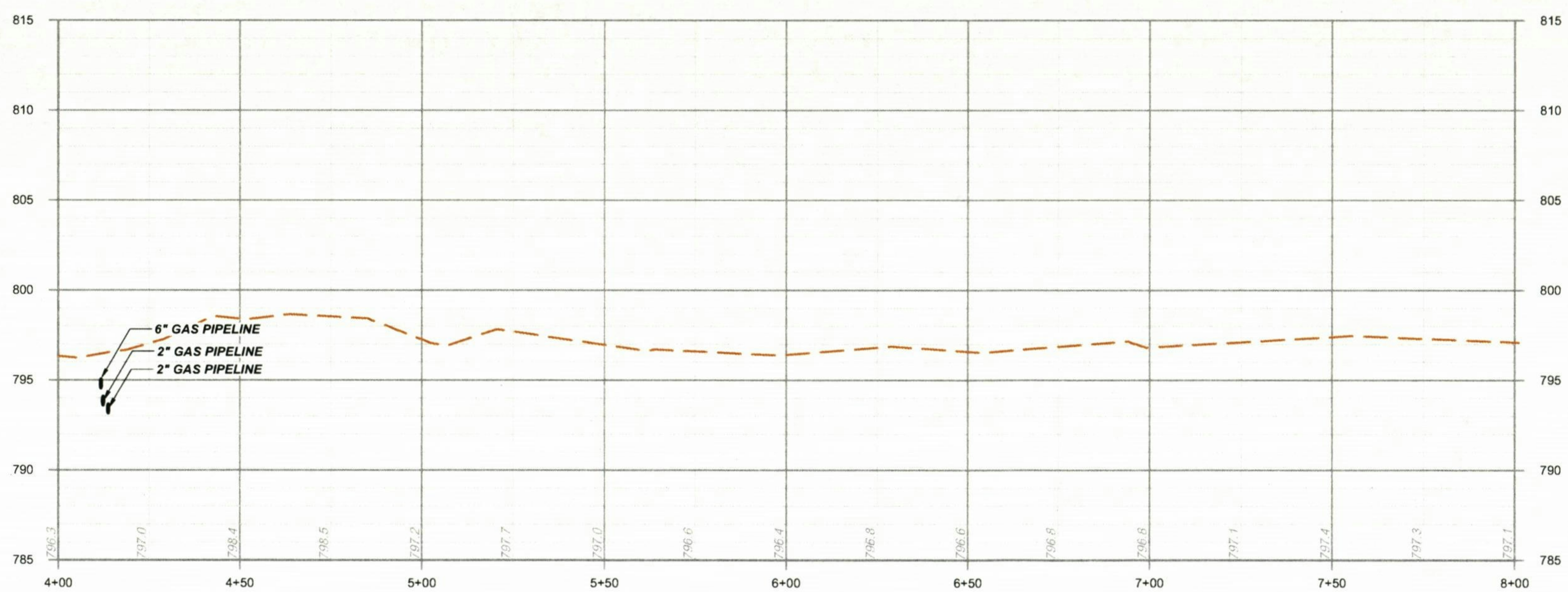
100 50 0 100 200

NOTES

1. THE AREA AFFECTED BY THIS PROPOSED RESTORATION PROJECT ARE LOCATED IN ZONE A, AND ARE LOCATED WITHIN A SPECIAL FLOOD HAZARD ZONE AS DEFINED BY FEMA.
2. RECEIVING STREAM(S): 1 UNT TO BUCKEYE CREEK.
3. NO GEOTECHNICAL INVESTIGATIONS OR ANALYSES WERE CONDUCTED AS PART OF THIS DESIGN. ADJUSTMENTS TO PROPOSED CUT AND FILL SLOPES MAY BE REQUIRED BASED ON SUBSURFACE CONDITIONS AND/OR MATERIAL ENCOUNTERED.
4. GAS LINE LOCATIONS WERE PROVIDED BY CIVIL AND ENVIRONMENTAL CONSULTANTS , INC. VIA THE THRASHER GROUP. THIS INFORMATION IS NOT FIELD VERIFIED BY CEC OR ALLSTAR ECOLOGY.

Scale	Drawn By	Sheet
1" = 200'	NCG	5
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	

BUCKEYE CREEK THALWEG PROFILE STATION 0+00 TO 4+00



BUCKEYE CREEK THALWEG PROFILE STATION 4+00 TO 8+00

No	Revision/Issue	Date

Legend

Title

EXISTING STREAM PROFILE

Title

SHERWOOD BANK STABILIZATION PROJECT

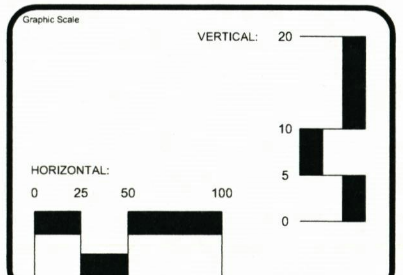
Project

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490, Toll Free 1-866-213-2666

Graphic Scale



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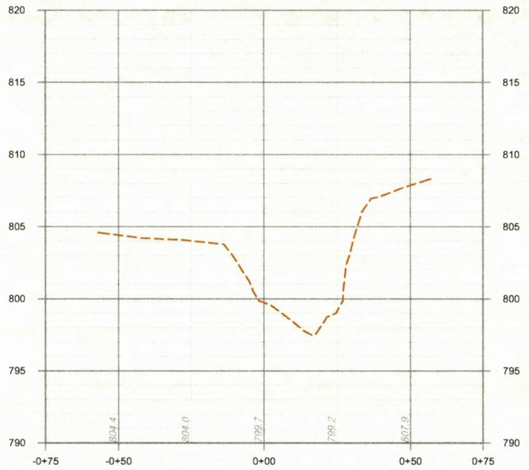
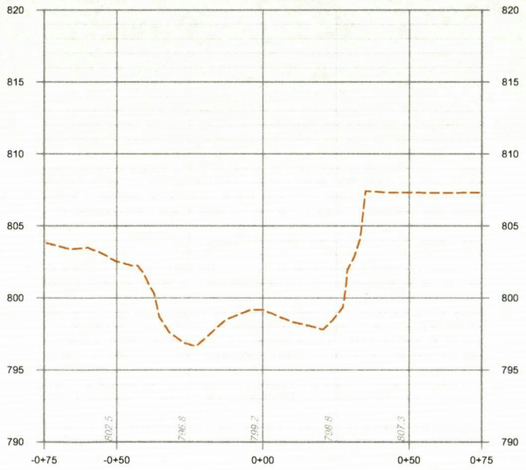
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



BUCKEYE CREEK CROSS SECTION 1 STA. 0+29.59

BUCKEYE CREEK CROSS SECTION 2 STA. 1+75.86

BUCKEYE CREEK CROSS SECTION 3 STA. 2+36.77



BUCKEYE CREEK CROSS SECTION 4 STA. 2+92.29

No	Revision/Issue	Date

Legend

Title

EXISTING STREAM CROSS SECTIONS

Title

SHERWOOD BANK STABILIZATION PROJECT

Project

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
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Graphic Scale

VERTICAL: 20 10 5 0

HORIZONTAL: 0 25 50 100

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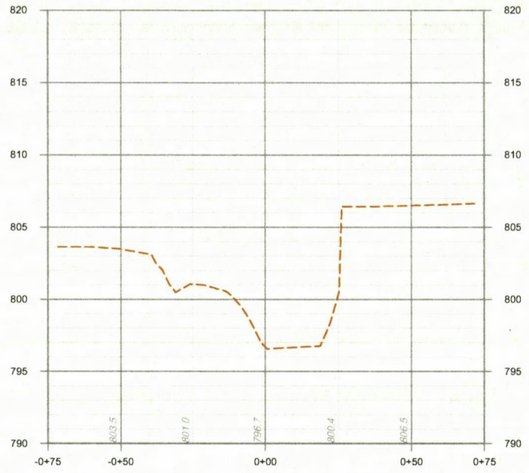
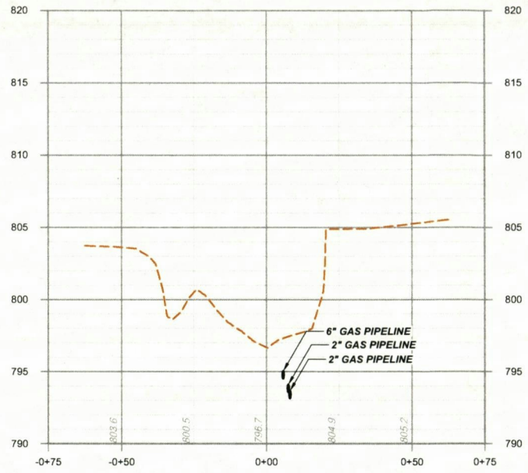
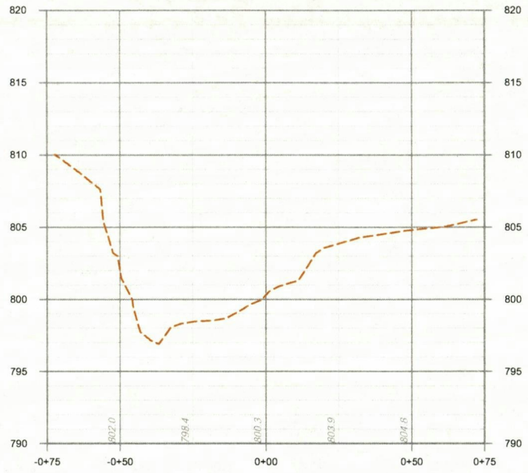
Date JAN. 2022	Checked By NCG	
Project ID SHERWOOD	Approved By RLW	



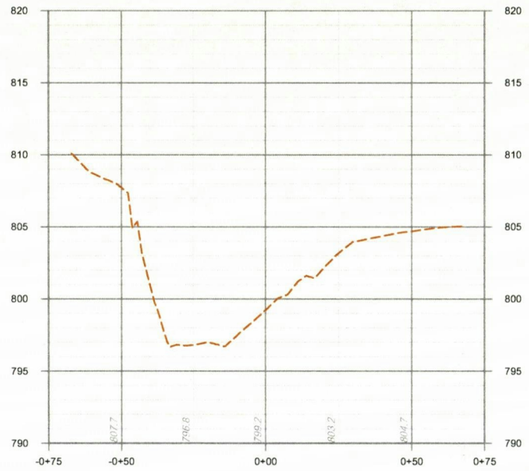
BUCKEYE CREEK CROSS SECTION 5 STA. 3+55.00



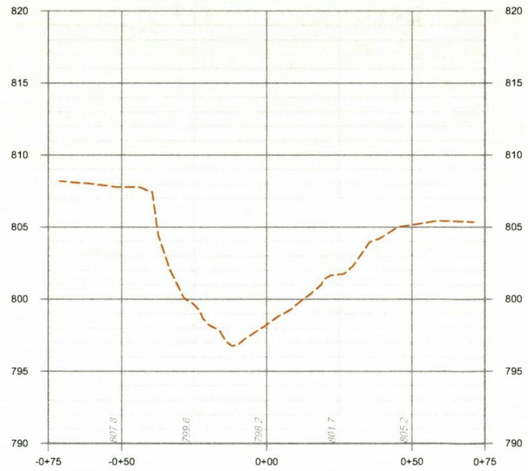
BUCKEYE CREEK CROSS SECTION 6 STA. 4+08.22



BUCKEYE CREEK CROSS SECTION 7 STA. 4+83.11



BUCKEYE CREEK CROSS SECTION 8 STA. 5+29.66



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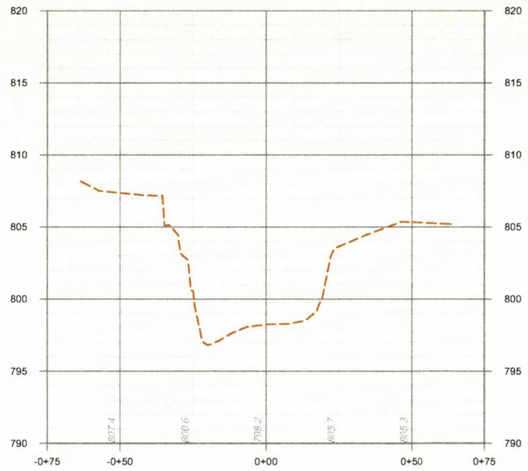


BUCKEYE CREEK CROSS SECTION 10 STA. 6+64.20

No	Revision/Issue	Date

Legend

Title
EXISTING BANK
CROSS SECTIONS

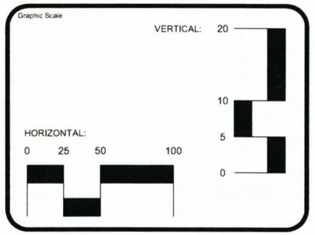
Title
SHERWOOD STREAM
STABILIZATION PROJECT

Project
MARKWEST LIBERTY MIDSTREAM
& RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304.816.0406 Toll Free 1.866.213.3668

Graphic Scale



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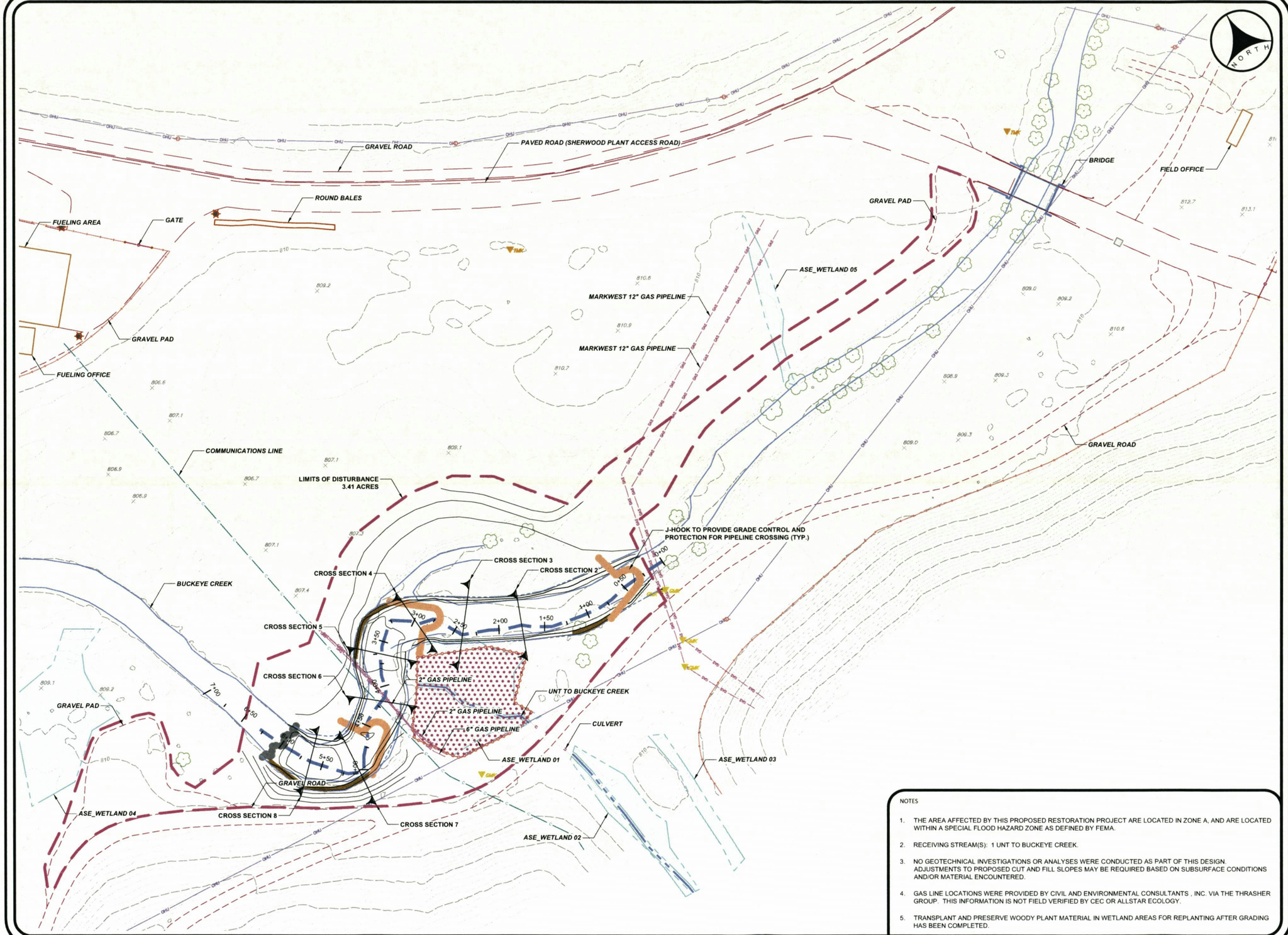
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



NOTES

1. THE AREA AFFECTED BY THIS PROPOSED RESTORATION PROJECT ARE LOCATED IN ZONE A, AND ARE LOCATED WITHIN A SPECIAL FLOOD HAZARD ZONE AS DEFINED BY FEMA.
2. RECEIVING STREAM(S): 1 UNT TO BUCKEYE CREEK.
3. NO GEOTECHNICAL INVESTIGATIONS OR ANALYSES WERE CONDUCTED AS PART OF THIS DESIGN. ADJUSTMENTS TO PROPOSED CUT AND FILL SLOPES MAY BE REQUIRED BASED ON SUBSURFACE CONDITIONS AND/OR MATERIAL ENCOUNTERED.
4. GAS LINE LOCATIONS WERE PROVIDED BY CIVIL AND ENVIRONMENTAL CONSULTANTS , INC. VIA THE THRASHER GROUP. THIS INFORMATION IS NOT FIELD VERIFIED BY CEC OR ALLSTAR ECOLOGY.
5. TRANSPLANT AND PRESERVE WOODY PLANT MATERIAL IN WETLAND AREAS FOR REPLANTING AFTER GRADING HAS BEEN COMPLETED.

No.	Revision/Issue	Date

Legend

- EX. CONTOUR MAJOR
- EX. CONTOUR MINOR
- EX. SPOT ELEVATION
- EX. TREELINE
- EX. TREE
- EX. STRUCTURE
- EX. FENCE
- EX. GATE
- EX. UTILITY POLE
- EX. CULVERT
- EX. GAS PIPELINE
- EX. OVERHEAD UTILITY
- EX. COMMUNICATION LINE
- EX. GAS MARKER
- EX. TELEPHONE MARKER
- EX. LIGHT POLE
- EX. GUIDE RAIL
- EX. PAVED ROAD
- EX. GRAVEL ROAD / PAD
- DELINEATED WETLAND
- DELINEATED STREAM
- LIMITS OF DISTURBANCE
- MINIMAL DISTURBANCE AREA
- EXCLUSION FENCING
- ROCK J-HOOK
- ROCK SILL WITH CONVERGING ROCK CLUSTERS
- TOE WOOD

Title

PROPOSED SITE PLAN

Title

SHERWOOD BANK
STABILIZATION PROJECT

Project

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304.816.3490, Toll Free 1.866.213.2666

Mapping Reference

TOPOGRAPHIC SURVEY PROVIDED TO ALLSTAR ECOLOGY, LLC BY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC. (UNKNOWN DATE). AND SUPPLEMENTED WITH ADDITIONAL FIELD DATA BY ALLSTAR ECOLOGY (NOVEMBER 17 AND 19, 2021)

Graphic Scale

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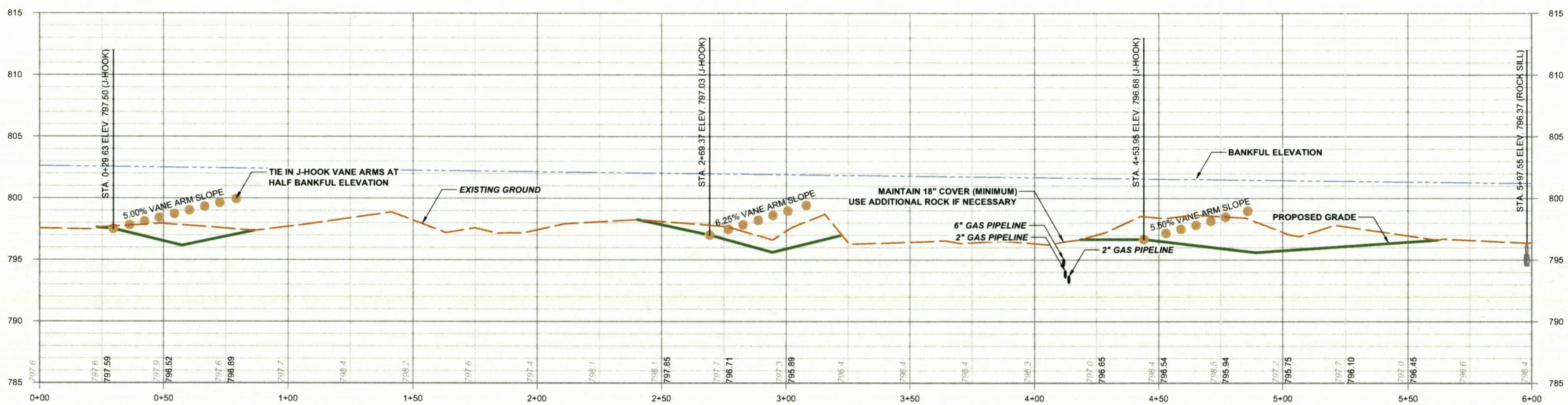
Project ID: SHERWOOD	Approved By: RLW	



BUCKEYE CREEK PROPOSED THALWEG PROFILE

No	Revision/Issue	Date

Legend

Title

PROPOSED STREAM PROFILE

Title

SHERWOOD BANK STABILIZATION PROJECT

Project

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC

NATURAL RESOURCE SPECIALISTS

1582 Meadowdale Road

Fairmont, WV 26554

Graphic Scale

VERTICAL: 20 10 5 0

HORIZONTAL: 0 25 50 100

Scale	Drawn By	Sheet
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Date: JAN. 2022	Checked By: NCG	
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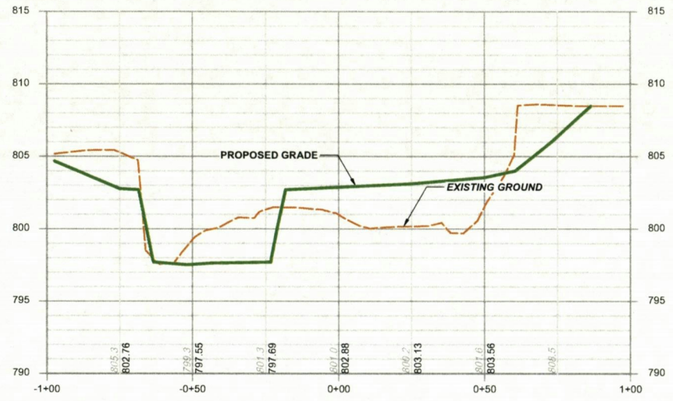
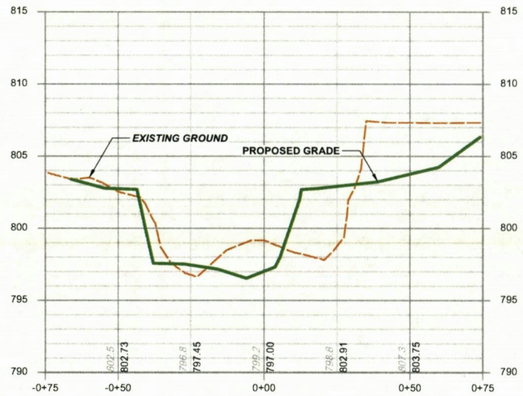


BUCKEYE CREEK CROSS SECTION 2 STA. 1+75.86

BUCKEYE CREEK CROSS SECTION 3 STA. 2+36.77



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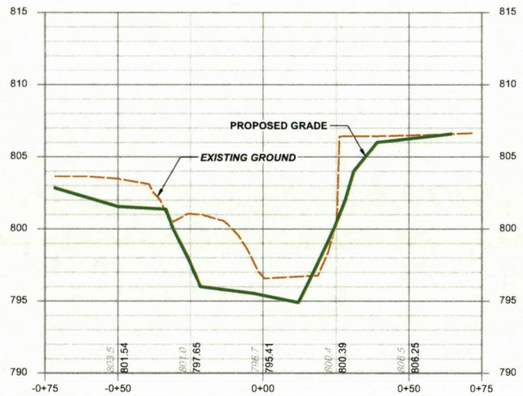

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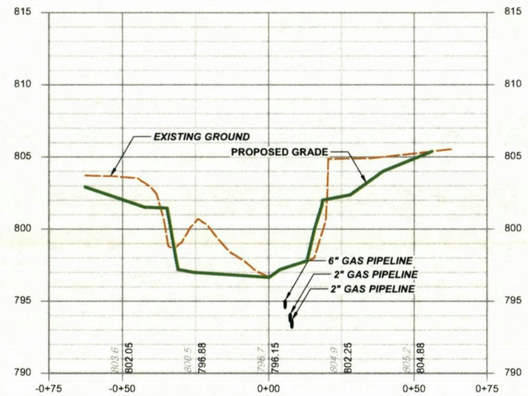
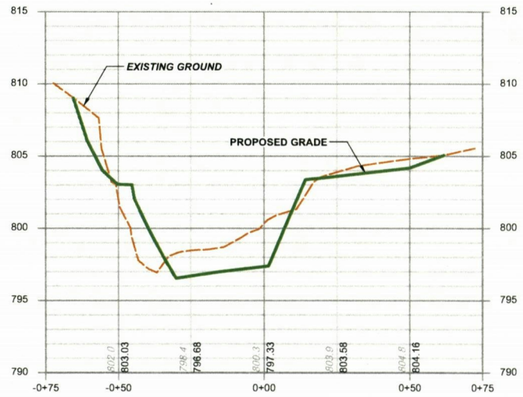
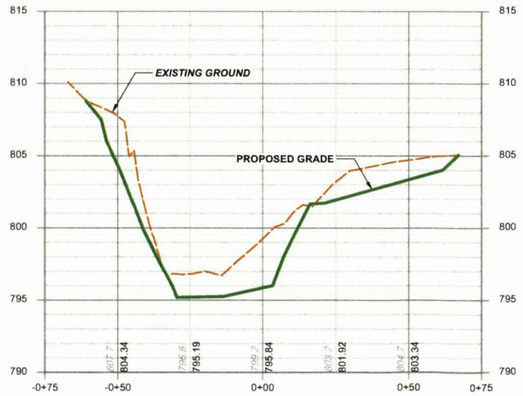


BUCKEYE CREEK CROSS SECTION 6 STA. 4+08.22



BUCKEYE CREEK CROSS SECTION 7 STA. 4+83.11



BUCKEYE CREEK CROSS SECTION 8 STA. 5+29.66

No	Revision/Issue	Date

Legend

Title

PROPOSED CROSS SECTIONS

Title

SHERWOOD BANK
STABILIZATION PROJECT

Project

MARKWEST LIBERTY MIDSTREAM
& RESOURCES, LLC

Prepared By

ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304.816.4405 Toll Free 1.866.213.2666

Graphic Scale

VERTICAL: 20 10 5 0

HORIZONTAL: 0 25 50 100

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Date: JAN. 2022	Checked By: NCG	
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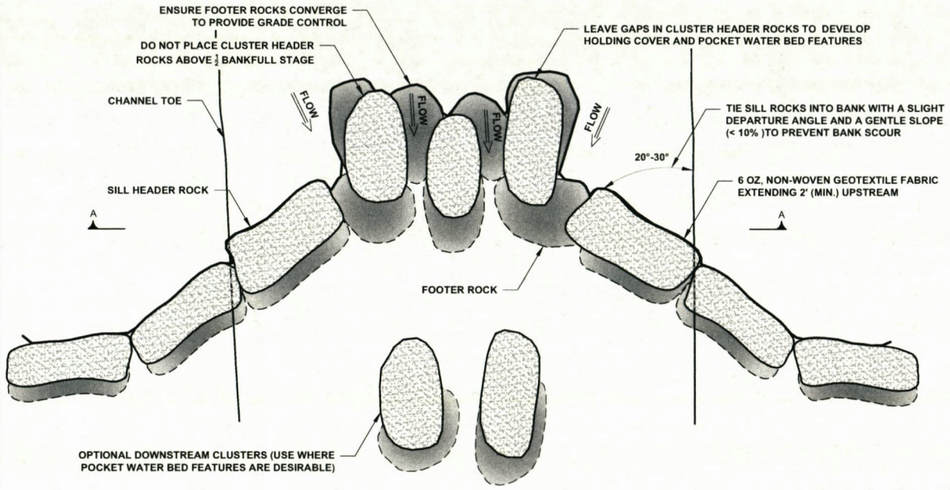
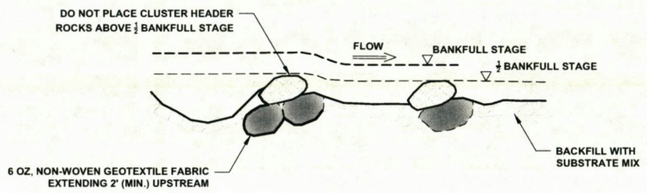
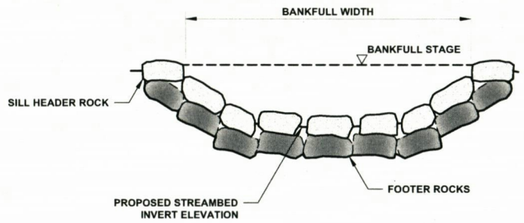


PLAN VIEW



PROFILE VIEW



SECTION A

ROCK SILL WITH CONVERGING ROCK CLUSTERS

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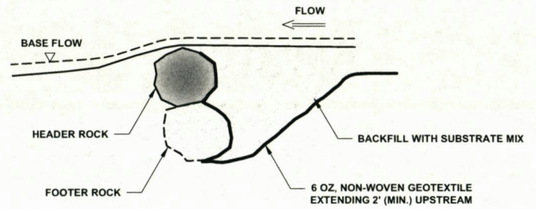
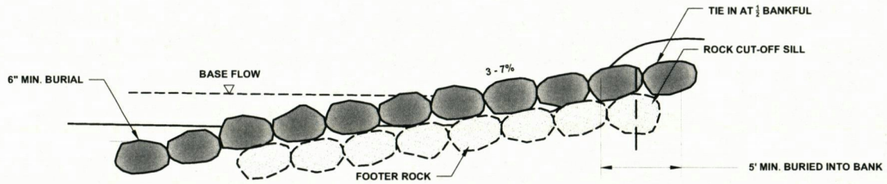
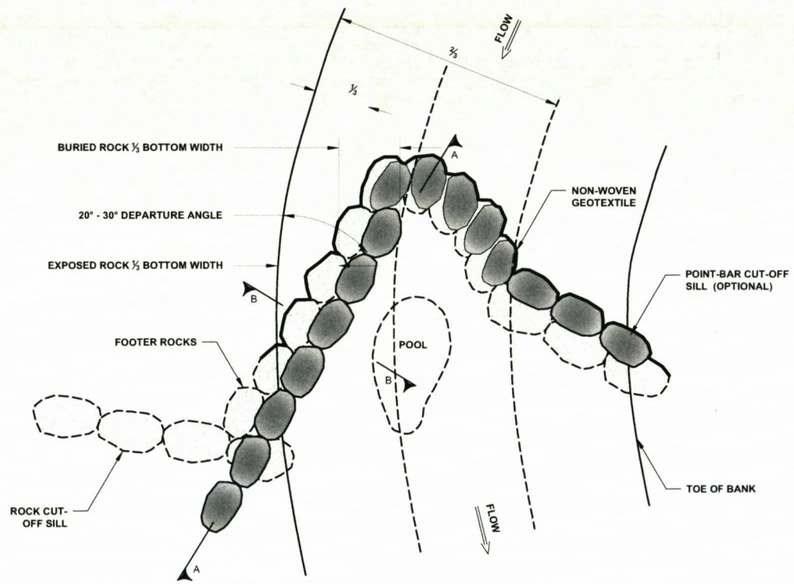


SECTION B



SECTION A



PLAN VIEW

ROCK J-HOOK

NO SCALE

No.	Revision/Issue	Date

Legend

Title: DETAILS

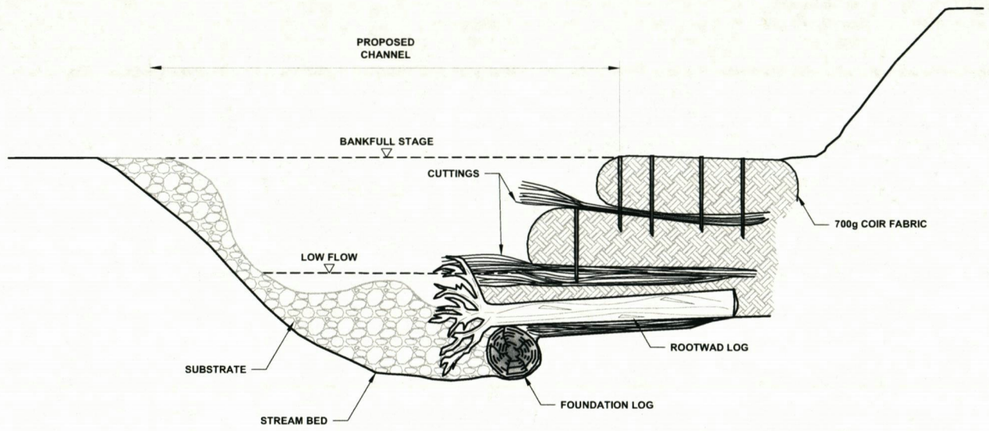
Project: SHERWOOD BANK STABILIZATION PROJECT

Client: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By

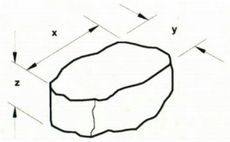
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490, Toll Free 1-866-213-2666

Scale	Drawn By	Sheet
NO SCALE	NCG	12
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	



TOE WOOD STRUCTURE

NO SCALE



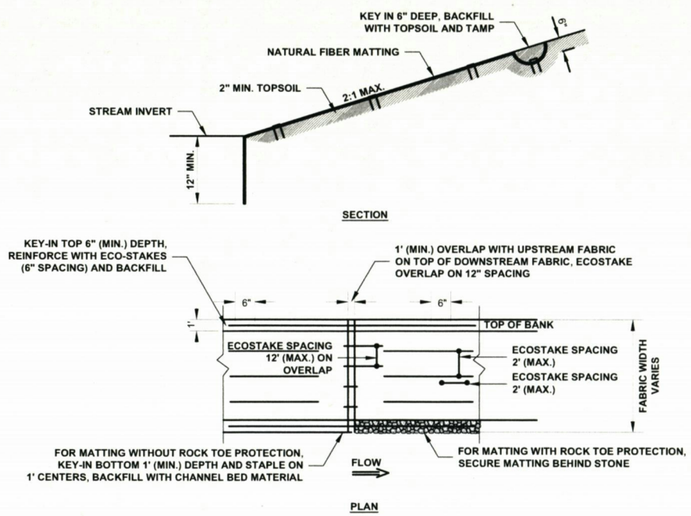
NOTES:

1. SUITABLE ROCKS WILL BE SIZED ACCORDING TO THREE PRIMARY DIMENSIONS (+/- 2")
2. y DIMENSION SHOULD ALWAYS BE AT LEAST 30% LARGER THAN THE z DIMENSION

x (LONGEST DIMENSION) = 4' MINIMUM
y (INTERMEDIATE DIMENSION) = 4' MINIMUM
z (SHORTEST DIMENSION) 3' MINIMUM

SUITABLE ROCK SIZE

NO SCALE

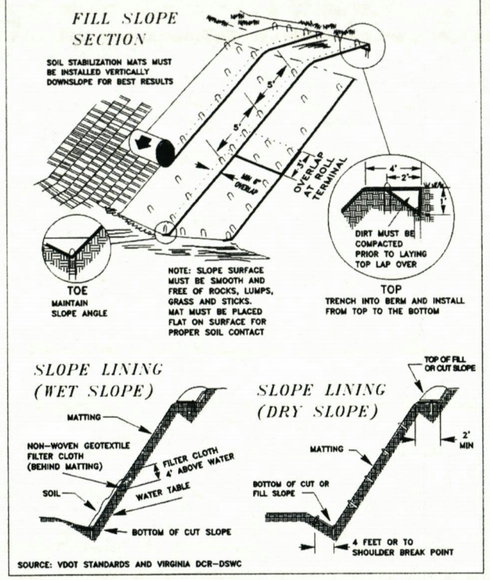


BANK STABILIZATION WITH NATURAL FIBER MATTING

NO SCALE

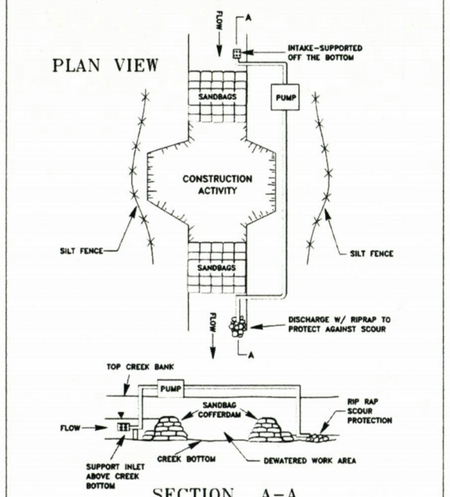
FIGURE 3.13.2

ROLLED EROSION CONTROL PRODUCTS



FIGURE

PUMP AROUND (IF NEEDED)



No.	Revision/Issue	Date

Legend

Title: DETAILS

Project: SHERWOOD BANK STABILIZATION PROJECT

Client: MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared By
ALLSTAR ECOLOGY LLC
NATURAL RESOURCE SPECIALISTS
1582 Meadowdale Road
Fairmont, WV 26554
304-816-3490, Toll Free 1-866-213-2666

Scale	Drawn By	Sheet
NO SCALE	NCG	13
Date: JAN. 2022	Checked By: NCG	
Project ID: SHERWOOD	Approved By: RLW	

HYDRAULIC TECHNICAL REPORT

SHERWOOD BANK STABILIZATION PROJECT
DODDRIDGE COUNTY, WEST VIRGINIA

Prepared For:

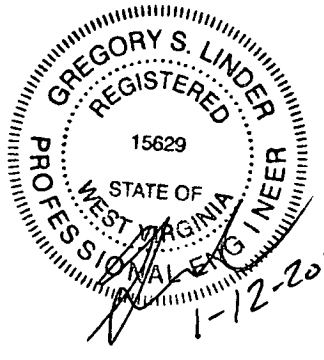
MARKWEST MIDSTREAM AND RESOURCES L.L.C.
4600 J. BARRY COURT, SUITE 500
CANONSBURG, PENNSYLVANIA 15317

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
120 GENESIS BOULEVARD
BRIDGEPORT, WEST VIRGINIA 26330

CEC Project 317-437

JANUARY 2022



Civil & Environmental Consultants, Inc.

