

Commercial/Industrial Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit has been issued to **Antero Resources**, and is for the approved commercial and/or industrial development project associated with this permit that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible, and must remain posted during entirety of development.

Permit: #14-275 ~ Antero Resources ~ Beech Lick Road Improvements

Date Approved: 12/03/2014

Expires: 12/03/2015

Issued to: Antero Resources

**POC: Rachel Grzybek
304-842-4008**

**Company Address: 535 White Oaks Blvd
Bridgeport, WV 26330**

**Project Address: New Milton District
Lat/Long: 39.189970N/80.629683W**

Purpose of development: Road improvement construction project.

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

Date: 12/03/2014

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

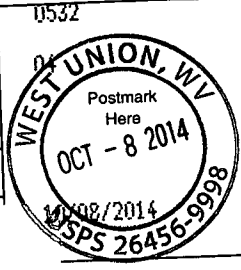
7013 2250 0001 6914 9435

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

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

PUNTA GORDA FL 33950
OFFICIAL USE

Postage	\$	\$0.49
Certified Fee		\$3.30
Return Receipt Fee (Endorsement Required)		\$2.70
Restricted Delivery Fee (Endorsement Required)		\$0.00
		\$6.49



#14-275
Carolyn R Lehmann Trust
2630 Parisian Court
Punta Gorda, FL 33950

PS Form 3800, August 2006 See Reverse for Instructions

7013 2250 0001 6914 9428

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

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

SALEM WV 26426
OFFICIAL USE

Postage	\$	\$0.49
Certified Fee		\$3.30
Return Receipt Fee (Endorsement Required)		\$2.70
Restricted Delivery Fee (Endorsement Required)		\$0.00
		\$6.49

0532
04
Postmark Here
10/08/2014

#14-275
Victor R. & Wanda F. Cox
Rt 3 Box 46
Salem, WV 26426

PS Form 3800, August 2006 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

#14-275
 Victor R. & Wanda F. Cox
 Rt 3 Box 46
 Salem, WV 26426

2. Article Number

(Transfer from service label)

7013 2250 0001 6914 9428

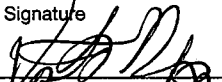
PS Form 3811, July 2013

Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

 Agent Addressee

B. Received by (Printed Name)

V. R. Cox

C. Date of Delivery

10-18-14

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

3. Service Type

 Certified Mail® Priority Mail Express™ Registered Return Receipt for Merchandise Insured Mail Collect on Delivery

4. Restricted Delivery? (Extra Fee)

 Yes

UNITED STATES POSTAL SERVICE



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

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

FILED

2014 DEC 18 AM 11:12

#4-

Doddridge County FPM
118 East Court St STE 102
West Union WV 26456-1262

STAN ROBERTS
COUNTY CLERK
DODDRIDGE COUNTY, WV



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

#14-275

Carolyn R Lehmann Trust
2630 Parisian Court
Punta Gorda, FL 33950

2. Article Number

*(Transfer from service label)***COMPLETE THIS SECTION ON DELIVERY**

A. Signature

X

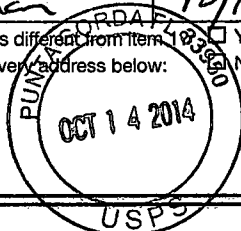

 Agent Addressee

B. Received by (Printed Name)

Lehmann

C. Date of Delivery

10/14/14

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

3. Service Type

 Certified Mail® Priority Mail Express™ Registered Return Receipt for Merchandise Insured Mail Collect on Delivery

4. Restricted Delivery? (Extra Fee)

 Yes

7013 2250 0001 6914 9435

Legal Advertisement:
Doddridge County
Floodplain Permit Application

Please take notice that on the 8th day of September, 2014

Antero Resources

filed an application for a Floodplain Permit to develop land located at or about:

New Milton District

39.189970N/80.629683W

Permit #14-275 Beech Lick Road Improvements

The Application is on file with the Clerk of the County Court and may be inspected
or copied during regular business hours.

Any interested persons who desire to
comment shall present the same in writing by **October 6, 2014**, delivered to:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456

Beth A Rogers, Doddridge County Clerk

Edwin L. "Bo" Wriston. Doddridge County Flood Plain Manager

Doddridge County, West Virginia

RECEIPT NO: 3022

DATE: 2014/09/25

FROM: ANTERO

AMOUNT: \$ 5,730.12

FIVE THOUSAND SEVEN HUNDRED THIRTY DOLLARS AND 12 CENTS

FOR: #14-275 BEECH LICK ROAD IMPROVEMENTS

00000072347 FP-BUILDING PERMITS

020-318

TOTAL: \$5,730.12

MICHAEL HEADLEY

SHERIFF & TREASURER

MEC

CLERK

Customer Copy

FILED

2014 SEP 24 AM 11:05

September 19, 2014

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV



Antero Resources
1625 17th Street
Denver, Colorado 80202
Office 303.357.7310
Fax 303.357.7315

Doddridge County Commission
Attn: Bo Wriston, Doddridge County Floodplain Manager
118 East Court Street, Room 102
West Union, WV 26456

Mr. Wriston:

Please find the included floodplain permit fee check for Beech Lick Road Improvements project. Our project is located in Doddridge County, New Milton District and per FIRM map #54017C0235C this location is within the floodplain.

Enclosed you will find the following:

- Permit Fee Check

If you have any questions please feel free to contact me at (303) 357-7232.

Thank you in advance.

Sincerely,

Emily Kijowski
Permit Representative
Antero Resources Corporation

Enclosures

#14-275
V 72347
@ 5,730.12
9/18/14

#14-275



September 4, 2014

Doddridge County Commission
Attn: Bo Wriston, Doddridge County Floodplain Manager
118 East Court Street, Room 102
West Union, WV 26456

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

Mr. Wriston:

Antero Resources Corporation (Antero) would like to submit a Doddridge County Floodplain permit application for our proposed Beech Lick Road Improvements. Our project is located in Doddridge County, New Milton District and per FIRM map #54017C0235C this location is within the floodplain.

Enclosed you will find the following:

- Doddridge County Floodplain Permit Application
- HEC-RAS Analysis
- FIRM Map
- Proposed Design Plans
- WV Flood Tool Map
- Additional Agency Permits

If you have any questions please feel free to contact me at (303) 357-7232.

Thank you in advance.

Sincerely,

Emily Kijowski
Permit Representative
Antero Resources Corporation

Enclosures

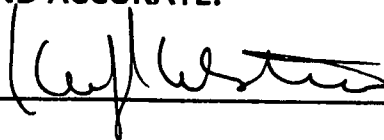
2014 SEP -8 PM 12: 26
 FILED
 COUNTY CLERK
 DODDRIDGE COUNTY, WV

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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

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

APPLICANT'S SIGNATURE



DATE August 27, 2014

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

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

APPLICANT'S NAME: Antero Midstream LLC

ADDRESS: 1615 Wynkoop Street, Denver, CO 80202

TELEPHONE NUMBER: Contact Emily Kijowski: (303)-357-7232

BUILDER'S NAME: Antero Midstream LLC
ADDRESS: 1615 Wynkoop Strett, Denver, CO 80202
TELEPHONE NUMBER: (303)-357-7310

ENGINEER'S NAME: EarthRes Engineering and Science
ADDRESS: P.O. Box 468, 6912 Old Easton Road, Pipersville, PA 18947
TELEPHONE NUMBER: (215)-766-1211

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Please see Surface Owner Table
ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Please see Surface Owner Table

DISTRICT: _____

DATE/FROM WHOM PROPERTY

PURCHASED: _____

LAND BOOK DESCRIPTION: Please see Surface Owner Table

DEED BOOK REFERENCE: Please see Surface Owner Table

TAX MAP REFERENCE: Please see Surface Owner Table

EXISTING BUILDINGS/USES OF PROPERTY: None

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY Please see Surface Owner Table

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY _____

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

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

ACTIVITY

STRUCTURAL TYPE

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

B. OTHER DEVELOPMENT ACTIVITIES:

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

C. STANDARD SITE PLAN OR SKETCH

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

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN \$ 753,086.40

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

Handwritten:
 1,000.00
 326,022

 842,652

Handwritten:
 6/5/00

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

NAME: Please see attached landowner information

ADDRESS: _____

NAME: _____

ADDRESS: _____

NAME: _____

ADDRESS: _____

NAME: _____

ADDRESS: _____

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

NAME: Please see attached landowner information

ADDRESS: _____

NAME: _____

ADDRESS: _____

NAME: _____

ADDRESS: _____

NAME: _____

ADDRESS: _____

E. CONFIRMATION FORM

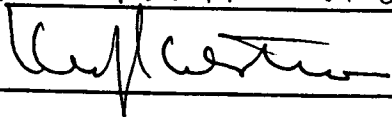
THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

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

**Property Owner Table-Doddridge County Floodplain Permit
 Antero Resources Corporation-Beech Lick Road Improvements**

Property Owner Name	Mailing Address	Parcel ID	Deed Book Reference
Host Properties-Inside Floodplain			
Cox Victor R & Wanda F	Rt 3 Box 46 Salem WV 26426	4-13-18.1	Book 207, Page 541
Aspy Thomas D & Helen L	Rt 3 Box 47 Salem WV 26426	4-14-26	Book 205, Page 253
Properties Abutting Host Properties-Inside Floodplain			
Cox Victor R & Wanda F	Rt 3 Box 46 Salem WV 26426	4-13-11	Book 229, Page 313
Cox Victor R & Wanda F	Rt 3 Box 46 Salem WV 26426	4-13-18	Book 207, Page 541
Lehmann Carolyn R Trust	2630 Parisian Court Punta Gorda FL 33950	4-14-6.1	Book 250, Page 26

- (D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.
- (E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT): Kevin Kilstrom
 SIGNATURE:  DATE: August 27, 2014

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: _____

Dated: _____

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

Is located in Special Flood Hazard Area.
 FIRM zone designation _____
 100-Year flood elevation is: _____ NGVD (MSL)

Unavailable

The proposed development is located in a floodway.
 FBFM Panel No. _____ Dated _____

See section 4 for additional instructions.