TABLE OF CONTENTS

APPENDICES

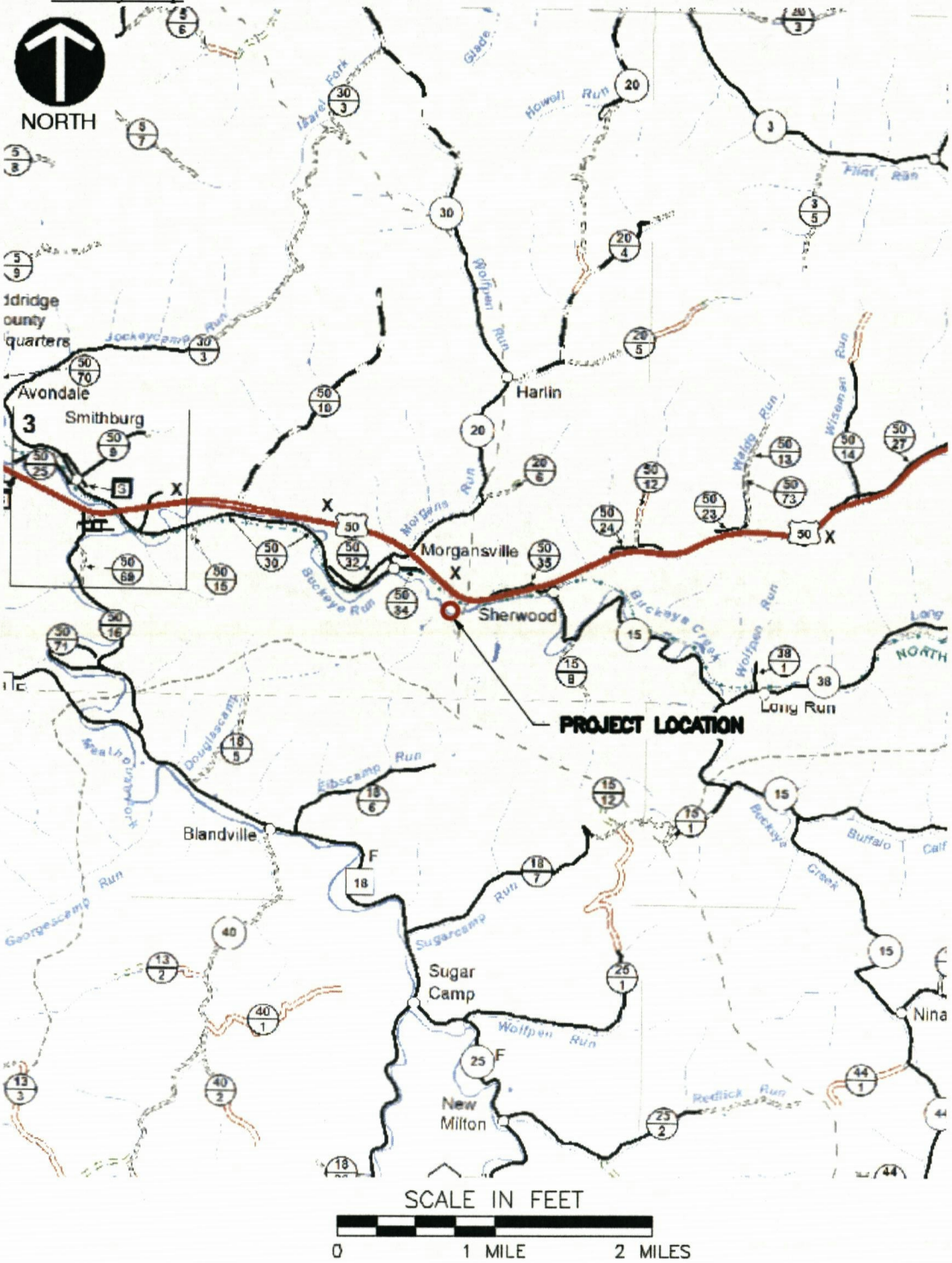
I. PROJECT DESCRIPTION

A. Narrative

The Sherwood Bank Stabilization Project is located approximately 5.9 miles east of West Union, Doddridge County, West Virginia. The purpose of this project is to stabilize 600 feet of Buckeye Creek stream bed and its banks near a farm field. The proposed construction will utilize natural channel design techniques including Rock J-Hooks for pipeline protection, Toe wood structures for streambank protection, and converging rock clusters for downstream grade control. According to the Federal Emergency Management Agency (FEMA), the site is located within the Buckeye Creek Zone AE Flood Hazard Area as designated on the Doddridge County Flood Insurance Rate Map (FIRM) Panel 54017C0140C with an effective date of October 4, 2011. The purpose of this hydraulic study is to determine the potential for adverse effects caused by the proposed stream channel bed and banks stabilization activities to the water surface elevation (WSEL) and floodplain of Buckeye Creek associated with the base flood storm event.

B. Location Maps

1. County Map



2. USGS Topographic Map

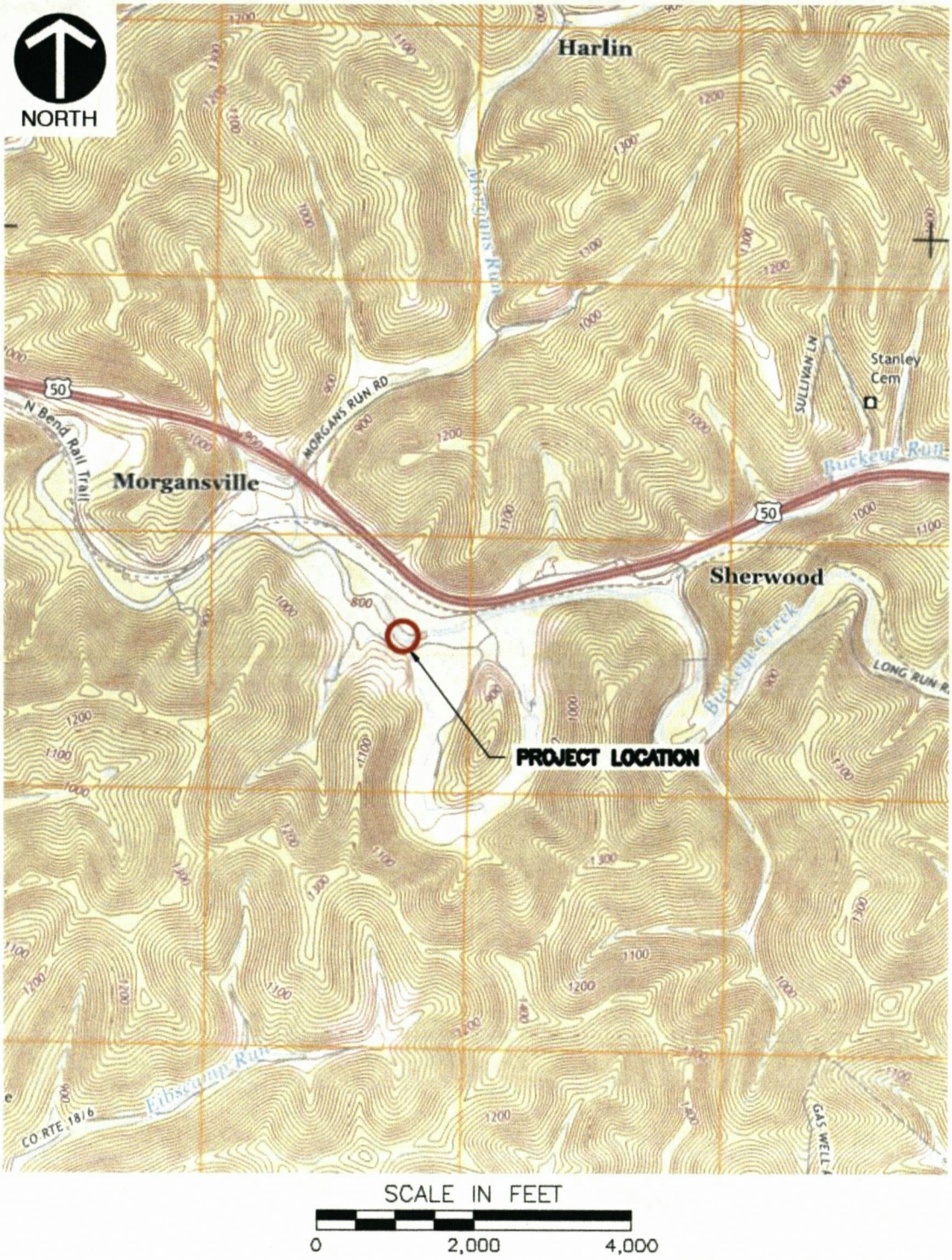


Figure: USGS 7 1/2 Minute Topographic Map – Smithburg Quadrangle

C. Field Observations

1. High Water Marks

There are no established landmarks in the project vicinity to determine a historic high water mark for Buckeye Creek.

2. Features Relevant to the Hydraulic Analysis

The hydraulic analyses for the Buckeye Creek have been carried out by FEMA and 100-year flood elevations at 300 feet downstream and 750 feet upstream of the project site are provided in the effective Doddridge County Flood Insurance Study (FIS).

3. Verification of Manning's "n" Values

Manning's 'n' values for Buckeye Creek were obtained from a combination of available aerial imagery and Doddridge County FIS report.

From Table 3.1 of the HEC-RAS Hydraulic Reference Manual:

a) Main Channel:

Clean, winding, some pools & shoals, some weeds, and more stones: 'n' value 0.055

b) Floodplain:

Light brush and trees, in winter: 'n' value 0.050

The Manning's 'n' values assigned to the left overbank (LOB), channel, and right overbank (ROB) for each cross-section of Buckeye Creek are shown in the following table.

Cross-Sections	Friction (n/K)	LOB	Channel	ROB
1370	n	0.05	0.055	0.05
1200	n	0.05	0.055	0.05
1050	n	0.05	0.055	0.05
923.73	n	0.05	0.055	0.05
779.43	n	0.05	0.055	0.05
719.69	n	0.05	0.055	0.05
662.01	n	0.05	0.055	0.05
606.9	n	0.05	0.055	0.05
555.72	n	0.05	0.055	0.05
482.3	n	0.05	0.055	0.05
432.35	n	0.05	0.055	0.05
370	n	0.05	0.055	0.05
300	n	0.05	0.055	0.05
200	n	0.05	0.055	0.05
81.68	n	0.05	0.055	0.05

II. SUMMARY OF RESULTS

A. Analyses Performed

Two analyses were performed in this study: an existing conditions analysis and a proposed conditions analysis. The existing condition model was based on the updated topography and centerline of Buckeye Creek. Light Detection and Ranging (LiDAR) elevation data completed by CEC in September 2021 served as the basis of the terrain model for the entire study area and a supplemental bathymetric survey within the study area was conducted to provide an accurate representation of the stream channel and floodplains. The valley cross-sections of the existing and proposed Buckeye Creek were aligned in such a way as to ensure the same cross-section would pass through both existing and proposed stream centerlines perpendicularly. Refer to Appendix A for the cross-section locations

In the proposed conditions model, the cross-sections from the existing condition geometry have been updated to reflect the proposed grading. The proposed grading includes the construction of a new stream channel and stabilization of stream banks and bed. By comparing the results from the two analyses, the effects of the proposed development on the 100-year water levels of Buckeye Creek were determined, as shown in the following table.

B. Water Surface Elevation Table, Including Existing and Proposed Analyses

Buckeye Creek 100-year Rainfall Event (7,350 cfs)			
Cross-section	Existing (ft)	Proposed (ft)	Difference (ft)
1370	812.48	812.46	-0.02
1200	812.24	812.22	-0.02
1050	811.94	811.91	-0.03
923.73	811.74	811.70	-0.04
779.43	811.65	811.63	-0.02
719.69	811.64	811.63	-0.01
662.01	811.61	811.61	0.00
606.9	811.60	811.60	0.00
555.72	811.59	811.59	0.00
482.3	811.53	811.53	0.00
432.35	811.51	811.51	0.00
370	811.48	811.48	0.00
300	811.42	811.42	0.00
200	811.34	811.34	0.00
81.68	810.99	810.99	0.00

See Appendix D – HEC-RAS Profile Summary Tables.

C. Conclusions

CEC performed a hydraulic analysis of Buckeye Creek for the proposed stream bed and bank stabilization project in general accordance with Doddridge County floodplain requirements, the National Flood Insurance Program, and standard engineering practices. Based on the analysis, our findings indicate that there is no rise to the 100-year water elevations on the

floodplain of Buckeye Creek due to the proposed stream stabilization project. Therefore, the proposed project will not increase the flooding threat to life or property upstream and downstream of the project area.

D. Recommendation

The Sherwood Bank Stabilization Project on Buckeye Creek for MarkWest Midstream and Resources L.L.C. involves construction within the floodplain established by FEMA. The results of the hydraulic study indicate that the construction of the proposed stream channel will not have an adverse impact on the water levels of Buckeye Creek. Therefore, it is recommended that the channel be constructed as designed.

E. Signature Block, Consultant, or In-House Designers

1. Preparer

   Sabin Shrestha, E.I.T.

2. Reviewer

   Gregory S. Linder, P.E. (West Virginia Registered Professional Engineer No. 15629)

3. Date

   January 6, 2022

4. Engineer's Seal on Final Report

   Gregory S. Linder, P.E. (West Virginia Registered Professional Engineer No. 15629)

III. AVAILABLE DATA

A. Flood Insurance Study

The initial countywide Flood Insurance Study (FIS) for Doddridge County had an effective date of October 4, 2011. The final Consultation and Coordination Officer's meeting for the countywide revision to the FIS was held on April 29, 2010. Since detailed hydraulic analyses were performed for Buckeye Creek, Base Flood Elevations (BFEs) or base flood depths are listed in the FIS report. See Appendix B – FEMA FIRMette

B. Existing Hydrologic Data

A detailed hydrologic study has been performed in Buckeye Creek by FEMA within the boundaries of this project site.

C. Existing Hydraulic Model from FEMA, USACE, NRCS, and others

There is no existing hydraulic model for this project site.

IV. HYDROLOGY

A. Design Discharge Calculations

A hydrologic analysis for the Buckeye Creek watershed was not part of this study since the stabilization of Buckeye Creek would not alter how the peak flows had been determined in the FIS. The steady-state flows contained in the hydraulic model which supports the Effective FIS were used for this analysis. Appendix C contains excerpts of the FEMA published Flood Insurance Study (FIS) for Doddridge County, West Virginia.

Buckeye Creek	
Frequency	Discharge (cfs)
100-year	7,350

B. Boundary Conditions

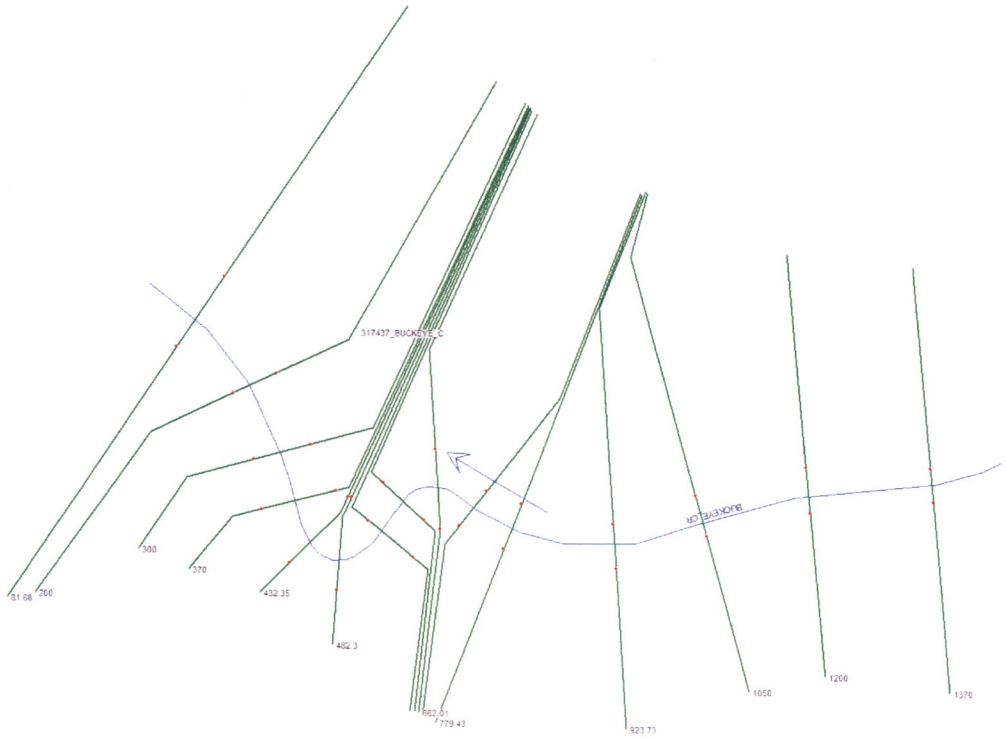
As the cross-sections provided in FEMA FIS Report were not lettered and unmapped within the study area, a downstream boundary condition was set to the normal depth method for all of the steady-state routing simulations. A friction slope of 0.002 ft/ft was selected for each simulation based on the evaluation of the available downstream channel slope data.

V. HYDRAULIC MODELING

A. Source of Model

HEC-RAS Version 6.1.0 was used to perform a hydraulic analysis to determine the potential impacts to the water levels and floodplain of Buckeye Creek. HEC-RAS 6.1.0 is the most current version of the river analysis software available from the Hydraulic Engineering Center of the U.S. Army Corps of Engineers.

B. Site Map with Cross-Sections



C. Explanation of Data and Methods

1. Manning's Values

Manning's roughness coefficients 'n' for the steady flow analysis was estimated at 0.055 for the stream channel and 0.050 for the overbanks in accordance with aerial imagery obtained by CEC, field observations, and values presented in the FEMA FIS Report. See Section I.C.3 for a detailed description of Manning's values used.

2. Ineffective Flow Areas

Ineffective flow areas were incorporated to account for areas in the cross-sectional geometry where ponded water will not be actively conveyed downstream.

3. Any Unusual Circumstances

There are no unusual circumstances specified in correlation with the hydraulic analysis of this project.

4. Table of HEC-RAS Plan Files

Filename	Description
317437 -EXISTING ANALYSIS	Existing Conditions Analysis
317437 -PROPOSED ANALYSIS	Proposed Conditions Analysis

D. HEC-RAS Generated Tables

1. Profile Summary of Existing and Proposed Conditions

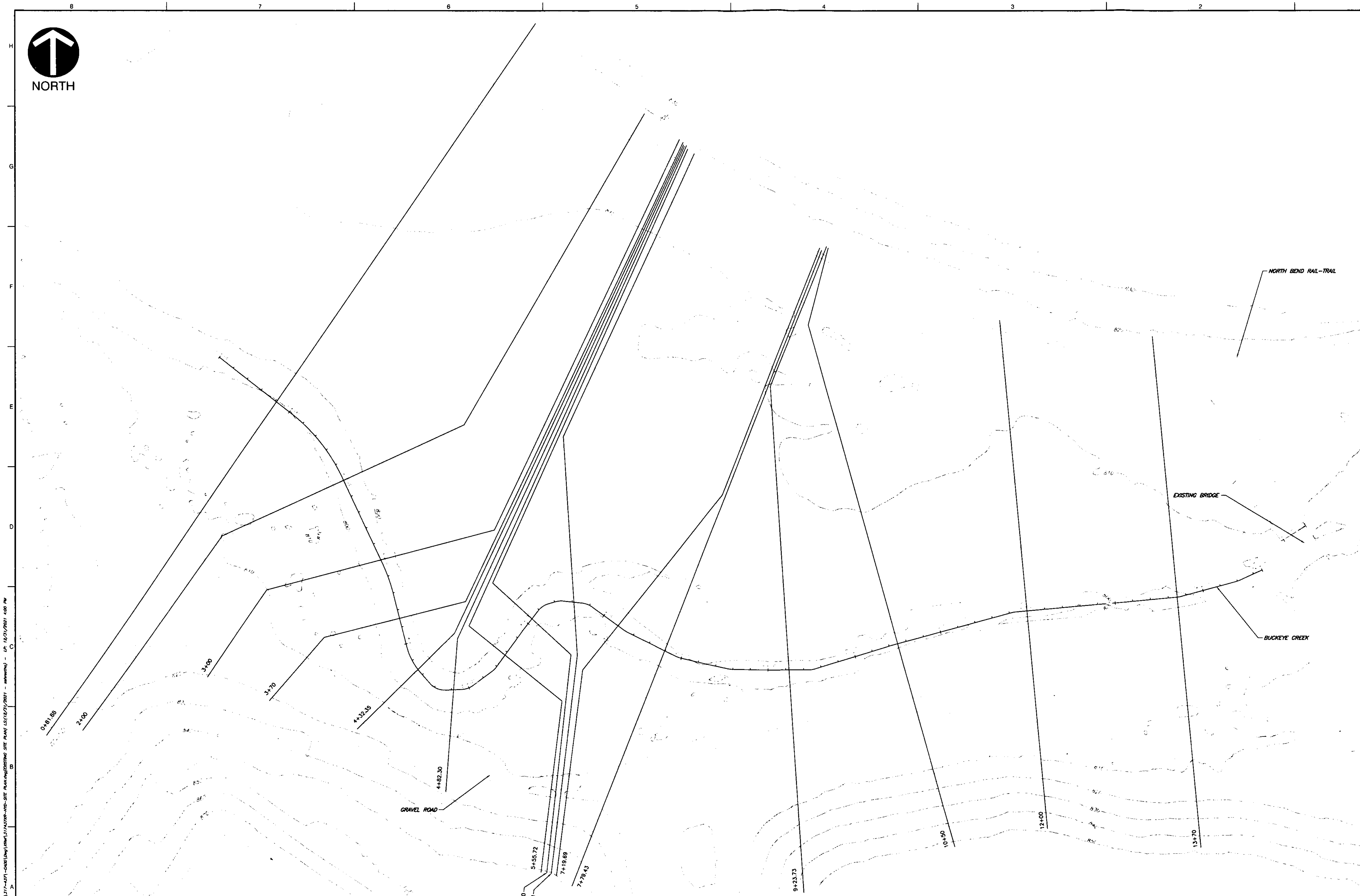
See Appendix D – HEC-RAS Profile Summary Tables

2. Detailed Output Tables

See Appendix F – HEC-RAS Output Files

APPENDIX A

SITE PLAN



REFERENCE

1. TOPOGRAPHIC SURVEY PROVIDED BY ALLSTAR ECOLOGY, LLC. (DECEMBER 22, 2021)

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
120 Genesis Boulevard · Bridgeport, WV 26330
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com

ALLSTAR ECOLOGY LLC
SHERWOOD BANK
STABLIZATION PROJECT
DODDRIDGE COUNTY, WV

EXISTING SITE PLAN

DATE	DEC. 2021	DRAWN BY	SS
DWG SCALE	1"=50'	CHECKED BY	APD
PROJECT NO			317-437
APPROVED BY			GSL

DRAWING NO **1**

SHEET 1 OF 2

P:\310-000\317-437\-CADD\Dwg\Other\317437DR-HYD-SITE PLAN.dwg[PROPOSED SITE PLAN] LS(12/31/2021 - sshrestha) - LP: 12/31/2021 4:00 PM

REFERENCE

1. TOPOGRAPHIC SURVEY PROVIDED BY ALLSTAR ECOLOGY, LLC (DECEMBER 22, 2021)

NORTH

0+81.88
2+00
3+00
3+70
4+32.35
4+82.30
5+55.72
6+06.90
6+62.01
7+19.69
7+78.43
9+23.73
10+50
12+00
13+70

GRAVEL ROAD

EXISTING BRIDGE

BUCKEYE CREEK

NORTH BEND RAIL-TRAIL

SCALE IN FEET
0
50
100

SHEET 1 OF 2

DRAWING NO 2

PROPOSED SITE PLAN

DATE	DEC. 2021	DRAWN BY	SS
DWG SCALE	1"=50'	CHECKED BY	APD
PROJECT NO			317-437
APPROVED BY			GSL

ALLSTAR ECOLOGY LLC
SHERWOOD BANK
STABLIZATION PROJECT
DODDRIDGE COUNTY, WV

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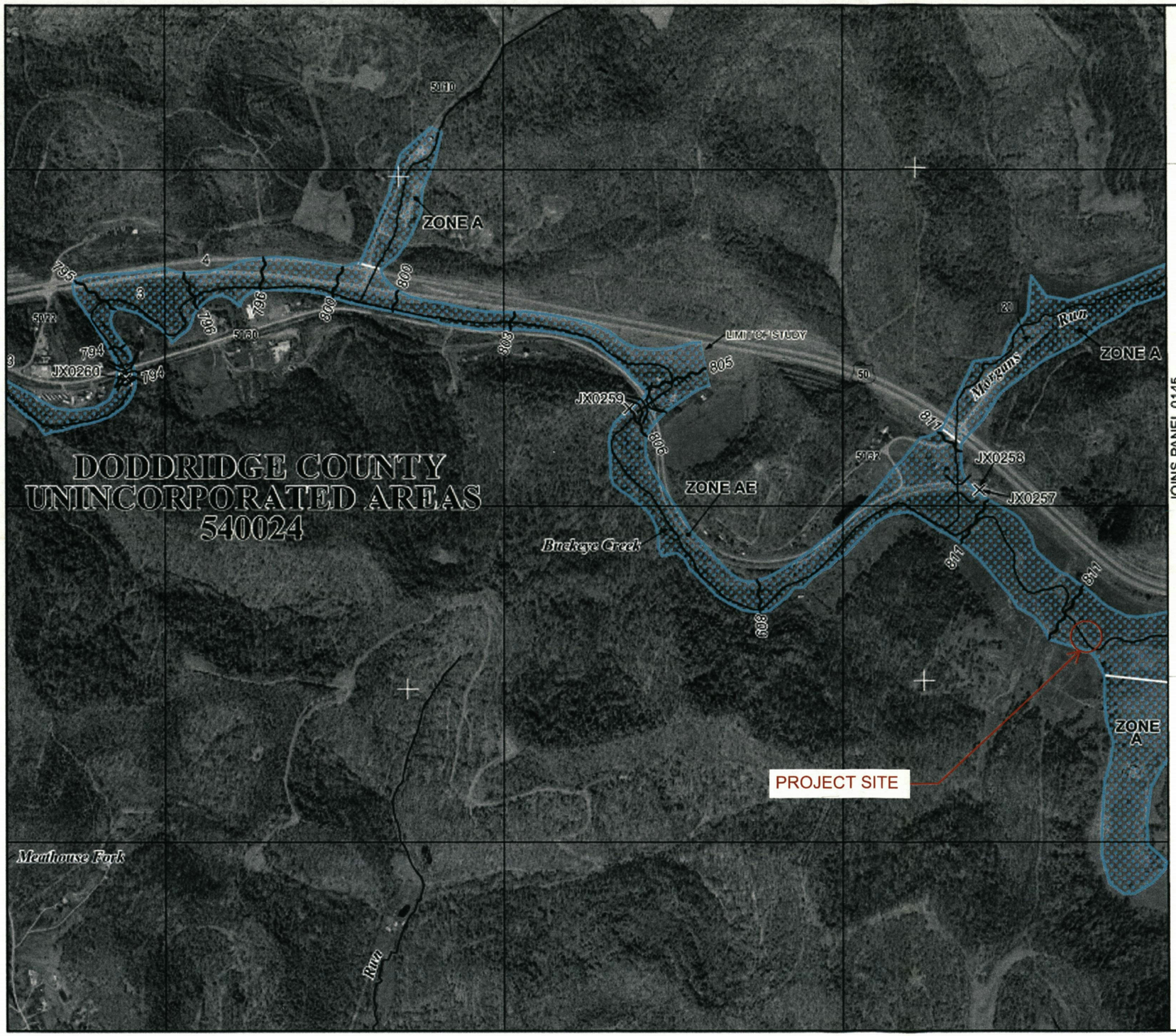
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com

REVISION RECORD

NO	DATE	DESCRIPTION

APPENDIX B

FEMA FIRMETTE



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET ME

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 140 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

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

MAP NUMBER
54017C0140C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

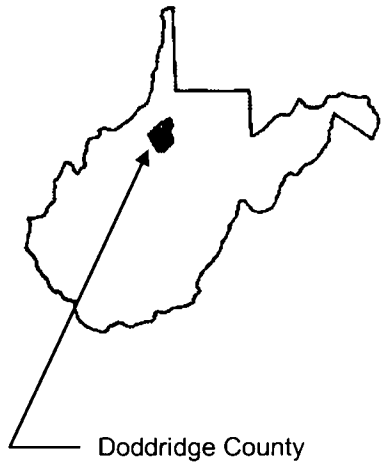
APPENDIX C

FEMA FIS RELEVANT DATA

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

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

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

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.

APPENDIX D

HEC-RAS PROFILE SUMMARY TABLES

HEC-RAS Plan: EXISTING River: BUCKEYE_CR Reach: 317437_BUCKEYE_C Profile: 100-YR

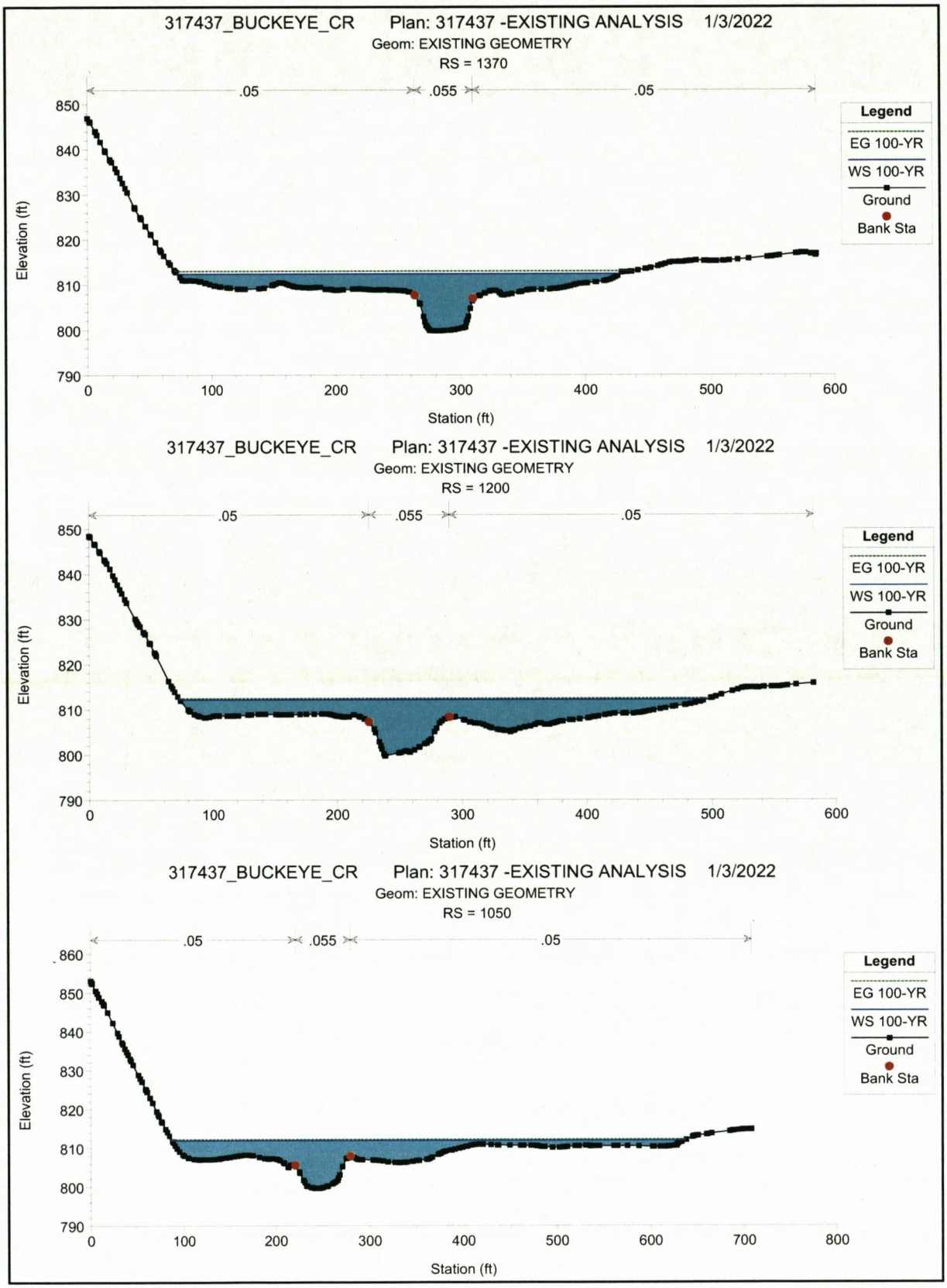
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
317437_BUCKEYE_C	1370	100-YR	7350.00	799.83	812.48		813.03	0.003597	7.44	1456.77	355.50	0.40
317437_BUCKEYE_C	1200	100-YR	7350.00	799.72	812.24		812.50	0.001951	5.11	1948.35	423.22	0.29
317437_BUCKEYE_C	1050	100-YR	7350.00	799.64	811.94		812.21	0.001986	5.38	2050.39	549.25	0.30
317437_BUCKEYE_C	923.73	100-YR	7350.00	797.47	811.74		811.96	0.001746	5.02	2231.41	582.15	0.28
317437_BUCKEYE_C	779.43	100-YR	7350.00	797.59	811.65		811.78	0.000890	3.77	2861.86	624.13	0.20
317437_BUCKEYE_C	719.69	100-YR	7350.00	798.28	811.64	804.99	811.73	0.000604	3.26	3252.78	644.26	0.17
317437_BUCKEYE_C	662.01	100-YR	7350.00	796.71	811.61	805.65	811.69	0.000452	2.73	3618.80	685.22	0.15
317437_BUCKEYE_C	606.9	100-YR	7350.00	796.56	811.60	806.16	811.67	0.000447	2.74	3765.23	742.27	0.15
317437_BUCKEYE_C	555.72	100-YR	7350.00	796.64	811.59	806.32	811.67	0.000469	2.79	3760.28	759.17	0.15
317437_BUCKEYE_C	482.3	100-YR	7350.00	796.91	811.53		811.63	0.000748	3.12	3067.52	649.10	0.18
317437_BUCKEYE_C	432.35	100-YR	7350.00	796.70	811.51		811.61	0.000740	3.20	3060.42	655.77	0.18
317437_BUCKEYE_C	370	100-YR	7350.00	796.86	811.48		811.59	0.000837	3.32	3026.61	703.32	0.19
317437_BUCKEYE_C	300	100-YR	7350.00	796.81	811.42	808.53	811.55	0.000983	3.74	2849.11	735.65	0.21
317437_BUCKEYE_C	200	100-YR	7350.00	797.27	811.34	808.06	811.47	0.000822	3.63	2879.93	620.76	0.19
317437_BUCKEYE_C	81.68	100-YR	7350.00	798.80	810.99	808.06	811.27	0.001997	4.79	1898.51	420.62	0.30

HEC-RAS Plan: PROPOSED River: BUCKEYE_CR Reach: 317437_BUCKEYE_C Profile: 100-YR

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)	
317437_BUCKEYE_C	1370	100-YR	7350.00	799.83	812.46		813.02	0.003633	7.47	1451.56	355.39	0.40
317437_BUCKEYE_C	1200	100-YR	7350.00	799.72	812.22		812.48	0.001973	5.13	1940.99	422.98	0.30
317437_BUCKEYE_C	1050	100-YR	7350.00	799.64	811.91		812.19	0.002021	5.42	2037.32	548.97	0.30
317437_BUCKEYE_C	923.73	100-YR	7350.00	799.46	811.70		811.94	0.001844	5.10	2195.82	581.81	0.29
317437_BUCKEYE_C	779.43	100-YR	7350.00	797.78	811.63		811.76	0.000764	3.71	2961.91	623.95	0.19
317437_BUCKEYE_C	719.69	100-YR	7350.00	797.69	811.63	805.82	811.72	0.000522	3.21	3378.85	644.14	0.16
317437_BUCKEYE_C	662.01	100-YR	7350.00	797.50	811.61	805.48	811.68	0.000398	2.63	3772.63	685.15	0.14
317437_BUCKEYE_C	606.9	100-YR	7350.00	796.00	811.60	805.08	811.67	0.000355	2.77	3956.65	742.19	0.13
317437_BUCKEYE_C	555.72	100-YR	7350.00	797.84	811.59	805.75	811.66	0.000404	2.74	3914.98	759.11	0.14
317437_BUCKEYE_C	482.3	100-YR	7350.00	797.17	811.53		811.63	0.000610	3.06	3208.49	649.06	0.17
317437_BUCKEYE_C	432.35	100-YR	7350.00	796.00	811.51		811.61	0.000548	3.07	3286.24	655.83	0.16
317437_BUCKEYE_C	370	100-YR	7350.00	796.93	811.48		811.59	0.000837	3.32	3026.35	703.31	0.19
317437_BUCKEYE_C	300	100-YR	7350.00	796.81	811.42	808.53	811.55	0.000983	3.74	2849.11	735.65	0.21
317437_BUCKEYE_C	200	100-YR	7350.00	797.27	811.34	808.06	811.47	0.000822	3.63	2879.93	620.76	0.19
317437_BUCKEYE_C	81.68	100-YR	7350.00	798.80	810.99	808.06	811.27	0.001997	4.79	1898.51	420.62	0.30

APPENDIX E

HEC-RAS CROSS-SECTION REPORTS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WS 100-YR
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Bank Sta
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Station (ft)
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Legend
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WS 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
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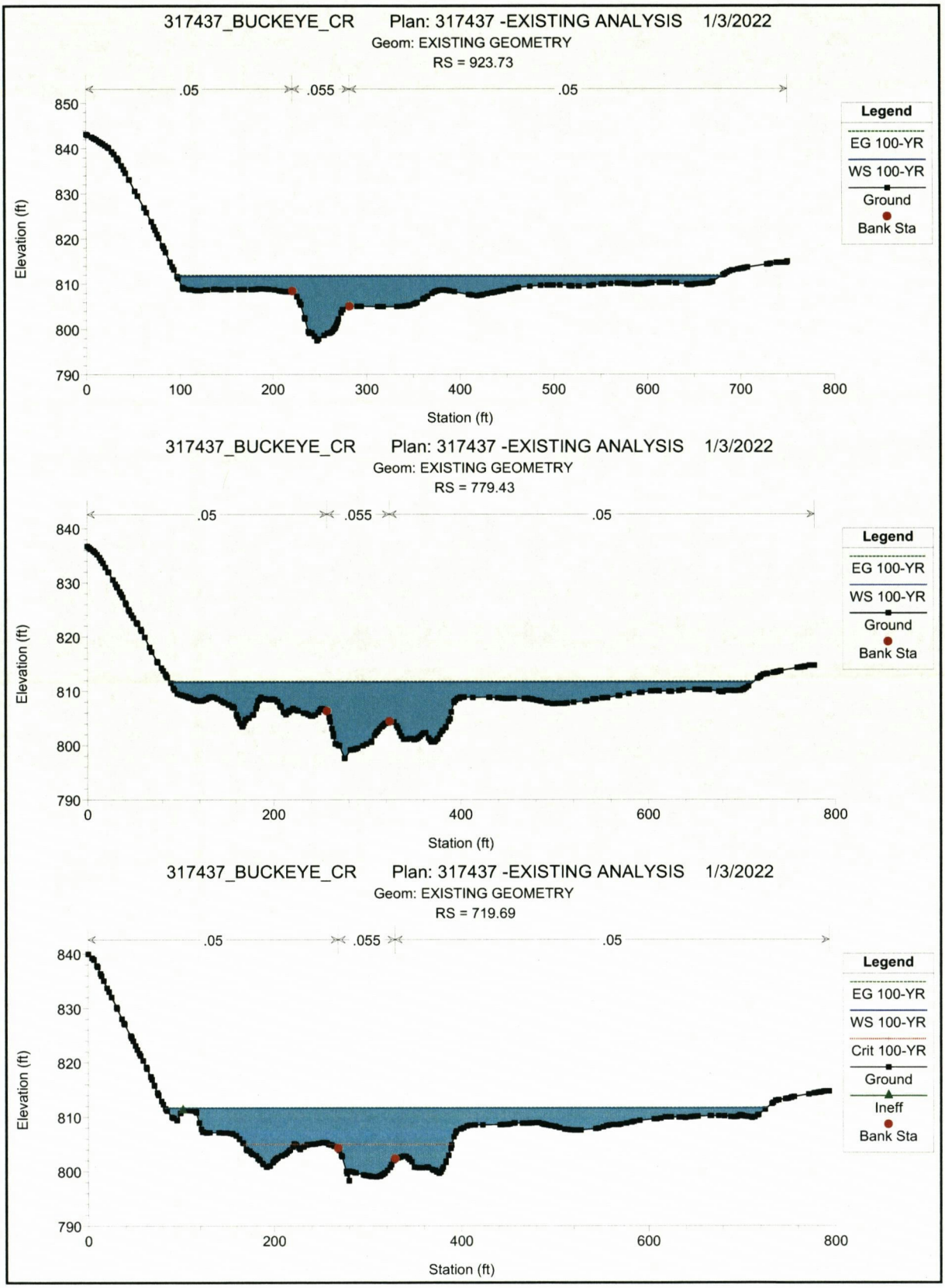
WS 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Ground
Bank Sta
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Ground
Bank Sta
Elevation (ft)
Station (ft)
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Crit 100-YR
Ground
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Bank Sta
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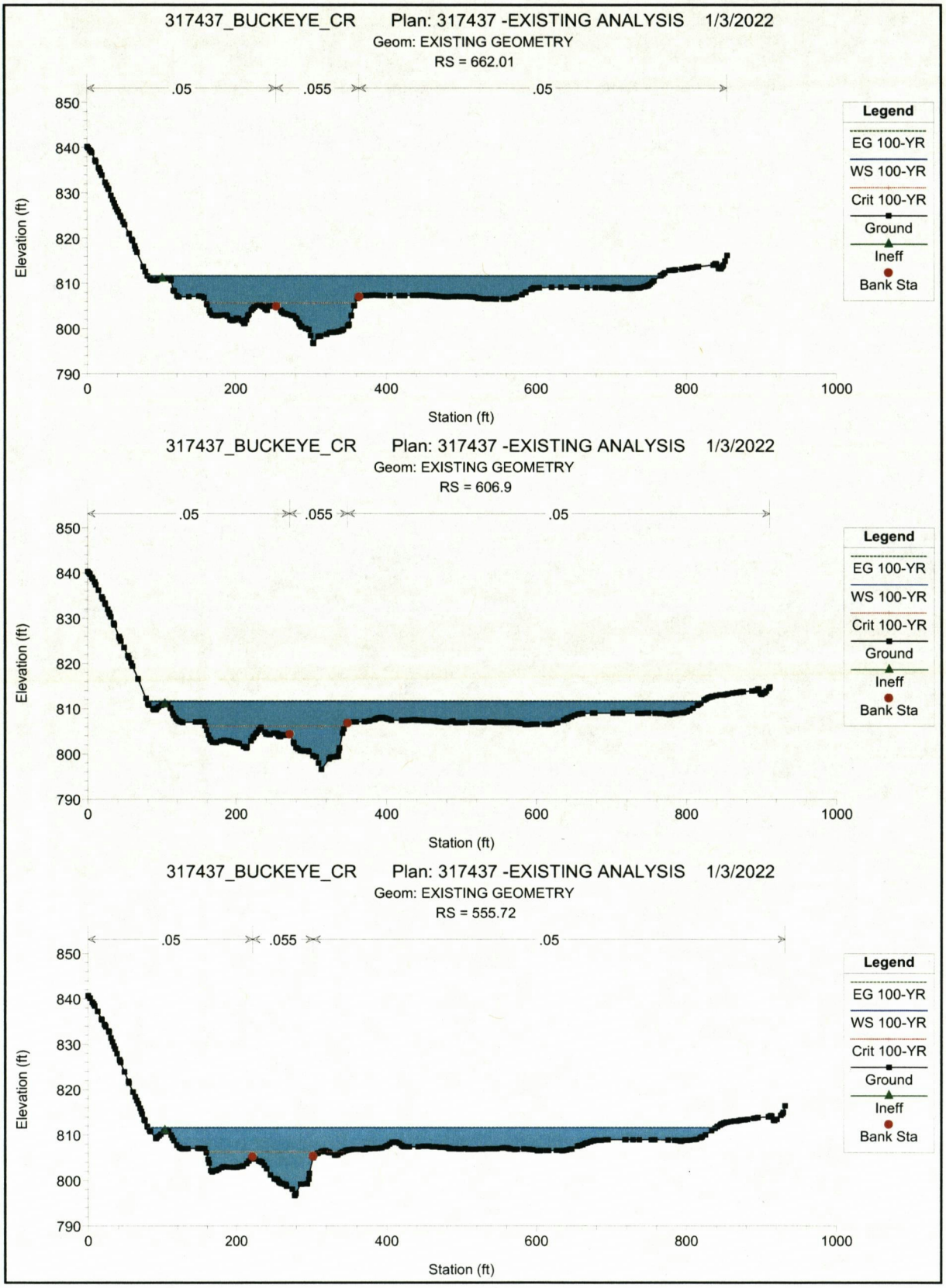
Station (ft)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Crit 100-YR
Ground
Ineff
Bank Sta
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840
830
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Station (ft)
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Crit 100-YR
Ground
Ineff
Bank Sta
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Station (ft)
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WS 100-YR
Crit 100-YR
Ground
Ineff
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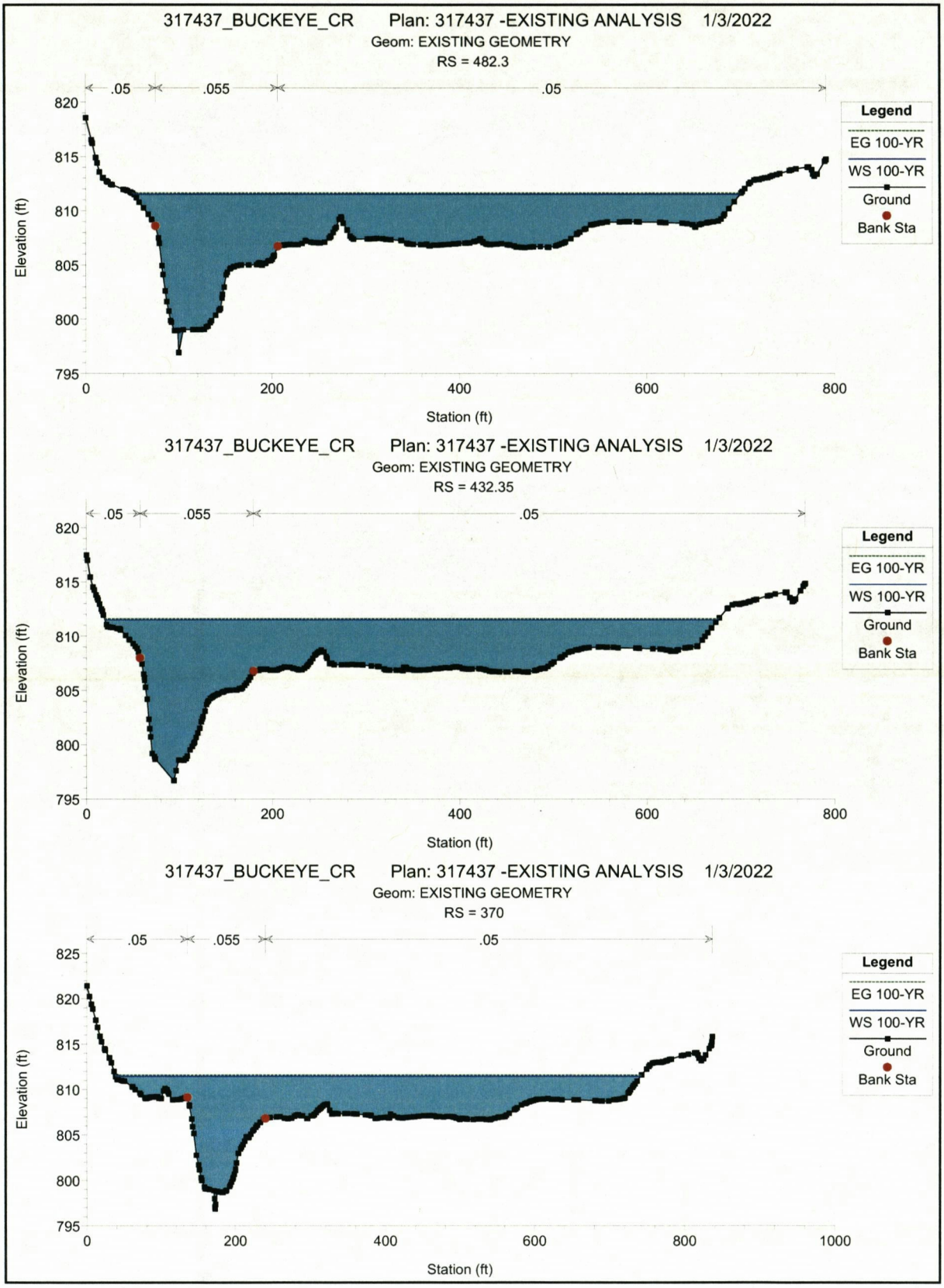
Station (ft)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WS 100-YR
Ground
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Elevation (ft)
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Station (ft)
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WS 100-YR
Ground
Bank Sta
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800
Station (ft)
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WS 100-YR
Ground
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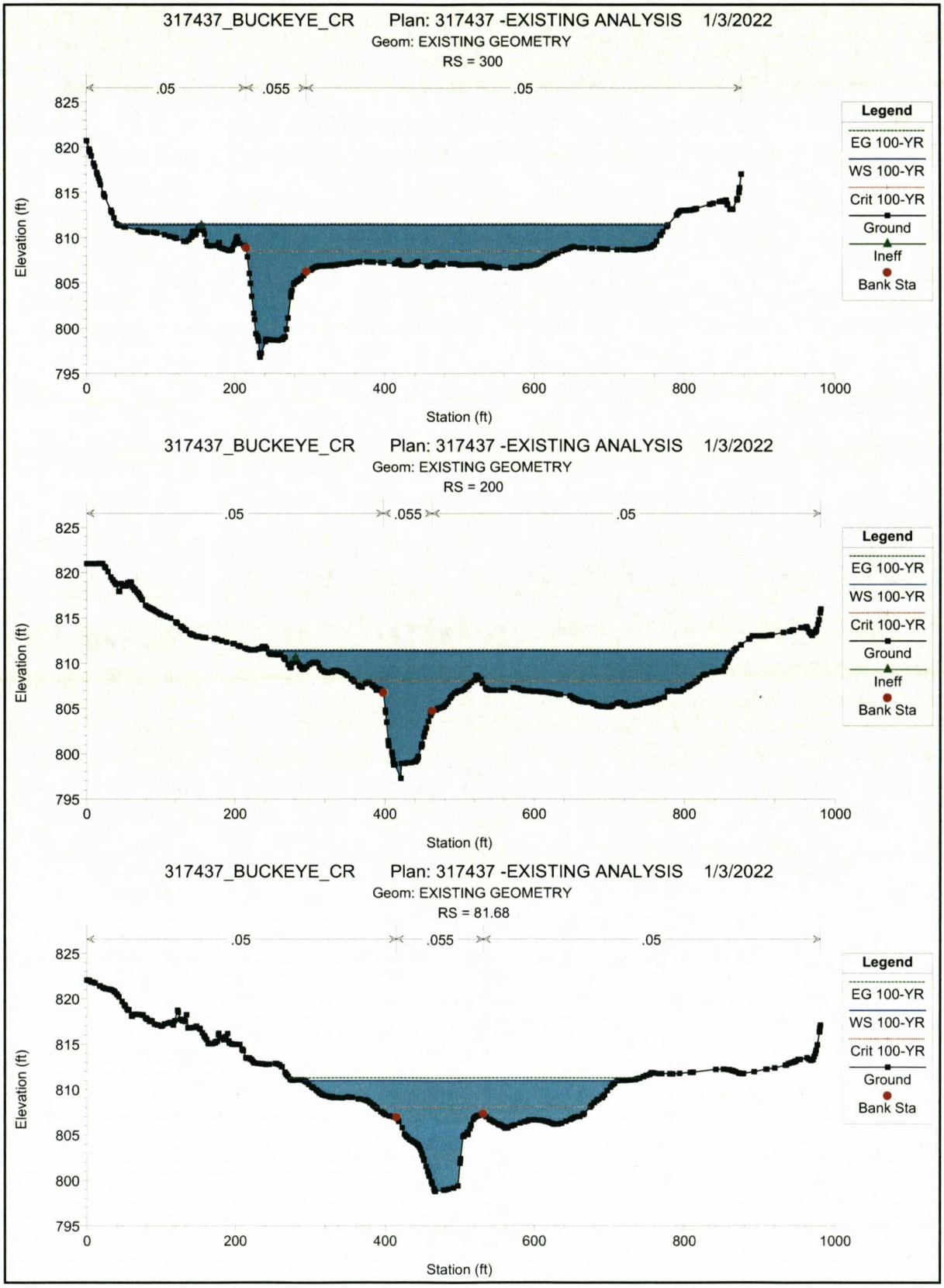
Station (ft)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Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
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Geom: EXISTING GEOMETRY
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Elevation (ft)
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Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
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Bank Sta
317437_BUCKEYE_CR Plan: 317437 -EXISTING ANALYSIS 1/3/2022
Geom: EXISTING GEOMETRY
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Station (ft)
Legend
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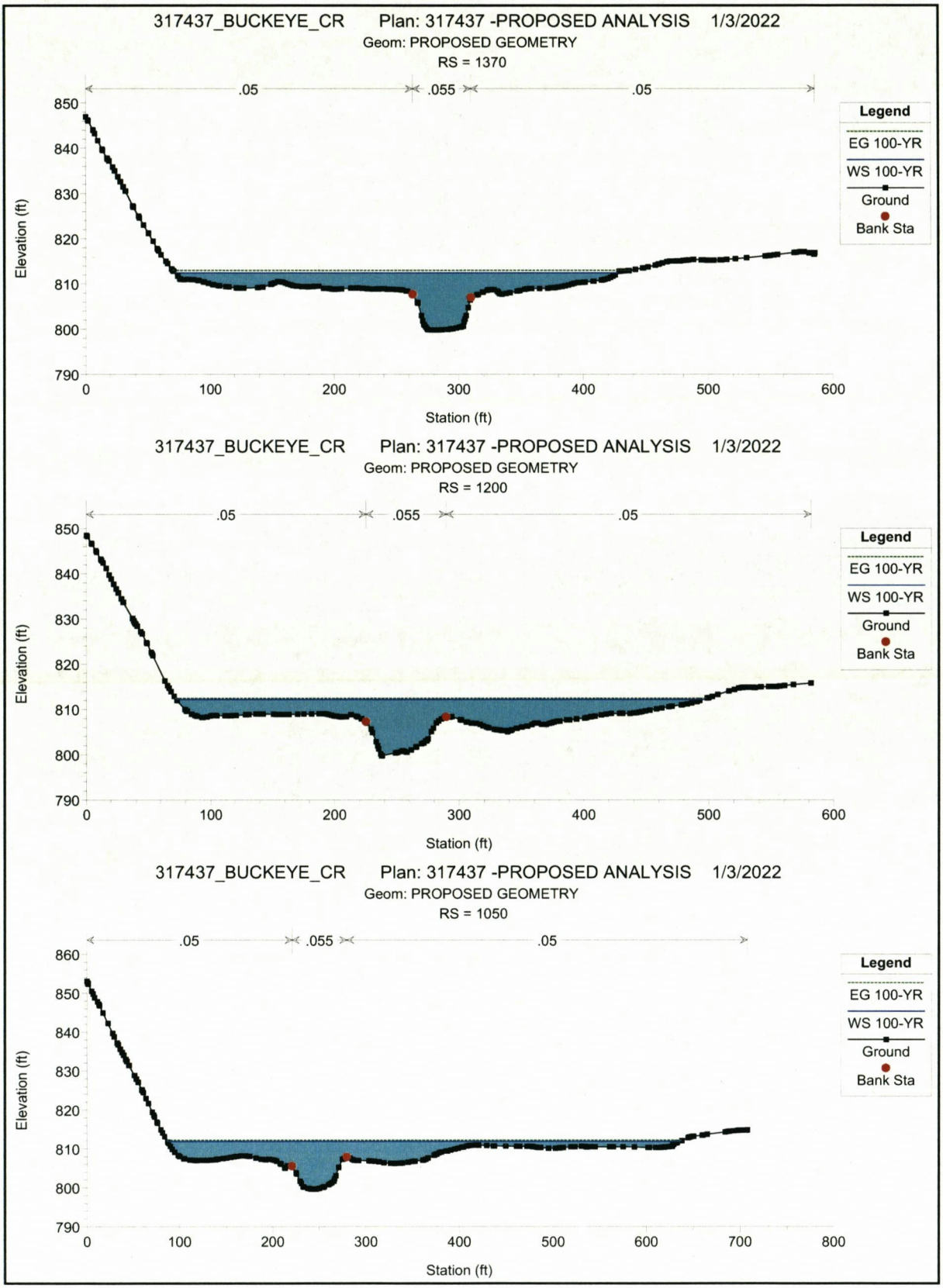
WS 100-YR
Crit 100-YR
Ground
Bank Sta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WS 100-YR
Ground
Bank Sta
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Station (ft)
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WS 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Geom: PROPOSED GEOMETRY
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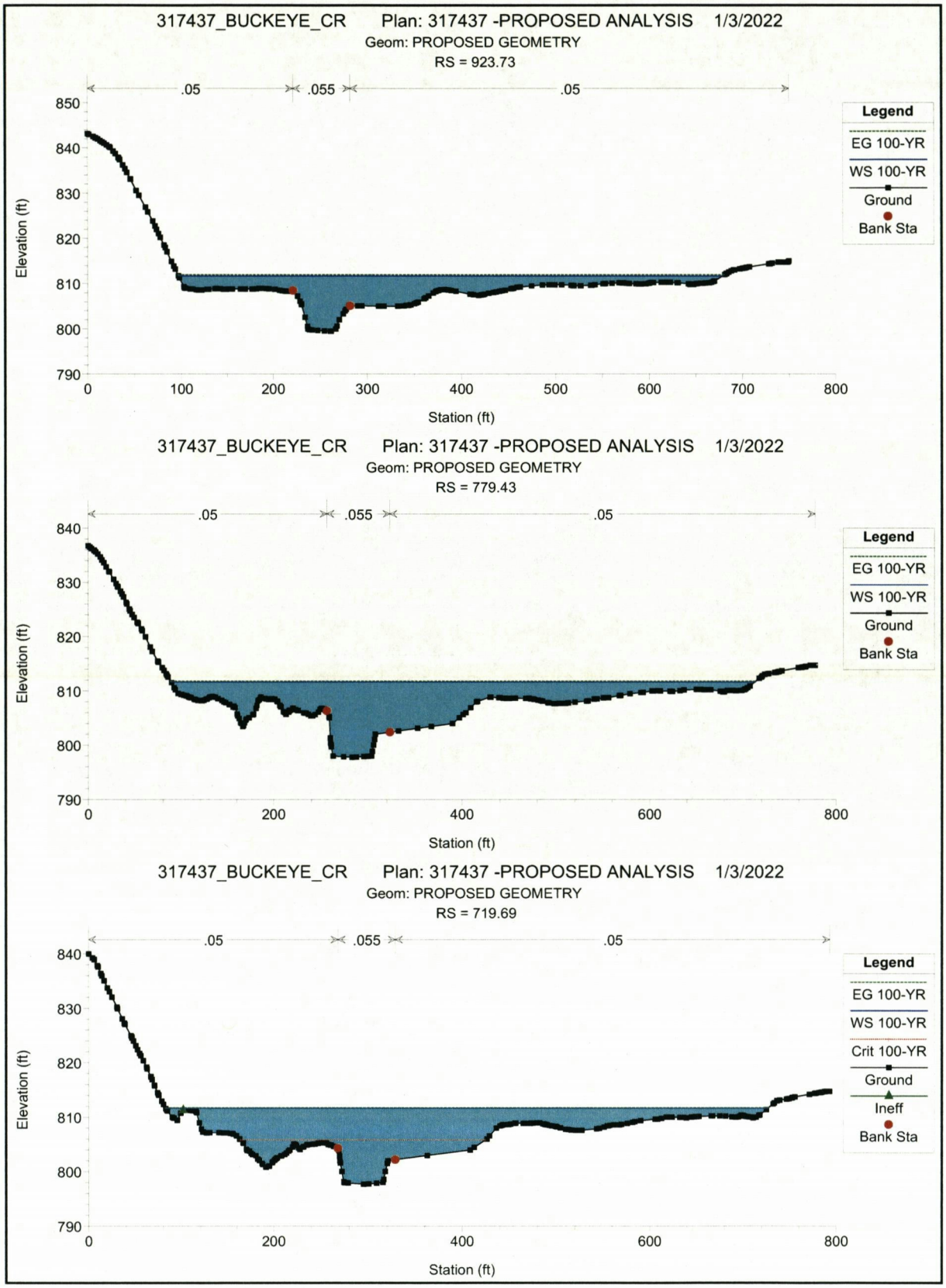
WS 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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WS 100-YR
Ground
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Station (ft)
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WS 100-YR
Ground
Bank Sta
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Station (ft)
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Crit 100-YR
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Ineff
Bank Sta
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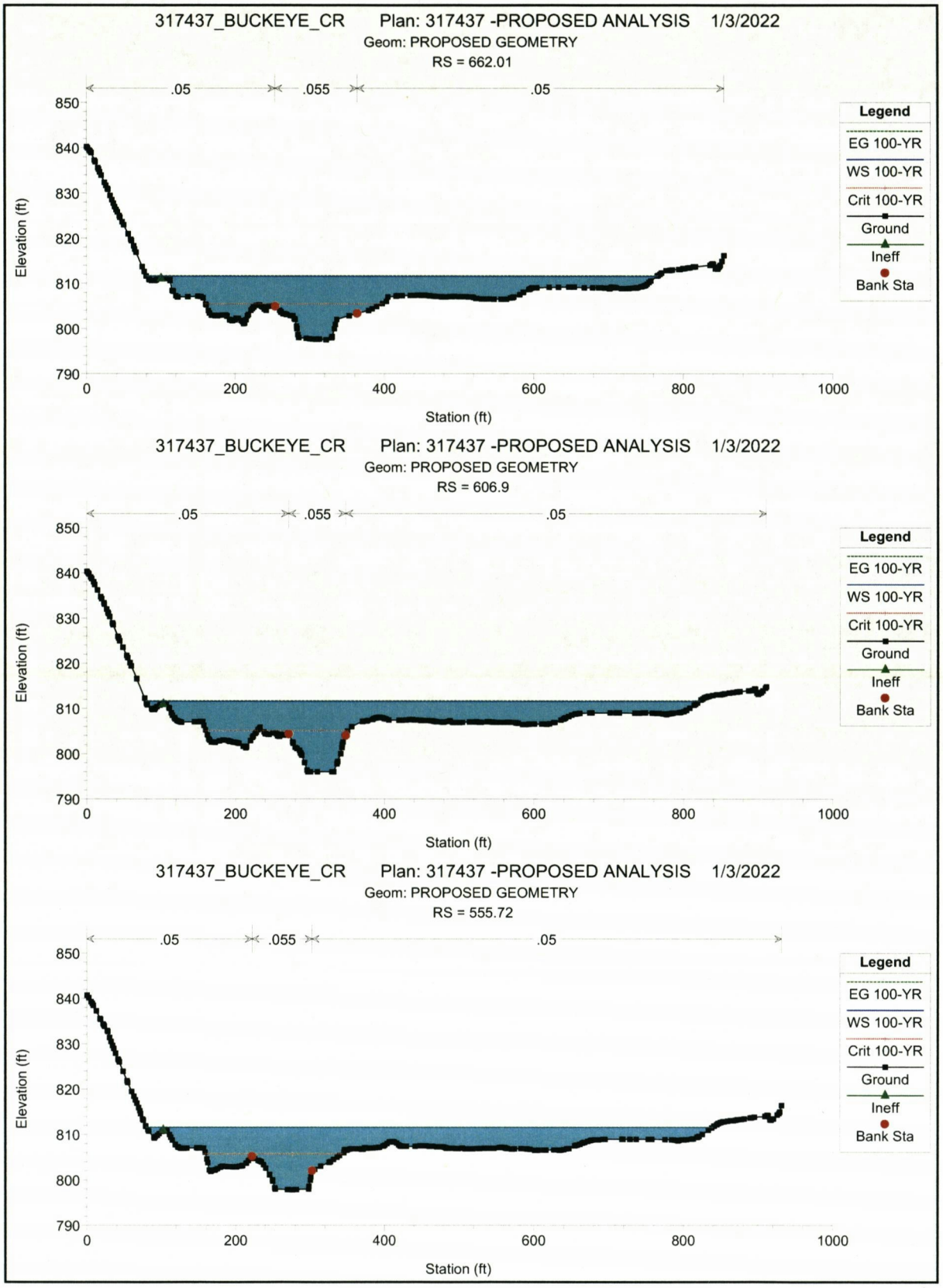
Station (ft)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Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
850
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Station (ft)
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Geom: PROPOSED GEOMETRY
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WS 100-YR
Crit 100-YR
Ground
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Station (ft)
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Legend
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WS 100-YR
Crit 100-YR
Ground
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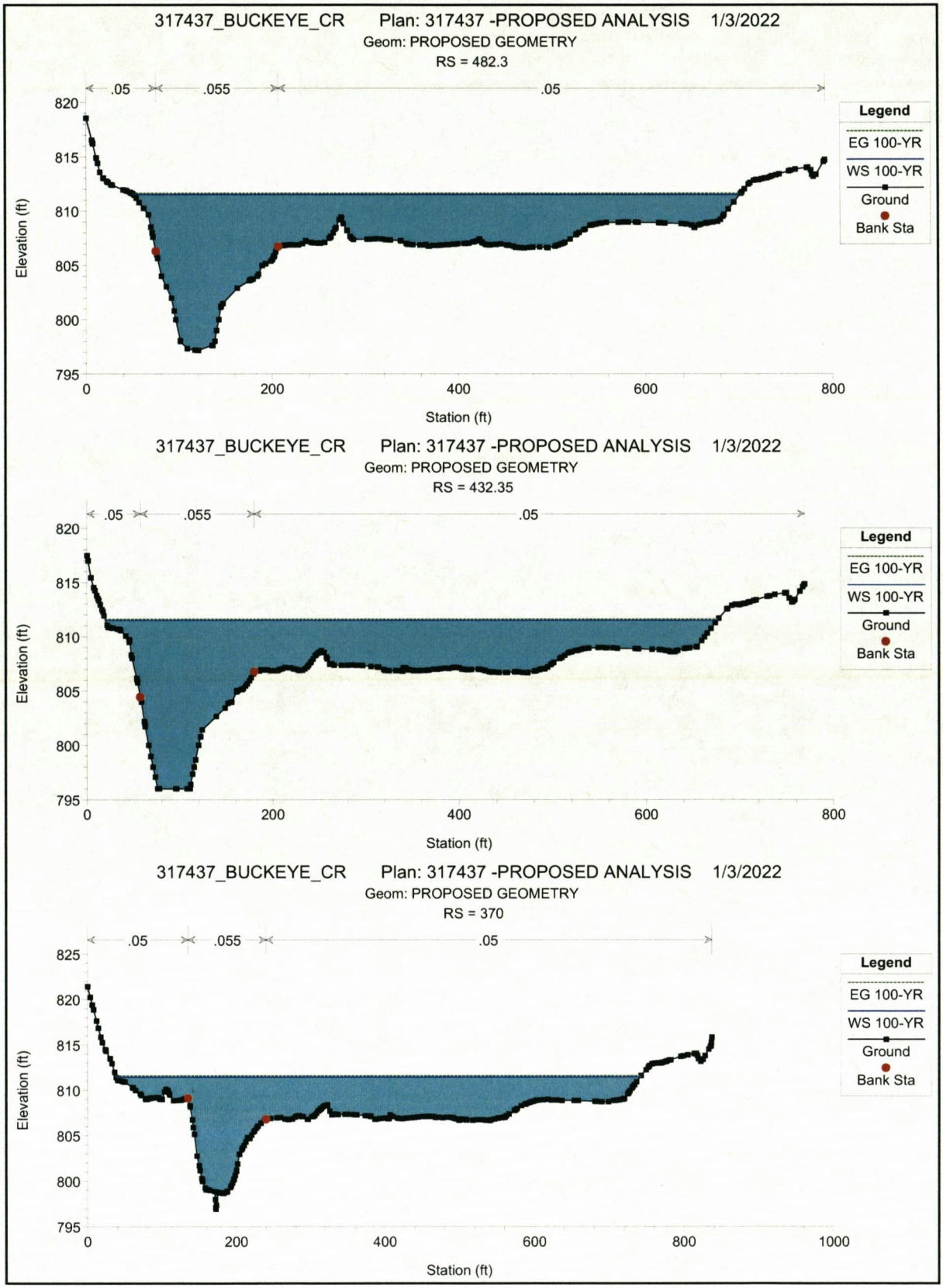
Station (ft)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Legend
EG 100-YR
WS 100-YR
Ground
Bank Sta
Elevation (ft)
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Station (ft)
317437_BUCKEYE_CR Plan: 317437 -PROPOSED ANALYSIS 1/3/2022
Geom: PROPOSED GEOMETRY
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Legend
EG 100-YR
WS 100-YR
Ground
Bank Sta
Elevation (ft)
820
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810
805
800
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0
200
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Station (ft)
317437_BUCKEYE_CR Plan: 317437 -PROPOSED ANALYSIS 1/3/2022
Geom: PROPOSED GEOMETRY
RS = 370
.05
.055
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Legend
EG 100-YR
WS 100-YR
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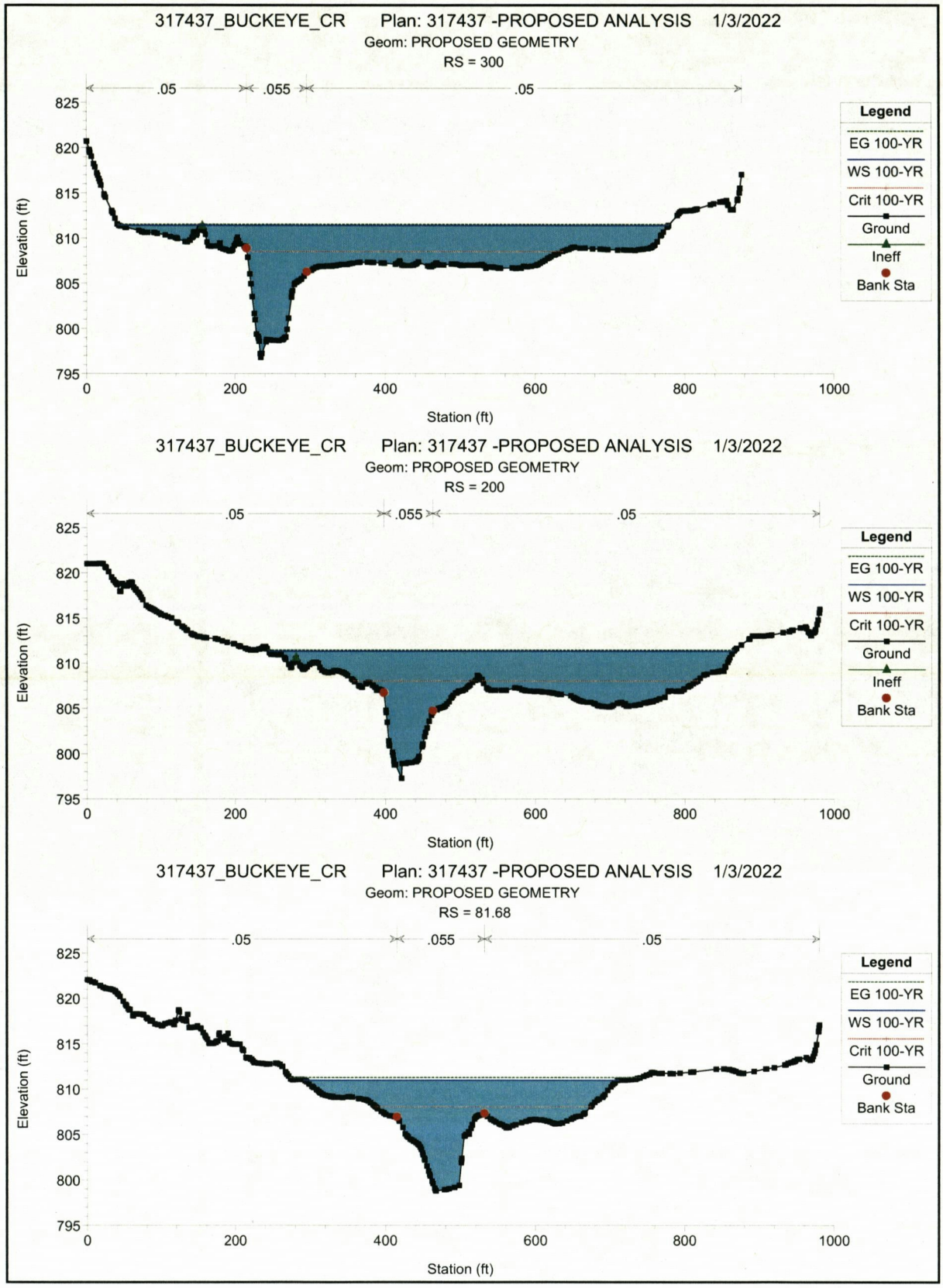
Station (ft)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WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
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Station (ft)
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Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
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Elevation (ft)
825
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Station (ft)
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Geom: PROPOSED GEOMETRY
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Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
0
200
400
600
800
1000
Station (ft)

APPENDIX F

HEC-RAS OUTPUT FILES

HEC-RAS HEC-RAS 6.1.0 September 2021
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
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X     X  X        X           X   X    X    X   X
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X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
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PROJECT DATA
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Project File : 317437_BUCKEYE_CR.prj
Run Date and Time: 1/3/2022 4:58:45 PM

Project in English units

PLAN DATA

Plan Title: 317437 -EXISTING ANALYSIS
Plan File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.p02

Geometry Title: EXISTING GEOMETRY
Geometry File :
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Flow Title : STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Plan Summary Information:

Number of:	Cross Sections	= 15	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	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: STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Flow Data (cfs)

River	Reach	RS	100-YR
BUCKEYE_CR	317437_BUCKEYE_C	1370	7350

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
BUCKEYE_CR	317437_BUCKEYE_C	100-YR	Normal S = 0.002	

GEOMETRY DATA

Geometry Title: EXISTING GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g03

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 1370

INPUT
Description:
Station Elevation Data   num=   260

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	846.91.609985	846.252.150024	846.026.029968	844.076.109985	844.04				