SIGNED _____

DATE _____

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

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

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

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

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

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

- Top of new fill elevation _____ Ft. NGVD (MSL).
For floodproofing structures applicant must attach certification from registered engineer or architect.

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

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

Other:

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

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

SIGNED _____ DATE _____

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

APPEALS: Appealed to the County Commission of Doddridge County? Yes No

Hearing Date: _____

County Commission Decision - Approved Yes No

CONDITIONS: _____

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

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

COMPLETE 1 OR 2 BELOW:

- 1 Actual (As-Built) Elevation of the top of the lowest floor (including basement or crawl space is _____ FT. NGVD (MSL)
- 2 Actual (As Built) elevation of floodproofing is _____ FT. NGVD (MSL)

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

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

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

INSPECTIONS:

DATE: _____ BY: _____
DEFICIENCIES ? Y/N

COMMENTS _____

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

Certificate of Compliance issued: DATE: _____ BY: _____

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

PERMIT NUMBER: _____

PERMIT DATE: _____

PURPOSE –

CONSTRUCTION LOCATION: _____

OWNER'S ADDRESS: _____

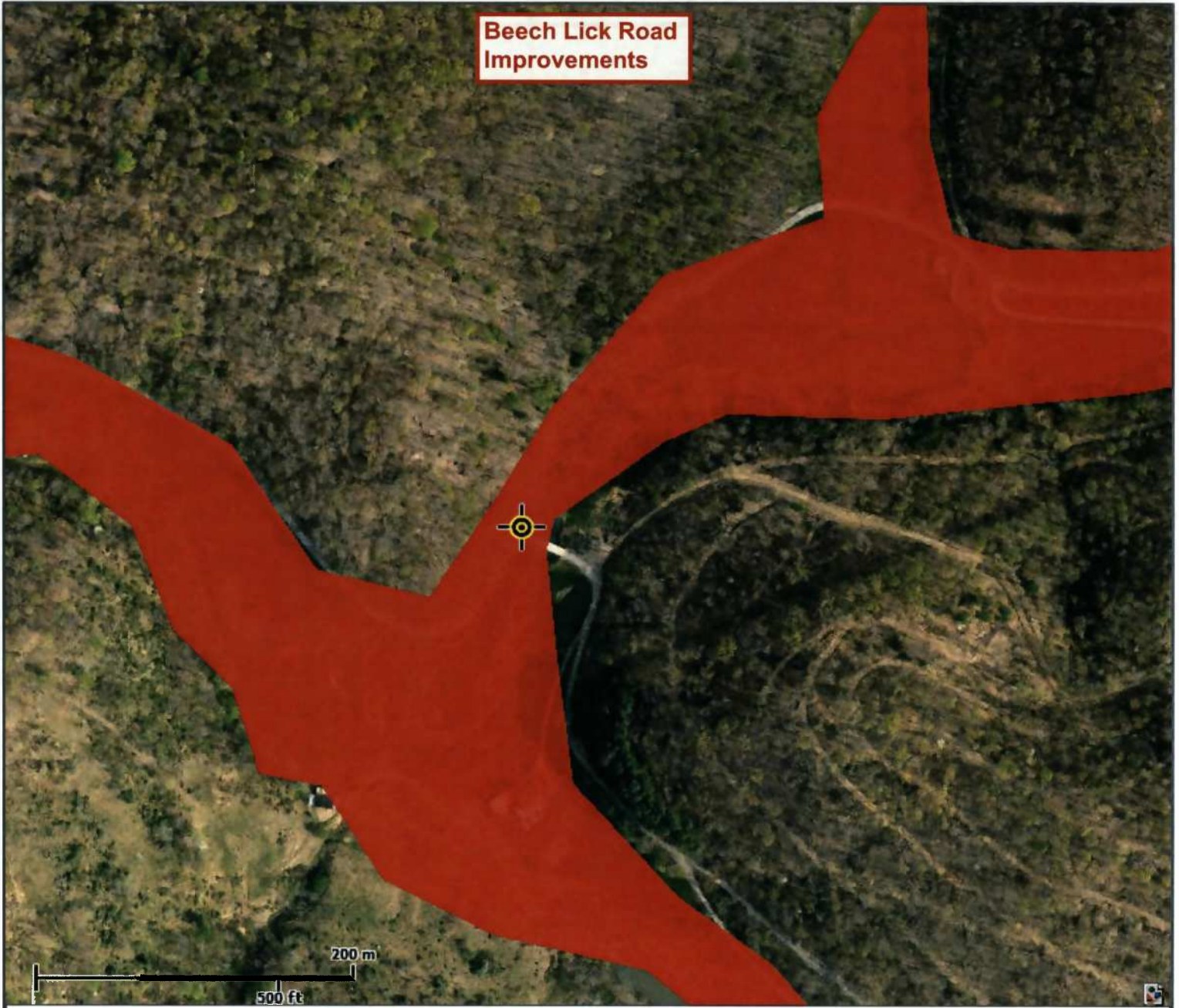
**THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN
ADMINISTRATOR/MANAGER OR HIS/HER AGENT.**

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

SIGNED _____ **DATE** _____


WV Flood Map


Beech Lick Road Improvements



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

Map Created on 8/26/2014

 Location of the mouse click

 **Flood Hazard Zone**
(1% annual chance floodplain)

User Notes:

Disclaimer:

The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov.

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

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

Elevation: About 885 feet

Location (long, lat): 80.629683 W, 39.189970 N

Location (UTM 17N): (531981, 4337923)

FEMA Issued Flood Map: 54017C0235C

Contacts: Doddridge County

CRS Information: N/A

Parcel Number:

**Beech Lick Road Improvements
Surface Owner Information**

COX VICTOR R & WANDA F (SURV)
Acres 17.823722 District 4 Map 13
PID 8.1 Book 207 Page 541

SALEM	
FID	2663
DIST	4
MAP	13
PID	8.1
GIS_Link	4-13-8.1
TAXDIST	4
TAXYR	2008
PARID	04
PARID	13000800010000
PAR_MAP	13
PAR_MAP1	8
PAR_MAP2	1
OWNTYPE1	
OWNTYPE2	
OWN1	COX VICTOR R & WANDAF (SURV)
OWN2	
ADDR1	
ADDR2	RT 3 BOX 46
ADDR3	SALEM WV 26426
CITYNAME	SALEM
STATECODE	WV
ZIP1	26426
BOOK	207
PAGE	541
LEGAL1	MEATHOUSE FORK
LEGAL2	25.5 AC
GISJOIN	4-13-8.1
MAPPED_AC	17.823722

ASPY THOMAS D & HELEN L (SURV)
Acres 61.47213742 District 4 Map
14 PID 26 Book 205 Page 253

SALEM	
FID	2688
DIST	4
MAP	14
PID	26
GIS_Link	4-14-26
TAXDIST	4
TAXYR	2008
PARID	04
PARID	14002600000000
PAR_MAP	14
PAR_MAP1	26
PAR_MAP2	0
OWNTYPE1	
OWNTYPE2	
OWN1	ASPY THOMAS D & HELEN L (SURV)
OWN2	
ADDR1	
ADDR2	RT 3 BOX 47
ADDR3	SALEM WV 26426
CITYNAME	SALEM
STATECODE	WV
ZIP1	26426
BOOK	205
PAGE	253
LEGAL1	BEECH LICK
LEGAL2	62.50 AC
GISJOIN	4-14-26
MAPPED_AC	61.472137

From: [Cole Kilstrom](mailto:Cole.Kilstrom)
To: [Rachel Grzybek](mailto:Rachel.Grzybek)
Subject: Fwd: Approval for WVR310367, Beech Lick Road (CR 25/10) Improvements, Doddridge Co., 2.93 Acres
Date: Friday, November 21, 2014 7:43:37 AM

-Cole Kilstrom

Begin forwarded message:

From: DEP NPDESEP <DEP.NPDESEP@wv.gov>
Date: November 13, 2014 at 1:32:26 PM MST
To: DEP NPDESEP <DEP.NPDESEP@wv.gov>, "ckilstrom@anteroresources.com" <ckilstrom@anteroresources.com>
Cc: "Hodge, Timothy W" <Timothy.W.Hodge@wv.gov>, "Swiger, Bradley C" <Bradley.C.Swiger@wv.gov>, "Minigh, Christina D" <Christina.D.Minigh@wv.gov>
Subject: Approval for WVR310367, Beech Lick Road (CR 25/10) Improvements, Doddridge Co., 2.93 Acres

Cole Kilstrom
Antero Resources Appalachian Corp.
1625 17th Street
Suite 300
Denver, CO 80202

Physical Site Location: CR 25/10, Salem

Please be advised that this e-mail constitutes approval for your project associated with Oil and Gas Construction Activities and your registration no. is **WVR310367**. You are now authorized to operate under WV/NPDES General Water Pollution Control Permit No. WV0116815, issued on May 13, 2013.