6.279968	843.95	7.48999	843.25	10.17999	841.69	13.63	839.82	13.84998	839.69		
14.20001	839.53	17.73999	837.82	18.21997	837.62	19.29999	837.17	22.22998	835.82		
23.71997	835	26.25	833.69	28.14001	832.59	30.27002	831.45	32.02997	830.5		
37.59998	827.21	37.95001	827.02	38.08002	826.94	42.32001	824.94	43.07001	824.59		
46.33002	823.05	50.26001	821.24	50.42999	821.16	54.37	819.45	7.77997	817.8		
58.38	817.55	59.09998	817.26	61.02997	816.46	65.14001	814.97	66.41998	814.49		
69.75	813.29	70.52002	813.02	71.37	812.77	74.45001	811.74	76.28	811.1		
76.82999	81	179.16998	810.98	82.48001	810.99	85.63998	810.96	86.5	810.95		
90.06	810.81	90.51999	810.89	0.89999	810.77	94.53	810.43	94.57999	810.43		
95.01999	810.39	98.54999	810.13	101.93	809.87	102.93	809.83	106.58	809.64		
107.75	809.61	112.97	809.4	115.56	809.32	121.44	809.13	122.71	809.07		
125.45	809.08	126.67	809.08	127.48	809.08	138.71	809.2	138.72	809.2		
138.78	809.2	142.62	809.31	142.72	809.3	149.19	809.93	149.6	809.98		
150.41	810.06	151.98	810.23	154.79	810.47	157.12	810.42	158.8	810.36		
160.83	810.15	162.82	809.97	165.25	809.79	166.84	809.67	169.67	809.54		
170.85	809.48	174.1	809.4	174.87	809.37	178.52	809.37	179.19	809.36		
182.54	809.4	182.9	809.4	182.92	809.4	182.94	809.4	184.13	809.42		
187.65	809.49	187.73	809.49	187.81	809.47	191.65	809.02	193.91	809.05		
194.95	809	196.21	808.96	198.41	808.87	200.61	808.84	202.99	808.86		
206.08	808.9	213.24	809.07	217.43	809.09	218.71	809.11	219.06	809.11		
222.75	809.05	223.07	809.04	226.3	808.95	227.09	808.92	227.17	808.93		
231.11	808.88	234.38	808.9	235.54	808.94	236.01	808.89	239.14	808.93		
240.5	808.94	243.16	808.83	247.33	808.81	250.1	808.78	251.19	808.78		
253.71	808.71	255.21	808.67	258.13	808.47	259.22	808.4	262.55	807.83		
263.24	807.73	266.97	805.9	267.26	805.78	267.41	805.71	270.07	803.02		
271.27	801.82	271.97	801.03	272.62	800.87	273.51	800.45	274.56	800.11		
275.19	799.88	278.66	799.83	282.74	799.85	283.32	799.84	283.96	799.84		
286.31	799.88	286.57	799.89	291.36	799.95	293.51	800.02	295.38	800.08		
297.93	800.26	300.61	800.4	301.95	800.46	302.71	800.62	303.5	800.65		
304.37	801.59	305.02	802.22	305.79	803.03	307.43	804.72	309.15	806.46		
309.79	807	314.38	807.54	315.32	807.64	315.46	807.67	319	808.12		
319.48	808.19	322.68	808.63	323.49	808.71	324.32	808.71	326.97	808.78		
327.51	808.7	328.35	808.73	330.91	808.36	331.53	808.12	332.75	807.84		
334.5	807.7	337.74	807.89	341.08	808.03	346.58	808.4	348.03	808.51		
348.9	808.57	352.9	808.84	354.68	808.93	356.64	808.97	358.33	808.97		
364.62	808.98	371.28	809.04	374.19	809.12	375.71	809.14	377.54	809.18		
379.73	809.29	382.9	809.41	385.23	809.59	387.76	809.73	390.81	809.97		
392.52	810.12	395.69	810.27	396.26	810.26	399.81	810.34	401.36	810.38		
407.85	810.58	408.5	810.61	414.66	810.85	415.88	810.93	417.35	811		
419.9	811.18	421.77	811.41	423.91	811.72	425.7	812	428.74	812.71		
429.18	812.79	429.6	812.81	433.05	812.82	435.96	812.93	436.73	812.97		
441.84	813.22	447.77	813.5	448.01	813.51	448.31	813.52	452.03	813.75		
457.75	814.17	460.06	814.35	460.78	814.41	463.43	814.62	467.1	814.87		
469.34	815.05	469.44	815.05	469.63	815.05	472.12	815.03	474.84	815.07		
477.62	815.08	480.15	815.17	482.45	815.24	484.17	815.31	488.11	815.38		
488.14	815.38	488.18	815.38	488.24	815.38	494.46	815.31	496.22	815.28		
499.28	815.25	501.38	815.24	504.61	815.24	509.56	815.29	510.8	815.31		
514.74	815.39	521.75	815.56	530.51	815.77	545.41	816.18	548.17	816.24		
549.51	816.29	552.45	816.38	555.21	816.48	568.56	816.94	570.16	816.98		
573.11	817.05	574.22	817.08	576.55	817.07	576.56	817.07	576.57	817.07		
580.57	816.83	580.84	816.88	584.39	816.54	584.59	816.6	585.06	816.86		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	263.24	.055	309.79	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
263.24	309.79	170.24	170	171.01	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1200

INPUT
Description:
Station Elevation Data num= 235

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	848.5	4.899902	848.28	4.109985	846.71	4.51001	846.55	7.789978	845.09
8.52002	844.77	11.97998	843.22	12.16003	843.12	12.76001	842.91	13.83002	842.37
16.41998	841.15	19.01001	839.69	20.57001	838.81	22.66998	837.66	24.59003	836.6
26.19	835.73	28.60999	834.42	29.98999	833.73	7.02002	830.07	38.03003	829.54
38.85999	829.12	39.56	828.83	40.66003	828.43	43.58002	827.16	44.66998	826.68
48.26001	824.78	48.69	824.57	52.31	822.59	53	822.23	53.63	821.89
63.83002	816.31	65.85999	815.24	67.08002	814.66	68.78003	813.94	71.32001	812.89
73.55002	811.93	79.89001	809.97	80.77002	809.64	81.37	809.6	84.84	808.94
87.34	808.67	88.86002	808.5	89.01001	808.49	92.88	808.24	93.44	808.24
96.89001	808.34	99.82001	808.53	101.31	808.66	102.14	808.66	104.16	808.66
104.93	808.62	111.61	808.63	114.72	808.62	116.98	808.63	118.16	808.65
120.99	808.68	128.56	808.84	129.03	808.84	129.12	808.85	131.1	808.88
136.83	808.98	137.08	808.99	137.66	808.98	141.08	808.99	142.56	808.98
150.93	808.91	153.13	808.87	154.08	808.87	155.76	808.87	158.97	808.87
163.29	808.87	170.4	808.91	175.21	808.95	181.55	808.96	187.55	809.04
192.08	809.01	193.3	808.99	195.16	808.85	197.31	808.73	199.58	808.58
201.33	808.51	204.01	808.4	205.35	808.36	208.43	808.39	209.36	808.39
212.85	808.79	213.38	808.81	217.27	808.51	217.4	808.5	218.63	808.32
221.41	807.92	221.7	807.88	225.43	807.3	226.12	807	229.45	805.64
230.54	804.89	233.47	802.88	234.73	801.91	235.62	801.24	237.14	800.16
237.83	799.72	238.56	799.76	249	800.39	249.23	800.41	250.61	800.51
253.55	800.71	254.97	800.85	256.44	800.73	257.57	800.54	257.97	800.58
261.58	801.02	265.33	801.68	265.6	801.74	265.78	801.77	269.84	802.38
271.63	802.59	273.06	803.02	273.47	803.03	273.63	803.05	274.08	803.06
274.86	803.42	277.65	805.12	279.19	805.86	281.67	807.06	283.62	807.48
285.68	807.9	288.04	808.15	289.7	808.35	292.46	808.27	294.09	808.42
300.92	807.7	301.75	807.59	305.73	807.22	305.77	807.22	306.15	807.2
309.78	806.99	309.99	807.01	310.15	806.99	313.8	806.89	316.84	806.68
319	806.38	321.84	806.08	323.42	805.92	327.87	805.55	329.87	805.45
332.27	805.41	333.89	805.3	336.69	805.29	338.57	805.04	340.99	805.31
341.92	805.48	345.53	805.78	345.94	805.81	349.91	806.08	349.95	806.09
349.96	806.09	353.97	806.3	354.38	806.31	357.99	806.6	360.08	806.95
361.16	806.97	363.01	806.97	366.02	806.68	367.47	806.66	369.75	806.66
372.07	806.89	374.05	807.03	375.7	807.2	378.07	807.36	379.38	807.42
380.49	807.43	386.1	807.67	388.36	807.68	394.07	807.84	394.14	807.84
394.16	807.84	394.24	807.85	400.47	808.09	402.17	808.19	405.14	808.37
406.19	808.39	409	808.49	414.22	808.75	417.82	808.94	422.26	809.09

428.68	809.1	430.29	809.11	431.3	809.1	436.96	809.07	440.2	809.23
442.34	809.29	444.68	809.4	446.38	809.48	449.34	809.65	452.96	809.79
458.2	810.07	462.42	810.27	468.04	810.58	470.46	810.7	477.88	810.95
478.49	810.99	478.72	811.01	482.51	811.17	486.08	811.43	489.09	811.67
489.76	811.7	490.54	811.76	492.64	811.95	498.57	812.45	500.04	812.6
502.67	812.84	507.13	813.28	516.01	814.03	520.46	814.38	523.7	814.67
526.08	814.8	526.92	814.85	527.89	814.88	530.71	814.88	531.29	814.89
535.07	814.88	535.98	814.85	536.31	814.83	536.7	814.83	537.09	814.84
541.51	815	541.56	815	541.58	815	547.56	815.02	550.18	815.05
554.14	815.06	556.57	815.12	560.36	815.24	567.63	815.44	581.82	815.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	225.43	.055	289.7	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
225.43	289.7	110.41	150	168.17	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1050

INPUT
Description:
Station Elevation Data num= 252

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	853.03.8699951	852.611.059998	852.531.390015	852.375.210022	850.49
6.530029	849.818.400024	848.8611.40002	847.7813.03998	847.213.58002	846.98
13.64001	846.9814.08002	846.7817.65002	844.9523.35004	842.2328.29999	839.72
30.10004	838.81	33.38	837.22	34.25	836.79	36.63	835.6338.40002	834.77
39.87	834.1142.22998	832.97	43.38	832.42	45.37	831.4750.85004	828.87
52.89001	827.9454.77002	827.0758.72003	825.259.15002	825.0160.28003	824.46
63.29999	822.9565.90002	821.62	70.19	819.3971.60004	818.65	72.44	818.19
75.29999	816.85	75.75	816.6475.91998	816.5679.90002	814.8681.66003	814.1
84.04999	813.0987.39001	811.7288.20001	811.3990.32001	810.6292.35004	809.89
95.16003	809.198.85999	808.29	100.65	807.98	104.59	807.48	104.8	807.46
105.34	807.43	111.42	807.16	116.06	807.1	117.56	807.04	120.37	807.05
124.74	807.05	125.55	807.06	125.93	807.06	126.44	807.05	129.22	807.1
133.26	807.14	138	807.2	139.51	807.29	140.69	807.37	146.3	807.5
150.44	807.65	154.6	807.81	158.46	807.92	161.38	808.04	162.9	808.12
166.7	808.22	167.05	808.23	167.66	808.22	171.2	808.21	173.4	808.11
175.35	808.02	182.36	807.65	187.8	807.34	188.73	807.3	191.95	807.25
192.53	807.22	195.48	807.3	196.1	807.31	196.33	807.31	200.25	807.21
202.06	807.05	204.4	806.84	207.8	806.19	208.55	806.09	208.97	806.01
212.68	805.1	213.1	804.99	213.13	804.99	215.47	805.66	219.26	805.48
220.99	805.54	225	803.82	225.14	803.75	225.53	803.56	229.29	801.69
230.83	801.11	232.65	800.27	232.85	800.18	232.92	800.16	233.59	800.12
237.95	799.81	240.08	799.73	240.55	799.71	241.74	799.65	242.2	799.65
245.89	799.64	247.93	799.72	250.04	799.8	253.67	800.05	254.19	800.08
254.49	800.11	255.57	800.24	260.03	800.77	261.65	801.03	263.52	801.29
265.66	801.7	266.58	802.34	267.76	803.1	270.77	805.18	270.79	805.19

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  270.87  805.22  274.94   807.3   276.6  807.44  279.49  807.95  282.43  807.69
  283.24  807.56  285.62  807.28  287.39   807.1  290.26     807  291.94     807
  292.14     807  303.27  806.97  303.58  806.96  305.27  806.91  309.77   806.8
  314.16  806.63  319.52  806.41  326.67  806.31   328.6  806.27  328.89  806.27
  329.11  806.27  330.95  806.24  335.78  806.27  337.19  806.29  339.03  806.32
   345.4  806.51  345.47  806.51  345.59  806.52  349.59  806.71   352.4   806.8
  360.62  807.06  362.05  807.14  364.14  807.33  366.24   807.6  373.03  808.37
  374.34  808.51  375.76  808.66  378.43  808.95  380.77  809.14  385.54  809.38
  386.99  809.46  390.78  809.69  395.29  809.94  398.36  810.14  402.05  810.36
  404.07  810.45  407.74  810.74  410.45  810.87  413.31  810.94  416.41  810.96
  420.17  810.95  420.37  810.94  429.11  810.83  435.85  810.74  436.78  810.73
  436.85  810.73  437.03  810.73  449.23  810.65  460.86  810.58  463.96  810.64
  471.69  810.62  474.72  810.62  477.75  810.52   478.6  810.48  482.43  810.34
  484.53   810.3  486.39  810.29  494.88  810.11  495.01  810.11  502.39  810.13
  506.51  810.21  507.33  810.22   507.9  810.23  510.97  810.29  519.04  810.46
  523.14   810.5  530.09  810.59  530.88  810.58  534.61  810.52  536.02  810.44
  541.01  810.49  544.37   810.5  544.68   810.5  545.05  810.51  560.57  810.49
  564.68  810.49  575.25  810.47  587.33  810.41  601.81   810.3  602.52  810.29
  603.04  810.29  609.87  810.29  612.67  810.28  615.23  810.32  617.34  810.35
  619.22  810.39  619.37  810.39  619.63   810.4   623.5  810.47  626.15  810.52
  627.52  810.57  628.29  811.04  629.17  811.17  631.77  811.45  632.72  811.58
  637.57  812.09  644.32  812.81  645.25  812.92  646.33  813.01   648.3  813.08
  650.45  813.16  659.52  813.45  660.66  813.52  664.85   813.7  684.21  814.29
  686.67  814.37  688.96  814.44  693.36  814.57  697.34  814.69   699.2  814.76
  699.86  814.76  700.29  814.76  701.27  814.74  704.53  814.74  706.17  814.74
  706.71  814.74  707.57  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  220.99    .055  279.49     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        220.99  279.49           168.68  126.27  101.85             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 923.73

INPUT
Description:
Station Elevation Data    num=     267
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  843.17 1.26001  843.015.950012   842.57.960022  842.29    8.75  842.22
10.67004     84213.29004   841.6   15.44  841.3217.29004  841.0520.17999  840.68
   22.69   840.323.70001   840.127.17004   839.329.32001  838.7732.59003  837.91
33.07001  837.7933.98004  837.4537.34003  836.2739.60004  835.4241.76001  834.59
45.28003  833.1845.40002  833.1445.45001  833.1251.77002  830.5854.42999  829.55
61.39001  826.8964.08002  825.85   69.31  823.7971.79004   822.773.41003  821.97
75.47003  821.0777.42004  820.19   81.31  818.5482.59003  817.9884.65002  817.02
89.45001  814.8891.89001  813.8193.46002   813.296.91003  811.7197.95001  811.25
   102.8  809.29  103.31  809.01  104.34  808.99  109.49  808.84   111.7  808.79
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116.04	808.64	118.15	808.61	120.53	808.61	122.06	808.61	127.71	808.74
129.53	808.78	136.21	808.88	137.66	808.9	140.67	808.88	142.36	808.86
145.57	808.75	148.63	808.75	151.57	808.83	154.11	808.81	155.77	808.83
164.33	808.83	169.45	808.83	169.63	808.83	177.07	808.82	177.63	808.83
178.39	808.84	181.64	808.88	184.46	808.99	187.11	808.99	193.1	808.93
195.54	808.88	201.69	808.74	206.91	808.56	209.7	808.45	212.69	808.36
213.71	808.3	216.98	808.35	217.72	808.3	220.07	808.54	220.53	808.58
220.67	808.57	220.93	808.51	221.73	808.25	225.56	807.25	225.74	807.22
228.31	806.12	229.71	805.53	229.74	805.5	229.84	805.41	233.75	802.54
234.13	802.29	237.76	799.46	238.78	799.12	239.62	799.15	241.44	799.19
244.2	798.47	246.66	797.47	246.68	797.47	246.69	797.47	248.68	797.85
254.52	798.68	257.8	799.15	259.18	799.12	260.36	799.14	261.52	799.3
263.04	799.57	264.64	799.97	265.65	800.19	266	800.27	266.52	800.38
266.55	800.4	267.33	800.85	268.33	801.4	269.03	801.7	269.83	802.27
272.73	803.63	273.96	804.39	274.81	804.38	281.3	805.08	281.97	805.08
282.77	805.09	289.87	805.12	291.24	805.12	292.67	805.09	294.17	805.08
311.77	805	312.75	804.98	313.92	804.99	317.54	805	332.2	805.02
335.02	805.03	339.05	805.07	341.34	805.2	343.74	805.23	345.62	805.29
346.31	805.32	350	805.57	351.98	805.71	353.84	805.9	360.26	806.66
362.03	806.87	365.13	807.29	370.04	807.94	372.65	808.25	373.84	808.4
375.64	808.48	378.06	808.67	379.93	808.67	382.07	808.72	384.22	808.66
386.08	808.62	389.15	808.48	394.09	808.29	409.21	807.69	409.85	807.66
410.04	807.65	410.13	807.65	410.29	807.64	412.71	807.57	418.37	807.39
420.8	807.49	422.15	807.56	422.81	807.57	424.54	807.66	429.1	807.86
434.18	808.02	436.63	808.14	440.26	808.29	443.02	808.44	446.34	808.56
452.48	808.88	454.22	808.94	455.44	808.99	459.11	809.16	462.24	809.22
474.25	809.52	474.26	809.52	485.86	809.72	492.93	809.76	493.67	809.78
494.05	809.78	499.2	809.78	506.33	809.77	516.48	809.63	517.57	809.62
518.07	809.6	518.72	809.58	519.42	809.57	526.37	809.53	526.76	809.53
537.4301	809.64	538.4	809.66	541.99	809.77	550.42	809.95	551.9	809.99
553.28	810.01	560.08	810.08	567.5	810.17	571.08	810.14	571.87	810.17
572.9	810.14	575.86	810.06	578.19	810.03	578.51	810.02	585.69	809.97
588.88	809.92	589.79	809.9	591.42	809.9	595.2	809.96	596.52	809.99
599.03	810.06	600.03	810.14	602.11	810.21	604.33	810.23	612.83	810.29
618.57	810.28	622.73	810.28	629.93	810.2	630.44	810.2	630.92	810.18
642.15	809.94	643.07	809.9	644.11	809.83	645.21	809.86	647.4	809.82
648.31	809.89	650.67	809.97	651.68	810.02	654.47	810.07	655.98	810.08
657.55	810.08	660.29	810.12	663.71	810.17	664.59	810.2	666.79	810.3
668.9	810.45	669.87	810.54	680.93	811.99	682.19	812.16	683.15	812.28
685.27	812.55	688.07	812.8	690.55	813.05	691.43	813.07	697.02	813.25
699.95	813.34	700.97	813.4	701.78	813.43	703.04	813.49	704.31	813.56
707.44	813.69	728.12	814.35	728.76	814.36	728.91	814.37	729.25	814.38
729.41	814.38	729.61	814.39	731.94	814.49	738.34	814.72	741.36	814.73
743.12	814.74	743.86	814.73	746.42	814.72	747.75	814.73	748.2	814.72
749.2	814.84	749.83	815.04						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	220.93	.055	281.97	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
220.93	281.97	209.68	144.3	84.88	.1 .3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 779.43

INPUT
Description:
Station Elevation Data num= 340

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.73	1.730042	836.48	3.530029	836.21	6.030029	835.97	6.619995	835.87
8.150024	835.61	0.32001	835.22	12.79999	834.63	14.60999	834.14	16.60999	833.58
19.17999	832.85	22.07001	832.02	22.54004	831.89	27.13	830.54	29.73004	829.78
31.34003	829.29	31.78003	829.15	34.42999	828.35	36.07001	827.83	37.52002	827.33
40.35999	826.34	40.47003	826.34	1.23004	826.01	43.70001	825.06	44.66003	824.74
46.79004	824.05	48.95001	823.48	52.26001	822.66	52.97003	822.49	53.23999	822.42
56.67999	821.41	57.65002	821.11	60.89001	819.96	66.12	818.08	68.41998	817.28
74.32001	815.47	74.64001	815.37	74.70001	815.35	74.95001	815.29	78.98999	814.27
80.78003	813.88	3.29004	813.13	84.19	812.88	85.35004	812.55	89.02002	811.5
91.87	810.55	93.13	810.21	96.16003	809.52	96.38	809.5	99.31	809.32
100.46	809.32	102.4	809.21	104.75	809.13	105.49	809.07	107.41	808.91
108.58	808.83	109.04	808.8	110.08	808.72	113.33	808.48	114.76	808.38
117.62	808.26	117.85	808.25	118.44	808.25	120.94	808.21	121.92	808.22
124.03	808.29	126.21	808.47	127.12	808.53	129.47	808.79	130.45	808.91
132.99	808.98	134.79	808.91	136.39	808.85	139.09	808.57	139.48	808.54
143.38	808.24	145.66	808	147.67	807.86	151.52	807.5	151.84	807.48
151.96	807.48	152.24	807.47	155.96	807.05	156.61	807.2	156.98	807.22
158.09	806.9	160.55	805.71	161.11	805.42	162.55	804.89	164.2	804.13
164.84	804.02	166.6	803.46	167.51	803.64	168.4	804.09	169.66	804.63
170.23	804.79	173.42	805.05	173.47	805.07	173.58	805.08	177.72	805.59
178.41	805.69	181	806.77	182.01	807.35	183.28	808.19	184.61	808.38
185.83	808.83	186.3	808.89	188.92	808.6	190.59	808.6	192.01	808.52
194.89	808.42	195.1	808.43	195.64	808.46	198.18	808.56	199.18	808.44
201.28	808.47	203.47	808.12	204.37	808.05	206.67	807.34	207.46	807.12
207.76	807.07	210.55	806.15	212.05	806.04	212.93	805.68	215.82	806.12
216.35	806.29	216.67	806.44	217.7	806.46	220.31	806.81	220.64	806.79
222.9	806.53	224.93	806.42	225.99	806.36	232.01	805.96	233.52	805.9
234.53	805.88	236.68	805.67	239.38	805.43	241.07	805.4	244.02	805.62
247.62	806.1	249.4	806.59	250.7	806.78	250.78	806.77	253.8	806.67
254.98	806.45	256.71	806.35	258.99	805.27	259.27	805.01	259.98	804.39
261.81	803.06	263.07	802.13	263.72	801.66	265.42	800.28	266.25	800.23
268.88	800.03	270.04	799.95	275.49	797.61	275.5	797.59	275.59	797.61
281.61	799.16	283.87	799.19	284.7	799.2	286.93	799.33	287.62	799.37
289.31	799.48	295.01	799.92	298.65	800.25	303.76	800.6	304.17	800.75
307.42	801.84	308.95	802.34	309.99	802.54	310.78	802.65	312.51	803.05
315.07	803.45	315.6	803.56	316.96	803.76	318.69	804.02	319.36	804.08
321.78	804.28	323.65	804.41	324.87	804.4	327.95	804.31	327.96	804.31
327.99	804.3	331.05	803.58	332.24	803.18	334.14	802.43	336.1	801.7
338.42	801.09	339.78	801.09	342.28	801.11	345.11	801.25	346.5	801.24
349.41	801.02	349.58	801.02	350.04	801.05	352.16	801.15	353.7	801.37
355.76	801.62	357.99	801.97	359.57	802.24	361.07	802.27	361.94	802.33
362.28	802.24	365.03	801.33	366.58	800.96	368.12	800.64	370.87	800.64
371.21	800.64	372.1	800.82	374.3	801.1	375.16	801.3	377.39	802.01

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  379.45  802.58  380.48  802.76  383.13  803.28  383.74  803.41  386.66  804.41
  388.04  804.85  389.75  806.17  392.33  807.92  392.52  808.08  394.16  808.29
  395.93  808.65  397.96  808.58  399.21   808.9  401.38  808.88  403.28  808.89
   412.8  808.83  429.92  808.86  430.63  808.86  439.19  808.75  439.45  808.75
  439.73  808.74  440.35  808.72  443.84  808.63  445.37  808.62  447.33  808.58
  450.51   808.6  454.64  808.63  456.68  808.65  467.68   808.6  471.42  808.64
  473.18  808.53  475.27  808.49  477.02  808.43  480.79  808.29  483.89   808.2
  485.53   808.1  491.32  807.84  492.33  807.79  497.89  807.66  499.33  807.64
  503.93  807.67  504.16  807.67  504.45  807.67  508.98  807.68  510.25  807.69
  512.51  807.75  512.99  807.76  520.15  807.93   532.4  808.12  533.97  808.18
  540.36  808.47  541.74  808.52  542.56  808.53  543.77  808.53  550.42  808.67
  552.79  808.72  555.43  808.75  556.11  808.77   567.5  809.12  568.52  809.16
  568.96  809.18  578.86  809.46  590.59  809.69  592.78  809.71  602.47  809.99
  602.95     810  603.71  810.01  609.13  810.04  611.23  810.01  621.79  809.93
  623.53  809.92  624.11  809.92  624.57  809.91  632.69  810.05  636.79  810.15
  636.93  810.15  636.99  810.15   650.3  810.25  652.85  810.24  654.67  810.24
  658.19   810.2  662.74  810.19  665.37  810.19  675.62  809.94   677.1  809.93
  678.44  809.83  679.99   809.8  683.28  810.07   684.2   810.1  686.37  810.09
  688.49  810.09  689.46  810.06  691.94  810.03  692.55  810.03  692.79  810.03
  693.33  810.04  697.08  810.06  698.73  810.09  701.37  810.23  701.82  810.28
  702.97   810.4  704.91  810.59  707.38  810.91  717.27   812.3   719.6  812.58
  720.73  812.76  723.32  813.02  726.54  813.12  727.53  813.15  733.95  813.34
  734.48  813.37  735.77  813.42  737.76  813.51  738.87  813.57  741.61  813.69
  759.59  814.26  762.98  814.34  763.77  814.37  765.65  814.42  766.49  814.44
  767.24  814.49  767.58   814.5  772.32  814.69  775.34   814.7  777.45  814.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  256.71    .055  323.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        256.71  323.65             55.27   59.74   21.26             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 719.69

INPUT
Description:
Station Elevation Data    num=     346
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     8404.030029  839.28 5.77002  838.965.930054   838.99.290039  837.83
9.960022  837.6212.87006  836.3713.99005  835.9616.45001  835.0220.06006  833.75
22.06006  833.0324.84003  832.0430.12006  830.1830.76001  829.9335.79004  828.06
37.91003  827.27   38.19  827.1838.53003  827.0745.07001  824.9545.74005  824.75
   46.25  824.5347.77002  823.9750.28003  823.0852.23004  822.4254.31006  821.71
55.57001  821.2858.35004  820.36   61.63   819.262.59003  818.8866.33002  817.43
66.46002  817.3767.54004  816.9370.12006  815.87   70.44  815.74   73.69  814.49
74.47003  814.1975.07001  813.9878.05005  812.8980.10004  812.3482.54004  811.55
83.46002  811.2984.43005  811.1489.34003     81090.60004  809.8791.58002  809.82
   94.63  809.3795.16003  809.4598.67004  810.7598.74005  810.76101.4901  811.25
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105.15	811.23	106.73	811.2	111.32	811.18	113.7	811.17	115.04	811.03
115.3101	810.99	115.67	810.81	118.83	808.94	120.76	807.82	122.33	807.24
122.86	807.28	126.29	807.14	126.7	807.13	130.14	807.16	140.02	807.17
145.25	807.12	147.05	807.11	148.14	807.1	152.5	807.03	155.1201	807.01
155.98	806.9	159.15	806.65	159.5601	806.53	162.82	806.02	163.14	805.97
163.1801	805.96	166.72	805.27	167.21	805.18	170.3	804.09	171.2401	803.89
173.8701	803.75	175.28	803.37	177.09	803.15	180.78	802.92	182.89	802.34
183.33	802.31	184.61	802.06	187.3701	801.49	188.1801	801.32	191.41	800.85
191.76	800.78	194.57	800.99	195.26	801.04	198.1201	801.63	198.17	801.64
198.85	801.79	200.6801	802.09	201.54	802.27	202.5	802.41	203.5	802.54
207.44	802.86	207.94	802.9	208.22	802.91	211.57	803.15	213.23	803.41
215.6	803.75	216.8101	803.98	219.63	804.51	221.13	805.1	222.98	804.97
223.66	804.75	226.33	804.33	227.5601	804.07	227.69	804.13	231.1201	804.51
231.73	804.61	234.7	804.91	235.27	804.99	236.22	805	236.57	805
240.73	805.03	242.54	805.06	243.7401	805.08	247.14	805.21	250.91	805.29
252.46	805.35	253.6	805.3	254.95	805.28	256	805.24	257.79	805
260.0601	804.93	260.64	804.89	261.1	804.89	263.4901	804.62	265.38	804.61
268.25	804.3	269.19	803.83	271.28	802.94	272.04	802.74	272.23	802.72
276.6201	800.02	277.48	799.61	279.48	798.38	279.6	798.34	279.6801	798.29
279.7	798.28	279.72	798.28	279.77	800.08	282.18	799.97	283.43	799.91
285.92	799.79	286.42	799.77	286.97	799.75	294.82	799.4	296.74	799.31
297.67	799.27	300.42	799.17	301.83	799.13	303.37	799.04	305.31	799.05
309.06	799.02	311.78	799.16	311.91	799.16	311.93	799.16	312.32	799.1
313.08	799.2	313.67	799.3	314.78	799.45	315.6	799.49	317.11	799.68
317.61	799.75	320.54	800.22	323.65	800.77	324.86	801.3	326.83	801.98
327.29	801.97	329	802.37	331.17	802.53	331.85	802.51	332.38	802.59
334.7	802.63	337.48	802.8	337.55	802.8	337.64	802.79	340.39	802.76
342.57	802.47	343.24	802.46	343.98	802.2	346.57	801.78	349.09	800.76
349.18	800.77	352.75	800.7	354.64	800.67	357.03	800.67	357.12	800.66
357.84	800.69	362.81	800.77	363.13	800.78	363.28	800.77	363.57	800.74
364.39	800.67	368.57	800.36	369.96	800.25	371.73	800.22	373.32	799.9
375.76	799.69	376.49	799.83	376.67	799.86	377.98	799.94	379.2	800.45
380.27	800.81	382.88	801.69	383	801.73	383.3	801.87	385.97	802.98
388.4	804.26	388.59	804.35	389.35	804.89	391.66	806.39	393.49	807.06
394.51	807.4	398.58	807.8	399.62	807.87	402.28	808.05	405.91	808.35
408.74	808.48	408.75	808.49	408.84	808.49	413.86	808.55	414.24	808.55
414.59	808.55	422.65	808.57	441.06	808.6	443.46	808.61	444.28	808.62
445.6	808.65	446.58	808.65	449.5	808.66	451.48	808.72	455.98	808.88
456.42	808.9	456.85	808.91	464.77	808.87	465.38	808.86	469.87	808.87
472.34	808.88	473.38	808.9	474.96	808.91	479.85	808.96	480.15	808.96
482.45	808.95	485.95	808.79	487.62	808.72	488.51	808.65	489.13	808.64
490.22	808.59	493.18	808.48	495.36	808.4	499.58	808.29	500.71	808.21
504.66	808.04	510.33	807.78	513.05	807.71	516.01	807.66	516.14	807.66
516.46	807.65	521.03	807.59	524.6	807.6	525.4	807.59	527.42	807.6
543.35	807.86	546.09	807.95	551.0601	808.18	554.6801	808.37	555.6	808.39
557.32	808.5	561.6	808.59	563.27	808.58	565.52	808.59	567.57	808.61
569.97	808.67	575.97	808.85	581.59	809.05	584.04	809.16	590.3	809.34
605.64	809.63	608.5	809.66	612.95	809.79	617.9901	809.97	621.75	809.98
624.16	810	632.2	809.95	636.32	809.93	639.59	809.88	644.91	809.97
647.75	810.04	649.21	810.06	650.33	810.09	652.79	810.13	665.87	810.2
667.37	810.21	674.9901	810.19	681.2	810.18	687.88	810.02	692.0601	809.98
692.1801	809.97	694.73	810.04	696.47	810.18	697.86	810.37	700.02	810.29
700.76	810.21	701.32	810.17	702.72	810.12	704.4	810.07	705.0601	810.06

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  706.57  810.04  709.36  809.98  710.87  809.87  713.66  809.98713.6801  809.98
  716.75   810.3  717.95  810.42  724.63  811.37732.1801  812.44  733.42  812.59
   735.9  812.97  736.09     813  736.44  813.01739.4301  813.12  746.54   813.3
  747.78  813.34  747.86  813.34  749.58  813.41  752.26  813.53  753.22  813.59
  755.59  813.69   771.2  814.18  776.98  814.33  778.33  814.37  781.51  814.46
  782.94  814.49783.4901  814.53  784.73  814.56  787.41  814.67789.1201  814.68
  792.78  814.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  268.25    .055     329     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        268.25     329             7.44   57.68  143.59             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  101.49  811.25       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 662.01

INPUT
Description:
Station Elevation Data    num=     315
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  840.251.290039  839.983.460022  839.484.690002  839.235.929993   838.9
10.42999  837.2411.52002  836.86       15  835.5815.97003  835.2417.67004  834.62
19.57001  833.9324.14001  832.31       26  831.6727.89001     831   28.38  830.81
31.66003  829.4333.97003  828.52    35.87  827.7137.89001  826.9339.71002  826.35
41.17004  825.8143.73999  824.9744.77002   824.647.77002  823.5949.54999  822.99
55.58002     82155.83002  820.9259.17999  819.7560.22003  819.4363.07001  818.29
64.45001  817.6266.11005  816.8974.42999  813.6877.17999  812.5879.98999  811.58
83.57001  810.9283.86005  810.84   84.38  810.7887.36005  810.6487.98004   810.6
88.04999   810.691.58002  810.6492.08002  810.6293.70001  810.8194.85004  810.99
98.78003  810.99  100.14  811.08  104.19  811.07  108.19  811.07  110.43  811.05
  112.33  811.04  112.38  810.99  112.56   810.6  115.24  808.44  116.25  808.36
  116.78  808.26  120.28  807.28  120.38  807.27  122.19  806.99  122.75  806.97
  136.05  807.05  149.18  807.12   153.4  807.09  153.62  807.09  153.69  807.09
  156.39  806.82  156.53  806.79  159.98  805.43  160.56  805.27  163.58  804.02
  164.69  803.45  167.69  802.96  170.43  802.94  172.64  802.86  175.89  802.88
  177.14  802.95  177.99  802.97  184.73  803.04  185.19  803.03  187.79  802.99
  188.75  802.77  188.79  802.77  189.05  802.72  192.39  802.01  192.78  801.92
  195.99  801.78  196.81  801.83  199.59  801.92   201.2  802.26   204.2  802.23
  208.02  801.81  210.04  801.49  211.14  801.06  212.52  801.18  214.76  801.99
  216.45  802.78  217.59   803.1  220.98  804.06  221.19  804.11  222.94  804.41
  224.79  804.74  225.01  804.74  228.39  805.16  229.04  805.17  231.99  805.27
  233.06  805.23  235.59  804.87  237.09  804.74  239.19  804.31  241.12  804.27
  241.93  804.04  244.51  804.89  244.63  804.94  244.81  804.97  249.18  805.01
  249.99  805.05  250.28  805.05  253.19  804.99  254.22  804.97  259.82  804.07
  261.21  803.77  261.83  803.57  264.21  803.25  265.21  803.33  267.06   803.2
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269.22	803.13	273.77	802.92	277.24	802.83	279.9	802.34	281.25	802.05
284.18	801.27	285.26	800.9	286.81	800.45	286.97	800.41	287.83	800.37
292.74	800.03	293.27	799.99	297.16	799.78	299.53	798.47	302.6	796.85
303.24	796.71	309.25	798.22	311.03	798.28	312.74	798.33	320.74	798.71
324.83	799.15	326.99	799.16	329.34	799.16	331.27	799.19	333.35	799.22
335.55	799.29	337.36	799.36	339.83	799.51	341.37	799.64	342.72	799.8
348.39	800.57	349.58	800.7	350.17	800.78	350.38	800.94	353.22	802.83
353.39	802.9	356.95	805.01	357.4	805.14	357.59	805.11	361.3	806.68
361.41	806.84	363.98	807.04	365.42	807.14	369.1	807.23	372.37	807.27
373.43	807.27	377.03	807.36	378.36	807.37	381.45	807.43	382.64	807.43
385.46	807.41	389.2	807.37	395.87	807.31	405.15	807.32	416.88	807.29
417.81	807.29	418.34	807.29	424.21	807.27	435.24	807.34	437.56	807.36
438.65	807.37	440.69	807.37	445.58	807.38	448.26	807.39	449.59	807.37
452	807.36	453.6	807.35	454.8	807.38	460.82	807.24	461.61	807.22
466.67	807.14	469.63	807.11	476.81	807.02	478.02	807.01	481.65	807
481.91	807.01	482.58	807.01	488.36	807.06	491.03	807.04	493.68	807.07
493.94	807.07	494.08	807.07	500.28	807.04	500.71	807.04	506.23	807.02
509.7	807.04	513.32	807.01	516.47	807	517.69	806.98	519.98	806.88
522.96	806.68	523.83	806.68	530.64	806.56	532.01	806.56	533	806.55
540.01	806.56	547.1	806.52	556.55	806.53	561.47	806.49	562.47	806.49
563.44	806.54	569.02	806.77	571.23	806.85	572.24	806.89	573.2	806.96
581.36	807.49	585.96	807.99	586.31	808.02	593.19	808.65	594.25	808.73
595.37	808.81	597.24	808.98	597.79	809.01	600.54	809	602.35	809.03
604.22	809.04	620.53	809.13	632.82	809.15	646.82	809.17	651.12	809.17
654.09	809.16	667.42	809.02	678.65	809.01	686.59	809.02	689.77	809
694.64	808.99	695.46	808.98	697.94	808.98	701.26	808.82	701.41	808.82
701.49	808.81	701.95	808.95	702.99	809.04	704.05	809.17	704.26	809.15
706.99	809.15	708.66	809.09	710.24	809.04	717.6	808.87	724.52	808.87
726.26	808.86	728.11	808.93	733.08	808.99	735.93	808.99	736.55	808.99
737.07	809	739.22	809.07	743.2	809.21	744.82	809.27	747.27	809.38
748.06	809.44	749.39	809.59	751.58	809.87	754.32	810.23	756.62	810.55
765.39	811.65	766.72	811.78	769.03	812.08	770.97	812.33	776.91	812.83
777.48	812.82	781.62	812.88	783.47	812.95	785.74	813.01	794.36	813.09
795.83	813.12	799.69	813.29	799.86	813.27	802.1	813.33	806.55	813.4
809.08	813.48	813.8	813.63	814.42	813.65	814.69	813.67	816.36	813.7
836.13	814.02	836.47	814.05	838.01	814.18	838.15	814.23	838.36	814.25
839.76	814.35	840.68	814.22	843.15	813.25	845.08	813.34	846.18	813.18
847.27	813.51	848.79	813.75	849.48	814.06	851.81	814.86	854.58	816.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	254.22	.055	363.98	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
254.22	363.98	6.58	55.11	38.66	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	100.14	811.08	F