You should carefully read the contents of this General Permit and become familiar with all requirements needed to remain in compliance with your permit. A "Notice of Termination" form is to be completed and submitted when all disturbed areas are stabilized. You can find the permit and Notice of Termination form via the Internet by visiting Permitting, Division of Water and Waste Management at www.dep.wv.gov . Your annual permit fee has been assessed as \$ 100.00. You will be invoiced by this agency upon the anniversary date of this approval date. Failure to submit the annual fee within ninety (90) days of the due date will render your permit void upon the date you are mailed a certified written notice to that effect. Please be advised that a pro-rated annual permit fee may be assessed upon the completion date and proper stabilization.

If you have any questions relative to this approval, please do not hesitate to contact **Alice Cooper** at (304) 926-0499 Ext. **1103** or by email at alice.e.cooper@wv.gov .

Scott G. Mandirola, Director
WV DEP-Division of Water & Waste Mgt.
601 57th St. SE
Charleston, WV 25304-2345
Phone: (304) 926-0495
Fax: (304) 926-0496

AGENCY PERMITS



Applicant:	ANTERO RESOURCES APPALACHIAN CORPORATION	Type:	New NPDES/State Storm Water Construction
Reference ID:	Beech Lick Road Improvements (08/07/2014)	Permit ID:	New/Pending
Signature Page: Applicant Signature Page			
Status	New	Printed:	Aug. 07, 2014 4:53 PM

BY COMPLETING AND SUBMITTING THIS APPLICATION, I HAVE REVIEWED AND UNDERSTAND AND AGREE TO THE TERMS AND CONDITIONS OF THE GENERAL PERMIT ISSUED ON May 13, 2013. I UNDERSTAND THAT PROVISIONS OF THE PERMIT ARE ENFORCEABLE BY LAW, VIOLATION OF ANY TERM AND CONDITION OF THE GENERAL PERMIT AND/OR OTHER APPLICABLE LAW OR REGULATIONS CAN LEAD TO ENFORCEMENT ACTION.

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED ON THIS FORM AND THAT IT IS, TO THE BEST OF MY KNOWLEDGE, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.

(APPLICANT SIGNATURE)

Print Name: Cole Kilstrom
 Print Title: Environmental Specialist
 Date: 8/7/2014

The application fee for construction projects disturbing between 1 to less than 3 acres in size is \$300.00. Prior to filing this application, you may wish to obtain a copy of the legislative rules of the Department of Environmental Protection, Title 47, Series 26, Water Pollution Control permit fee schedule. You may obtain a copy of the referenced rules from the Secretary of State's Office, State Capitol Building, Charleston, WV 25305.

Your check or money order for the application fee must be made payable to the West Virginia Department of Environmental Protection.

ALL SPILLS OR ACCIDENTAL DISCHARGES ARE REQUIRED TO BE REPORTED IMMEDIATELY TO THE EMERGENCY RESPONSE SPILL ALERT SYSTEM TOLL FREE TELEPHONE NUMBER 1-800-642-3074. CALLS FROM OUT OF STATE SHOULD BE MADE TO 304-348-8899.

Please Print, Sign, Scan and attach this document rather than mailing as a wet ink signature is no longer required.



ALLSTAR ECOLOGY
Natural Resource Specialists

AllStar Ecology, LLC

Office of Land and Streams
Building 74, Room 200
324 Fourth Avenue
South Charleston, WV 25303

August 21, 2014

RE: Beech Lick Road (CR 25/10) Improvements – Victor Pad Stream Activity Application

To Whom It May Concern:

Antero Resources Corporation has proposed the construction of the Beech Lick Road (CR 25/10) Improvements – Victor Pad Project in Doddridge County, West Virginia. AllStar Ecology, LLC. (ASE) completed a stream and wetland delineation of the site Area of Interest (AOI) which included the proposed improvements to Beech Lick Road. The total area of the AOI is 24.53 acres. The proposed Limit of Disturbance (LOD) is 4.36 acres.

The proposed project is in the Meathouse Fork of Middle Island Creek (HUC# 05030201) watershed. Waters onsite included Meathouse Fork, Beech Lick and unnamed tributaries of Beech Lick. Meathouse Fork is a tributary of Middle Island Creek. Meathouse Fork is a known location of the federally endangered clubshell (*Pleurobema clava*) and snuffbox (*Epioblasma triquetra*) mussels. The project proposes one impact of 36 linear feet to a jurisdictional stream (Stream 03) from the replacement of a culvert during the improvements to Beech Lick Road. Enclosed is a right-of-entry permit application, delineation map, impact map, cross sectional drawing, as well as a location map of the project located on the USGS New Milton quadrangle.

Please contact me with any questions or concerns.

Thank you,

Terry Burhans
AllStar Ecology, LLC
858 243 9900 (direct line)
terry@allstarecology.com

cc: Cole Kilstrom - Antero
Brett Fletcher - Antero
Antero Resources Corporation
1615 Wynkoop Street
Denver, CO 80202

AllStar Ecology, LLC
1582 Meadowdale Road, Fairmont, WV 26554
Phone/Fax: 1-866-213-2666
www.allstarecology.com

2014 SEP -8 PM 12:26
FILED
BRIAN ANTONIERS
CO. CLERK
DODDRIDGE COUNTY, WV

OFFICE OF LAND AND STREAMS
STREAM ACTIVITY APPLICATION

1. Name of Applicant: <u>Antero Resources Corporation</u> (Landowner)
2. Date: <u>August 21, 2014</u>
3. Complete mailing address of applicant: <u>1615 Wynkoop Street, Denver, CO, 80202 c/o Brett Fletcher</u> Telephone Number: <u>(303) 357-6795</u> Fax Number: <u>(303) 357-7315</u> E-Mail Address: <u>bletcher@anteroresources.com</u>
4. Name, address, telephone number, and title of applicant's authorized agent (i.e. contractor employed by landowner): <u>AllStar Ecology, LLC 1582 Meadowdale Road, Fairmont, WV 26554 c/o Terry Burhans</u>
Please <input checked="" type="checkbox"/> if you want the approval sent to the agent <input checked="" type="checkbox"/>
5. Describe the proposed activity, its purpose and intended use after completion, type of equipment to be used in the stream, amount of material to be dredged (if any), plan for disposing of dredged materials, length of stream/bank to be worked or type and size of structure to be placed in the stream (i.e. length and width of bridge, diameter and length of culvert). One copy of a map (topographical or detailed, hand-drawn) showing exact location of the work site (enabling Officials to locate site) must accompany this application , and all other information that may be important to this application. Beech Lick Road (CR 25/10) Improvements - Victor Pad Activity: Activities include one stream impact totalling 36 linear feet from a culvert replacement. An existing 15-inch diameter culvert will be replaced by an 18-inch diameter ADS culvert in Stream 03 (UNT of Beech Lick) to allow for road improvements along Beech Lick Road. Temporary silt fence and 24-inch compost filter sock will be utilized to prohibit sediment from leaving the site during construction. Upon completion of the culvert installation, flow will not be impeded. Purpose: To allow road improvements for vehicle access in the area. Equipment: Excavator and Dozer Attachments: Project Location Map, Delineation Maps, Impact Map, and Cross-Sectional Drawing
(if additional space is required, continue on a separate sheet)

6. Please the proposed use:
Private: _____ Public: _____ Commerical: ✓
(person use) (Government Agency) (Business)

7. Location where proposed activity exists or will occur:
UNT Beech Lick of Meathouse Fork of Middle Island Creek (HUC# 05030201)
Name of Water Way (if unnamed or unknown tributary, provide the stream that is flows into)
Doddridge County, WV New Milton New Milton
County District (taxable) Closest City or Town

8. Date activity is proposed to commence: September 2014
Date activity is expected to be complete: March 2015

9. Is any portion of the activity for which authorization is sought now complete? Yes _____ No ✓
(If the answer is "Yes", give reasons in Section 5 including month and year the activity was completed)

10. Below is a list of entities that may require permits. Please list all approvals or certifications required by other Government Agencies for the above-described activity:

Issuing agency: Corps of Engineers – (304) 399-5710 (412) 395-7170 (412) 395-7157	Type of approval: <u>NWP 14 (non reporting)</u>
Identification No.: _____	Date of approval: _____
Issuing agency: County Commission Flood Plain Coordinator	Type of approval: _____
Identification No.: _____	Date of approval: _____
Issuing agency: City Government (if in City Limits the County isn't needed)	Type of approval: _____
Identification No.: _____	Date of approval: _____

11. Has any agency denied approval for the activity described herein? Yes _____ No ✓
(if "Yes", explain in Section 5 and/or attach a copy of the denial)

12: If activity is a pipeline construction (that is, gas, water, or sewer) give:
Material pipeline is made of: _____
Size of Pipeline: _____
Maximum pressure of the pipeline: _____
Please provide the appropriate line number and if a Gathering or Well Line provide the A.P.I. Well Number:
Transmission: _____ Distribution: _____ Gathering: _____ Well Line: _____ A.P.I Well Number: _____

13: Application is hereby made for authorization to conduct the activities described herein. I certify that I am familiar with the information in this application, and that to the best of my knowledge and belief such information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities.

Signature of Applicant or Agent

Office of Land and Streams
Building 74, Room 200
324 Fourth Avenue
South Charleston, WV 25303
Phone Number 304-558-3225
Fax Number 304-558-6048



Beech Lick Rd (CR 25/10) Improvement - Victor Pad

Copyright © 2011 National Geographic Society, Inc.

Figure 1
Project Location Map
Beech Lick Road Improvements
Victor Pad
 Latitude 39.188384°, Longitude -80.628843°
 Portions of the New Milton and Big Isaac 7 1/2°
 Quadrangles
 Scale: 1 inch = 2000 feet

Prepared by:

ALLSTAR ECOLOGY
 Natural Resource Specialists
 1582 Meadowdale Road, Fairmont, WV 26554
 866-213-2666


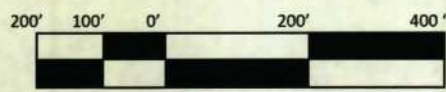
Prepared for:

Antero
 Resources

Figure 2
 Beech Lick Road (CR 25/10) Improvements - Victor Pad
 Jurisdictional Streams and Wetlands Map
 Doddridge County, WV



Notes:
 1. Background is a 2011 ESRI aerial image.
 2. Streams and wetlands were delineated by AllStar Ecology, LLC in July, August, September, October, and November 2012; February, October, and November 2013; February, July, and August 2014.
 3. Information regarding waters in the Victor Pad and Beech Lick Bridge can be found in their respective WDSIRs.



Map created August 20, 2014

LEGEND			
	FEMA Floodplain		Limit of Disturbance
	Perennial		SAMB Stream Layer
	Intermittent		Existing Culvert
	Ephemeral		Data Point (DP)
	Victor Pad AOI		
	Beech Lick Rd. to Victor Pad AOI		
	PEM Wetland		

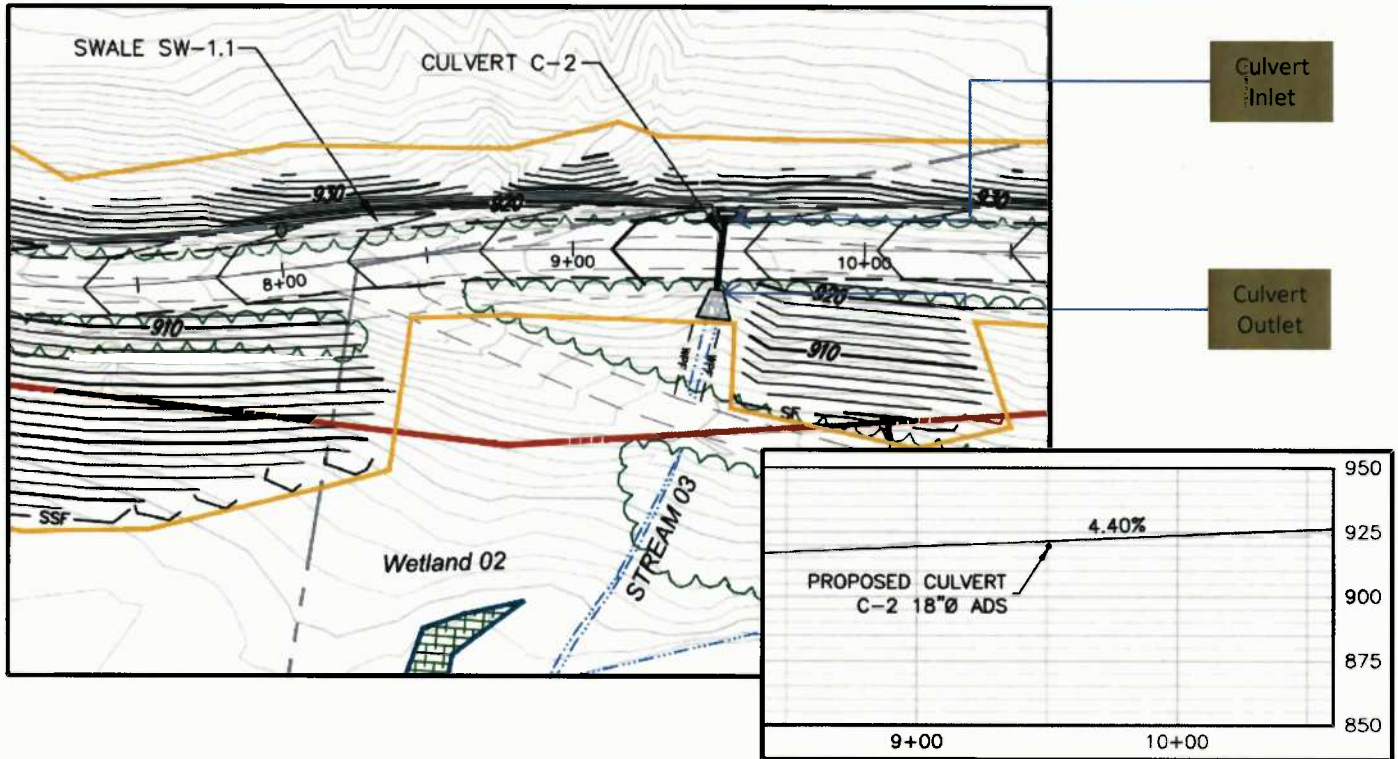
Prepared for:

**ANTERO
RESOURCES**

Prepared by:

ALLSTAR ECOLOGY
Natural Resource Specialists

**Figure 4. Beech Lick Road (CR 25/10) Improvements
Victor Pad
Impact # 01 (Stream 3)
36 LF of 18" ADS Culvert Replacement**



Excerpt from "Beech Lick Road (CR 25-10) Improvements – Victor Pad",
sheet 4 by EarthRes

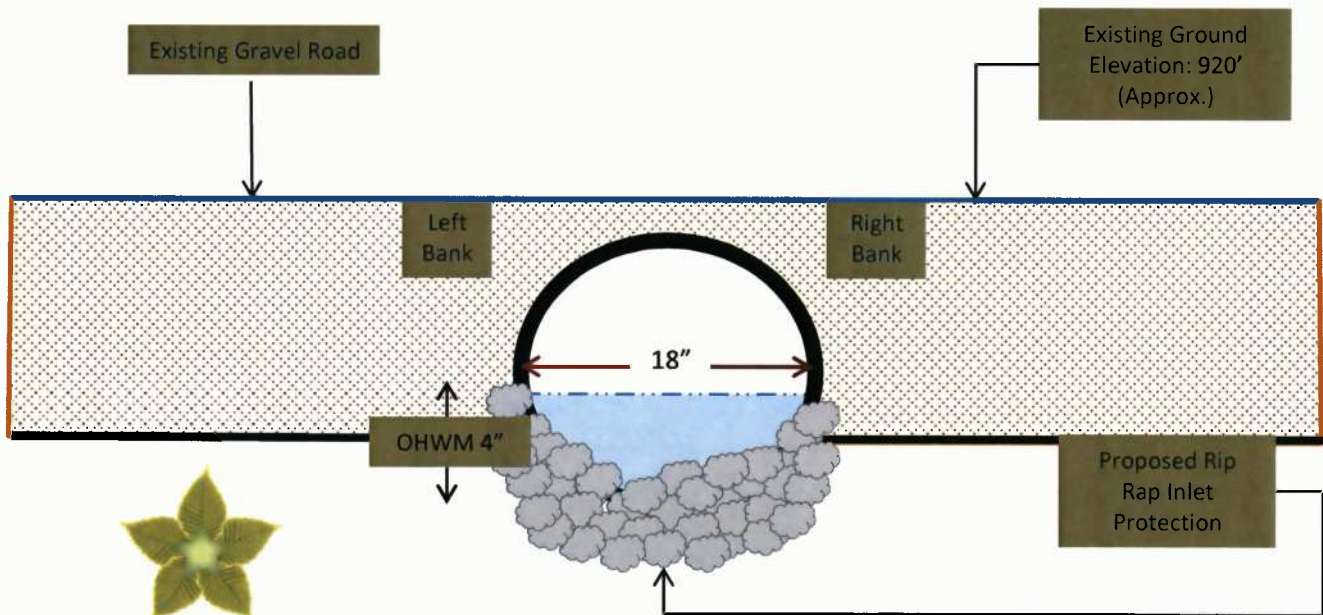




Figure 1
Project Location Map
Beech Lick Road Improvements
Victor Pad
 Latitude 39.188384°, Longitude -80.628843°
 Portions of the New Milton and Big Isaac 7 1/2' Quadrangles
 Scale: 1 inch = 2000 feet

Prepared by:



ALLSTAR ECOLOGY
 Natural Resource Specialists

1582 Meadowdale Road, Fairmont, WV 26554
 866-213-2666

Prepared for:



Antero
 Resources



AllStar Ecology, LLC.

August 21, 2014

Delivery Method: US Mail

Attn: Ms. Elizabeth Stout
U.S. Fish and Wildlife Service
West Virginia Field Office
Ecological Services
694 Beverly Pike
Elkins, WV 26241

**Re: Threatened and Endangered Species Consultation
Beech Lick Road (CR 25/10) Improvements – Victor Pad Project
Doddridge County, WV
Antero Resources Corporation**

FILED
2014 SEP -8 PM 12:26
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Dear Ms. Stout:

AllStar Ecology, LLC is submitting this consultation on behalf of Antero Resources (Antero) for the Beech Lick Road (CR 25/10) Improvements – Victor Pad project. Please address any questions or comments regarding this consultation to:

Brett F. Fletcher
Senior Environmental Scientist & Regulatory Manager
Antero Resources
1615 Wynkoop St.
Denver, CO 80202
(720) 666-2814
bfletcher@anteroresources.com

1.0 PROJECT DESCRIPTION

Antero Resources Corporation (Antero) has proposed the construction of the Beech Lick Road (CR 25/10) Improvements – Victor Pad project in Doddridge County, WV. AllStar Ecology, LLC. (ASE) completed a stream and wetland delineation of the site Area of Interest (AOI) which included the proposed locations of a well pad, various topsoil stockpiles and associated access road. Total area of the AOI is 24.53 acres. The proposed Limit of Disturbance (LOD) is 4.36 acres with 1.99 acres of proposed tree clearing.



AllStar Ecology, LLC.