CROSS SECTION

RIVER: BUCKEYE_CR

REACH: 317437_BUCKEYE_C RS: 606.9

INPUT
Description:
Station Elevation Data num= 331

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840.35	1.630005	839.96	2.469971	839.77	5.25	839.05	6.5	838.71
8.880005	837.96	10.52002	837.39	14.13	836.21	18.57001	834.67	19.75	834.29
22.59998	833.33	23.38	833.09	26.62	831.95	28.14996	831.26	28.81	831
30.59998	830.36	30.64001	830.35	34.26001	828.89	34.66998	828.72	35.17999	828.53
41.51001	825.97	42.71997	825.53	44.22998	824.99	48.20001	823.48	53.40997	821.72
54.78998	821.22	57.78998	820.12	59.63	819.44	66.83997	816.59	66.85999	816.58
66.88	816.57	66.89996	816.57	77.5	812.24	80.09998	811.16	80.38	811.06
80.60999	810.99	81.37	810.81	86.97998	809.98	87.96997	809.76	90.46002	809.74
90.89996	809.74	92.26001	810.09	94.32001	810.43	98.48999	810.75	99.51001	810.88
103.08	810.99	103.13	810.99	103.63	810.98	107.1	810.92	110.38	810.19
111.13	810.02	114.01	809.05	115.15	808.52	117.63	807.94	119.18	807.64
121.26	807.37	123.2	807.17	125.62	807.09	127.22	807	144.2	807.08
151.37	807.1	152.75	807.15	155.39	807.16	157.27	806.23	159.42	805.28
161.8	804.18	163.44	803.26	164.76	803.03	167.47	802.6	168.39	802.61
171.49	802.5	172.01	802.54	172.44	802.58	178.15	802.88	182.89	803
183.56	803.01	184.4	802.99	190.14	802.89	191.61	802.76	193.45	802.68
196.81	802.6	198.81	802.56	199.66	802.52	202.49	802.39	204.64	802.3
210.23	801.68	211.91	801.64	213.36	801.42	213.92	801.31	214.63	801.5
219.78	802.92	222.76	803.66	223.8	803.89	226.39	804.49	227.83	804.76
230.01	805.3	231.85	805.56	232.86	805.87	238.38	804.86	239.65	804.45
239.9	804.43	240.89	804.37	243.92	804.27	245	804.25	249.93	804.56
250.01	804.56	252.92	804.58	254.2	804.57	255.39	804.35	256.5	803.93
258.32	803.91	258.98	803.84	260.84	804.26	264.69	804.13	266.29	804.18
270.58	804.34	271.34	804.35	271.74	804.19	276.47	802.58	277.19	802.27
279.68	801.37	282.36	801.14	285.34	800.77	288.1	800.72	288.25	800.72
291	800.65	294.64	800.7	295.83	800.71	297.03	800.51	302.32	799.64
306.16	799.35	306.32	799.33	306.41	799.33	306.49	799.33	309.89	797.97
313.35	796.58	313.39	796.58	313.39	796.56	323.58	798.9	325.4	799.3
328.54	799.37	331.7	799.41	332.86	799.42	334.42	799.49	335.2	799.49
336.4	800.73	337.15	801.31	341.25	804.58	342.6	805.51	347.14	806.64
348.05	806.81	353.03	807.08	353.35	807.09	359.34	807.11	369.85	807.15
369.93	807.15	370.09	807.15	370.37	807.15	370.46	807.16	370.83	807.17
375.8	807.26	377.26	807.34	383.63	807.54	385.53	807.78	388.01	807.89
388.56	807.92	389.8	807.95	391.59	808.01	392.38	808.01	394.62	808.01
396.76	807.95	397.65	807.91	399.65	807.78	400.68	807.73	402.32	807.67
405.97	807.47	406.24	807.47	419.93	807.41	424.15	807.42	429.21	807.47
434.02	807.51	436.85	807.58	437.79	807.58	440.53	807.47	443.11	807.45
448.92	807.38	449.15	807.37	449.34	807.37	452.15	807.36	458.26	807.33
458.64	807.33	462.94	807.31	465.99	807.24	466.79	807.19	468.63	807.15
470.39	807.09	477.2	807.02	478.6	807	480.44	807.05	485.54	807.14
487.95	807.31	488.29	807.32	488.45	807.32	491.6	806.95	492.73	806.87
494.4	806.91	500.69	806.9	501.8	806.91	504.74	806.94	514.09	807.03
517.9	807.02	519.31	807.04	520.44	807.04	523.69	807.07	527.75	806.97
528.06	806.96	529.59	806.93	530.05	806.93	537.61	807.07	540.09	807.1
544.06	807.02	545.57	806.99	546.15	806.96	547.04	806.95	552.35	806.92
554.21	806.95	556.13	806.95	558.7	806.94	565.14	806.99	567.46	806.96
570.35	806.92	572.78	806.91	576.21	806.81	576.46	806.8	579.03	806.71

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  584.83  806.48  586.34  806.46  589.58  806.48  592.86  806.54  594.64  806.55
  600.62  806.55  610.63  806.57   611.8  806.56  612.55  806.55  617.38  806.49
   620.4  806.61   626.5  806.87  627.98  806.91  636.15  807.47  639.58  807.69
  640.82  807.83  641.86  807.93     646  808.23  646.24  808.25  646.43  808.26
  650.62  808.54  654.75  808.74   655.1  808.76  655.86  808.79  658.29  808.87
  661.12  808.93  674.49  809.01  676.55  809.02  677.43  809.02  701.71  809.05
  709.38  809.04   710.2  809.04  713.82     809  734.82  808.97  740.47  808.98
  746.71  809.02  748.79     809  757.62  808.97  764.25  808.92  766.66  808.92
  772.41  808.84  773.17  808.83  773.67  808.84  775.61  808.77  777.39  808.65
  780.29   808.8  781.92  808.85  782.55  808.86  783.96   808.9  785.62  808.95
   786.3  808.96  793.81  809.06  794.67  809.06  796.04  809.12  800.73  809.35
  803.67   809.6  803.77  809.61  803.91  809.63  808.18  810.09  814.27  810.75
  816.13  810.96  818.44  811.24  823.48  811.88  825.69  812.11  828.01  812.35
  830.06   812.5  831.04  812.58  833.23   812.7  834.07  812.75  834.44  812.76
  838.99  812.89  844.56  813.03  849.73  813.07  852.13  813.13  854.98  813.25
  861.31  813.41  866.12  813.53  871.46  813.68  872.68  813.71  875.38  813.76
  887.46  813.93  892.04  814.01  892.09  814.01  892.33  814.03  892.35  814.04
  892.52  814.06  895.47  814.38   896.3  814.29  898.16  813.39     900  813.13
  902.21  813.38     904   813.5  904.47  813.62  906.28  813.95  909.84  814.52
  910.93  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  271.34    .055  348.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        271.34  348.05             5.06   51.18    4.03             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  103.08  810.99       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 555.72

INPUT
Description:
Station Elevation Data    num=     349
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  840.72.159973  840.175.549988  839.296.899963  838.948.429993  838.45
12.39996  837.2317.66998  835.5618.27002  835.3621.52997  834.3722.29999  834.13
23.27997  833.8427.35999  832.9327.89996  832.7130.35999  831.3832.32001  830.53
34.39001  829.6335.90997  828.9938.41998  827.94   41.62  826.6442.20001   826.4
43.09998  826.0348.45996   823.953.60999  821.8254.53998  821.4859.83002  819.46
62.59998  818.4565.03998  817.5966.83002   816.969.02002  815.9470.64996  815.17
71.84998  814.6374.67999  813.41   75.44  813.1578.70996   811.979.02997  811.82
   81.69  811.07   82.69  810.7882.89001  810.7389.82001  809.3990.35999  809.23
90.70996  809.23   92.06  809.5494.83002  809.82       97  810.22  101.23  810.71
  102.86  810.96  105.88  810.93  107.28  810.91  107.78  810.73  110.95  810.04
  112.83   809.4  114.98  808.74  118.57  807.88  119.01  807.78  122.16   807.3
  123.03   807.2  125.75  807.06  127.06  806.99  130.94  807.01  133.99  807.02
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147.07	807.07	148.87	807.06	150.3	807.07	152.96	807.06	155.27	807.05
156.44	807.04	158.52	806.08	160.99	804.63	162.16	803.82	164.18	802.19
166.45	801.87	167.36	801.95	168.88	802.13	171.39	802.14	172.47	802.29
175.41	802.5	179.17	802.81	179.56	802.85	181.8	803	185.76	802.94
189.5	802.91	191.53	802.89	196.05	802.87	196.63	802.86	197.41	802.87
200.25	802.88	200.61	802.88	201.27	802.9	204.87	803.03	208.09	803.09
208.25	803.11	208.54	803.13	209.32	803.15	213.91	803.69	214.49	803.76
217.06	804.29	219.65	804.77	220.23	804.85	222.18	805.23	224.82	804.74
225.73	804.73	229.97	804.28	231.29	804.2	232.87	804.09	234.89	803.95
237.4	803.39	240.32	802.57	245.47	801.24	245.49	801.23	245.51	801.23
250.65	800.4	251.83	800.36	254.03	800.2	255.2	800.23	256.58	799.76
257.14	799.54	257.55	799.5	259.43	799.34	260.99	799.28	264.47	799.18
265.4	799.16	266.15	799.16	266.97	798.74	274.5	798.11	277.87	796.64
278.05	796.69	279.25	797.11	285.3	799.18	286.82	799.19	293.95	799.25
294.06	799.25	294.08	799.26	294.16	799.3	294.46	799.26	296.65	800.31
297.18	801.55	301.98	805.01	302.32	805.29	302.39	805.31	307.48	805.92
308.71	806.02	312.65	806.29	313.72	806.35	314.77	806.45	318.88	806.58
321.35	806.3	322.4	806.23	322.98	806.18	324.11	806.09	330.78	805.63
331.63	805.57	333.27	805.62	334.8	805.69	338.22	806.04	340.86	806.24
342.03	806.31	345.12	806.53	346.42	806.65	346.91	806.68	348.02	806.71
349.94	806.79	353.05	806.83	355.99	806.88	362.89	806.86	365.08	806.86
368.97	806.77	370.44	806.76	371.18	806.77	372.96	807.07	373.25	806.99
376.95	807.02	377.09	807.01	377.4	807.01	381.47	807.06	384.17	807.06
387.89	807.11	391.11	807.15	393.26	807.19	398.05	807.44	399	807.47
400.64	807.68	403.38	808.02	406.78	808.33	407.46	808.37	407.77	808.38
410.49	808.47	412.15	808.43	413.52	808.35	416.53	808.12	416.54	808.12
416.57	808.12	419.57	807.79	421.14	807.52	422.67	807.43	423.7	807.44
429.7	807.42	441.61	807.43	448.23	807.49	451.59	807.51	455.74	807.51
455.92	807.51	455.97	807.51	456.16	807.51	460.78	807.43	462.28	807.42
465.54	807.39	470.81	807.32	475.33	807.32	477.09	807.31	478.23	807.32
480.31	807.27	482.26	807.15	483.23	807.04	483.97	807.01	485.26	807
491.03	806.98	492.86	806.97	496.36	806.95	499.14	806.95	504.18	807.04
504.35	807.04	504.71	807.02	508.56	806.87	510.4	806.87	515.31	806.86
518.6	806.88	524.29	806.92	525.24	806.93	526.6	806.94	527.54	806.94
534.47	806.98	538.36	806.97	539.19	806.98	543.88	807	546.72	807
547.18	806.99	553.97	807.14	556.76	807.19	559.26	807.13	561.38	807.15
562.1	807.03	563.47	806.99	564.89	806.92	570.5699	806.85	571.14	806.85
573.88	806.89	574.05	806.89	574.29	806.89	583.05	806.94	583.06	806.94
590.22	806.89	591.8199	806.84	595.16	806.78	601.71	806.53	604.33	806.53
605.64	806.55	613.33	806.59	616.38	806.59	626.71	806.62	629.31	806.6
634.39	806.52	636.44	806.56	640.14	806.72	643.93	806.88	646.63	806.95
654.44	807.49	656.44	807.59	657.95	807.67	661.4	807.9	664.8	808.13
666.3199	808.23	667.74	808.3	672.03	808.52	675.08	808.65	676.98	808.78
680.98	808.84	682.21	808.87	686.16	808.89	692.61	808.95	695.07	808.98
717.89	808.99	718.54	808.99	718.86	809	719.09	808.99	719.19	808.99
727.89	808.99	728.49	808.99	736.61	808.98	752.85	808.95	754.74	808.96
756.84	808.97	757.55	808.96	775.45	808.91	783.92	808.85	785.9	808.81
788.71	808.77	789.02	808.77	789.1	808.77	791.03	808.7	792.65	808.62
794.33	808.71	797.78	808.81	801.03	808.87	803.29	808.93	804.06	808.94
810.93	809.03	813.41	809.06	818.09	809.38	819.2	809.43	819.69	809.47
821	809.61	825.25	810.07	833.49	810.97	838.17	811.49	840.89	811.83
841.61	811.91	844.79	812.23	846.45	812.41	847.47	812.48	849.47	812.63
850.37	812.68	852.5	812.8	853.62	812.83	855.13	812.82	859.18	812.93

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  863.38  813.03  867.29  813.07  870.01  813.14  872.39  813.24  877.68  813.37
   881.7  813.47  889.66  813.69  891.46  813.73  895.45  813.81  909.55  814.01
  909.72  814.01  909.87  814.01  909.89  814.01  910.03  814.02  912.18  814.25
  913.72  814.14  916.04  813.23   916.1   813.2  917.79  813.17  920.49  813.48
  925.81  814.28  928.19  814.66  929.25  814.97  931.49  816.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  222.18    .055  302.32     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        222.18  302.32           126.35   73.42    4.69             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  102.86  810.96       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 482.3

INPUT
Description:
Station Elevation Data    num=     284
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  818.575.879944  816.536.449951  816.336.799988  816.2110.60999  814.91
10.71997  814.8812.15997   814.414.64996  813.5817.85999  813.0618.34998  813.05
18.62994  813.0221.89996  812.7422.63995  812.68    23.5  812.6326.64996  812.45
28.04999  812.3939.83997  811.9742.69995  811.8944.26996  811.8347.60999  811.73
   48.56  811.6749.87994  811.6151.85999  811.4953.89996  811.2157.20996  810.78
61.57996  810.2766.76996  809.6870.35999  809.2370.77997  809.1874.08997  808.68
74.78998   808.6   77.81  807.5178.79999  806.9981.53998  804.92   82.81  804.12
85.26996  802.5986.82996  801.63      89  800.7490.83997  799.8891.90997  799.73
94.85999  798.9495.60999  798.9597.57996  798.9698.85999  798.9999.50995  796.94
99.53998  796.9199.53998  796.92   99.56  796.92  104.54  799.05  114.69  799.04
  116.71  799.04  118.92  799.05123.3799  799.06  126.94  799.08   129.4  799.28
  130.95  799.36  133.73  799.69  134.96  799.85  139.62  800.37  142.83  800.82
   143.6  800.88   144.8  800.99   146.4  801.95     147   802.3  148.64  802.95
151.0099   804.1  152.37  804.31  155.02  804.64   156.1  804.71  159.03  804.82
159.8199  804.85  163.05  804.92   166.8     805  167.06  805.01  167.28  805.01
  167.47  805.01     175  805.01  175.39  805.01  183.83  805.03  183.85  805.03
183.8799  805.03  185.65  805.17  186.87  805.22  189.42  804.99  189.67  804.99
192.7599  805.14  193.44  805.17  195.93  805.36  197.06  805.38  198.86  805.38
  200.56  805.53  201.46  805.75  201.97  805.82202.3799   805.9  206.61  806.73
  209.69  806.81  211.03  806.81  212.75  806.84  214.05  806.87  216.22  806.89
  219.39  806.91  220.09   806.9  222.41   806.9227.8199  806.89232.0699     807
   232.2  807.01  232.22  807.01  232.24  807.01  235.47  807.26  236.61  807.19
  241.73  807.11  244.25  807.07  248.47  807.06   249.8  807.05  250.29  807.04
251.3799  807.05  256.33   807.1  261.04   807.5  262.37  807.58  262.98  807.67
  265.39     808267.3799  808.35  268.42  808.49  271.94  809.23  273.74  809.43
  274.66  809.33  276.17  808.85  280.36  808.23   280.5  808.21  280.56   808.2
  283.52  807.66  284.96  807.51  287.01   807.4  301.66  807.41  303.79  807.41
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  309.33  807.44  311.32  807.45  311.91  807.45  318.11  807.44  321.63  807.38
  326.96  807.34  337.73  807.25   337.8  807.25   338.3  807.23  343.92  807.03
  345.22  806.95  347.01  806.93  350.88  806.92  358.69  806.89  359.18  806.89
  361.38  806.88  364.06  806.88  365.06  806.93  367.93  806.77  368.23  806.77
  368.34  806.77  368.68  806.77  372.85  806.84  374.12  806.84  376.93  806.84
  380.77  806.86  383.03  806.88  389.03  806.92  393.92  806.96  396.08  806.95
  399.08  806.99  405.92  807.02  407.25  807.03  409.17  807.05  411.07  807.04
  415.56  807.15   416.8  807.18  419.43  807.23  422.23  807.42  422.85  807.43
  424.91  807.16  425.51  807.07  425.59  807.07  428.49  806.95  429.98  806.92
  431.51  806.91  433.05   806.9  434.37  806.92  440.24  806.93  445.21  806.97
   451.3  806.89  451.95  806.88  452.37  806.87  453.02  806.86  454.19  806.83
  458.69  806.75  461.17  806.65  462.67  806.65  466.69  806.62  469.97  806.61
  475.64  806.64  479.33  806.68  486.62   806.7  494.43  806.65  495.61  806.63
  503.26  806.77  504.69  806.83  506.54  806.89  509.65  806.97  512.13  807.04
  513.88  807.13519.3099  807.43  525.48  807.83525.8099  807.86  526.66  807.91
528.9399  808.03  533.65  808.29  535.45  808.36  540.43   808.7  542.36  808.73
  544.24  808.76  547.35   808.8  550.76  808.87  553.03  808.89  558.36  808.95
571.0599  808.96  576.46  808.98  579.03     809580.9399  808.97  581.72  808.97
  589.26  808.97  592.13  808.95  614.24  808.93  614.87  808.92  615.53  808.92
620.5599   808.9  637.92  808.85  643.23  808.81  648.97  808.72  649.71  808.71
  651.87  808.51652.0699   808.5  652.23  808.49  656.43  808.72   658.5  808.78
664.0699  808.88  665.38  808.92  667.09  808.93671.6899  808.99676.6899  809.05
  679.65  809.25682.1899  809.53  683.64  809.71  688.23   810.2  694.13  810.84
  701.22  811.63  702.45  811.76  705.28  812.05  709.38  812.48  711.24  812.61
714.9399  812.82  715.42  812.84   717.6  812.91  720.52  812.88  723.49  812.96
  726.59  813.04  729.48  813.06  732.47  813.14  734.47  813.22  738.95  813.34
  742.36  813.42  752.33  813.69  754.58  813.75  759.53  813.85  771.53  814.02
  771.98  814.02  772.39  814.02  772.45     814   772.8  814.04772.8799  814.03
  776.11   813.8  777.16  813.39  778.84  813.19  781.56  813.37  781.86  813.39
   789.8  814.56  790.69  814.68  791.09  814.74  791.41  814.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .0574.78998    .055  206.61     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      74.78998  206.61             58.55   49.95    4.42             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 432.35

INPUT
Description:
Station Elevation Data    num=     301
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  817.471.039978  816.994.169983  815.43 6.98999  814.518.419983  814.25
10.14996   813.811.42999  813.5112.33997  813.3314.07996  812.9515.81995  812.48
16.90997  812.3117.98999  811.9421.48999  811.08   22.56  810.8823.63995  810.87
25.97998   810.828.21997  810.7832.81995  810.7133.87994   810.735.31995  810.67
36.03998  810.6436.69995  810.56   42.06  810.0745.53998  809.7146.22998  809.65
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49.81	809.31	52.25995	809.07	54.15997	808.87	55.63995	808.52	57.51996	807.99
59.32996	807.43	61.14996	806.56	1.98999	806.18	62.15997	805.94	63.16998	805.28
64.98999	804.18	66.81	802.34	67.81995	801.47	68.81995	800.72	70.31995	799.18
72.81995	798.92	73.41998	798.65	73.77997	798.68	73.94995	798.68	93.81995	796.7
93.87	796.79	3.88995	796.79	3.89996	796.79	4.04999	796.73	96.37994	797.62
98.95996	798.6	104.59	798.58	106.47	798.71	107.2	798.72	108.35	798.97
111.21	799.53	113.71	799.86	115.25	800.11	115.9	800.24	117.8	800.67
119.65	801.07	121.56	801.52	123.47	802.12	124.39	802.38	125.3	802.61
127.21	803.11	129.14	803.71	130.04	803.94	130.95	804.05	132.87	804.25
134.8	804.34	135.7	804.44	136.59	804.49	138.53	804.55	140.47	804.63
141.36	804.69	142.24	804.72	146.1299	804.83	147.0099	804.87	147.89	804.9
151.08	805	155	805.01	161.11	805.03	161.33	805.03	161.56	805.04
162.05	805.05	164.5699	805.17	165.08	805.12	166.59	805.13	167.99	805.23
170.14	805.47	172.2	805.67	174.55	805.95	176.62	806.21	178.96	806.59
180.0099	806.79	185.33	806.85	187.1899	806.95	189.08	806.96	191.42	806.94
194.04	806.96	197.71	806.87	201	806.87	203.74	806.86	205.41	806.89
207	806.98	209.8199	807.04	212.77	807.17	215.61	807.13	218.6299	807.15
221.81	807.04	223.04	807.02	226.39	806.95	227.89	806.9	231.45	806.92
233.86	807.05	236.27	807.22	236.9	807.25	238.1899	807.4	239.89	807.58
240.67	807.69	242.9	807.93	245.08	808.26	245.91	808.33	247.71	808.45
249.3199	808.58	249.49	808.57	251.9399	808.72	253.9	808.52	254.93	808.54
257.23	808.14	258.31	807.96	260.82	807.46	263.21	807.49	265.67	807.37
273.41	807.37	279.58	807.38	284.76	807.4	289.08	807.38	293.9	807.37
296.14	807.34	305.09	807.26	311.93	807.21	313.58	807.19	318.87	806.97
320.46	806.88	321.23	806.89	323.85	806.86	324.25	806.86	324.43	806.86
324.94	806.86	331.8	806.87	333.25	806.87	333.28	806.87	333.36	806.87
336.3	806.86	337.66	806.86	338.92	806.83	339.63	807.13	342.01	807.13
342.88	807.08	345.37	806.94	346.47	806.95	349.57	806.91	351.36	806.87
355.29	806.87	356.54	806.86	358.48	806.88	363.16	806.9	366.02	806.92
367.12	806.93	367.61	806.93	372.68	806.99	376.59	807.01	379.88	807.04
384.59	807.08	389.22	807.07	392.33	807.14	393.54	807.15	394.96	807.19
396.55	807.2	399.37	807.15	399.98	807.13	402.58	807.02	403.78	806.99
407.06	806.97	408.82	806.96	409.5	806.96	412.87	806.97	420.02	806.99
420.96	806.99	422.14	806.98	425.82	806.94	428.12	806.86	431.7	806.79
434.64	806.74	435.62	806.77	438.05	806.74	442.44	806.71	449.54	806.69
451.39	806.7	458.92	806.77	460.28	806.78	462.73	806.76	468.03	806.7
469.9	806.69	472.45	806.67	473.13	806.71	480.11	806.83	482.05	806.86
485.39	806.96	487.54	807.02	489.95	807.02	491.21	807.04	494.34	807.21
497.36	807.41	498.31	807.48	500.76	807.62	507.22	807.98	508.92	808.07
509.58	808.1	512.45	808.29	516.38	808.51	518.36	808.58	520.08	808.6
523.71	808.71	525.53	808.73	527.21	808.77	530.1	808.83	533.22	808.9
535.14	808.92	538.45	808.93	548.35	808.97	553	809	556.42	808.95
557.8199	808.95	564.3099	808.95	569.2	808.91	588.0099	808.9	589.85	808.89
591.74	808.88	605.98	808.82	613.96	808.8	616.47	808.78	620.5699	808.72
624.1899	808.7	625.35	808.6	630.15	808.62	632.14	808.72	633.0099	808.75
640.59	808.89	641.09	808.91	643.6	808.93	646.23	808.96	653.14	809.04
653.28	809.05	653.35	809.05	653.39	809.05	653.85	809.1	658.66	809.63
661.6899	809.99	664.6899	810.31	668.58	810.74	673.34	811.26	677.09	811.68
685.5	812.52	685.78	812.55	685.91	812.55	686.2599	812.57	690.83	812.88
694.68	812.96	694.8199	812.96	694.93	812.96	695.02	812.97	698.92	812.93
701.0099	812.99	703.21	813.04	705.27	813.06	708.48	813.14	710.17	813.21
713.97	813.31	716.87	813.38	728.5099	813.7	731.11	813.76	736.8199	813.88
747.14	814.02	747.81	814.03	748.43	814.02	748.5099	814	748.84	814.04

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  749.05  814.04  752.03  813.54  752.06  813.54  752.12  813.53755.0699  813.18
756.4399  813.27  758.09   813.4  763.48  814.19  766.37   814.6  767.67  814.78
  768.47  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .0557.51996    .055180.0099     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      57.51996180.0099             83.86   62.35    3.34             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 370

INPUT
Description:
Station Elevation Data    num=     340
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.423.559998  820.256.219971  819.397.820007  818.8811.77997  817.62
14.21002  816.8517.48999  815.8519.46002  815.2523.65997  814.4924.22998   814.4
24.71997  814.3229.83002   813.529.90997  813.4929.96997  813.4832.73999  812.96
36.01001  811.9938.41998  811.4140.46997  811.1340.72998  811.0841.54999  811.09
46.51001  810.9948.34998  810.9449.77002  810.9150.46002  810.9160.58997  810.32
60.90997  810.29   61.31  810.2664.54999  810.0170.70001   809.672.46997  809.46
77.33997   809.178.51001  809.0279.27002     80980.97998  809.0683.34998   809.1
83.82001  809.13   85.38  809.1686.65997  809.19    89.5  809.17      93  809.21
94.70001   809.2   95.25  809.1896.71997  809.0499.17999  809.0499.89001  809.02
   102.6  809.85  104.73  810.05  104.98  810.11   105.1  810.12  105.54  810.08
  107.82  810.01  109.11  809.68  110.09  809.51  115.23  808.86  121.48  808.89
  121.51  808.89  121.52  808.89  125.64  808.94  128.09     809  129.77  809.03
  131.38  809.12   133.9  809.04  135.25  809.15  137.62  808.29  138.03  808.17
  141.23  806.77  142.16  805.91  143.74  805.17  147.08  802.75  149.95  801.71
  151.08  801.16  153.65  800.28  154.37  800.03  154.55  799.99  157.65  799.26
  158.66  799.07  159.61  799.07  161.22  799.06  162.07  799.05  164.62     799
   170.6  798.86  171.41  797.99  171.77  797.06     172  796.96  172.03  796.86
  172.07  796.93  172.67  797.34   175.2  798.78  177.12  798.72  180.64   798.7
   182.2  798.67  183.11  798.65  187.02  798.79  187.37  798.84   187.6  798.86
  188.24  798.93  191.95  799.31  192.87  799.51  194.72   799.8  196.34  800.14
  197.21   800.3  198.36  800.66  199.99   801.1  200.35  801.24  201.76  801.91
   203.8  802.97  204.12  802.96  206.92  803.46  208.25  803.64   210.2  803.95
  212.38   804.3   214.7  804.79  216.22   804.8  217.02  804.69  217.65  804.69
  218.15  804.75  220.64   805.1  223.34  805.43  224.77  805.59  227.19  805.84
   228.9  806.02  229.46  806.05  233.03  806.38   233.2  806.39  237.31  806.71
  239.04  806.81  240.44  806.82  243.05  806.88  246.51  806.91  254.79  806.98
  257.03     807  258.52  806.99  258.92  806.99  259.31  806.99  259.67  806.99
  265.48  806.85  265.54  806.85  265.74  806.85  269.96  806.79  274.04  806.85
  274.41  806.85  274.76  806.87  278.79  807.04  280.52  807.14  283.21   807.2
  283.44  807.22   284.2   807.2  287.63  807.11  289.54  807.09  294.95  806.81
  296.44  806.82  300.88   807.1  303.08  807.11  304.67  807.17  305.29  807.27
  307.59  807.47  309.71  807.69   310.6  807.76  312.51  807.88  313.61  807.98
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314.12	808.01	316.62	808.18	318.54	808.29	319.63	808.35	321.95	808.36
322.61	808.4	322.96	808.29	325.64	807.69	328.23	807.33	328.32	807.32
328.55	807.32	333.39	807.38	334.22	807.34	336.84	807.34	346.03	807.35
349.45	807.37	357.57	807.33	360.34	807.32	361.64	807.3	373.28	807.21
377.2	807.17	380.03	807.14	380.92	807.11	386.24	806.81	388.82	806.83
389.2	806.83	393.19	806.9	398.03	806.91	400.86	806.95	402.45	806.92
404.19	806.87	405.55	806.89	406.87	807.32	410.64	807.1	416.32	806.95
418.91	806.9	420.12	806.89	422.98	806.86	427.41	806.92	430.04	806.93
434.46	806.96	437.47	807	439.09	807	443.89	807.04	450.77	807.11
457.47	807.09	458.76	807.12	459.86	807.13	463.51	807.11	464.03	807.11
464.28	807.11	464.96	807.09	467.91	807	470.05	807.01	471.67	807.01
477.59	806.98	482.38	807.02	486.36	807.02	489.86	806.99	490.78	806.97
491.01	806.98	491.82	806.94	494.55	806.86	498.16	806.79	499.42	806.72
500.14	806.76	500.72	806.79	502.81	806.85	507.26	806.8	508.44	806.76
509.53	806.74	517.28	806.71	523.26	806.76	527.78	806.77	529.71	806.76
530.82	806.75	534.94	806.71	540.51	806.68	541.98	806.77	546.63	806.85
550.59	806.91	551.82	806.94	552.61	806.96	556.26	806.98	557.88	806.99
558.41	806.99	559.75	807.01	560.2	807.03	560.63	807.06	562.1	807.17
565.85	807.38	572.87	807.77	574.69	807.87	575.08	807.89	576.76	807.98
582.52	808.3	587.03	808.46	587.38	808.47	589.47	808.53	592.97	808.63
593.07	808.63	595.63	808.72	598.5	808.78	601.19	808.85	603.34	808.92
605.07	808.93	611.53	808.96	617.94	809	622.63	808.94	624.55	808.94
630.16	808.93	636.75	808.88	652.75	808.87	655.63	808.85	658.58	808.84
680.51	808.76	680.65	808.76	680.7	808.76	680.78	808.76	682.31	808.75
689.42	808.72	689.63	808.72	689.83	808.72	690.31	808.73	698.76	808.73
706.01	808.88	707.18	808.88	708.88	808.91	710.73	808.92	711.59	808.94
713.89	808.96	717.5	809	719.27	809.04	720.31	809.09	724.84	809.6
725.39	809.66	726.25	809.77	727.75	809.95	730.22	810.24	731.79	810.41
733.84	810.64	736.36	810.92	742.51	811.59	749.2	812.26	752.24	812.54
753.61	812.69	756.83	812.91	759.26	812.96	761.87	812.97	764.02	812.97
765.5	813	767.87	812.98	769.15	813.01	770.5	813.05	771.77	813.06
775.18	813.14	776.57	813.2	779.71	813.28	782.11	813.34	795.39	813.7
798.35	813.77	804.82	813.9	813.47	814.03	814.37	814.04	815.19	814.02
815.31	813.99	815.61	814.03	816.02	814.05	817.58	813.78	819.03	813.46
822	813.17	822.01	813.16	822.13	813.17	825.05	813.4	827.73	813.79
832.76	814.52	835.01	814.82	835.74	814.88	836.08	815.24	836.87	815.82

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	135.25	.055	240.44	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.25	240.44	71.45	70	5.34	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 300

INPUT
Description:
Station Elevation Data num= 334

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	820.71	3.440002	819.79	3.880005	819.68	4.609985	819.48	6.330017	819.05
9.419983	818.24	11.09003	817.86	13.60004	817.21	14.83002	816.95	16.41003	816.58
17.85999	816.26	19.06	815.88	23.23999	814.89	23.88	814.76	25.16998	814.53
33.51001	813.02	34.01001	812.93	35.15002	812.76	38.10004	812.24	1.10999	811.57
43.04004	811.39	45.35999	811.33	51.95001	811.19	52.63	811.18	53.20001	811.17
69.73999	810.85	73.63	810.72	74.60999	810.68	77.28003	810.62	79.91003	810.63
81.85004	810.64	90.16998	810.64	91.40002	810.61	95.01001	810.53	105.78	810.36
112.97	810.16	119.66	810.04	121.48	809.99	122.28	809.94	132.61	809.62
133.71	809.6	135.11	809.59	138.23	809.79	138.56	809.79	141.5	810.05
142.7	810.15	143.48	810.69	144.5	810.71	147.29	810.33	148.03	810.52
150.24	810.87	150.99	811.05	151.3	811.11	152.49	811.13	154.9	811.33
155.13	811.26	157.84	810.82	159.27	810.41	161.6	809.55	163.09	809.13
167.12	809.09	167.48	809.1	167.7	809.1	167.99	809.1	174.17	809.11
175.83	809.14	178.74	809.45	179.35	809.46	179.47	809.46	180.24	808.92
183.49	808.82	186.59	808.76	188.25	808.71	191.59	808.6	193.58	808.55
195.91	808.62	197.05	808.77	198.99	809.19	200.8	809.36	202.39	809.87
203.36	810.11	204.81	809.7	206.85	809.37	212.58	809.13	213.09	809.09
214.05	809.12	215.15	809.09	215.63	808.89	217.23	807.88	219.92	806.05
221.37	804.96	223.19	803.52	225.51	801.67	226.45	800.98	228.46	799.38
230.66	799.12	231.11	798.94	231.22	798.89	232.09	798.57	233.27	797.23
233.81	796.83	233.88	796.83	233.89	796.81	233.9	796.82	233.94	796.82
234.01	796.83	235.67	797.24	241.41	798.52	242.07	798.79	242.79	798.77
245.49	798.75	246.2	798.74	246.32	798.74	250.7	798.71	251.17	798.7
252.16	798.7	258.25	798.68	263.14	798.75	263.65	798.81	264.39	798.84
265.66	799	267.15	799.06	269.18	799.91	271.05	801.14	274.72	803.46
275.41	803.95	275.53	803.97	276.49	804.19	278.73	804.89	279.33	805.03
282	805.11	283.47	805.23	285.27	805.32	287.61	805.45	288.54	805.53
291.75	805.79	291.89	805.82	291.99	805.83	295.07	806.27	295.72	806.3
297.31	806.39	300.03	806.43	301.61	806.47	304.17	806.62	307.49	806.75
308.31	806.78	311.41	806.84	312.45	806.87	314.26	806.89	315.61	806.89
317.94	806.86	322.99	806.92	324.14	806.92	324.87	806.9	327.75	806.94
329.03	806.88	331.21	806.99	333.15	806.96	334.28	806.94	337.3	807.04
337.55	807.04	338.49	807.05	341.44	807.1	342.51	807.1	349.65	807.1
353.02	807.17	356.6	807.22	364.01	807.31	366.28	807.33	376.4	807.33
379.21	807.33	382.84	807.3	383.59	807.3	384.66	807.31	384.76	807.31
394.8	807.26	396.81	807.26	398.01	807.25	399.08	807.24	413.64	807.12
414.12	807.15	416.49	807.24	418.23	807.31	419.45	807.46	420.09	807.3
422.51	807.06	424.51	807	425.51	806.97	432.2	806.96	434.05	806.96
437.09	807.03	437.76	807.04	440.55	807.13	442.18	807.2	444.07	807.35
444.31	807.36	444.58	807.36	456.77	806.92	459.31	806.85	460.87	806.84
461.63	806.83	463.89	806.94	464.67	807.05	465.38	807.07	467.63	807.24
468.68	807.26	470.64	807.09	473.1	807.05	473.64	807.05	474.81	807.05
476.29	807.04	477.79	807.06	488.25	807.16	493.72	807.14	495.18	807.13
499.76	807.04	501.91	807	503.46	807	509.74	807.01	516.59	807.03
519.54	807.02	523.53	807.05	526.1	807.01	528.09	807.09	529.17	807.09
531.79	806.95	534.32	806.68	538.06	806.81	539.82	806.81	540.82	806.8
542.7	806.82	543.77	806.79	545.84	806.75	550.25	806.7	551.47	806.68
552.6	806.68	553.48	806.68	569.71	806.71	569.9	806.71	570.27	806.71
574.27	806.66	578.54	806.71	581.47	806.69	584.42	806.87	584.73	806.88
585.21	806.88	589.74	806.85	594.91	806.89	599.98	806.96	602.26	807.05
603.92	807.09	606.83	807.22	610.03	807.39	613	807.54	616.77	807.74
618.77	807.84	621.04	807.96	625.53	808.14	627.06	808.19	630.89	808.3

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  631.39  808.32  637.22  808.53  640.41  808.64   643.2  808.74  645.36  808.76
  648.11  808.89  650.53  808.99  652.78     809  660.11   808.9  663.12   808.9
  666.88   808.9   677.1  808.82  686.95  808.81  692.14  808.78  697.45  808.75
   710.8   808.7  718.58  808.72  722.28   808.7   728.2   808.7  733.99  808.68
  738.68  808.74  742.54  808.76  744.96  808.79  750.39  808.85  751.37  808.86
  754.09  808.94  755.79  808.98  757.72   809.1   759.5   809.2  760.21  809.28
  763.31  809.61  768.12  810.26  769.04  810.37  771.44  810.68  776.58  811.23
  777.87  811.37  778.46  811.43  790.15  812.51  792.17  812.74  793.95  812.89
   795.9     813  800.26  813.02  802.33  813.01  804.87  813.03  807.98  813.02
  808.79  813.05  811.55  813.09  813.92  813.15   814.5  813.17   815.8  813.21
   816.8  813.23  834.69  813.72  838.67  813.81  847.39  813.99  851.17  814.04
  852.75  814.07   854.2  814.04  854.41  813.99  854.63  814.01  855.17  814.03
  855.67  814.01  856.09  814.19  857.55  813.76  857.84  813.64  861.53  813.17
   861.8  813.19  864.69  813.17  870.41  814.19  870.51   814.2  870.63  814.24
  870.91  814.33  873.06  815.03  873.84  815.55   876.2  817.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  215.63    .055  295.72     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        215.63  295.72             88.38     100   89.28             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0   154.9  811.33       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 200