The site was located approximately 7.5 miles southeast of Salem, WV, in the eastern portion of Doddridge County, WV. From U.S. Route 50, take CR 31 / Jarvisville-Makin Road for 8.0 miles. Continue onto CR 25 Meathouse Fork Road for 5.6 miles. Turn left onto CR 25/10 Beech Lick Road and cross the Beech Lick Road Bridge. The approximate center of the AOI was 39.180760 °N, -80.617365 °W located on the United States Geological Survey (USGS) topographical maps of the New Milton and Big Isaac 7.5' Quadrangles (Figure 1).

The western end of Beech Lick Road was situated along bottomland and hillsides, while the eastern end of the road continued through bottomland associated with the perennial stream Beech Lick and its unnamed tributaries. The surrounding land was primarily rural residences. Forested areas were dominated by white oak (*Quercus alba*) and red maple (*Acer rubrum*). Herbaceous bottomland areas were dominated by deertongue (*Dichanthelium clandestinum*) and wingstem (*Verbesina alternifolia*).

2.0 THREATENED AND ENDANGERED SPECIES IN DODDRIDGE COUNTY, WV

Rare, threatened, and endangered species located within Doddridge County, WV include the Indiana bat (*Myotis sodalis*), snuffbox mussel (*Epioblasma triquetra*), clubshell mussel (*Pleurobema clava*), and rayed bean mussel (*Villosa fabalis*) (Table 1).

Table 1. Threatened and Endangered Species Known to Occur in Doddridge County, WV

Common Name	Scientific Name	Nearest Known Habitat (Miles)	Status
Indiana Bat	<i>Myotis sodalis</i>	16.8 miles Northwest	Endangered
Clubshell Mussel	<i>Pleurobema clava</i>	Within AOI	Endangered
Snuffbox Mussel	<i>Epioblasma triquetra</i>	Within AOI	Endangered
Rayed Bean Mussel	<i>Villosa fabalis</i>	8 river miles to Middle Island Creek	Endangered



AllStar Ecology, LLC.

3.0 POTENTIAL THREATENED AND ENDANGERED SPECIES HABITAT IN PROJECT AOI

Indiana bats are restricted to underground hibernacula during winter, with preferred areas being caves located in karst areas. However, Indiana bats will also use other cave-like areas, mostly abandoned mine portals. During the summer, Indiana bats roost mainly under exfoliating bark on dead or nearly dead trees, but will also use crevices in trees as roost sites. They will also utilize live trees with exfoliating bark to a lesser extent, mostly hickory species (*Carya* spp.). They select larger trees, which provide more room for roosting and better thermal advantages. They also select trees which are either located near edges or extend above the surrounding trees as these trees provide more sunlight and are easier and safer to approach. Spring and fall roosting areas are usually located near the hibernacula and are similar to summer roosting areas. Indiana bats prefer foraging areas, such as water bodies and open areas, to be near the roosting areas (USFWS Indiana Bat Recovery Plan, p. 51-69).

Freshwater mussels require high-quality waters with gravel/cobble substrate and are most often found in runs slightly below riffles. They are found in streams and small to medium rivers. These mussels are extremely susceptible to pollution and siltation and require clear water (USFWS Endangered Species Pages).

Within the Beech Lick Road (CR 25/10) Improvements – Victor Pad AOI, Indiana bat habitat was considered marginal. No suitable snags or live shagbark hickory (*C. ovata*) were documented within the AOI. Meathouse Fork, a known mussel stream suitable for endangered mussels was mapped within the AOI. In addition, no potential habitat for bald eagles was located on or near the site. No caves or mine portals were located onsite.

4.0 PROPOSED IMPACTS

The Beech Lick Road (CR 25/10) Improvements – Victor Pad project will require 4.36 acres for construction. One impact to a perennial stream (Red Lick) is proposed from construction of the access road. Best management practices will be utilized to protect aquatic resources during all earth disturbing activities. The proposed LOD will require 1.99 acres of disturbance to upland forest. Photos are provided documenting the site cover types (Figure 2).



AllStar Ecology, LLC.

Habitat Impacts

The impacted habitat is mostly upland deciduous forest. Minimal tree clearing is necessary to complete the project (1.99 acres). Additionally, one impact to one ephemeral stream (Stream 03) will result from the replacement of a culvert. Silt fencing and compost filter sock will be used to minimize sediment from leaving the site.

5.0 PROPOSED IMPACTS

The Beech Lick Road (CR 25/10) Improvements – Victor Pad project was designed to utilize the existing road right of way to avoid impacts to sensitive species and critical habitat. One Impact to one ephemeral stream (Stream 03) is proposed resulting from the improvement of Beech Lick Road. The amount of forest clearing has been minimized to the least amount practical.

6.0 SUMMARY

In our professional opinion, no significant impacts to sensitive species or habitat will occur during the construction of the Beech Lick Road (CR 25/10) Improvements – Victor Pad project. The amount of tree clearing required for the road improvements. We request concurrence with the above determinations from the USFWS.

Should you have any questions please do not hesitate to contact Brett Fletcher at (720) 666-2814 or bfletcher@anteroresources.com. We appreciate your timely review of this request.

Sincerely,

Terry Burhans, B.S., M.S.
Project Manager
Environmental Scientist
AllStar Ecology, LLC.

Enclosures (2):
Figure 1- USGS Topographic Map
Figure 2- Habitat Photographs

Cc: Brett F. Fletcher, Antero Resources



ALLSTAR ECOLOGY
Natural Resource Specialists

AllStar Ecology, LLC

Ms. Barbara Sargent
WV Division of Natural Resources
Natural Heritage Program
PO Box 67
Elkins, WV 26241

August 21, 2014

**RE: Beech Lick Road (CR 25/10) Improvements – Victor Pad
Environmental Review**

FILED
2014 SEP - 8 PM 12: 30
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Ms. Sargent,

Antero Resources Corporation has proposed the Beech Lick Road (CR 25/10) Improvements – Victor Pad in Doddridge County, West Virginia. AllStar Ecology, LLC. (ASE) completed a stream and wetland delineation of the site Area of Interest (AOI) which included the proposed of a road improvement project. Total area of the AOI is 24.53 acres. The proposed Limit of Disturbance (LOD) is 4.36 acres. The project proposes 1.99 acres of tree clearing.

The proposed project is in the Meathouse Fork of Middle Island Creek (HUC# 05030201) watershed. Waters onsite included Meathouse Fork, Beech Lick and unnamed tributaries of Beech Lick. Meathouse Fork is a tributary of Middle Island Creek. Meathouse Fork is a known location of the federally endangered clubshell (*Pleurobema clava*) and snuffbox (*Epioblasma triquetra*) mussels. The project proposes one impact of 36 linear feet to a jurisdictional stream (Stream 03) from the replacement of a culvert during the improvements to Beech Lick Road. Included with this letter is a delineation map and a location map of the project located on the USGS New Milton quadrangle. Please provide any additional information on known records in the site vicinity.

Please contact me with any questions or concerns.

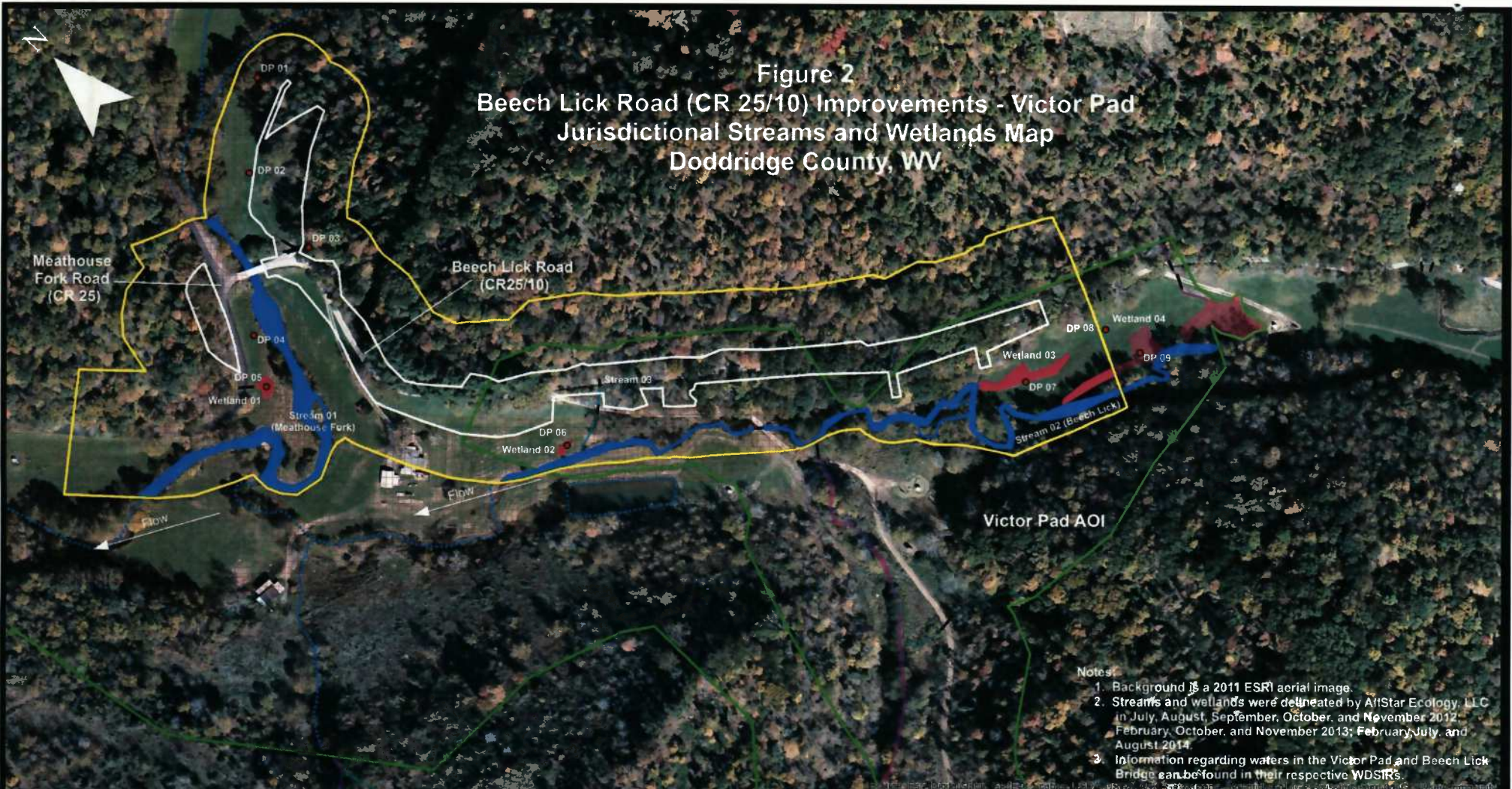
Thank you,

Terry Burhans
AllStar Ecology, LLC
858 243 9900 (direct line)
terry@allstarecology.com

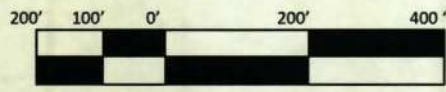
cc: Cole Kilstrom - Antero
Brett Fletcher - Antero
Antero Resources Corporation
1615 Wynkoop Street
Denver, CO 80202

AllStar Ecology, LLC
1582 Meadowdale Road, Fairmont, WV 26554
Phone/Fax: 1-866-213-2666
www.allstarecology.com

Figure 2
 Beech Lick Road (CR 25/10) Improvements - Victor Pad
 Jurisdictional Streams and Wetlands Map
 Doddridge County, WV



- Notes:
1. Background is a 2011 ESRI aerial image.
 2. Streams and wetlands were delineated by AllStar Ecology, LLC in July, August, September, October, and November 2012; February, October, and November 2013; February, July, and August 2014.
 3. Information regarding waters in the Victor Pad and Beech Lick Bridge can be found in their respective WDSIRs.



Map created August 20, 2014

LEGEND			
	FEMA Floodplain		Limit of Disturbance
	Perennial		SAMB Stream Layer
	Intermittent		Existing Culvert
	Ephemeral		Data Point (DP)
	Victor Pad AOI		
	Beech Lick Rd. to Victor Pad AOI		
	PEM Wetland		

Prepared for:

ANTERO RESOURCES

Prepared by:

ALLSTAR ECOLOGY
 Natural Resource Specialists



**Beech Lick Road (CR 25/10) to Victor Pad
Improvements Project
Storm Water Pollution Prevention Plan**

Antero Resources Corporation
Doddridge County, West Virginia

August 2014

FILED
2014 SEP -8 PM 12:26
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

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Table 3.1 Inventory of Potential Pollutants and Associated BMPs

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Figure 1 USGS Location Map

LIST OF ATTACHMENTS

Attachment A Existing Groundwater Quality

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Appendix A – Authorization to Discharge West Virginia Permit No. WV0116815

Appendix B – Notice of Intent filed with WVDEP

Appendix C – Notification of Public Safety Officials and Government Agencies

Appendix D – Soils Map and Report

Appendix E – E&SC Plans

Appendix F – Secondary Containment Drainage Log

Appendix G – BMP Technical Installation Details

Appendix H – Doddridge CR 13 Improvements Storm Water Pollution Prevention Training Log

Appendix I – Antero Midstream Erosion & Sediment Control Inspection Report

Appendix J – WVDEP Notice of Termination F

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) controls storm water and sewer discharges through its National Pollutant Discharge Elimination System (NPDES) and provides guidance to municipalities, states and federal permitting authorities on how to meet storm water pollution control goals as flexibly and cost-effectively as possible. Construction activities that disturb more than three acres during the life of the project, or are part of a larger common plan of development, are required to submit a Site Registration Application (SRA) and prepare a Storm Water Pollution Prevention Plan (SWPPP). The Environmental Protection Agency (EPA) has delegated responsibility for implementation of these regulations to state agencies.

The West Virginia Department of Environmental Protection (WVDEP), Division of Water and Waste Management regulates storm water discharges through its West Virginia General Water Pollution Control Permit program. Construction of a natural gas gathering pipeline has the potential to impact storm water. The regulations also require oil and gas related construction sites, disturbing more than one acre of land, to prepare a storm water pollution prevention plan. The goal of this plan is to improve water quality by reducing pollutants in storm water discharges. Construction activities potentially produce many different kinds of pollutants that may adversely impact storm water.

The main pollutant of concern at construction projects is sediment, which can become entrained in storm water runoff following excavation and/or grading activities that remove protective vegetative cover. When the storm water runoff carrying these sediments reaches a lake or stream and slows down, the suspended sediments are deposited, which can choke the river channel or cover areas where fish spawn and aquatic plants grow. The particles also cloud waters causing aquatic respiration problems potentially resulting in the death of fish and plants in these ecosystems.

Construction activities may also involve the use of toxic or hazardous materials, including petroleum products, building materials, such as asphalt, sealants and concrete, and other chemicals that can be harmful to humans and aquatic life.

The objectives of this plan are:

- To identify potential sources of pollution that may be reasonably expected to affect the quality of storm water discharges associated with oil & gas related construction activities.
- To describe those practices, controls, and Best Management Practices (BMP) to be used to minimize storm water pollution.
- To assure compliance with the terms and conditions listed in the Permit.

AllStar Ecology, LLC (ASE) has prepared this SWPPP for the Doddridge County Route (CR) 25/10 Beech Lick Road Improvements – Victor Pad Project to satisfy West Virginia SWPPP requirements

for a new construction site disturbance. A SRA has been completed to obtain regulatory coverage through the WV general permit for storm water discharges associated with oil and gas related construction activities. A copy of the SRA is included in **Appendix B**.

Copies of the SWPPP will be maintained at Antero field office and onsite.

Project Name

Beech Lick Road (CR 25/10) Improvements - Victor Pad

Owner/Operator

Antero Resources Corporation

Address: 1615 Wynkoop Street, Denver, CO 80202

Project Contact

Cole Kilstrom

Telephone: (303) 357-7310

This SWPPP will be reviewed and amended during construction as necessary whenever there is a right-of-way (ROW) design change or process that could increase the exposure of construction materials to storm water, when a West Virginia (WV) Department of Environmental Protection (DEP) representative determines that a modification to the SWPPP is necessary, or whenever there is a spill, leak, release, or unauthorized discharge from the Site. Revisions to the SWPPP required as a result of a site inspection will be completed immediately. Reports, inspections, and certifications associated with this SWPPP and GPP will be retained by Antero Resources Corporation (Antero) for at least 3 years.

Appendix C presents a list of government agencies that may need to be notified if impacted storm water is released to a water way, if there is a non-storm water discharge event or if there is a spill/release of a hazardous material.

ASE conducted stream and wetland investigations for the Beech Lick Road (CR 25/10) Improvements – Victor Pad Project on July, August, September, October and November 2012; February, October, and November 2013; and February and July 2014. During the site review three streams were identified. Additionally, four jurisdictional palustrine emergent wetlands were identified. Based upon engineer drawings provided by EarthRes Group dated June 26, 2014, one stream impact is proposed from this road improvement project. Intermittent Stream 3 will be impacted from a culvert replacement.

The impacts are the result of necessary road improvements to accommodate large vehicular traffic on Doddridge CR 25/10. These aquatic impacts are minimized by using the existing county road instead of building a new access road and are the minimum necessary to complete the road

improvement project. These proposed impacts are covered under NWP 14 through the US Army Corps of Engineers (ACOE). Impacts may include fill to Waters of the United States (WoUS) consisting of culverts, native fill material, gabion baskets, and rip rap outlet protection. Temporary fills for construction may include temporary native fill, matting for machinery crossing, and temporary erosion and sediment control measures. Portions of the stream temporarily affected by construction will be restored to pre-construction contours at the completion of construction.

No impacts to jurisdictional aquatic resources are proposed. The project does not require individual 404 permitting through the United States Army Corps of Engineers (ACOE), nor does it require individual Section 401 permitting through the WV DEP.

A desktop review of the proposed project area revealed no known archaeological or architectural resources within the Area of Interest (AOI), or within one mile, as recorded on the WV State Historic Preservation Office (SHPO) online GIS database.

The closest property listed on the National Register of Historic Places (NRHP) is the Krenn School (89000181), located approximately 5.35 miles southwest of the project area. This resource will not be physically or visually affected due to its distance from the project area. Historical topographic maps depict fourteen structures within the project's AOI, three of which are still standing in modern aerial imagery, and several nearby standing structures which will have lines-of-sight to the project's AOI.

Topographic maps depict landforms within the AOI which are suitable for intact archaeological resources. Should any cultural resources be encountered during construction, Brett Fletcher (Antero) should be immediately notified at (720) 666-2814. Antero shall immediately notify the WVSHPO at (304) 558-0240 and, in the case of human remains, the appropriate local Sheriff's office or West Virginia State Highway Patrol (911).

1.1 Project Location

The Beech Lick Road (CR 25/10) Road Improvements – Victor Pad project will be located at 39.189244°, -80.629260° on the United States Geologic Survey (USGS) topographic map of the New Milton 7.5' quadrangle (**Figure 1**).