INPUT
Description:
Station Elevation Data    num=     437
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.014.700012    8216.570007  821.0110.65002  821.0112.32001  821.01
17.31006  821.0219.15002  821.0221.28003  820.9924.33002  820.66      25   820.6
25.47003  820.5628.79004  820.1132.90002  819.5135.29004  819.2335.76001  819.17
   38.13  818.9439.34003  818.8240.20001  818.6943.87006  817.9645.02002  817.95
45.07001  817.9445.11005  817.9447.23004  818.8149.65002  818.6550.81006  818.54
51.92004  818.5953.68005  818.5454.93005  818.6456.05005  818.8859.28003  818.97
60.47003  818.9162.28003  818.38   64.75  818.2165.15002  818.1565.71002  818.08
68.02002  817.8569.66003  817.6970.89001  817.5472.61005  817.2974.57001  817.02
79.43005   816.479.49005  816.39    79.5  816.3982.36005  816.2284.39001  816.11
85.23004  816.0886.40002  816.0388.09003  815.9889.30005  815.9390.96002  815.85
93.29004  815.7293.83002   815.796.48004  815.5799.12006  815.4599.57001  815.42
99.86005  815.39  104.57  815.28   105.3  815.27  108.94  815.16  113.91  814.98
  120.88  814.56  121.77   814.5  122.94  814.42  128.11   814.1128.4301  814.08
  130.59  813.93   133.5  813.72  134.19  813.67  134.67  813.64  139.72   813.3
  141.57   813.2  142.59  813.15  143.86  813.12  148.23  812.99  150.92  812.94
  156.47  812.86157.2401  812.83  158.05  812.82  160.48  812.79  172.29  812.71
     176  812.65  181.98  812.47  188.66  812.31  197.55  812.18  198.72  812.14
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204.55	811.94	205.69	811.9	206.89	811.85	213.52	811.65	216.97	811.55
217.16	811.54	217.42	811.54	220.65	811.47	224.7	811.47	225.77	811.48
226.8	811.47	231.21	811.57	231.71	811.57	234.3701	811.62	236.6201	811.75
237.44	811.86	238.11	811.84	240.11	811.85	241.53	811.61	242.28	811.6
245.01	811.22	245.48	811.16	246.64	811.12	247.5	811	251.35	810.98
251.67	810.96	256.9301	810.95	258.8	810.95	260.7401	810.97	265.38	810.62
265.92	810.56	266.08	810.54	267.03	810.41	271.09	809.89	271.66	809.87
272.29	809.87	272.48	809.85	273.64	809.51	274.47	809.61	276.9	810.04
279.6801	810.45	280.59	810.57	280.96	810.54	283.66	810.12	285.72	809.79
286.67	809.68	288.71	809.52	289.6201	809.37	290.7401	809.32	292.69	809.42
294.55	809.62	295.7	809.64	298.97	809.87	302.09	810	303.64	810.06
304.73	810.12	307.63	810.12	307.7401	810.12	307.79	810.12	310.75	810
312.8	809.53	315.09	809.24	318.58	809.12	319.78	809.04	321.04	809.01
324.1201	808.95	326.55	809.02	328.8101	809.02	329.86	809.07	331.46	809.18
334.07	809.22	336.01	809.18	338.1801	809.15	338.69	809.15	341.76	809.07
343.11	809.01	345.34	808.92	347.52	808.79	349.88	808.65	354.9301	808.27
356.35	808.17	358.91	807.96	364.39	807.54	364.84	807.51	365.1801	807.52
365.82	807.46	368.44	807.33	368.98	807.37	373.72	807.73	373.96	807.75
374	807.75	376.97	807.88	378.42	807.85	382.41	807.6	382.98	807.59
383.3101	807.55	385.9901	807.35	387.2401	807.31	388.23	807.03	390.38	807.06
391.66	807.16	392.01	807.12	392.78	807.07	395.02	807.06	396.07	806.94
397.03	806.95	397.95	806.76	400.4901	804.81	401.04	804.53	402.2401	803.49
404.46	801.42	404.9	801.05	404.9901	800.98	405.38	800.89	409.3101	800.17
409.76	799.86	410.91	799.29	411.32	799.19	411.96	798.75	413.4901	798.82
421.29	797.27	422.11	798.91	422.22	798.92	422.29	798.92	422.3701	798.92
422.8101	798.92	426.97	798.93	430.04	799	431.71	799	435.32	799.02
439.8	799.12	440.66	799.13	440.9901	799.15	441.88	799.25	443.19	799.34
443.33	799.38	444.15	799.58	444.63	799.71	448.6	800.77	449.2	800.96
449.54	801.07	452.14	801.9	453.45	802.34	455.22	802.85	457.8701	803.6
461.2401	804.25	462.28	804.5	463.5	804.76	468.46	804.86	470.08	805.02
471.11	805.02	473.28	805.07	475.52	805.11	476.29	805.14	477.92	805.23
479.3	805.29	479.79	805.29	481.7	805.51	484.35	805.77	487.38	806.16
488.33	806.27	489.97	806.44	493.18	806.72	494.05	806.71	494.95	806.74
496.85	806.89	497.35	806.91	497.54	806.93	498.24	806.93	502.01	806.98
503.37	807.03	506.31	807.13	506.41	807.13	508.82	807.36	510.83	807.49
512.4	807.6	515.77	807.89	519.66	808.12	522.21	808.66	523.11	808.61
524.46	808.45	524.72	808.44	525.23	808.37	527.4501	808.23	528.49	808.19
530.46	807.77	534.6901	807.29	536.48	807.14	537.3201	807.1	540.62	807.03
546.15	807.02	554.4	807.01	556.5601	807.01	560.92	807.03	572.28	807.27
572.52	807.28	572.91	807.27	578.4501	807.22	581.63	807.07	585.13	807.02
586.72	806.98	592.8	806.94	598.4501	806.9	601.3	806.91	606.5601	806.88
609.3	806.85	615.62	806.81	618.52	806.77	622.41	806.71	624.61	806.69
629.48	806.6	632.36	806.55	634.13	806.54	647.29	806.43	647.3101	806.43
647.3201	806.43	650.8	806.21	651.71	806.17	653.29	806.11	654.64	806.03
655.77	805.99	658.27	805.91	660.03	805.85	660.5	805.84	661.33	805.83
664.11	805.76	669.09	805.7	669.25	805.7	669.29	805.7	669.36	805.7
673.86	805.68	678.08	805.57	678.47	805.57	679.91	805.51	683.08	805.36
683.9401	805.33	685.4401	805.3	688.64	805.25	690.78	805.25	695.0701	805.22
698.59	805.2	699.37	805.19	702.11	805.24	704.4501	805.37	709.55	805.55
710.75	805.59	713.25	805.7	715.36	805.77	718.4401	805.43	720.26	805.52
721.66	805.27	724.59	805.29	724.97	805.28	732.66	805.36	733.66	805.37
733.76	805.37	733.8101	805.37	733.87	805.37	738.42	805.43	740.34	805.46
745.48	805.61	747.65	805.62	749.7401	805.67	751.34	805.72	752.26	805.71

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  754.27  805.78  756.87  805.77  757.47  805.81  757.78  805.82  761.65  805.93
  765.78  806.06  766.07  806.06  766.21  806.07   773.2  806.26  777.35   806.9
  778.21  806.96   779.4  806.97  780.72  806.96  788.27  806.92  791.12  806.94
  794.46  806.92  795.29  806.93  797.97  807.11  798.37  807.15798.9301  807.17
  804.09  807.42     806  807.51  807.02  807.54   807.6  807.57  811.04  807.75
  814.04  807.93815.8101  808.01  816.82  808.06820.1901  808.35825.0601   808.7
  825.84  808.75  828.96  808.81  836.88     809  839.88  809.03843.8101  809.09
844.4901  809.11846.1901  809.14   849.1  809.19  849.83  809.14  851.46  809.15
  853.55  809.55   853.9   809.6  854.23  809.66  856.83  810.11  858.33  810.39
  859.76  810.63  862.26  811.03  862.83  811.13  865.33  811.39   866.7  811.51
   868.8  811.64  875.33  812.05  885.48  812.67     886   812.7  886.13   812.7
  886.38  812.72  890.37  813.02  890.95  813.03     892  813.03   893.8  813.03
  897.86  813.03  905.35  813.03911.9301  813.08  913.57  813.08  914.02  813.09
  915.82  813.13  931.26  813.41  939.38  813.53  942.66  813.65  944.38  813.69
  954.25  813.92  961.19  814.06  961.98  813.94  962.97  813.83  965.26  813.49
  965.65  813.46  966.75  813.32968.1801  813.12  969.13  813.09  972.04  813.38
973.6201  813.48  974.04  813.55  974.79  813.74  976.97   814.3  978.23   814.8
  979.91  815.57  980.53  815.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  397.95    .055   463.5     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        397.95   463.5             79.15  118.32  197.15             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  280.59  810.57       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 81.68

INPUT
Description:
Station Elevation Data    num=     420
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  822.042.440002  822.02    2.75     8222.960022  822.015.630005  821.85
7.800049  821.8310.54004  821.7316.70001  821.4317.15002  821.4117.46002   821.4
   21.12  821.2423.82001  821.1625.23004  821.11   27.13  821.0828.67004  821.05
30.95001  821.0231.55005  821.0134.08002  820.9436.79004  820.84   37.31   820.8
38.08002  820.7340.41003  820.56   41.62  820.42   43.44  820.23   47.94  819.69
51.29004  819.3251.71002  819.2752.33002  819.1754.59003  818.87   56.12  818.74
57.10004  818.7860.89001  818.0961.48004  818.0763.23004  818.2765.79004  818.26
66.11005  818.2966.59003  818.2768.98999  818.2570.41003  818.2574.58002  818.23
   74.75  818.2175.45001  818.1779.11005  817.8980.29004  817.8480.79004  817.75
84.14001   817.5   85.12   817.6   87.31  817.5590.47003  817.22   94.44  817.11
94.78003  817.1295.10004  817.1199.76001  816.97  101.65  817.03  104.45  817.25
  109.36  817.33  112.19  817.39  116.63  817.11  116.97  817.11  117.21  817.13
  118.95  817.57  122.82  818.69  123.02  818.74  123.33  818.67  123.78  818.52
  126.59  817.77  128.61  817.69  129.47  817.58  130.74  817.69  132.35  817.59
```

133.45	817.49	135.1	818.22	136.93	816.82	137.12	816.79	138.28	816.79
141.5	816.81	145	816.84	147.8	816.97	152.15	816.73	152.51	816.65
152.78	816.63	155.39	816.24	157.61	815.94	158.27	815.84	159.25	815.7
161.15	815.48	163.26	815.13	163.84	815.05	165.32	815.04	166.91	815.05
167.27	815.05	169.79	815.08	172.11	815.14	172.67	815.14	173.51	815.27
175.77	815.31	176.97	816.02	177.69	816.19	180.64	815.66	181.35	815.66
181.77	815.71	184.19	815.46	186.61	815.82	187.07	815.8	187.76	815.77
189.63	816.18	191.44	815.32	191.93	815.12	194.89	815.05	195.71	814.96
196.27	814.97	198.59	814.93	201.1	814.98	205.83	814.96	206.18	814.93
209.15	814.45	210.11	814.32	210.77	814.25	214.5	813.49	215.76	813.43
216.27	813.45	218.75	813.47	220.43	813.28	221.63	813.31	223.4	813.11
225.09	812.92	225.27	812.94	230.53	812.87	234.93	812.85	237.19	812.82
241.41	812.75	244.56	812.79	244.6	812.79	244.67	812.79	244.79	812.79
245.31	812.8	253.31	812.87	254.26	812.87	256.19	812.82	259.04	812.74
259.07	812.73	259.1	812.74	261.95	812.51	262.58	812.5	266.69	811.92
267.71	811.73	268.76	811.62	270.59	811.45	273.3	811.16	273.62	811.12
276.03	811.01	277.13	811.02	279.92	811.04	283.26	811.06	287.87	811.09
288.09	811.09	289.23	811.05	292.93	810.92	293.63	810.91	294.68	810.81
298.04	810.58	301.81	810.31	302.27	810.29	302.59	810.28	304.24	810.17
307.69	809.97	308.03	809.96	308.94	809.9	310.91	809.76	312.26	809.64
313.79	809.58	316.06	809.46	316.67	809.42	317.09	809.4	319.55	809.32
323.19	809.28	325.31	809.24	326.93	809.17	328.97	809.17	329.93	809.21
331.12	809.1	335.78	809.11	342.6	809.09	350.51	809.17	350.92	809.17
351.25	809.18	351.7	809.17	355	809.13	355.75	809.13	364.27	808.98
365.55	808.95	365.73	808.95	365.96	808.95	371.4	808.88	373.09	808.84
374.28	808.81	375.08	808.78	377.16	808.69	379.91	808.54	380.04	808.53
380.21	808.51	382.92	808.33	384.75	808.22	385.8	808.13	387.34	808.03
388.68	807.93	389.58	807.85	394.29	807.55	394.42	807.54	394.47	807.54
397.32	807.4	398.04	807.35	400.31	807.24	405.44	807.07	408.91	807.04
411.72	806.97	413.7	807	415.28	806.96	417.48	806.62	418.58	806.46
422.98	805.78	426.31	805.09	428.24	804.88	429	804.8	430.11	804.73
433.07	804.51	434.76	804.42	437.24	804.29	437.64	804.26	437.91	804.24
440.52	804.11	442.74	803.98	443.4	803.95	444.37	803.82	446.28	803.62
447.57	803.38	449.16	802.99	450	802.77	451.49	802.39	452.04	802.26
452.4	802.18	454.92	801.54	457.24	800.99	458.62	800.65	459.55	800.44
462.07	799.85	463.16	799.63	465.56	799.09	466.24	798.93	466.82	798.8
467.25	798.8	478.29	798.95	481.05	798.98	484.34	799.05	491.87	799.19
497.85	799.38	497.87	799.38	497.92	799.42	500.73	801.9	501	802.17
501.39	802.4	504.48	804.82	505.56	804.85	506.76	805.03	510.4	805.31
511.41	805.06	513.96	805.69	515.23	806.03	515.4	806.07	515.64	806.13
518.28	806.745	20.0601	806.92	521.16	807	522.77	807.07	524.29	807.1
524.9	807.14	526.92	807.14	531.5	807.365	31.6801	807.35	531.88	807.34
535.5601	806.99	539.39	806.73	541.32	806.62	544.23	806.49	547.08	806.37
551.28	806.22	552.39	806.16	553.89	806.1	555.72	806.05	558.41	805.92
558.72	805.9	560.78	805.75	561.48	805.885	64.0601	805.77	564.7	805.79
569.47	805.97	572.67	806.07	573	806.09	573.34	806.1	581.41	806.32
587.26	806.45	591.09	806.53	592.55	806.62	594.05	806.65	598.92	806.67
601.1801	806.66	607.05	806.66	07.5601	806.59	611.88	806.546	15.4301	806.47
616.72	806.46	619.08	806.396	22.5601	806.29	624.84	806.23	626.38	806.19
629.6901	806.2	630.6	806.2	631.21	806.2	632	806.22	636.05	806.28
641.82	806.49	647.88	806.716	50.6801	806.84	651.07	806.85	653.78	806.97
658.33	807.02	659.7	807.01	660.41	807.016	64.4401	807.25	665	807.27
665.33	807.3	666.13	807.38	674.14	808.07	675.86	808.24	679.45	808.56

679.55	808.57	679.5601	808.57	679.58	808.57	682.4401	808.78	684.37	808.94
685.32	808.94	690.24	809.12	691.32	809.23	693	809.4	696.84	809.86
700.97	810.25	703.71	810.5	705.48	810.66	706.71	810.74	709.86	810.97
712.87	811.01	714.8	811	720.42	811	724.11	811.01	728.52	811.04
732.7	811.09	734.28	811.11	736.61	811.19	740.04	811.26	745.32	811.41
748.6801	811.55	753.19	811.61	753.29	811.61	755.35	811.82	756.86	811.86
759.7	811.81	765.72	811.75	766.29	811.75	769.5	811.75	780.4301	811.74
780.55	811.73	784.47	811.73	793.61	811.77	807.89	811.87	809.61	811.88
810.36	811.89	811.6	811.9	841.97	812.23	851.87	812.25	852.63	812.25
858.06	812.2	858.35	812.2	859.55	812.17	863.1801	812.1	864.91	812.05
868.02	811.96	872.04	811.82	872.52	811.81	874.4301	811.78	876.25	811.77
877.01	811.76	878.4	811.77	892.57	811.95	908.4301	812.24	909.58	812.24
919.59	812.39	933.92	812.67	935.39	812.68	938.15	812.87	942.15	812.96
944.73	813.01	946.31	813.06	946.92	813.11	947.8	813.14	950.76	813.3
953.22	813.32	962.45	813.5	964.68	813.35	964.7	813.35	967.56	813.19
969.5	813.26	970.44	813.33	971.83	813.64	973.32	813.96	974.34	814.3
976.2	814.91	978.95	816.36	979.08	816.42	979.62	816.8	980.02	817.08

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	415.28	.055	531.88	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
415.28	531.88	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:BUCKEYE_CR

Reach	River Sta.	n1	n2	n3
317437_BUCKEYE_C	1370	.05	.055	.05
317437_BUCKEYE_C	1200	.05	.055	.05
317437_BUCKEYE_C	1050	.05	.055	.05
317437_BUCKEYE_C	923.73	.05	.055	.05
317437_BUCKEYE_C	779.43	.05	.055	.05
317437_BUCKEYE_C	719.69	.05	.055	.05
317437_BUCKEYE_C	662.01	.05	.055	.05
317437_BUCKEYE_C	606.9	.05	.055	.05
317437_BUCKEYE_C	555.72	.05	.055	.05
317437_BUCKEYE_C	482.3	.05	.055	.05
317437_BUCKEYE_C	432.35	.05	.055	.05
317437_BUCKEYE_C	370	.05	.055	.05
317437_BUCKEYE_C	300	.05	.055	.05
317437_BUCKEYE_C	200	.05	.055	.05
317437_BUCKEYE_C	81.68	.05	.055	.05

SUMMARY OF REACH LENGTHS

River: BUCKEYE_CR

Reach	River Sta.	Left	Channel	Right
317437_BUCKEYE_C	1370	170.24	170	171.01
317437_BUCKEYE_C	1200	110.41	150	168.17
317437_BUCKEYE_C	1050	168.68	126.27	101.85
317437_BUCKEYE_C	923.73	209.68	144.3	84.88
317437_BUCKEYE_C	779.43	55.27	59.74	21.26
317437_BUCKEYE_C	719.69	7.44	57.68	143.59
317437_BUCKEYE_C	662.01	6.58	55.11	38.66
317437_BUCKEYE_C	606.9	5.06	51.18	4.03
317437_BUCKEYE_C	555.72	126.35	73.42	4.69
317437_BUCKEYE_C	482.3	58.55	49.95	4.42
317437_BUCKEYE_C	432.35	83.86	62.35	3.34
317437_BUCKEYE_C	370	71.45	70	5.34
317437_BUCKEYE_C	300	88.38	100	89.28
317437_BUCKEYE_C	200	79.15	118.32	197.15
317437_BUCKEYE_C	81.68	0		0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: BUCKEYE_CR

Reach	River Sta.	Contr.	Expan.
317437_BUCKEYE_C	1370	.1	.3
317437_BUCKEYE_C	1200	.1	.3
317437_BUCKEYE_C	1050	.1	.3
317437_BUCKEYE_C	923.73	.1	.3
317437_BUCKEYE_C	779.43	.1	.3
317437_BUCKEYE_C	719.69	.1	.3
317437_BUCKEYE_C	662.01	.1	.3
317437_BUCKEYE_C	606.9	.1	.3
317437_BUCKEYE_C	555.72	.1	.3
317437_BUCKEYE_C	482.3	.1	.3
317437_BUCKEYE_C	432.35	.1	.3
317437_BUCKEYE_C	370	.1	.3
317437_BUCKEYE_C	300	.1	.3
317437_BUCKEYE_C	200	.1	.3
317437_BUCKEYE_C	81.68	.1	.3

HEC-RAS HEC-RAS 6.1.0 September 2021
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: 317437_BUCKEYE_CR
Project File : 317437_BUCKEYE_CR.prj
Run Date and Time: 1/3/2022 5:10:13 PM

Project in English units

PLAN DATA

Plan Title: 317437 -PROPOSED ANALYSIS
Plan File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.p01

Geometry Title: PROPOSED GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g04

Flow Title : STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Plan Summary Information:

Number of:	Cross Sections	= 15	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	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: STEADY FLOW 100-YR
Flow File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.f01

Flow Data (cfs)

River	Reach	RS	100-YR
BUCKEYE_CR	317437_BUCKEYE_C	1370	7350

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
BUCKEYE_CR	317437_BUCKEYE_C	100-YR		

Normal S = 0.002

GEOMETRY DATA

Geometry Title: PROPOSED GEOMETRY
Geometry File :
p:\310-000\317-437\-Calculations\HECRAS\MODEL\HECRAS\317437_BUCKEYE_CR.g04

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 1370

INPUT
Description:
Station Elevation Data   num=   260

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	846.91.609985	846.252.150024		846.026.029968		844.076.109985		844.04	

6.279968	843.95	7.48999	843.25	10.17999	841.69	13.63	839.82	13.84998	839.69		
14.20001	839.53	17.73999	837.82	18.21997	837.62	19.29999	837.17	22.22998	835.82		
23.71997	835	26.25	833.69	28.14001	832.59	30.27002	831.45	32.02997	830.5		
37.59998	827.21	37.95001	827.02	38.08002	826.94	42.32001	824.94	43.07001	824.59		
46.33002	823.05	50.26001	821.24	50.42999	821.16	54.37	819.45	7.77997	817.8		
58.38	817.55	59.09998	817.26	61.02997	816.46	65.14001	814.97	66.41998	814.49		
69.75	813.29	70.52002	813.02	71.37	812.77	74.45001	811.74	76.28	811.1		
76.82999	81	179.16998	810.98	82.48001	810.99	85.63998	810.96	86.5	810.95		
90.06	810.81	90.51999	810.89	0.89999	810.77	94.53	810.43	94.57999	810.43		
95.01999	810.39	98.54999	810.13	101.93	809.87	102.93	809.83	106.58	809.64		
107.75	809.61	112.97	809.4	115.56	809.32	121.44	809.13	122.71	809.07		
125.45	809.08	126.67	809.08	127.48	809.08	138.71	809.2	138.72	809.2		
138.78	809.2	142.62	809.31	142.72	809.3	149.19	809.93	149.6	809.98		
150.41	810.06	151.98	810.23	154.79	810.47	157.12	810.42	158.8	810.36		
160.83	810.15	162.82	809.97	165.25	809.79	166.84	809.67	169.67	809.54		
170.85	809.48	174.1	809.4	174.87	809.37	178.52	809.37	179.19	809.36		
182.54	809.4	182.9	809.4	182.92	809.4	182.94	809.4	184.13	809.42		
187.65	809.49	187.73	809.49	187.81	809.47	191.65	809.02	193.91	809.05		
194.95	809	196.21	808.96	198.41	808.87	200.61	808.84	202.99	808.86		
206.08	808.9	213.24	809.07	217.43	809.09	218.71	809.11	219.06	809.11		
222.75	809.05	223.07	809.04	226.3	808.95	227.09	808.92	227.17	808.93		
231.11	808.88	234.38	808.9	235.54	808.94	236.01	808.89	239.14	808.93		
240.5	808.94	243.16	808.83	247.33	808.81	250.1	808.78	251.19	808.78		
253.71	808.71	255.21	808.67	258.13	808.47	259.22	808.4	262.55	807.83		
263.24	807.73	266.97	805.9	267.26	805.78	267.41	805.71	270.07	803.02		
271.27	801.82	271.97	801.03	272.62	800.87	273.51	800.45	274.56	800.11		
275.19	799.88	278.66	799.83	282.74	799.85	283.32	799.84	283.96	799.84		
286.31	799.88	286.57	799.89	291.36	799.95	293.51	800.02	295.38	800.08		
297.93	800.26	300.61	800.4	301.95	800.46	302.71	800.62	303.5	800.65		
304.37	801.59	305.02	802.22	305.79	803.03	307.43	804.72	309.15	806.46		
309.79	807	314.38	807.54	315.32	807.64	315.46	807.67	319	808.12		
319.48	808.19	322.68	808.63	323.49	808.71	324.32	808.71	326.97	808.78		
327.51	808.7	328.35	808.73	330.91	808.36	331.53	808.12	332.75	807.84		
334.5	807.7	337.74	807.89	341.08	808.03	346.58	808.4	348.03	808.51		
348.9	808.57	352.9	808.84	354.68	808.93	356.64	808.97	358.33	808.97		
364.62	808.98	371.28	809.04	374.19	809.12	375.71	809.14	377.54	809.18		
379.73	809.29	382.9	809.41	385.23	809.59	387.76	809.73	390.81	809.97		
392.52	810.12	395.69	810.27	396.26	810.26	399.81	810.34	401.36	810.38		
407.85	810.58	408.5	810.61	414.66	810.85	415.88	810.93	417.35	811		
419.9	811.18	421.77	811.41	423.91	811.72	425.7	812	428.74	812.71		
429.18	812.79	429.6	812.81	433.05	812.82	435.96	812.93	436.73	812.97		
441.84	813.22	447.77	813.5	448.01	813.51	448.31	813.52	452.03	813.75		
457.75	814.17	460.06	814.35	460.78	814.41	463.43	814.62	467.1	814.87		
469.34	815.05	469.44	815.05	469.63	815.05	472.12	815.03	474.84	815.07		
477.62	815.08	480.15	815.17	482.45	815.24	484.17	815.31	488.11	815.38		
488.14	815.38	488.18	815.38	488.24	815.38	494.46	815.31	496.22	815.28		
499.28	815.25	501.38	815.24	504.61	815.24	509.56	815.29	510.8	815.31		
514.74	815.39	521.75	815.56	530.51	815.77	545.41	816.18	548.17	816.24		
549.51	816.29	552.45	816.38	555.21	816.48	568.56	816.94	570.16	816.98		
573.11	817.05	574.22	817.08	576.55	817.07	576.56	817.07	576.57	817.07		
580.57	816.83	580.84	816.88	584.39	816.54	584.59	816.6	585.06	816.86		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	263.24	.055	309.79	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
263.24	309.79	170.24	170	171.01	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1200

INPUT
Description:
Station Elevation Data num= 235

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	848.5	4.899902	848.28	4.109985	846.71	4.51001	846.55	7.789978	845.09
8.52002	844.77	11.97998	843.22	12.16003	843.12	12.76001	842.91	13.83002	842.37
16.41998	841.15	19.01001	839.69	20.57001	838.81	22.66998	837.66	24.59003	836.6
26.19	835.73	28.60999	834.42	29.98999	833.73	7.02002	830.07	38.03003	829.54
38.85999	829.12	39.56	828.83	40.66003	828.43	43.58002	827.16	44.66998	826.68
48.26001	824.78	48.69	824.57	52.31	822.59	53	822.23	53.63	821.89
63.83002	816.31	65.85999	815.24	67.08002	814.66	68.78003	813.94	71.32001	812.89
73.55002	811.93	79.89001	809.97	80.77002	809.64	81.37	809.6	84.84	808.94
87.34	808.67	88.86002	808.58	9.01001	808.49	92.88	808.24	93.44	808.24
96.89001	808.34	99.82001	808.53	101.31	808.66	102.14	808.66	104.16	808.66
104.93	808.62	111.61	808.63	114.72	808.62	116.98	808.63	118.16	808.65
120.99	808.68	128.56	808.84	129.03	808.84	129.12	808.85	131.1	808.88
136.83	808.98	137.08	808.99	137.66	808.98	141.08	808.99	142.56	808.98
150.93	808.91	153.13	808.87	154.08	808.87	155.76	808.87	158.97	808.87
163.29	808.87	170.4	808.91	175.21	808.95	181.55	808.96	187.55	809.04
192.08	809.01	193.3	808.99	195.16	808.85	197.31	808.73	199.58	808.58
201.33	808.51	204.01	808.4	205.35	808.36	208.43	808.39	209.36	808.39
212.85	808.79	213.38	808.81	217.27	808.51	217.4	808.5	218.63	808.32
221.41	807.92	221.7	807.88	225.43	807.3	226.12	807	229.45	805.64
230.54	804.89	233.47	802.88	234.73	801.91	235.62	801.24	237.14	800.16
237.83	799.72	238.56	799.76	249	800.39	249.23	800.41	250.61	800.51
253.55	800.71	254.97	800.85	256.44	800.73	257.57	800.54	257.97	800.58
261.58	801.02	265.33	801.68	265.6	801.74	265.78	801.77	269.84	802.38
271.63	802.59	273.06	803.02	273.47	803.03	273.63	803.05	274.08	803.06
274.86	803.42	277.65	805.12	279.19	805.86	281.67	807.06	283.62	807.48
285.68	807.9	288.04	808.15	289.7	808.35	292.46	808.27	294.09	808.42
300.92	807.7	301.75	807.59	305.73	807.22	305.77	807.22	306.15	807.2
309.78	806.99	309.99	807.01	310.15	806.99	313.8	806.89	316.84	806.68
319	806.38	321.84	806.08	323.42	805.92	327.87	805.55	329.87	805.45
332.27	805.41	333.89	805.3	336.69	805.29	338.57	805.04	340.99	805.31
341.92	805.48	345.53	805.78	345.94	805.81	349.91	806.08	349.95	806.09
349.96	806.09	353.97	806.3	354.38	806.31	357.99	806.6	360.08	806.95
361.16	806.97	363.01	806.97	366.02	806.68	367.47	806.66	369.75	806.66
372.07	806.89	374.05	807.03	375.7	807.2	378.07	807.36	379.38	807.42
380.49	807.43	386.1	807.67	388.36	807.68	394.07	807.84	394.14	807.84
394.16	807.84	394.24	807.85	400.47	808.09	402.17	808.19	405.14	808.37
406.19	808.39	409	808.49	414.22	808.75	417.82	808.94	422.26	809.09

428.68	809.1	430.29	809.11	431.3	809.1	436.96	809.07	440.2	809.23
442.34	809.29	444.68	809.4	446.38	809.48	449.34	809.65	452.96	809.79
458.2	810.07	462.42	810.27	468.04	810.58	470.46	810.7	477.88	810.95
478.49	810.99	478.72	811.01	482.51	811.17	486.08	811.43	489.09	811.67
489.76	811.7	490.54	811.76	492.64	811.95	498.57	812.45	500.04	812.6
502.67	812.84	507.13	813.28	516.01	814.03	520.46	814.38	523.7	814.67
526.08	814.8	526.92	814.85	527.89	814.88	530.71	814.88	531.29	814.89
535.07	814.88	535.98	814.85	536.31	814.83	536.7	814.83	537.09	814.84
541.51	815	541.56	815	541.58	815	547.56	815.02	550.18	815.05
554.14	815.06	556.57	815.12	560.36	815.24	567.63	815.44	581.82	815.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	225.43	.055	289.7	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
225.43	289.7	110.41	150	168.17	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 1050

INPUT
Description:
Station Elevation Data num= 252

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	853.03	8699951	852.61	1.059998	852.53	1.390015	852.37	5.210022	850.49
6.530029	849.81	8.400024	848.86	11.40002	847.78	13.03998	847.21	3.58002	846.98
13.64001	846.98	14.08002	846.78	17.65002	844.95	23.35004	842.23	28.29999	839.72
30.10004	838.81	33.38	837.22	34.25	836.79	36.63	835.63	38.40002	834.77
39.87	834.11	42.22998	832.97	43.38	832.42	45.37	831.47	50.85004	828.87
52.89001	827.94	54.77002	827.07	58.72003	825.25	9.15002	825.01	60.28003	824.46
63.29999	822.95	65.90002	821.62	70.19	819.39	71.60004	818.65	72.44	818.19
75.29999	816.85	75.75	816.64	75.91998	816.56	79.90002	814.86	81.66003	814.1
84.04999	813.09	87.39001	811.72	88.20001	811.39	90.32001	810.62	92.35004	809.89
95.16003	809.1	98.85999	808.29	100.65	807.98	104.59	807.48	104.8	807.46
105.34	807.43	111.42	807.16	116.06	807.1	117.56	807.04	120.37	807.05
124.74	807.05	125.55	807.06	125.93	807.06	126.44	807.05	129.22	807.1
133.26	807.14	138	807.2	139.51	807.29	140.69	807.37	146.3	807.5
150.44	807.65	154.6	807.81	158.46	807.92	161.38	808.04	162.9	808.12
166.7	808.22	167.05	808.23	167.66	808.22	171.2	808.21	173.4	808.11
175.35	808.02	182.36	807.65	187.8	807.34	188.73	807.3	191.95	807.25
192.53	807.22	195.48	807.3	196.1	807.31	196.33	807.31	200.25	807.21
202.06	807.05	204.4	806.84	207.8	806.19	208.55	806.09	208.97	806.01
212.68	805.1	213.1	804.99	213.13	804.99	215.47	805.66	219.26	805.48
220.99	805.54	225	803.82	225.14	803.75	225.53	803.56	229.29	801.69
230.83	801.11	232.65	800.27	232.85	800.18	232.92	800.16	233.59	800.12
237.95	799.81	240.08	799.73	240.55	799.71	241.74	799.65	242.2	799.65
245.89	799.64	247.93	799.72	250.04	799.8	253.67	800.05	254.19	800.08
254.49	800.11	255.57	800.24	260.03	800.77	261.65	801.03	263.52	801.29
265.66	801.7	266.58	802.34	267.76	803.1	270.77	805.18	270.79	805.19

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  270.87  805.22  274.94   807.3   276.6  807.44  279.49  807.95  282.43  807.69
  283.24  807.56  285.62  807.28  287.39   807.1  290.26     807  291.94     807
  292.14     807  303.27  806.97  303.58  806.96  305.27  806.91  309.77   806.8
  314.16  806.63  319.52  806.41  326.67  806.31   328.6  806.27  328.89  806.27
  329.11  806.27  330.95  806.24  335.78  806.27  337.19  806.29  339.03  806.32
   345.4  806.51  345.47  806.51  345.59  806.52  349.59  806.71   352.4   806.8
  360.62  807.06  362.05  807.14  364.14  807.33  366.24   807.6  373.03  808.37
  374.34  808.51  375.76  808.66  378.43  808.95  380.77  809.14  385.54  809.38
  386.99  809.46  390.78  809.69  395.29  809.94  398.36  810.14  402.05  810.36
  404.07  810.45  407.74  810.74  410.45  810.87  413.31  810.94  416.41  810.96
  420.17  810.95  420.37  810.94  429.11  810.83  435.85  810.74  436.78  810.73
  436.85  810.73  437.03  810.73  449.23  810.65  460.86  810.58  463.96  810.64
  471.69  810.62  474.72  810.62  477.75  810.52   478.6  810.48  482.43  810.34
  484.53   810.3  486.39  810.29  494.88  810.11  495.01  810.11  502.39  810.13
  506.51  810.21  507.33  810.22   507.9  810.23  510.97  810.29  519.04  810.46
  523.14   810.5  530.09  810.59  530.88  810.58  534.61  810.52  536.02  810.44
  541.01  810.49  544.37   810.5  544.68   810.5  545.05  810.51  560.57  810.49
  564.68  810.49  575.25  810.47  587.33  810.41  601.81   810.3  602.52  810.29
  603.04  810.29  609.87  810.29  612.67  810.28  615.23  810.32  617.34  810.35
  619.22  810.39  619.37  810.39  619.63   810.4   623.5  810.47  626.15  810.52
  627.52  810.57  628.29  811.04  629.17  811.17  631.77  811.45  632.72  811.58
  637.57  812.09  644.32  812.81  645.25  812.92  646.33  813.01   648.3  813.08
  650.45  813.16  659.52  813.45  660.66  813.52  664.85   813.7  684.21  814.29
  686.67  814.37  688.96  814.44  693.36  814.57  697.34  814.69   699.2  814.76
  699.86  814.76  700.29  814.76  701.27  814.74  704.53  814.74  706.17  814.74
  706.71  814.74  707.57  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  220.99    .055  279.49     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        220.99  279.49           168.68  126.27  101.85             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 923.73

INPUT
Description:
Station Elevation Data    num=     254
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  843.17 1.26001  843.015.950012   842.57.960022  842.29    8.75  842.22
10.67004     84213.29004   841.6   15.44  841.3217.29004  841.0520.17999  840.68
   22.69   840.323.70001   840.127.17004   839.329.32001  838.7732.59003  837.91
33.07001  837.7933.98004  837.4537.34003  836.2739.60004  835.4241.76001  834.59
45.28003  833.1845.40002  833.1445.45001  833.1251.77002  830.5854.42999  829.55
61.39001  826.8964.08002  825.85   69.31  823.7971.79004   822.773.41003  821.97
75.47003  821.0777.42004  820.19   81.31  818.5482.59003  817.9884.65002  817.02
89.45001  814.8891.89001  813.8193.46002   813.296.91003  811.7197.95001  811.25
   102.8  809.29  103.31  809.01  104.34  808.99  109.49  808.84   111.7  808.79
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  116.04  808.64  118.15  808.61  120.53  808.61  122.06  808.61  127.71  808.74
  129.53  808.78  136.21  808.88  137.66   808.9  140.67  808.88  142.36  808.86
  145.57  808.75  148.63  808.75  151.57  808.83  154.11  808.81  155.77  808.83
  164.33  808.83  169.45  808.83  169.63  808.83  177.07  808.82  177.63  808.83
  178.39  808.84  181.64  808.88  184.46  808.99  187.11  808.99   193.1  808.93
  195.54  808.88  201.69  808.74  206.91  808.56   209.7  808.45  212.69  808.36
  213.71   808.3  216.98  808.35  217.72   808.3  220.07  808.54  220.53  808.58
  220.67  808.57  220.93  808.51  221.73  808.25  225.56  807.25  225.74  807.22
  228.31  806.12  229.71  805.53  229.74   805.5  229.84  805.41  229.86  805.39
  233.74  802.55  236.33  800.52  236.92     800  238.37  799.84  241.07  799.79
  247.42  799.69  254.52  799.57  260.97  799.46  261.69  799.46  266.39     800
  267.66  800.63  270.27     802  274.62  803.32   276.6     804  277.44   804.3
   281.3  805.08  281.97  805.08  282.77  805.09  289.87  805.12  291.24  805.12
  292.67  805.09  294.17  805.08  311.77     805  312.75  804.98  313.92  804.99
  317.54     805   332.2  805.02  335.02  805.03  339.05  805.07  341.34   805.2
  343.74  805.23  345.62  805.29  346.31  805.32     350  805.57  351.98  805.71
  353.84   805.9  360.26  806.66  362.03  806.87  365.13  807.29  370.04  807.94
  372.65  808.25  373.84   808.4  375.64  808.48  378.06  808.67  379.93  808.67
  382.07  808.72  384.22  808.66  386.08  808.62  389.15  808.48  394.09  808.29
  409.21  807.69  409.85  807.66  410.04  807.65  410.13  807.65  410.29  807.64
  412.71  807.57  418.37  807.39   420.8  807.49  422.15  807.56  422.81  807.57
  424.54  807.66   429.1  807.86  434.18  808.02  436.63  808.14  440.26  808.29
  443.02  808.44  446.34  808.56  452.48  808.88  454.22  808.94  455.44  808.99
  459.11  809.16  462.24  809.22  474.25  809.52  474.26  809.52  485.86  809.72
  492.93  809.76  493.67  809.78  494.05  809.78   499.2  809.78  506.33  809.77
  516.48  809.63  517.57  809.62  518.07   809.6  518.72  809.58  519.42  809.57
  526.37  809.53  526.76  809.53537.4301  809.64   538.4  809.66  541.99  809.77
  550.42  809.95   551.9  809.99  553.28  810.01  560.08  810.08   567.5  810.17
  571.08  810.14  571.87  810.17   572.9  810.14  575.86  810.06  578.19  810.03
  578.51  810.02  585.69  809.97  588.88  809.92  589.79   809.9  591.42   809.9
   595.2  809.96  596.52  809.99  599.03  810.06  600.03  810.14  602.11  810.21
  604.33  810.23  612.83  810.29  618.57  810.28  622.73  810.28  629.93   810.2
  630.44   810.2  630.92  810.18  642.15  809.94  643.07   809.9  644.11  809.83
  645.21  809.86   647.4  809.82  648.31  809.89  650.67  809.97  651.68  810.02
  654.47  810.07  655.98  810.08  657.55  810.08  660.29  810.12  663.71  810.17
  664.59   810.2  666.79   810.3   668.9  810.45  669.87  810.54  680.93  811.99
  682.19  812.16  683.15  812.28  685.27  812.55  688.07   812.8  690.55  813.05
  691.43  813.07  697.02  813.25  699.95  813.34  700.97   813.4  701.78  813.43
  703.04  813.49  704.31  813.56  707.44  813.69  728.12  814.35  728.76  814.36
  728.91  814.37  729.25  814.38  729.41  814.38  729.61  814.39  731.94  814.49
  738.34  814.72  741.36  814.73  743.12  814.74  743.86  814.73  746.42  814.72
  747.75  814.73   748.2  814.72   749.2  814.84  749.83  815.04

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  220.93    .055  281.97     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        220.93  281.97           209.68   144.3   84.88             .1       .3

CROSS SECTION
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RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 779.43

INPUT
Description:
Station Elevation Data num= 285

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.73	1.730042	836.48	3.530029	836.21	6.030029	835.97	6.619995	835.87
8.150024	835.61	0.32001	835.22	12.79999	834.63	14.60999	834.14	16.60999	833.58
19.17999	832.85	22.07001	832.02	22.54004	831.89	27.13	830.54	29.73004	829.78
31.34003	829.29	31.78003	829.15	34.42999	828.35	36.07001	827.83	37.52002	827.33
40.35999	826.34	40.47003	826.34	1.23004	826.01	43.70001	825.06	44.66003	824.74
46.79004	824.05	48.95001	823.48	52.26001	822.66	52.97003	822.49	53.23999	822.42
56.67999	821.41	57.65002	821.11	60.89001	819.96	66.12	818.08	68.41998	817.28
74.32001	815.47	74.64001	815.37	74.70001	815.35	74.95001	815.29	78.98999	814.27
80.78003	813.88	3.29004	813.13	84.19	812.88	85.35004	812.55	89.02002	811.5
91.87	810.55	93.13	810.21	96.16003	809.52	96.38	809.5	99.31	809.32
100.46	809.32	102.4	809.21	104.75	809.13	105.49	809.07	107.41	808.91
108.58	808.83	109.04	808.8	110.08	808.72	113.33	808.48	114.76	808.38
117.62	808.26	117.85	808.25	118.44	808.25	120.94	808.21	121.92	808.22
124.03	808.29	126.21	808.47	127.12	808.53	129.47	808.79	130.45	808.91
132.99	808.98	134.79	808.91	136.39	808.85	139.09	808.57	139.48	808.54
143.38	808.24	145.66	808	147.67	807.86	151.52	807.5	151.84	807.48
151.96	807.48	152.24	807.47	155.96	807.05	156.61	807.2	156.98	807.22
158.09	806.9	160.55	805.71	161.11	805.42	162.55	804.89	164.2	804.13
164.84	804.02	166.6	803.46	167.52	803.64	168.4	804.09	169.66	804.63
170.23	804.79	173.42	805.05	173.47	805.07	173.58	805.08	177.72	805.59
178.41	805.69	181	806.77	182.01	807.35	183.28	808.19	184.61	808.38
185.83	808.83	186.3	808.89	188.92	808.6	190.59	808.6	192.01	808.52
194.89	808.42	195.1	808.43	195.64	808.46	198.18	808.56	199.18	808.44
201.28	808.47	203.47	808.12	204.37	808.05	206.67	807.34	207.46	807.12
207.76	807.07	210.55	806.15	212.05	806.04	212.93	805.68	215.82	806.12
216.35	806.29	216.67	806.44	217.7	806.46	220.31	806.81	220.64	806.79
222.9	806.53	224.93	806.42	225.99	806.36	232.01	805.96	233.52	805.9
234.53	805.88	236.68	805.67	239.38	805.43	241.07	805.4	244.02	805.62
247.62	806.1	249.4	806.59	250.71	806.78	250.78	806.77	253.8	806.67
254.98	806.45	256.71	806.35	05 256.72	806.35	258.99	805.27	259.27	805.01
260.36	801.36	260.73	800.31	261.04	800	261.31	799.72	263.07	798
274.47	797.88	283.44	797.78	287.62	797.83	295.78	797.91	300.2	797.96
303.83	798	304.72	798.89	305.88	800	306.9	801.05	307.86	802
323.65	802.4041	332.48	802.63	352.89	803.11	367.27	803.47	389.79	804
397.17	805.08	401.03	805.65	403.92	806	409.05	806.91	415.2	808
416.5	808.08	429.92	808.86	430.63	808.86	439.19	808.75	439.45	808.75
439.73	808.74	440.35	808.72	443.84	808.63	445.37	808.62	447.33	808.58
450.51	808.6	454.64	808.63	456.68	808.65	467.68	808.6	471.42	808.64
473.18	808.53	475.27	808.49	477.02	808.43	480.79	808.29	483.89	808.2
485.53	808.1	491.32	807.84	492.33	807.79	497.89	807.66	499.33	807.64
503.93	807.67	504.16	807.67	504.45	807.67	508.98	807.68	510.25	807.69
512.51	807.75	512.99	807.76	520.15	807.93	532.4	808.12	533.97	808.18
540.36	808.47	541.74	808.52	542.56	808.53	543.77	808.53	550.42	808.67
552.79	808.72	555.43	808.75	556.11	808.77	567.5	809.12	568.52	809.16
568.96	809.18	578.86	809.46	590.59	809.69	592.78	809.71	602.47	809.99
602.95	810	603.71	810.01	609.13	810.04	611.23	810.01	621.79	809.93

623.53	809.92	624.11	809.92	624.57	809.91	632.69	810.05	636.79	810.15
636.93	810.15	636.99	810.15	650.3	810.25	652.85	810.24	654.67	810.24
658.19	810.2	662.74	810.19	665.37	810.19	675.62	809.94	677.1	809.93
678.44	809.83	679.99	809.8	683.28	810.07	684.2	810.1	686.37	810.09
688.49	810.09	689.46	810.06	691.94	810.03	692.55	810.03	692.79	810.03
693.33	810.04	697.08	810.06	698.73	810.09	701.37	810.23	701.82	810.28
702.97	810.4	704.91	810.59	707.38	810.91	717.27	812.3	719.6	812.58
720.73	812.76	723.32	813.02	726.54	813.12	727.53	813.15	733.95	813.34
734.48	813.37	735.77	813.42	737.76	813.51	738.87	813.57	741.61	813.69
759.59	814.26	762.98	814.34	763.77	814.37	765.65	814.42	766.49	814.44
767.24	814.49	767.58	814.5	772.32	814.69	775.34	814.7	777.45	814.71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	256.71	.055	323.65	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
256.71	323.65	55.27	59.74	21.26	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 719.69

INPUT
Description:
Station Elevation Data num= 276

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	8404.030029	839.28	5.77002	838.96	5.930054	838.99	0.290039	837.83	
9.960022	837.62	12.87006	836.37	13.99005	835.96	16.45001	835.02	20.06006	833.75
22.06006	833.03	24.84003	832.04	30.12006	830.18	30.76001	829.93	35.79004	828.06
37.91003	827.27	38.19	827.18	38.53003	827.07	45.07001	824.95	45.74005	824.75
46.25	824.53	47.77002	823.97	50.28003	823.08	52.23004	822.42	54.31006	821.71
55.57001	821.28	58.35004	820.36	61.63	819.26	2.59003	818.88	66.33002	817.43
66.46002	817.37	67.54004	816.93	70.12006	815.87	70.44	815.74	73.69	814.49
74.47003	814.19	75.07001	813.98	78.05005	812.89	80.10004	812.34	82.54004	811.55
83.46002	811.29	84.43005	811.14	89.34003	810	90.60004	809.87	91.58002	809.82
94.63	809.37	95.16003	809.45	98.67004	810.75	98.74005	810.76	101.4901	811.25
105.15	811.23	106.73	811.2	111.32	811.18	113.7	811.17	115.04	811.03
115.3101	810.99	115.67	810.81	118.83	808.94	120.76	807.82	122.33	807.24
122.86	807.28	126.29	807.14	126.7	807.13	130.14	807.16	140.02	807.17
145.25	807.12	147.05	807.11	148.14	807.1	152.5	807.03	155.1201	807.01
155.98	806.9	159.15	806.65	159.5601	806.53	162.82	806.02	163.14	805.97
163.1801	805.96	166.72	805.27	167.21	805.18	170.3	804.09	171.2401	803.89
173.8701	803.75	175.28	803.37	177.09	803.15	180.78	802.92	182.89	802.34
183.33	802.31	184.61	802.06	187.3701	801.49	188.1801	801.32	191.41	800.85
191.76	800.78	194.57	800.99	195.26	801.04	198.1201	801.63	198.17	801.64
198.85	801.79	200.6801	802.09	201.54	802.27	202.5	802.41	203.5	802.54
207.44	802.86	207.94	802.9	208.22	802.91	211.57	803.15	213.23	803.41
215.6	803.75	216.8101	803.98	219.63	804.51	221.13	805.1	222.98	804.97
223.66	804.75	226.33	804.33	227.5601	804.07	227.69	804.13	231.1201	804.51
231.73	804.61	234.7	804.91	235.27	804.99	236.22	805	236.57	805

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  240.73  805.03  242.54  805.06243.7401  805.08  247.14  805.21  250.91  805.29
  252.46  805.35   253.6   805.3  254.95  805.28     256  805.24  257.79     805
260.0601  804.93  260.64  804.89   261.1  804.89263.4901  804.62  265.38  804.61
  268.25   804.3  269.19  803.83  270.15  802.83  270.45     802  270.89  801.57
272.4901     800274.4901  798.16  274.66     798  275.83  797.98  276.57  797.97
  278.66  797.94  295.22  797.69  300.42  797.77  309.02   797.9  315.77     798
  316.48  798.59  318.15     800  320.35   801.5  321.02     802     329802.1833
  362.82  802.96   408.3     804  412.57  804.48  426.17     806  429.01  806.57
  436.18     808  440.38  808.36  442.03  808.51  443.46  808.61  444.28  808.62
   445.6  808.65  446.58  808.65   449.5  808.66  451.48  808.72  455.98  808.88
  456.42   808.9  456.85  808.91  464.77  808.87  465.38  808.86  469.87  808.87
  472.34  808.88  473.38   808.9  474.96  808.91  479.85  808.96  480.15  808.96
  482.45  808.95  485.95  808.79  487.62  808.72  488.51  808.65  489.13  808.64
  490.22  808.59  493.18  808.48  495.36   808.4  499.58  808.29  500.71  808.21
  504.66  808.04  510.33  807.78  513.05  807.71  516.01  807.66  516.14  807.66
  516.46  807.65  521.03  807.59   524.6   807.6   525.4  807.59  527.42   807.6
  543.35  807.86  546.09  807.95551.0601  808.18554.6801  808.37   555.6  808.39
  557.32   808.5   561.6  808.59  563.27  808.58  565.52  808.59  567.57  808.61
  569.97  808.67  575.97  808.85  581.59  809.05  584.04  809.16   590.3  809.34
  605.64  809.63   608.5  809.66  612.95  809.79617.9901  809.97  621.75  809.98
  624.16     810   632.2  809.95  636.32  809.93  639.59  809.88  644.91  809.97
  647.75  810.04  649.21  810.06  650.33  810.09  652.79  810.13  665.87   810.2
  667.37  810.21674.9901  810.19   681.2  810.18  687.88  810.02692.0601  809.98
692.1801  809.97  694.73  810.04  696.47  810.18  697.86  810.37  700.02  810.29
  700.76  810.21  701.32  810.17  702.72  810.12   704.4  810.07705.0601  810.06
  706.57  810.04  709.36  809.98  710.87  809.87  713.66  809.98713.6801  809.98
  716.75   810.3  717.95  810.42  724.63  811.37732.1801  812.44  733.42  812.59
   735.9  812.97  736.09     813  736.44  813.01739.4301  813.12  746.54   813.3
  747.78  813.34  747.86  813.34  749.58  813.41  752.26  813.53  753.22  813.59
  755.59  813.69   771.2  814.18  776.98  814.33  778.33  814.37  781.51  814.46
  782.94  814.49783.4901  814.53  784.73  814.56  787.41  814.67789.1201  814.68
  792.78  814.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  268.25    .055     329     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        268.25     329             7.44   57.68  143.59             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  101.49  811.25       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 662.01

INPUT
Description:
Station Elevation Data    num=     294
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
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0	840.25	1.290039	839.98	3.460022	839.48	4.690002	839.23	5.929993	838.9
10.42999	837.24	11.52002	836.86	15	835.58	15.97003	835.24	17.67004	834.62
19.57001	833.93	24.14001	832.31	26	831.67	27.89001	831	28.38	830.81
31.66003	829.43	33.97003	828.52	35.87	827.71	37.89001	826.93	39.71002	826.35
41.17004	825.81	43.73999	824.97	44.77002	824.64	7.77002	823.59	49.54999	822.99
55.58002	82	155.83002	820.92	59.17999	819.75	60.22003	819.43	63.07001	818.29
64.45001	817.62	66.11005	816.89	74.42999	813.68	77.17999	812.58	79.98999	811.58
83.57001	810.92	83.86005	810.84	84.38	810.78	87.36005	810.64	87.98004	810.6
88.04999	810.69	1.58002	810.64	92.08002	810.62	93.70001	810.81	94.85004	810.99
98.78003	810.99	100.14	811.08	104.19	811.07	108.19	811.07	110.43	811.05
112.33	811.04	112.38	810.99	112.56	810.6	115.24	808.44	116.25	808.36
116.78	808.26	120.28	807.28	120.38	807.27	122.19	806.99	122.75	806.97
136.05	807.05	149.18	807.12	153.4	807.09	153.62	807.09	153.69	807.09
156.39	806.82	156.53	806.79	159.98	805.43	160.56	805.27	163.58	804.02
164.69	803.45	167.69	802.96	170.43	802.94	172.64	802.86	175.89	802.88
177.14	802.95	177.99	802.97	184.73	803.04	185.19	803.03	187.79	802.99
188.75	802.77	188.79	802.77	189.05	802.72	192.39	802.01	192.78	801.92
195.99	801.78	196.81	801.83	199.59	801.92	201.2	802.26	204.2	802.23
208.02	801.81	210.04	801.49	211.14	801.06	212.52	801.18	214.76	801.99
216.45	802.78	217.59	803.1	220.98	804.06	221.19	804.11	222.94	804.41
224.79	804.74	225.01	804.74	228.39	805.16	229.04	805.17	231.99	805.27
233.06	805.23	235.59	804.87	237.09	804.74	239.19	804.31	241.12	804.27
241.93	804.04	244.51	804.89	244.63	804.94	244.81	804.97	249.18	805.01
249.99	805.05	250.28	805.05	253.19	804.99	254.22	804.97	259.82	804.07
261.21	803.77	261.83	803.57	264.21	803.25	265.21	803.33	267.06	803.2
269.22	803.13	273.77	802.92	277.24	802.83	279.19	802.19	279.95	802
281.86	800.49	282.53	800	283.88	798.69	284.66	798	294.74	797.83
299.67	797.75	303.58	797.68	307.6	797.61	310.32	797.65	311.03	797.66
313.01	797.7	321.6	797.5	322.62	797.52	329.34	797.97	329.83	798
330.18	798.21	332.97	800	334.49	800.9	336.35	802	352.84	802.88
363.98	803.36	17	378.74	804	383.37	804.36	389.33	804.83	397.56	805.52
402.74	806	405.18	806.99	415.89	807.13	417.01	807.22	417.81	807.29
418.34	807.29	424.21	807.27	435.24	807.34	437.56	807.36	438.65	807.37
440.69	807.37	445.58	807.38	448.26	807.39	449.59	807.37	452	807.36
453.6	807.35	454.8	807.38	460.82	807.24	461.61	807.22	466.67	807.14
469.63	807.11	476.81	807.02	478.02	807.01	481.65	807	481.91	807.01
482.58	807.01	488.36	807.06	491.03	807.04	493.68	807.07	493.94	807.07
494.08	807.07	500.28	807.04	500.71	807.04	506.23	807.02	509.7	807.04
513.32	807.01	516.47	807	517.69	806.98	519.98	806.88	522.96	806.68
523.83	806.68	530.64	806.56	532.01	806.56	533	806.55	540.01	806.56
547.1	806.52	556.55	806.53	561.47	806.49	562.47	806.49	563.44	806.54
569.02	806.77	571.23	806.85	572.24	806.89	573.2	806.96	581.36	807.49
585.96	807.99	586.3101	808.02	593.19	808.65	594.25	808.73	595.37	808.81
597.24	808.98	597.79	809.01	600.54	809	602.35	809.03	604.22	809.04
620.53	809.13	632.82	809.15	646.82	809.17	651.12	809.17	654.09	809.16
667.42	809.02	678.65	809.01	686.59	809.02	689.77	809	694.64	808.99
695.46	808.98	697.94	808.98	701.26	808.82	701.41	808.82	701.49	808.81
701.95	808.95	702.99	809.04	704.05	809.17	704.26	809.15	706.99	809.15
708.66	809.09	710.24	809.04	717.6	808.87	724.52	808.87	726.26	808.86
728.11	808.93	733.08	808.99	735.93	808.99	736.55	808.99	737.07	809
739.22	809.07	743.2	809.21	744.82	809.27	747.27	809.38	748.06	809.44
749.39	809.59	751.58	809.87	754.32	810.23	756.62	810.55	765.39	811.65
766.72	811.78	769.03	812.08	770.97	812.33	776.91	812.83	777.48	812.82

781.62	812.88	783.47	812.95	785.74	813.01	794.36	813.09	795.83	813.12
799.69	813.29	799.86	813.27	802.1	813.33	806.55	813.4	809.08	813.48
813.8	813.63	814.42	813.65	814.69	813.67	816.36	813.7	836.13	814.02
836.47	814.05	838.01	814.18	838.15	814.23	838.36	814.25	839.76	814.35
840.68	814.22	843.15	813.25	845.08	813.34	846.18	813.18	847.27	813.51
848.79	813.75	849.48	814.06	851.81	814.86	854.58	816.19		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	254.22	.055	363.98	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
254.22	363.98	6.58	55.11	38.66	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	100.14	811.08	F

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 606.9

INPUT
Description:
Station Elevation Data num= 323

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840.35	1.630005	839.96	2.469971	839.77	5.25	839.05	6.5	838.71
8.880005	837.96	10.52002	837.39	14.13	836.21	18.57001	834.67	19.75	834.29
22.59998	833.33	23.38	833.09	26.62	831.95	28.14996	831.26	28.81	831
30.59998	830.36	30.64001	830.35	34.26001	828.89	34.66998	828.72	35.17999	828.53
41.51001	825.97	42.71997	825.53	44.22998	824.99	48.20001	823.48	53.40997	821.72
54.78998	821.22	57.78998	820.12	59.63	819.44	66.83997	816.59	66.85999	816.58
66.88	816.57	66.89996	816.57	77.5	812.24	80.09998	811.16	80.38	811.06
80.60999	810.99	81.37	810.81	86.97998	809.98	87.96997	809.76	90.46002	809.74
90.89996	809.74	92.26001	810.09	94.32001	810.43	98.48999	810.75	99.51001	810.88
103.08	810.99	103.13	810.99	103.63	810.98	107.1	810.92	110.38	810.19
111.13	810.02	114.01	809.05	115.15	808.52	117.63	807.94	119.18	807.64
121.26	807.37	123.2	807.17	125.62	807.09	127.22	807	144.2	807.08
151.37	807.1	152.75	807.15	155.39	807.16	157.27	806.23	159.42	805.28
161.79	804.18	163.44	803.26	164.76	803.03	167.47	802.6	168.39	802.61
171.49	802.5	172.01	802.54	172.44	802.58	178.15	802.88	182.89	803
183.56	803.01	184.4	802.99	190.14	802.89	191.61	802.76	193.45	802.68
196.81	802.6	198.81	802.56	199.66	802.52	202.49	802.39	204.64	802.3
210.23	801.68	211.91	801.64	213.36	801.42	213.92	801.31	214.63	801.5
219.78	802.92	222.76	803.66	223.8	803.89	226.39	804.49	227.83	804.76
230.01	805.3	231.85	805.56	232.86	805.87	238.38	804.86	239.65	804.45
239.9	804.43	240.89	804.37	243.92	804.27	245	804.25	249.93	804.56
250.01	804.56	252.92	804.58	254.2	804.57	255.39	804.35	256.5	803.93
258.32	803.91	258.98	803.84	260.84	804.26	264.69	804.13	266.29	804.18
270.58	804.34	271.34	804.35	271.74	804.19	276.47	802.58	277.19	802.27
279.68	801.37	282.36	801.14	285.34	800.77	286.54	800.18	287.2	800.05
287.24	800	288.16	799.65	292.09	798	295.74	796.4	296.5	796

300.05	796	309.89	796	329.18	796	331.99	796	336.15	797.76
336.72	798	337.42	798.3	341.27	800	342.63	801.36	343.28	802
344.42	802.57	348.03	804	348.05	804.0087	350.37	805.02	355.49	806
355.66	806.01	369.85	807.15	369.93	807.15	370.09	807.15	370.38	807.14
370.44	807.14	370.83	807.17	375.8	807.26	377.26	807.34	383.63	807.54
385.53	807.78	388.01	807.89	388.56	807.92	389.8	807.95	391.59	808.01
392.38	808.01	394.62	808.01	396.76	807.95	397.65	807.91	399.65	807.78
400.68	807.73	402.32	807.67	405.97	807.47	406.24	807.47	419.93	807.41
424.15	807.42	429.21	807.47	434.02	807.51	436.85	807.58	437.79	807.58
440.53	807.47	443.11	807.45	448.92	807.38	449.15	807.37	449.34	807.37
452.15	807.36	458.26	807.33	458.64	807.33	462.94	807.31	465.99	807.24
466.79	807.19	468.63	807.15	470.39	807.09	477.2	807.02	478.6	807
480.44	807.05	485.54	807.14	487.95	807.31	488.29	807.32	488.45	807.32
491.6	806.95	492.73	806.87	494.4	806.91	500.69	806.9	501.8	806.91
504.74	806.94	514.09	807.03	517.9	807.02	519.31	807.04	520.44	807.04