1.2 Project Description

This SWPPP covers linear construction activities associated with improvements to Doddridge CR 25/10 (Beech Lick Road) to provide improved access to the Victor Well Pad. Construction activities associated with the road improvements include but are not limited to: brush hogging and removing top vegetative cover, grading slopes, cutting existing rock, culvert removal, culvert installation, establishing temporary workspaces, and associated activities. Upon completion of earth disturbing activities, ground surfaces will be stabilized and vegetated. The Doddridge CR

25/10 Project has an AOI totaling approximately 25.3 acres. The project proposes a Limit of Disturbance (LOD) of 4.32 acres, excluding the existing roadbed, with 1.97 acres of tree clearing.

The project AOI overlaps with the Victor Well Pad AOI southeast of CR 25/10. Any construction activities associated with the Victor Well Pad will be covered under the well work permit.

The project area is located in the Appalachian Plateau Physiographic Province. Surrounding land use is primarily privately owned and classified as deciduous forest.

1.3 Climate

Annual precipitation in northwestern West Virginia averages approximately 40 to 44 inches. Most of the precipitation originates as frontal storms, either thunder or snow storms. The prevailing winds in the vicinity of the Beech Lick Road (CR 25/10) Improvements – Victor Pad project area are generally from the northwest.

From May through September, precipitation comes primarily from thunderstorms, with the preponderance of storms occurring from June through August. Thunderstorms occasionally produce intense showers that can deposit 1.5 inches or more of rain within a few hours. Flash floods sometimes occur in streambeds that are normally dry.

The precipitation in a 24-hour period, for a 25-year storm event in northwestern West Virginia is approximately 4.5 inches. The precipitation for a 10 day, 25-year storm event is approximately 6 inches.

1.4 Soils

There were several soil types located within the area of disturbance for the Doddridge CR 25/10 Improvements Project. The soil types exist in different layers which vary from the surface layer to the depth where bedrock is present. The soils present within the project area of disturbance consist of a mixture of the following:

- Loams
- Channery loams
- Channery sandy loam
- Very Channery sandy loam
- Extremely Channery sandy loam
- Very Channery silt loam
- Channery silty clay loam
- Very Channery silty clay
- Silt loams
- Silty clay loam
- Clay
- Bedrock

Apart from areas in the bottomland associated with Stream 01 and the lower reach of Stream 02, the soils in the project area are primarily well draining soils with no frequency of ponding and only occasional flooding. The soils in the area of concern have a very low susceptibility to wind erosion. All of the soils fall into wind erodibility group 8. The wind erodibility groups range from 1-8 with group 1 being the most susceptible to wind erosion and group 8 being the least susceptible.

The soils within the project area have a moderate susceptibility to sheet and rill erosion by water (K-factor). The Sensabaugh silt loam and the Gilpin-Peabody complex (35 to 70 % slopes) make up 82 % of the site and each have K values of 0.37 inches/hour. K values range from 0.02-0.69, with Higher K values representing soils that are more susceptible to sheet and rill erosion by water. A soils map showing the entire area of disturbance, a soil unit legend and index map are included in **Appendix D**.

1.5 Surface Water Drainages

Surface water runoff and discharges from the road improvement project will be controlled by structural devices that slow runoff and cause ponding or direct runoff towards trenches to be controlled by ROW diversions, compost filter sock, silt fence, rock check dams, permanent seeding and mulch, and erosion control matting. Uncontrolled surface water from the project area could reach the following surface drainages:

- Small creeks, streams and wetlands that exist along CR 25/10. Erosion and sediment controls have been designed to traverse away from and around these areas, thereby minimizing potential impacts to these sensitive areas. Details of these features are shown on the Erosion & Sediment Control (E&SC) Plans provided in **Appendix E**.

In compliance with the Clean Water Act, the WVDEP established water quality standards under Title 47CRS2. The water quality standards include designated uses, water quality criteria and antidegradation policies. To maintain these standards, the WVDEP assigned specific tiers depending on the level of protection needed to maintain water quality and/or existing uses. A Tier 3 classification is given to protect outstanding national resource waters including Federal Wilderness Areas, specifically designated federal waters, high quality waters, or naturally reproducing trout streams in state parks, national parks, and national forests. ASE conducted a desktop analysis to examine known stream classifications along the alignment. No Tier 3 streams were identified in the Doddridge CR 25/10 Improvement project area.

Beech Lick (NHD Code WVOMI-46-L) and Meathouse Fork (NHD Code WVOMI-46) are included in the Middle Ohio North Watershed Total Maximum Daily Load (TMDL) Report. Meathouse Fork is listed as impaired by the WVDEP for Conditions not allowable (CNA) biological condition, fecal coliform, and iron. Runoff from adjacent land could be controlled by implementing BMPs to control erosion and slow runoff.

Under Section 5.1.3 (“Construction Stormwater Permits”) of the Middle Ohio River North and South Watersheds TMDL Report, “Stormwater permits require that the site have properly installed BMPs, such as silt fences, sediment traps, seeding/mulching, and riprap to prevent or reduce erosion and sediment runoff.” The BMPs will remain intact until the construction is complete and the site has been stabilized.

2.0 CONSTRUCTION ACTIVITY

Construction of the Doddridge CR 25/10 Road Improvements – Victor Pad Project is scheduled to start in August 2014 and the estimated construction completion will be sometime in October 2014.

The road improvements will include the following activities listed below:

- Clearing, grading and stockpiling of top soil;
- Road grading and improvement;
- Excavation for culvert removal/installation with rip rap;
- Backfilling and compacting;
- Cleanup, grading, surface roughening, and seeding.

Earthmoving activities will be limited to the proposed LOD as presented in the enclosed plans and detail drawings. Disturbed areas have been limited to those necessary for road improvements, culvert removal/installations, work spaces, soil stockpiles, and to avoid in-stream construction. Earthmoving will also be limited appropriately for weather conditions, specifically during rainfall events. Topsoil will be segregated in agricultural, wetland, and residential areas. The topsoil will then be replaced in its existing layer. Disturbed areas will be permanently stabilized upon completion of construction. All revegetation of disturbed areas associated with this project will be completed in accordance with the E&SC Plans provided in **Appendix E** and BMP Technical Installation Details provided in **Appendix G**.

Storm water outfalls, drainage control within the ROW, wetland crossings, and materials handling, loading and storage areas are described in the following sections.

2.1 Location of Storm Water Outfalls

Local drainage for the majority of the road right of way (ROW) is directed via unnamed channels and drainages as shown on the USGS Location Map **Figure 1**. Storm water draining away from the road ROW is expected to leave the project area through storm water erosion controls such as ROW diversions, compost filter sock, silt fence, super silt fence, erosion control matting, and through small drainage channels. The stormwater runoff will then flow through stabilized, well vegetated areas.

2.2 Drainage Control within the ROW

ROW diversions, compost filter sock, silt fence, super silt fence, erosion control matting, and diversionary earthen berms will be used to prevent or control storm water running onto the project area. Structural control measures will be used to protect slopes and dissipate erosive energy along hill slopes, shoulders of access roads, and nearby wetland banks to prevent excess sediment runoff.

During construction of road improvements, engineering controls and work practices will be employed to prevent potential storm water impacts resulting from erosion of excavated materials or chemical impacts due to storm water coming into contact with construction materials, fuel products or equipment. Low-lying areas within the ROW will collect storm water runoff and create small water bodies. Within these areas storm water will be allowed to evaporate, infiltrate and flow through erosion control devices into vegetated drainage channels. Sediment will be maintained within the ROW by the use of ROW diversions, compost filter sock, silt fence, and erosion control matting.

2.3 Materials Handling, Loading, and Storage Areas

Materials stored in the project area will include supplies such as the High-Density Polyethylene (HDPE) pipes, rip rap, stone, and steel culverts in addition to other materials listed in **Table 3.1**. Materials handling, loading, and storage areas will be sited away from natural storm water drainages or surrounded with earthen berms to prevent storm water impact. Construction materials and chemical storage will be kept covered with secondary containment practices implemented where applicable to prevent storm water impacts.

Small amounts of storm water impounded within secondary containment structures are expected to be lost through evaporation. Antero personnel or approved subcontractor personnel will inspect large accumulations of storm water, and if no impacts are observed (e.g., oil sheens, oil skims, or other evidence of chemical impact) within the secondary containment, the storm water will be allowed to evaporate. If the impounded storm water exhibits signs of impact, such as sheen waters or oil skim, then the storm water will be properly disposed of offsite by a vacuum truck contractor and documented on the Secondary Containment Drainage log contained in **Appendix F**.

3.0 POTENTIAL POLLUTION SOURCES AND MATERIAL INVENTORY

The following is a description of potential sources of pollutants to storm water discharges.

3.1 Potential Pollution Sources

Table 3.1 provides an inventory of potential materials/pollutants that will be on site during construction. Some of these materials have potential pollutants that can become pollutants associated with storm water discharge. The table below shows the materials, potential pollutants associated with the materials and the BMPs that will be used on site to eliminate the possible discharge of pollutants.