523.69	807.07	527.75	806.97	528.06	806.96	529.59	806.93	530.05	806.93
537.61	807.07	540.09	807.1	544.06	807.02	545.57	806.99	546.15	806.96
547.04	806.95	552.35	806.92	554.21	806.95	556.13	806.95	558.7	806.94
565.14	806.99	567.46	806.96	570.35	806.92	572.78	806.91	576.21	806.81
576.46	806.8	579.03	806.71	584.83	806.48	586.34	806.46	589.58	806.48
592.86	806.54	594.64	806.55	600.62	806.55	610.63	806.57	611.8	806.56
612.55	806.55	617.38	806.49	620.4	806.61	626.5	806.87	627.98	806.91
636.15	807.47	639.58	807.69	640.82	807.83	641.86	807.93	646	808.23
646.24	808.25	646.43	808.26	650.62	808.54	654.75	808.74	655.1	808.76
655.86	808.79	658.29	808.87	661.12	808.93	674.49	809.01	676.55	809.02
677.43	809.02	701.71	809.05	709.38	809.04	710.2	809.04	713.82	809
734.82	808.97	740.47	808.98	746.71	809.02	748.79	809	757.62	808.97
764.25	808.92	766.66	808.92	772.41	808.84	773.17	808.83	773.67	808.84
775.61	808.77	777.39	808.65	780.29	808.8	781.92	808.85	782.55	808.86
783.96	808.9	785.62	808.95	786.3	808.96	793.81	809.06	794.67	809.06
796.04	809.12	800.73	809.35	803.67	809.6	803.77	809.61	803.91	809.63
808.18	810.09	814.27	810.75	816.13	810.96	818.44	811.24	823.48	811.88
825.69	812.11	828.01	812.35	830.06	812.5	831.04	812.58	833.23	812.7
834.07	812.75	834.44	812.76	838.99	812.89	844.56	813.03	849.73	813.07
852.13	813.13	854.98	813.25	861.31	813.41	866.12	813.53	871.46	813.68
872.68	813.71	875.38	813.76	887.46	813.93	892.04	814.01	892.09	814.01
892.33	814.03	892.35	814.04	892.52	814.06	895.47	814.38	896.3	814.29
898.16	813.39	900	813.13	902.21	813.38	904	813.5	904.47	813.62
906.28	813.95	909.84	814.52	910.93	814.84				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	271.34	.055	348.05	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
271.34	348.05	5.06	51.18	4.03	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	102.62	810.98	F

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 555.72

INPUT
Description:
Station Elevation Data num= 329

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840.72	2.159973	840.17	5.549988	839.29	6.899963	838.94	8.429993	838.45
12.39996	837.23	17.66998	835.56	18.27002	835.36	21.52997	834.37	22.29999	834.13
23.27997	833.84	27.35999	832.93	27.89996	832.71	30.35999	831.38	32.32001	830.53
34.39001	829.63	35.90997	828.99	38.41998	827.94	41.62	826.64	42.20001	826.4
43.09998	826.03	48.45996	823.95	3.60999	821.82	54.53998	821.48	59.83002	819.46
62.59998	818.45	65.03998	817.59	66.83002	816.96	9.02002	815.94	70.64996	815.17
71.84998	814.63	74.67999	813.41	75.44	813.15	78.70996	811.97	9.02997	811.82
81.69	811.07	82.69	810.78	82.89001	810.73	89.82001	809.39	90.35999	809.23
90.70996	809.23	92.06	809.54	94.83002	809.82	97	810.22	101.23	810.71
102.86	810.96	105.88	810.93	107.28	810.91	107.78	810.73	110.95	810.04
112.83	809.4	114.98	808.74	118.57	807.88	119.01	807.78	122.16	807.3
123.03	807.2	125.75	807.06	127.06	806.99	130.94	807.01	133.99	807.02
147.07	807.07	148.87	807.06	150.3	807.07	152.96	807.06	155.27	807.05
156.44	807.04	158.52	806.08	160.99	804.63	162.16	803.82	164.18	802.19
166.45	801.87	167.36	801.95	168.88	802.13	171.39	802.14	172.47	802.29
175.41	802.5	179.17	802.81	179.56	802.85	181.8	803	185.76	802.94
189.5	802.91	191.53	802.89	196.05	802.87	196.63	802.86	197.41	802.87
200.25	802.88	200.61	802.88	201.27	802.9	204.87	803.03	208.09	803.09
208.25	803.11	208.54	803.13	209.32	803.15	213.91	803.69	214.49	803.76
217.06	804.29	219.65	804.77	220.23	804.85	222.18	805.23	224.82	804.74
225.73	804.73	229.97	804.28	231.29	804.2	232.87	804.09	234.89	803.95
237.4	803.39	240.32	802.57	245.47	801.24	245.49	801.23	245.51	801.23
245.81	801.14	249.49	800.02	249.54	800	250.02	799.71	252.6	798.27
253.04	798	269.57	797.88	275.76	797.84	279.25	797.87	280.94	797.88
297.44	798	298.01	798.59	299.72	800	300.36	800.64	301.8	802
302.32	802.04	47 305.87	802.35	313.76	803.04	325.49	803.86	326.23	803.92
327.44	804	331.63	804.52	336.22	805	339.43	805.34	345.23	806
346.06	806.58	346.42	806.65	346.91	806.68	348.02	806.71	349.18	806.52
350.56	806.7	353.05	806.83	355.99	806.88	362.89	806.86	365.08	806.86
368.97	806.77	370.44	806.76	371.18	806.77	372.96	807.07	373.25	806.99
376.95	807.02	377.09	807.01	377.4	807.01	381.47	807.06	384.17	807.06
387.89	807.11	391.11	807.15	393.26	807.19	398.05	807.44	399	807.47
400.64	807.68	403.38	808.02	406.78	808.33	407.46	808.37	407.77	808.38
410.49	808.47	412.15	808.43	413.52	808.35	416.53	808.12	416.54	808.12
416.57	808.12	419.57	807.79	421.14	807.52	422.67	807.43	423.7	807.44
429.7	807.42	441.61	807.43	448.23	807.49	451.59	807.51	455.74	807.51
455.92	807.51	455.97	807.51	456.16	807.51	460.78	807.43	462.28	807.42
465.54	807.39	470.81	807.32	475.33	807.32	477.09	807.31	478.23	807.32
480.31	807.27	482.26	807.15	483.23	807.04	483.97	807.01	485.26	807
491.03	806.98	492.86	806.97	496.36	806.95	499.14	806.95	504.18	807.04
504.35	807.04	504.71	807.02	508.56	806.87	510.4	806.87	515.31	806.86
518.6	806.88	524.29	806.92	525.24	806.93	526.6	806.94	527.54	806.94
534.47	806.98	538.36	806.97	539.19	806.98	543.88	807	546.72	807
547.18	806.99	553.97	807.14	556.76	807.19	559.26	807.13	561.38	807.15
562.1	807.03	563.47	806.99	564.89	806.92	570.5699	806.85	571.14	806.85
573.88	806.89	574.05	806.89	574.29	806.89	583.05	806.94	583.06	806.94

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  590.22  806.89591.8199  806.84  595.16  806.78  601.71  806.53  604.33  806.53
  605.64  806.55  613.33  806.59  616.38  806.59  626.71  806.62  629.31   806.6
  634.39  806.52  636.44  806.56  640.14  806.72  643.93  806.88  646.63  806.95
  654.44  807.49  656.44  807.59  657.95  807.67   661.4   807.9   664.8  808.13
666.3199  808.23  667.74   808.3  672.03  808.52  675.08  808.65  676.98  808.78
  680.98  808.84  682.21  808.87  686.16  808.89  692.61  808.95  695.07  808.98
  717.89  808.99  718.54  808.99  718.86     809  719.09  808.99  719.19  808.99
  727.89  808.99  728.49  808.99  736.61  808.98  752.85  808.95  754.74  808.96
  756.84  808.97  757.55  808.96  775.45  808.91  783.92  808.85   785.9  808.81
  788.71  808.77  789.02  808.77   789.1  808.77  791.03   808.7  792.65  808.62
  794.33  808.71  797.78  808.81  801.03  808.87  803.29  808.93  804.06  808.94
  810.93  809.03  813.41  809.06  818.09  809.38   819.2  809.43  819.69  809.47
     821  809.61  825.25  810.07  833.49  810.97  838.17  811.49  840.89  811.83
  841.61  811.91  844.79  812.23  846.45  812.41  847.47  812.48  849.47  812.63
  850.37  812.68   852.5   812.8  853.62  812.83  855.13  812.82  859.18  812.93
  863.38  813.03  867.29  813.07  870.01  813.14  872.39  813.24  877.68  813.37
   881.7  813.47  889.66  813.69  891.46  813.73  895.45  813.81  909.55  814.01
  909.72  814.01  909.87  814.01  909.89  814.01  910.03  814.02  912.18  814.25
  913.72  814.14  916.04  813.23   916.1   813.2  917.79  813.17  920.49  813.48
  925.81  814.28  928.19  814.66  929.25  814.97  931.49  816.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  222.18    .055  302.32     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        222.18  302.32           126.35   73.42    4.69             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  102.86  810.96       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 482.3

INPUT
Description:
Station Elevation Data    num=     263
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  818.575.869995  816.536.440002  816.336.790039  816.2110.60004  814.91
10.71002  814.8812.15002   814.414.64001  813.5817.86005  813.0618.34003  813.05
   18.62  813.0221.89001  812.74   22.63  812.6823.49005  812.6326.64001  812.45
28.04004  812.3939.83002  811.97   42.69  811.8944.26001  811.8347.60004  811.73
48.55005  811.67   49.87  811.6151.85004  811.4953.89001  811.2157.20001  810.78
61.57001  810.2766.76001  809.68   69.44  808.5270.55005     80871.54004   807.6
74.78998806.303375.55005     80676.45001  805.6480.55005     80486.05005  803.03
91.60004     80294.41003  800.7996.26001     800  101.19  798.07  101.36     798
   101.4     798  101.42  797.99  108.62  797.32   116.7  797.21  120.42  797.17
  135.03  797.63135.9901  797.62  138.05     798  140.14  799.01  142.34     800
  144.73  801.14  145.17  801.24  146.89  801.49  162.28   802.9     175  803.59
  176.25  803.65   177.2  803.69  177.96  803.72  179.48  803.76184.1801     804
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  185.28  804.19  189.11  804.98  189.41  804.99  189.66  804.99  192.75  805.14
193.4301  805.17  198.85  805.38  200.55  805.53  201.45  805.75  201.96  805.82
  202.37   805.9  204.14  806.25   206.6  806.73  206.61806.7302209.6801  806.81
  211.02  806.81212.7401  806.84  214.04  806.87  216.21  806.89  219.38  806.91
  220.08   806.9   222.4   806.9  227.81  806.89  232.06     807  232.19  807.01
  232.21  807.01  232.23  807.01  235.46  807.26   236.6  807.19  241.72  807.11
244.2401  807.07  248.46  807.06  249.79  807.05  250.28  807.04  251.37  807.05
  256.32   807.1  261.03   807.5  262.36  807.58  262.97  807.67  265.38     808
  267.37  808.35  268.41  808.49271.9301  809.23  273.73  809.43  274.65  809.33
  276.16  808.85  280.35  808.23  280.49  808.21  280.55   808.2  283.51  807.66
  284.95  807.51     287   807.4  301.65  807.41  303.78  807.41  309.32  807.44
  311.31  807.45   311.9  807.45   318.1  807.44  321.62  807.38  326.95  807.34
  337.72  807.25  337.79  807.25  338.29  807.23  343.91  807.03  345.21  806.95
     347  806.93  350.87  806.92  358.68  806.89  359.17  806.89  361.37  806.88
  364.05  806.88  365.05  806.93  367.92  806.77  368.22  806.77  368.33  806.77
  368.67  806.77  372.84  806.84  374.11  806.84  376.92  806.84  380.76  806.86
  383.02  806.88  389.02  806.92  393.91  806.96  396.07  806.95  399.07  806.99
  405.91  807.02  407.24  807.03  409.16  807.05  411.06  807.04  415.55  807.15
  416.79  807.18  419.42  807.23  422.22  807.42  422.84  807.43   424.9  807.16
   425.5  807.07  425.58  807.07  428.48  806.95  429.97  806.92   431.5  806.91
  433.04   806.9  434.36  806.92  440.23  806.93   445.2  806.97  451.29  806.89
  451.94  806.88  452.36  806.87  453.01  806.86  454.18  806.83  458.68  806.75
  461.16  806.65  462.66  806.65  466.68  806.62  469.96  806.61  475.63  806.64
  479.32  806.68  486.61   806.7  494.42  806.65   495.6  806.63  503.25  806.77
  504.68  806.83  506.53  806.89  509.64  806.97  512.12  807.04  513.87  807.13
   519.3  807.43  525.47  807.83   525.8  807.86  526.65  807.91528.9301  808.03
  533.64  808.29  535.44  808.36  540.42   808.7  542.35  808.73  544.23  808.76
  547.34   808.8  550.75  808.87  553.02  808.89  558.35  808.95  571.05  808.96
  576.45  808.98  579.02     809580.9301  808.97  581.71  808.97  589.25  808.97
  592.12  808.95  614.23  808.93  614.86  808.92  615.52  808.92  620.55   808.9
  637.91  808.85  643.22  808.81  648.96  808.72   649.7  808.71  651.86  808.51
652.0601   808.5  652.22  808.49  656.42  808.72  658.49  808.78664.0601  808.88
  665.37  808.92  667.08  808.93671.6801  808.99676.6801  809.05  679.64  809.25
682.1801  809.53  683.63  809.71  688.22   810.2  694.12  810.84  701.21  811.63
  702.44  811.76  705.27  812.05  709.37  812.48  711.23  812.61714.9301  812.82
  715.41  812.84  717.59  812.91  720.51  812.88  723.48  812.96  726.58  813.04
  729.47  813.06  732.46  813.14  734.46  813.22  738.94  813.34  742.35  813.42
  752.32  813.69  754.57  813.75  759.52  813.85  771.52  814.02  771.97  814.02
  772.38  814.02  772.44     814  772.79  814.04  772.87  814.03   776.1   813.8
  777.15  813.39  778.83  813.19  781.55  813.37  781.85  813.39  789.79  814.56
790.6801  814.68  791.08  814.74   791.4  814.76

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .0574.78998    .055  206.61     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      74.78998  206.61             58.55   49.95    4.42             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
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REACH: 317437_BUCKEYE_C RS: 432.35

INPUT
Description:
Station Elevation Data num= 278

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	817.47	1.039978	816.99	4.169983	815.43	6.98999	814.51	8.419983	814.25
10.14996	813.81	1.42999	813.51	12.33997	813.33	14.07996	812.95	15.81995	812.48
16.90997	812.31	17.98999	811.94	21.48999	811.08	22.56	810.88	23.63995	810.87
25.97998	810.8	28.21997	810.78	32.81995	810.71	33.87994	810.7	35.31995	810.67
36.03998	810.64	36.69995	810.56	42.06	810.07	45.18994	809.74	45.58997	809.5
46.22998	809.65	47.94995	808.31	48.56995	808	53.5	806.17	53.93994	806
54.45996	805.79	57.51996	804.46	0	58.57996	804	61.53998	802.21	62.01996
802	62.58997	801.72	65.93994	800	68.29999	798.99	70.68994	798	72.89996
797.08	75.60999	796	75.97998	796	77.22998	796	95.31	796	96.37994
796	107.45	796	110.61	796	111.36	796.39	113.46	797.35	114.83
798	116.47	798.66	119.73	800	121.79	800.79	123.6	801.43	138.99
802.66	148.22	803.42	151.68	803.86	155	803.97	155.66	804	160.7599
804.94	161.11	805.03	161.33	805.03	161.56	805.04	162.05	805.05	165.08
805.12	166.59	805.13	167.99	805.23	170.14	805.47	172.2	805.67	174.55
805.95	176.62	806.21	178.96	806.59	180.0099	806.79	185.33	806.85	187.1899
806.95	189.08	806.96	191.42	806.94	194.04	806.96	197.71	806.87	201
806.87	203.74	806.86	205.41	806.89	207	806.98	209.8199	807.04	212.77
807.17	215.61	807.13	218.6299	807.15	221.81	807.04	223.04	807.02	226.39
806.95	227.89	806.9	231.45	806.92	233.86	807.05	236.27	807.22	236.9
807.25	238.1899	807.4	239.89	807.58	240.67	807.69	242.9	807.93	245.08
808.26	245.91	808.33	247.71	808.45	249.3199	808.58	249.49	808.57	251.9399
808.72	253.9	808.52	254.93	808.54	257.23	808.14	258.31	807.96	260.82
807.46	263.21	807.49	265.67	807.37	273.41	807.37	279.58	807.38	284.76
807.4	289.08	807.38	293.9	807.37	296.14	807.34	305.09	807.26	311.93
807.21	313.58	807.19	318.87	806.97	320.46	806.88	321.23	806.89	323.85
806.86	324.25	806.86	324.43	806.86	324.94	806.86	331.8	806.87	333.25
806.87	333.28	806.87	333.36	806.87	336.3	806.86	337.66	806.86	338.92
806.83	339.63	807.13	342.01	807.13	342.88	807.08	345.37	806.94	346.47
806.95	349.57	806.91	351.36	806.87	355.29	806.87	356.54	806.86	358.48
806.88	363.16	806.9	366.02	806.92	367.12	806.93	367.61	806.93	372.68
806.99	376.59	807.01	379.88	807.04	384.59	807.08	389.22	807.07	392.33
807.14	393.54	807.15	394.96	807.19	396.55	807.2	399.37	807.15	399.98
807.13	402.58	807.02	403.78	806.99	407.06	806.97	408.82	806.96	409.5
806.96	412.87	806.97	420.02	806.99	420.96	806.99	422.14	806.98	425.82
806.94	428.12	806.86	431.7	806.79	434.64	806.74	435.62	806.77	438.05
806.74	442.44	806.71	449.54	806.69	451.39	806.7	458.92	806.77	460.28
806.78	462.73	806.76	468.03	806.7	469.9	806.69	472.45	806.67	473.13
806.71	480.11	806.83	482.05	806.86	485.39	806.96	487.54	807.02	489.95
807.02	491.21	807.04	494.34	807.21	497.36	807.41	498.31	807.48	500.76
807.62	507.22	807.98	508.92	808.07	509.58	808.1	512.45	808.29	516.38
808.51	518.36	808.58	520.08	808.6	523.71	808.71	525.53	808.73	527.21
808.77	530.1	808.83	533.22	808.9	535.14	808.92	538.45	808.93	548.35
808.97	553	809	556.42	808.95	557.8199	808.95	564.3099	808.95	569.2
808.91	588.0099	808.9	589.85	808.89	591.74	808.88	605.98	808.82	613.96
808.8	616.47	808.78	620.5699	808.72	624.1899	808.7	625.35	808.6	630.15
808.62	632.14	808.72	633.0099	808.75	640.59	808.89	641.09	808.91	643.6
808.93	646.23	808.96	653.14	809.04	653.28	809.05	653.35	809.05	653.39
809.05									

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  653.85   809.1  658.66  809.63661.6899  809.99664.6899  810.31  668.58  810.74
  673.34  811.26  677.09  811.68   685.5  812.52  685.78  812.55  685.91  812.55
686.2599  812.57  690.83  812.88  694.68  812.96694.8199  812.96  694.93  812.96
  695.02  812.97  698.92  812.93701.0099  812.99  703.21  813.04  705.27  813.06
  708.48  813.14  710.17  813.21  713.97  813.31  716.87  813.38728.5099   813.7
  731.11  813.76736.8199  813.88  747.14  814.02  747.81  814.03  748.43  814.02
748.5099     814  748.84  814.04  749.05  814.04  752.03  813.54  752.06  813.54
  752.12  813.53755.0699  813.18756.4399  813.27  758.09   813.4  763.48  814.19
  766.37   814.6  767.67  814.78  768.47  814.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .0557.51996    .055180.0099     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      57.51996180.0099             83.86   62.35    3.34             .1       .3

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 370

INPUT
Description:
Station Elevation Data    num=     339
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  821.423.559998  820.256.219971  819.397.820007  818.8811.77997  817.62
14.21002  816.8517.48999  815.8519.46002  815.2523.65997  814.4924.22998   814.4
24.71997  814.3229.83002   813.529.90997  813.4929.96997  813.4832.73999  812.96
36.01001  811.9938.41998  811.4140.46997  811.1340.72998  811.0841.54999  811.09
46.51001  810.9948.34998  810.9449.77002  810.9150.46002  810.9160.58997  810.32
60.90997  810.29   61.31  810.2664.54999  810.0170.70001   809.672.46997  809.46
77.33997   809.178.51001  809.0279.27002     80980.97998  809.0683.34998   809.1
83.82001  809.13   85.38  809.1686.65997  809.19    89.5  809.17      93  809.21
94.70001   809.2   95.25  809.1896.71997  809.0499.17999  809.0499.89001  809.02
   102.6  809.85  104.73  810.05  104.98  810.11   105.1  810.12  105.54  810.08
  107.82  810.01  109.11  809.68  110.09  809.51  115.23  808.86  121.48  808.89
  121.51  808.89  121.52  808.89  125.64  808.94  128.09     809  129.77  809.03
  131.38  809.12   133.9  809.04  135.25  809.15  137.62  808.29  138.03  808.17
  141.23  806.77  142.16  805.91  143.74  805.17  147.08  802.75  149.95  801.71
  151.08  801.16  153.65  800.28  154.37  800.03  154.55  799.99  157.65  799.26
  158.66  799.07  161.22  799.06  162.07  799.05  164.62     799   170.6  798.86
  171.41  797.99  171.77  797.06     172  796.96  172.03  797.03  172.07  796.93
  172.67  797.34   175.2  798.78  177.12  798.72  180.64   798.7   182.2  798.67
  183.11  798.65  187.02  798.79  187.37  798.84   187.6  798.86  188.24  798.93
  191.95  799.31  192.87  799.51  194.72   799.8  196.34  800.14  197.21   800.3
  198.36  800.66  199.99   801.1  200.35  801.24  201.76  801.91   203.8  802.97
  204.12  802.96  206.92  803.46  208.25  803.64   210.2  803.95  212.38   804.3
   214.7  804.79  216.22   804.8  217.02  804.69  217.65  804.69  218.15  804.75
  220.64   805.1  223.34  805.43  224.77  805.59  227.19  805.84   228.9  806.02
  229.46  806.05  233.03  806.38   233.2  806.39  237.31  806.71  239.04  806.81
  240.44  806.82  243.05  806.88  246.51  806.91  254.79  806.98  257.03     807
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258.52	806.99	258.92	806.99	259.31	806.99	259.67	806.99	265.48	806.85
265.54	806.85	265.74	806.85	269.96	806.79	274.04	806.85	274.41	806.85
274.76	806.87	278.79	807.04	280.52	807.14	283.21	807.2	283.44	807.22
284.2	807.2	287.63	807.11	289.54	807.09	294.95	806.81	296.44	806.82
300.88	807.1	303.08	807.11	304.67	807.17	305.29	807.27	307.59	807.47
309.71	807.69	310.6	807.76	312.51	807.88	313.61	807.98	314.12	808.01
316.62	808.18	318.54	808.29	319.63	808.35	321.95	808.36	322.61	808.4
322.96	808.29	325.64	807.69	328.23	807.33	328.32	807.32	328.55	807.32
333.39	807.38	334.22	807.34	336.84	807.34	346.03	807.35	349.45	807.37
357.57	807.33	360.34	807.32	361.64	807.3	373.28	807.21	377.2	807.17
380.03	807.14	380.92	807.11	386.24	806.81	388.82	806.83	389.2	806.83
393.19	806.9	398.03	806.91	400.86	806.95	402.45	806.92	404.19	806.87
405.55	806.89	406.87	807.32	410.64	807.1	416.32	806.95	418.91	806.9
420.12	806.89	422.98	806.86	427.41	806.92	430.04	806.93	434.46	806.96
437.47	807	439.09	807	443.89	807.04	450.77	807.11	457.47	807.09
458.76	807.12	459.86	807.13	463.51	807.11	464.03	807.11	464.28	807.11
464.96	807.09	467.91	807	470.05	807.01	471.67	807.01	477.59	806.98
482.38	807.02	486.36	807.02	489.86	806.99	490.78	806.97	491.01	806.98
491.82	806.94	494.55	806.86	498.16	806.79	499.42	806.72	500.14	806.76
500.72	806.79	502.81	806.85	507.26	806.8	508.44	806.76	509.53	806.74
517.28	806.71	523.26	806.76	527.78	806.77	529.71	806.76	530.82	806.75
534.94	806.71	540.51	806.68	541.98	806.77	546.63	806.85	550.59	806.91
551.82	806.94	552.61	806.96	556.26	806.98	557.88	806.99	558.41	806.99
559.75	807.01	560.2	807.03	560.63	807.06	562.1	807.17	565.85	807.38
572.87	807.77	574.69	807.87	575.08	807.89	576.76	807.98	582.52	808.3
587.03	808.46	587.38	808.47	589.47	808.53	592.97	808.63	593.07	808.63
595.63	808.72	598.5	808.78	601.19	808.85	603.34	808.92	605.07	808.93
611.53	808.96	617.94	809	622.63	808.94	624.55	808.94	630.16	808.93
636.75	808.88	652.75	808.87	655.63	808.85	658.58	808.84	680.51	808.76
680.65	808.76	680.7	808.76	680.78	808.76	682.31	808.75	689.42	808.72
689.63	808.72	689.83	808.72	690.31	808.73	698.76	808.73	706.01	808.88
707.18	808.88	708.88	808.91	710.73	808.92	711.59	808.94	713.89	808.96
717.5	809	719.27	809.04	720.31	809.09	724.84	809.6	725.39	809.66
726.25	809.77	727.75	809.95	730.22	810.24	731.79	810.41	733.84	810.64
736.36	810.92	742.51	811.59	749.2	812.26	752.24	812.54	753.61	812.69
756.83	812.91	759.26	812.96	761.87	812.97	764.02	812.97	765.5	813
767.87	812.98	769.15	813.01	770.5	813.05	771.77	813.06	775.18	813.14
776.57	813.2	779.71	813.28	782.11	813.34	795.39	813.7	798.35	813.77
804.82	813.9	813.47	814.03	814.37	814.04	815.19	814.02	815.31	813.99
815.61	814.03	816.02	814.05	817.58	813.78	819.03	813.46	822	813.17
822.01	813.16	822.13	813.17	825.05	813.4	827.73	813.79	832.76	814.52
835.01	814.82	835.74	814.88	836.08	815.24	836.87	815.82		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	135.25	.055	240.44	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.25	240.44	71.45	70	5.34	.1	.3

CROSS SECTION

RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C RS: 300

INPUT
Description:
Station Elevation Data num= 334

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	820.71	3.440002	819.79	3.880005	819.68	4.609985	819.48	6.330017	819.05
9.419983	818.24	11.09003	817.86	13.60004	817.21	14.83002	816.95	16.41003	816.58
17.85999	816.26	19.06	815.88	23.23999	814.89	23.88	814.76	25.16998	814.53
33.51001	813.02	34.01001	812.93	35.15002	812.76	38.10004	812.24	1.10999	811.57
43.04004	811.39	45.35999	811.33	51.95001	811.19	52.63	811.18	53.20001	811.17
69.73999	810.85	73.63	810.72	74.60999	810.68	77.28003	810.62	79.91003	810.63
81.85004	810.64	90.16998	810.64	91.40002	810.61	95.01001	810.53	105.78	810.36
112.97	810.16	119.66	810.04	121.48	809.99	122.28	809.94	132.61	809.62
133.71	809.6	135.11	809.59	138.23	809.79	138.56	809.79	141.5	810.05
142.7	810.15	143.48	810.69	144.5	810.71	147.29	810.33	148.03	810.52
150.24	810.87	150.99	811.05	151.3	811.11	152.49	811.13	154.9	811.33
155.13	811.26	157.84	810.82	159.27	810.41	161.6	809.55	163.09	809.13
167.12	809.09	167.48	809.1	167.7	809.1	167.99	809.1	174.17	809.11
175.83	809.14	178.74	809.45	179.35	809.46	179.47	809.46	180.24	808.92
183.49	808.82	186.59	808.76	188.25	808.71	191.59	808.6	193.58	808.55
195.91	808.62	197.05	808.77	198.99	809.19	200.8	809.36	202.39	809.87
203.36	810.11	204.81	809.7	206.85	809.37	212.58	809.13	213.09	809.09
214.05	809.12	215.15	809.09	215.63	808.89	217.23	807.88	219.92	806.05
221.37	804.96	223.19	803.52	225.51	801.67	226.45	800.98	228.46	799.38
230.66	799.12	231.11	798.94	231.22	798.89	232.09	798.57	233.27	797.23
233.81	796.83	233.88	796.83	233.89	796.81	233.9	796.82	233.94	796.82
234.01	796.83	235.67	797.24	241.41	798.52	242.07	798.79	242.79	798.77
245.49	798.75	246.2	798.74	246.32	798.74	250.7	798.71	251.17	798.7
252.16	798.7	258.25	798.68	263.14	798.75	263.65	798.81	264.39	798.84
265.66	799	267.15	799.06	269.18	799.91	271.05	801.14	274.72	803.46
275.41	803.95	275.53	803.97	276.49	804.19	278.73	804.89	279.33	805.03
282	805.11	283.47	805.23	285.27	805.32	287.61	805.45	288.54	805.53
291.75	805.79	291.89	805.82	291.99	805.83	295.07	806.27	295.72	806.3
297.31	806.39	300.03	806.43	301.61	806.47	304.17	806.62	307.49	806.75
308.31	806.78	311.41	806.84	312.45	806.87	314.26	806.89	315.61	806.89
317.94	806.86	322.99	806.92	324.14	806.92	324.87	806.9	327.75	806.94
329.03	806.88	331.21	806.99	333.15	806.96	334.28	806.94	337.3	807.04
337.55	807.04	338.49	807.05	341.44	807.1	342.51	807.1	349.65	807.1
353.02	807.17	356.6	807.22	364.01	807.31	366.28	807.33	376.4	807.33
379.21	807.33	382.84	807.3	383.59	807.3	384.66	807.31	384.76	807.31
394.8	807.26	396.81	807.26	398.01	807.25	399.08	807.24	413.64	807.12
414.12	807.15	416.49	807.24	418.23	807.31	419.45	807.46	420.09	807.3
422.51	807.06	424.51	807	425.51	806.97	432.2	806.96	434.05	806.96
437.09	807.03	437.76	807.04	440.55	807.13	442.18	807.2	444.07	807.35
444.31	807.36	444.58	807.36	456.77	806.92	459.31	806.85	460.87	806.84
461.63	806.83	463.89	806.94	464.67	807.05	465.38	807.07	467.63	807.24
468.68	807.26	470.64	807.09	473.1	807.05	473.64	807.05	474.81	807.05
476.29	807.04	477.79	807.06	488.25	807.16	493.72	807.14	495.18	807.13
499.76	807.04	501.91	807	503.46	807	509.74	807.01	516.59	807.03
519.54	807.02	523.53	807.05	526.1	807.01	528.09	807.09	529.17	807.09
531.79	806.95	534.32	806.68	538.06	806.81	539.82	806.81	540.82	806.8

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   542.7  806.82  543.77  806.79  545.84  806.75  550.25   806.7  551.47  806.68
   552.6  806.68  553.48  806.68  569.71  806.71   569.9  806.71  570.27  806.71
  574.27  806.66  578.54  806.71  581.47  806.69  584.42  806.87  584.73  806.88
  585.21  806.88  589.74  806.85  594.91  806.89  599.98  806.96  602.26  807.05
  603.92  807.09  606.83  807.22  610.03  807.39     613  807.54  616.77  807.74
  618.77  807.84  621.04  807.96  625.53  808.14  627.06  808.19  630.89   808.3
  631.39  808.32  637.22  808.53  640.41  808.64   643.2  808.74  645.36  808.76
  648.11  808.89  650.53  808.99  652.78     809  660.11   808.9  663.12   808.9
  666.88   808.9   677.1  808.82  686.95  808.81  692.14  808.78  697.45  808.75
   710.8   808.7  718.58  808.72  722.28   808.7   728.2   808.7  733.99  808.68
  738.68  808.74  742.54  808.76  744.96  808.79  750.39  808.85  751.37  808.86
  754.09  808.94  755.79  808.98  757.72   809.1   759.5   809.2  760.21  809.28
  763.31  809.61  768.12  810.26  769.04  810.37  771.44  810.68  776.58  811.23
  777.87  811.37  778.46  811.43  790.15  812.51  792.17  812.74  793.95  812.89
   795.9     813  800.26  813.02  802.33  813.01  804.87  813.03  807.98  813.02
  808.79  813.05  811.55  813.09  813.92  813.15   814.5  813.17   815.8  813.21
   816.8  813.23  834.69  813.72  838.67  813.81  847.39  813.99  851.17  814.04
  852.75  814.07   854.2  814.04  854.41  813.99  854.63  814.01  855.17  814.03
  855.67  814.01  856.09  814.19  857.55  813.76  857.84  813.64  861.53  813.17
   861.8  813.19  864.69  813.17  870.41  814.19  870.51   814.2  870.63  814.24
  870.91  814.33  873.06  815.03  873.84  815.55   876.2  817.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  215.63    .055  295.72     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        215.63  295.72            88.38     100   89.28             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0   154.9  811.33       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 200

INPUT
Description:
Station Elevation Data    num=     437
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 821.014.700012    8216.570007 821.0110.65002 821.0112.32001 821.01
17.31006 821.0219.15002 821.0221.28003 820.9924.33002 820.66      25  820.6
25.47003 820.5628.79004 820.1132.90002 819.5135.29004 819.2335.76001 819.17
   38.13 818.9439.34003 818.8240.20001 818.6943.87006 817.9645.02002 817.95
45.07001 817.9445.11005 817.9447.23004 818.8149.65002 818.6550.81006 818.54
51.92004 818.5953.68005 818.5454.93005 818.6456.05005 818.8859.28003 818.97
60.47003 818.9162.28003 818.38   64.75 818.2165.15002 818.1565.71002 818.08
68.02002 817.8569.66003 817.6970.89001 817.5472.61005 817.2974.57001 817.02
79.43005  816.479.49005 816.39    79.5 816.3982.36005 816.2284.39001 816.11
85.23004 816.0886.40002 816.0388.09003 815.9889.30005 815.9390.96002 815.85
93.29004 815.7293.83002  815.796.48004 815.5799.12006 815.4599.57001 815.42
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99.86005	815.39	104.57	815.28	105.3	815.27	108.94	815.16	113.91	814.98
120.88	814.56	121.77	814.5	122.94	814.42	128.11	814.11	28.4301	814.08
130.59	813.93	133.5	813.72	134.19	813.67	134.67	813.64	139.72	813.3
141.57	813.2	142.59	813.15	143.86	813.12	148.23	812.99	150.92	812.94
156.47	812.86	157.2401	812.83	158.05	812.82	160.48	812.79	172.29	812.71
176	812.65	181.98	812.47	188.66	812.31	197.55	812.18	198.72	812.14
204.55	811.94	205.69	811.9	206.89	811.85	213.52	811.65	216.97	811.55
217.16	811.54	217.42	811.54	220.65	811.47	224.7	811.47	225.77	811.48
226.8	811.47	231.21	811.57	231.71	811.57	234.3701	811.62	236.6201	811.75
237.44	811.86	238.11	811.84	240.11	811.85	241.53	811.61	242.28	811.6
245.01	811.22	245.48	811.16	246.64	811.12	247.5	811	251.35	810.98
251.67	810.96	256.9301	810.95	258.8	810.95	260.7401	810.97	265.38	810.62
265.92	810.56	266.08	810.54	267.03	810.41	271.09	809.89	271.66	809.87
272.29	809.87	272.48	809.85	273.64	809.51	274.47	809.61	276.9	810.04
279.6801	810.45	280.59	810.57	280.96	810.54	283.66	810.12	285.72	809.79
286.67	809.68	288.71	809.52	89.6201	809.37	290.7401	809.32	292.69	809.42
294.55	809.62	295.7	809.64	298.97	809.87	302.09	810	303.64	810.06
304.73	810.12	307.63	810.12	307.7401	810.12	307.79	810.12	310.75	810
312.8	809.53	315.09	809.24	318.58	809.12	319.78	809.04	321.04	809.01
324.1201	808.95	326.55	809.02	328.8101	809.02	329.86	809.07	331.46	809.18
334.07	809.22	336.01	809.18	338.1801	809.15	338.69	809.15	341.76	809.07
343.11	809.01	345.34	808.92	347.52	808.79	349.88	808.65	354.9301	808.27
356.35	808.17	358.91	807.96	364.39	807.54	364.84	807.51	365.1801	807.52
365.82	807.46	368.44	807.33	368.98	807.37	373.72	807.73	373.96	807.75
374	807.75	376.97	807.88	378.42	807.85	382.41	807.6	382.98	807.59
383.3101	807.55	385.9901	807.35	387.2401	807.31	388.23	807.03	390.38	807.06
391.66	807.16	392.01	807.12	392.78	807.07	395.02	807.06	396.07	806.94
397.03	806.95	397.95	806.76	400.4901	804.81	401.04	804.53	402.2401	803.49
404.46	801.42	404.9	801.05	404.9901	800.98	405.38	800.89	409.3101	800.17
409.76	799.86	410.91	799.29	411.32	799.19	411.96	798.75	413.4901	798.82
421.29	797.27	422.11	798.91	422.22	798.92	422.29	798.92	422.3701	798.92
422.8101	798.92	426.97	798.93	430.04	799	431.71	799	435.32	799.02
439.8	799.12	440.66	799.13	440.9901	799.15	441.88	799.25	443.19	799.34
443.33	799.38	444.15	799.58	444.63	799.71	448.6	800.77	449.2	800.96
449.54	801.07	452.14	801.9	453.45	802.34	455.22	802.85	457.8701	803.6
461.2401	804.25	462.28	804.5	463.5	804.76	468.46	804.86	470.08	805.02
471.11	805.02	473.28	805.07	475.52	805.11	476.29	805.14	477.92	805.23
479.3	805.29	479.79	805.29	481.7	805.51	484.35	805.77	487.38	806.16
488.33	806.27	489.97	806.44	493.18	806.72	494.05	806.71	494.95	806.74
496.85	806.89	497.35	806.91	497.54	806.93	498.24	806.93	502.01	806.98
503.37	807.03	506.31	807.13	506.41	807.13	508.82	807.36	510.83	807.49
512.4	807.6	515.77	807.89	519.66	808.12	522.21	808.66	523.11	808.61
524.46	808.45	524.72	808.44	525.23	808.37	527.4501	808.23	528.49	808.19
530.46	807.77	534.6901	807.29	536.48	807.14	537.3201	807.1	540.62	807.03
546.15	807.02	554.4	807.01	556.5601	807.01	560.92	807.03	572.28	807.27
572.52	807.28	572.91	807.27	578.4501	807.22	581.63	807.07	585.13	807.02
586.72	806.98	592.8	806.94	598.4501	806.9	601.3	806.91	606.5601	806.88
609.3	806.85	615.62	806.81	618.52	806.77	622.41	806.71	624.61	806.69
629.48	806.6	632.36	806.55	634.13	806.54	647.29	806.43	647.3101	806.43
647.3201	806.43	650.8	806.21	651.71	806.17	653.29	806.11	654.64	806.03
655.77	805.99	658.27	805.91	660.03	805.85	660.5	805.84	661.33	805.83
664.11	805.76	669.09	805.7	669.25	805.7	669.29	805.7	669.36	805.7
673.86	805.68	678.08	805.57	678.47	805.57	679.91	805.51	683.08	805.36

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683.9401  805.33685.4401   805.3  688.64  805.25  690.78  805.25695.0701  805.22
  698.59   805.2  699.37  805.19  702.11  805.24704.4501  805.37  709.55  805.55
  710.75  805.59  713.25   805.7  715.36   805.7718.4401  805.43  720.26  805.52
  721.66  805.27  724.59  805.29  724.97  805.28  732.66  805.36  733.66  805.37
  733.76  805.37733.8101  805.37  733.87  805.37  738.42  805.43  740.34  805.46
  745.48  805.61  747.65  805.62749.7401  805.67  751.34  805.72  752.26  805.71
  754.27  805.78  756.87  805.77  757.47  805.81  757.78  805.82  761.65  805.93
  765.78  806.06  766.07  806.06  766.21  806.07   773.2  806.26  777.35   806.9
  778.21  806.96   779.4  806.97  780.72  806.96  788.27  806.92  791.12  806.94
  794.46  806.92  795.29  806.93  797.97  807.11  798.37  807.15798.9301  807.17
  804.09  807.42     806  807.51  807.02  807.54   807.6  807.57  811.04  807.75
  814.04  807.93815.8101  808.01  816.82  808.06820.1901  808.35825.0601   808.7
  825.84  808.75  828.96  808.81  836.88     809  839.88  809.03843.8101  809.09
844.4901  809.11846.1901  809.14   849.1  809.19  849.83  809.14  851.46  809.15
  853.55  809.55   853.9   809.6  854.23  809.66  856.83  810.11  858.33  810.39
  859.76  810.63  862.26  811.03  862.83  811.13  865.33  811.39   866.7  811.51
   868.8  811.64  875.33  812.05  885.48  812.67     886   812.7  886.13   812.7
  886.38  812.72  890.37  813.02  890.95  813.03     892  813.03   893.8  813.03
  897.86  813.03  905.35  813.03911.9301  813.08  913.57  813.08  914.02  813.09
  915.82  813.13  931.26  813.41  939.38  813.53  942.66  813.65  944.38  813.69
  954.25  813.92  961.19  814.06  961.98  813.94  962.97  813.83  965.26  813.49
  965.65  813.46  966.75  813.32968.1801  813.12  969.13  813.09  972.04  813.38
973.6201  813.48  974.04  813.55  974.79  813.74  976.97   814.3  978.23   814.8
  979.91  815.57  980.53  815.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  397.95    .055   463.5     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        397.95   463.5             79.15  118.32  197.15             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  280.59  810.57       F

CROSS SECTION


RIVER: BUCKEYE_CR
REACH: 317437_BUCKEYE_C   RS: 81.68

INPUT
Description:
Station Elevation Data    num=     420
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  822.042.440002  822.02    2.75     8222.960022  822.015.630005  821.85
7.800049  821.8310.54004  821.7316.70001  821.4317.15002  821.4117.46002   821.4
   21.12  821.2423.82001  821.1625.23004  821.11   27.13  821.0828.67004  821.05
30.95001  821.0231.55005  821.0134.08002  820.9436.79004  820.84   37.31   820.8
38.08002  820.7340.41003  820.56   41.62  820.42   43.44  820.23   47.94  819.69
51.29004  819.3251.71002  819.2752.33002  819.1754.59003  818.87   56.12  818.74
57.10004  818.7860.89001  818.0961.48004  818.0763.23004  818.2765.79004  818.26
66.11005  818.2966.59003  818.2768.98999  818.2570.41003  818.2574.58002  818.23
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74.75	818.2	175.45001	818.1	779.11005	817.8	980.29004	817.8	480.79004	817.75
84.14001	817.5	85.12	817.6	87.31	817.5	590.47003	817.22	94.44	817.11
94.78003	817.1	295.10004	817.1	199.76001	816.97	101.65	817.03	104.45	817.25
109.36	817.33	112.19	817.39	116.63	817.11	116.97	817.11	117.21	817.13
118.95	817.57	122.82	818.69	123.02	818.74	123.33	818.67	123.78	818.52
126.59	817.77	128.61	817.69	129.47	817.58	130.74	817.69	132.35	817.59
133.45	817.49	135.1	818.22	136.93	816.82	137.12	816.79	138.28	816.79
141.5	816.81	145	816.84	147.8	816.97	152.15	816.73	152.51	816.65
152.78	816.63	155.39	816.24	157.61	815.94	158.27	815.84	159.25	815.7
161.15	815.48	163.26	815.13	163.84	815.05	165.32	815.04	166.91	815.05
167.27	815.05	169.79	815.08	172.11	815.14	172.67	815.14	173.51	815.27
175.77	815.31	176.97	816.02	177.69	816.19	180.64	815.66	181.35	815.66
181.77	815.71	184.19	815.46	186.61	815.82	187.07	815.8	187.76	815.77
189.63	816.18	191.44	815.32	191.93	815.12	194.89	815.05	195.71	814.96
196.27	814.97	198.59	814.93	201.1	814.98	205.83	814.96	206.18	814.93
209.15	814.45	210.11	814.32	210.77	814.25	214.5	813.49	215.76	813.43
216.27	813.45	218.75	813.47	220.43	813.28	221.63	813.31	223.4	813.11
225.09	812.92	225.27	812.94	230.53	812.87	234.93	812.85	237.19	812.82
241.41	812.75	244.56	812.79	244.6	812.79	244.67	812.79	244.79	812.79
245.31	812.8	253.31	812.87	254.26	812.87	256.19	812.82	259.04	812.74
259.07	812.73	259.1	812.74	261.95	812.51	262.58	812.5	266.69	811.92
267.71	811.73	268.76	811.62	270.59	811.45	273.3	811.16	273.62	811.12
276.03	811.01	277.13	811.02	279.92	811.04	283.26	811.06	287.87	811.09
288.09	811.09	289.23	811.05	292.93	810.92	293.63	810.91	294.68	810.81
298.04	810.58	301.81	810.31	302.27	810.29	302.59	810.28	304.24	810.17
307.69	809.97	308.03	809.96	308.94	809.9	310.91	809.76	312.26	809.64
313.79	809.58	316.06	809.46	316.67	809.42	317.09	809.4	319.55	809.32
323.19	809.28	325.31	809.24	326.93	809.17	328.97	809.17	329.93	809.21
331.12	809.1	335.78	809.11	342.6	809.09	350.51	809.17	350.92	809.17
351.25	809.18	351.7	809.17	355	809.13	355.75	809.13	364.27	808.98
365.55	808.95	365.73	808.95	365.96	808.95	371.4	808.88	373.09	808.84
374.28	808.81	375.08	808.78	377.16	808.69	379.91	808.54	380.04	808.53
380.21	808.51	382.92	808.33	384.75	808.22	385.8	808.13	387.34	808.03
388.68	807.93	389.58	807.85	394.29	807.55	394.42	807.54	394.47	807.54
397.32	807.4	398.04	807.35	400.31	807.24	405.44	807.07	408.91	807.04
411.72	806.97	413.7	807	415.28	806.96	417.48	806.62	418.58	806.46
422.98	805.78	426.31	805.09	428.24	804.88	429	804.8	430.11	804.73
433.07	804.51	434.76	804.42	437.24	804.29	437.64	804.26	437.91	804.24
440.52	804.11	442.74	803.98	443.4	803.95	444.37	803.82	446.28	803.62
447.57	803.38	449.16	802.99	450	802.77	451.49	802.39	452.04	802.26
452.4	802.18	454.92	801.54	457.24	800.99	458.62	800.65	459.55	800.44
462.07	799.85	463.16	799.63	465.56	799.09	466.24	798.93	466.82	798.8
467.25	798.8	478.29	798.95	481.05	798.98	484.34	799.05	491.87	799.19
497.85	799.38	497.87	799.38	497.92	799.42	500.73	801.9	501	802.17
501.39	802.4	504.48	804.82	505.56	804.85	506.76	805.03	510.4	805.31
511.41	805.06	513.96	805.69	515.23	806.03	515.4	806.07	515.64	806.13
518.28	806.7	4520.0601	806.92	521.16	807	522.77	807.07	524.29	807.1
524.9	807.14	526.92	807.14	531.5	807.36	531.6801	807.35	531.88	807.34
535.5601	806.99	539.39	806.73	541.32	806.62	544.23	806.49	547.08	806.37
551.28	806.22	552.39	806.16	553.89	806.1	555.72	806.05	558.41	805.92
558.72	805.9	560.78	805.75	561.48	805.88	564.0601	805.77	564.7	805.79
569.47	805.97	572.67	806.07	573	806.09	573.34	806.1	581.41	806.32
587.26	806.45	591.09	806.53	592.55	806.62	594.05	806.65	598.92	806.67

601.1801	806.66	607.05	806.66	607.5601	806.59	611.88	806.546	615.4301	806.47
616.72	806.46	619.08	806.396	622.5601	806.29	624.84	806.23	626.38	806.19
629.6901	806.2	630.6	806.2	631.21	806.2	632	806.22	636.05	806.28
641.82	806.49	647.88	806.716	650.6801	806.84	651.07	806.85	653.78	806.97
658.33	807.02	659.7	807.01	660.41	807.016	664.4401	807.25	665	807.27
665.33	807.3	666.13	807.38	674.14	808.07	675.86	808.24	679.45	808.56
679.55	808.576	679.5601	808.57	679.58	808.576	682.4401	808.78	684.37	808.94
685.32	808.94	690.24	809.12	691.32	809.23	693	809.4	696.84	809.86
700.97	810.25	703.71	810.5	705.48	810.66	706.71	810.74	709.86	810.97
712.87	811.01	714.8	811	720.42	811	724.11	811.01	728.52	811.04
732.7	811.09	734.28	811.11	736.61	811.19	740.04	811.26	745.32	811.41
748.6801	811.55	753.19	811.61	753.29	811.61	755.35	811.82	756.86	811.86
759.7	811.81	765.72	811.75	766.29	811.75	769.5	811.757	780.4301	811.74
780.55	811.73	784.47	811.73	793.61	811.77	807.89	811.87	809.61	811.88
810.36	811.89	811.6	811.9	841.97	812.23	851.87	812.25	852.63	812.25
858.06	812.2	858.35	812.2	859.55	812.178	863.1801	812.1	864.91	812.05
868.02	811.96	872.04	811.82	872.52	811.818	874.4301	811.78	876.25	811.77
877.01	811.76	878.4	811.77	892.57	811.959	908.4301	812.24	909.58	812.24
919.59	812.39	933.92	812.67	935.39	812.68	938.15	812.87	942.15	812.96
944.73	813.01	946.31	813.06	946.92	813.11	947.8	813.14	950.76	813.3
953.22	813.32	962.45	813.5	964.68	813.35	964.7	813.35	967.56	813.19
969.5	813.26	970.44	813.33	971.83	813.64	973.32	813.96	974.34	814.3
976.2	814.91	978.95	816.36	979.08	816.42	979.62	816.8	980.02	817.08

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	415.28	.055	531.88	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
415.28	531.88	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:BUCKEYE_CR

Reach	River Sta.	n1	n2	n3
317437_BUCKEYE_C	1370	.05	.055	.05
317437_BUCKEYE_C	1200	.05	.055	.05
317437_BUCKEYE_C	1050	.05	.055	.05
317437_BUCKEYE_C	923.73	.05	.055	.05
317437_BUCKEYE_C	779.43	.05	.055	.05
317437_BUCKEYE_C	719.69	.05	.055	.05
317437_BUCKEYE_C	662.01	.05	.055	.05
317437_BUCKEYE_C	606.9	.05	.055	.05
317437_BUCKEYE_C	555.72	.05	.055	.05
317437_BUCKEYE_C	482.3	.05	.055	.05
317437_BUCKEYE_C	432.35	.05	.055	.05
317437_BUCKEYE_C	370	.05	.055	.05
317437_BUCKEYE_C	300	.05	.055	.05
317437_BUCKEYE_C	200	.05	.055	.05

317437_BUCKEYE_C	81.68	.05	.055	.05

SUMMARY OF REACH LENGTHS

River: BUCKEYE_CR

Reach	River Sta.	Left	Channel	Right
317437_BUCKEYE_C	1370	170.24	170	171.01
317437_BUCKEYE_C	1200	110.41	150	168.17
317437_BUCKEYE_C	1050	168.68	126.27	101.85
317437_BUCKEYE_C	923.73	209.68	144.3	84.88
317437_BUCKEYE_C	779.43	55.27	59.74	21.26
317437_BUCKEYE_C	719.69	7.44	57.68	143.59
317437_BUCKEYE_C	662.01	6.58	55.11	38.66
317437_BUCKEYE_C	606.9	5.06	51.18	4.03
317437_BUCKEYE_C	555.72	126.35	73.42	4.69
317437_BUCKEYE_C	482.3	58.55	49.95	4.42
317437_BUCKEYE_C	432.35	83.86	62.35	3.34
317437_BUCKEYE_C	370	71.45	70	5.34
317437_BUCKEYE_C	300	88.38	100	89.28
317437_BUCKEYE_C	200	79.15	118.32	197.15
317437_BUCKEYE_C	81.68	0		0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: BUCKEYE_CR

Reach	River Sta.	Contr.	Expan.
317437_BUCKEYE_C	1370	.1	.3
317437_BUCKEYE_C	1200	.1	.3
317437_BUCKEYE_C	1050	.1	.3
317437_BUCKEYE_C	923.73	.1	.3
317437_BUCKEYE_C	779.43	.1	.3
317437_BUCKEYE_C	719.69	.1	.3
317437_BUCKEYE_C	662.01	.1	.3
317437_BUCKEYE_C	606.9	.1	.3
317437_BUCKEYE_C	555.72	.1	.3
317437_BUCKEYE_C	482.3	.1	.3
317437_BUCKEYE_C	432.35	.1	.3
317437_BUCKEYE_C	370	.1	.3
317437_BUCKEYE_C	300	.1	.3
317437_BUCKEYE_C	200	.1	.3
317437_BUCKEYE_C	81.68	.1	.3