*The materials presented in **Table 3.1** serve as initial guidance to the potential on site materials and pollutants associated with those materials. The list also provides BMPs (structural and non-structural) for the associated pollutants. However, it is the responsibility of the storm water inspector to continually update and monitor the inventory list within this SWPPP, and to ensure that each potential pollutant listed below has a BMP installed to prevent discharges.*

Table 3.1 Inventory of Potential Pollutants and Associated BMPs

Material Trade Name	Applicable to Site Y or N	Potential Pollutant	Associated BMP(s)
Glue, Adhesives, Epoxy powders	Y/N	Polymers, epoxies	Disposal of used containers must follow manufacturer specifications. Proper application (see manufacturer recommendations). Storage of products: Properly sealed containers indoors, on a pallet, preferably under shelter, tarp or inside a vehicle tool cabinet.
Asphalt	Y/N	Oil, petroleum distillates	Follow manufacturer's application specifications. Disposal of used containers and excess material must follow manufacturer specifications.
Concrete, concrete washout water	Y/N	Limestone, sand, pH	Designated concrete washout area on ROW. Do not clean out hopper or chute on to ground or in drainage channels. Concrete washout area must be within a bermed containment area. It must be cleaned out when it reaches a 75% capacity. Recommend cleanout at 50%. All wash out areas will be in the permanent ROW.
Cleaning Solvents	Y/N	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, precautions shall be taken to ensure there is no contact with stormwater (e.g. stored under a shelter or tarp preferably within secondary containment).
Wood Preservatives	Y/N	Stoddard solvent, petroleum distillates, arsenic, copper, chromium; creosote; pentachlorophenol	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, precautions shall be taken to ensure there is no contact with stormwater (e.g. stored under a shelter or tarp preferably within secondary containment).

Material Trade Name	Applicable to Site Y or N	Potential Pollutant	Associated BMP(s)
Hydraulic Oil/Fluids (brake, power steering, etc...) Greases, Lubrication oils.	Y/N	Mineral oil	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, precautions shall be taken to ensure there is no contact with stormwater (e.g. stored under a shelter or tarp preferably within secondary containment). All onsite vehicles will be routinely inspected for leaks and drips and will be cleaned up as necessary.
Gasoline / Diesel Fuel	Y/N	Benzene, ethyl benzene, toluene, xylene, MTBE	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp preferably within secondary containment. All onsite vehicles will be routinely inspected for leaks and drips.
Kerosene	Y/N	Coal oil, petroleum distillates	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, precautions shall be taken to ensure there is no contact with stormwater (e.g. stored under a shelter or tarp preferably within secondary containment).

Material Trade Name	Applicable to Site Y or N	Potential Pollutant	Associated BMP(s)
Antifreeze/Coolant	Y/N	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	<p>Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications.</p> <p>Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, precautions shall be taken to ensure there is no contact with stormwater (e.g. stored under a shelter or tarp preferably within secondary containment). All onsite vehicles will be routinely inspected for leaks and drips</p>
Detergents	Y/N	Phosphorous	<p>Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications.</p> <p>Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, precautions shall be taken to ensure there is no contact with stormwater (e.g. stored under a shelter or tarp preferably within secondary containment).</p>
Dust or particulate generating processes	Y/N	Dust, particulates	<p>BMPs used on site to reduce the movement of dust and particulates include but are not limited to the following: watering practices during earth moving activities, the application of a chemical dust suppressant substance to bind the dirt to the earth during construction, speed limit controls to ensure minimal dust kick up produced by moving vehicles, ceasing any earth moving activity during high wind. Other BMPs may be introduced on site during construction.</p>

Material Trade Name	Applicable to Site Y or N	Potential Pollutant	Associated BMP(s)
Boring Activities	Y/N	Bentonite; diesel based drilling muds, barium based drilling muds, saline solutions (potassium chloride, calcium chloride).	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: mud storage tank/trailer, tightly sealed containers, placed on a pallet, use of plastic shrink-wrap, under shelter or tarp. Use of secondary containment practices. Use of a designated containment pit and/or a vacuum truck for removal from project site and or reuse. Wattles and earthen berms are to be used for containment of bentonite releases.
Sediment	Y/N	Nutrients, suspended solids, sediment	Sediment erosion and sedimentation on site should be controlled by structural and non-structural BMPs. Structural BMPs can include but are not limited to: sediment control logs, erosion control blankets, riprap, earth berms, and silt fence. Non-structural BMPs can include but are not limited to: seed and mulch, exposure time of disturbed soils, education of onsite personnel.

3.2 Description of Significant Material Storage

During construction, chemical storage is expected to be minimal. Chemical containers should be covered and properly stored in areas where they will not come in contact with storm water. Fuel storage tanks (diesel fuel and gasoline tanks) for trucks and heavy construction equipment will be placed in earthen secondary containment structures capable of containing the entire volume of the largest tank and sufficient freeboard to contain impounded storm water. In areas within 50 feet of drainages, secondary containment areas should contain a proper liner to prevent infiltration into the ground. Material storage areas should be inspected every 7 days and/or during regularly scheduled storm water inspections as well as post precipitation events.

It shall be the responsibility of all Antero employees and contractors to structure their operations in a manner that reduces the risk of spills or accidental exposure of fuels or hazardous materials to the environment. Particular care should be taken when working within or near water bodies or wetlands. At a minimum Antero and its contractors shall:

Ensure that all employees handling fuels and other hazardous materials are properly trained.

- Ensure that all equipment is in good operating order and inspected on a regular basis.
- Ensure that fuel trucks transporting fuel to on-site equipment travel only on approved access roads.
- Ensure that all equipment is parked overnight and/or fueled at least 100 feet from a water body or wetland boundary.
- Ensure that hazardous materials, including chemicals, fuels, hydraulic fluids, and lubricating oils, are properly handled and stored at least 100 feet from a water body or wetland boundary and placed inside of secondary containment.
- Ensure all solid wastes are properly handled and disposed of.
- Where conditions require construction equipment (e.g., barge-mounted backhoes, trench dewatering pumps) be refueled within 100 feet of streams, the contractor must follow the procedures described in the prepared Spill Prevention, Control and Countermeasure (SPCC) Plan, if required. In the absence of an SPCC plan contact the Antero Environmental Staff for assistance.
- Ensure that any concrete and/or pipeline seam/welding coating activities are not performed within 100 feet of a waterbody or wetland boundary unless that area is an existing industrial site designated for such use.
- Ensure that proper handling and disposal methods for excess concrete/cement are adhered to.
- Secondary containment shall be provided for all chemical and fuel storage and stationary equipment such as pumps and generators used within 100' of water bodies and wetlands.

- Antero and its contractors should structure their operations in a manner that provides for the prompt and effective clean-up of released fuel or other hazardous material. At a minimum Antero and its contractors shall:
 - Ensure that all personnel on-site know the proper procedure for reporting spills.
 - Ensure that each construction crew has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials.
 - Ensure that each construction crew has on hand sufficient tools and material to stop leaks.

4.0 GROUNDWATER PROTECTION PLAN

The following section provides a description of BMPs including physical structures, employed to protect groundwater resources. The use of a combination of physical BMPs, good work practices, and storing fuels, chemicals, and materials in covered and isolated areas will prevent groundwater impacts.

4.1 Introduction

While the United States EPA has enacted federal laws for general groundwater protection on a national basis such as the Safe Drinking Water Act, individual states in cooperation with local governments are responsible for implementing specific and locally focused groundwater protection strategies. AllStar Ecology has prepared this Groundwater Protection Plan (GPP) in accordance with the requirements of the West Virginia Groundwater Protection Rule, 47 C.S.R. 58 § 4.11 and the General Water Pollution Control Permit (Permit No. WV-116815). The Groundwater Protection Rule was promulgated by the WVDEP, Division of Water and Waste Management (DWWM) and became effective on June 1st, 1994. The General Water Pollution Control Permit is also under the purview of the WVDEP-DWWM, and became effective on June 12th, 2013. The General Water Pollution Control Permit does not require that the GPP be submitted to the DWWM for review, but a copy of this document must be prepared and kept on the project site.

Construction activities potentially produce many different kinds of pollutants that may adversely impact groundwater. These activities may involve the use of hazardous materials, including petroleum products, building materials such as asphalt, sealants and concrete, and other chemicals that can be harmful to humans and aquatic life.

The objectives of this Plan are:

- 1.0 To identify potential sources of pollution associated with project construction that may be reasonably expected to affect the quality of storm water discharges associated with project construction, and subsequently adversely impact groundwater.

- 2.0 To describe those practices, controls, and Best Management Practices (BMPs) to be used to minimize groundwater pollution.
- 3.0 To ensure compliance with the terms and conditions listed in the Construction Stormwater Permit and Groundwater Protection Rule.

AllStar Ecology has prepared this GPP for the Beech Lick Road (CR 25/10) Improvements – Victor Pad Project to satisfy the requirements of the West Virginia Groundwater Protection Rule and Construction Stormwater General Permit. Copies of this GPP will be maintained at the field office.

Project Name and Location

Beech Lick Road (CR 25/10) Improvements – Victor Pad Middle Ohio North Watershed Total Maximum Daily Load (TMDL) Report
Doddridge County, West Virginia
Lat: 39.189244° N & Long: -80.629260° W

Owner/Operator

Antero Resources Corporation
c/o Cole Kilstrom
1625 17th Street, Suite 300
Denver, CO 80202
Business Phone: (303) 357-7310
Fax: 303-357-7315

Project Contact

Antero Resources Corporation
c/o Cole Kilstrom, Environmental Specialist (Project Manager)
1625 17th Street, Suite 300
Denver, CO 80202
Business Phone: (303) 357-7310
Fax: 303-357-7315

This GPP will be reviewed and amended during construction as necessary whenever there is a ROW design change or process that could increase the exposure of construction materials to groundwater, or whenever there is a spill, leak, release, or unauthorized discharge from the Site. Any revision to the GPP required as a result of a site inspection will be completed immediately. All reports, inspections, and certifications associated with this GPP will be retained by Antero for at least 3 years.

4.2 Existing Groundwater Quality

Existing ground water quality data for Doddridge County is provided in **Attachment A**. Doddridge County is not within a prevalent karst area. Additionally, it does not have bedrock units which appear to be conducive to yielding sufficient quantities of water for industrial or public use. The location of drinking water wells within 2,000 feet is unknown. The nearest well head protection area and the nearest source water protection area is unknown. The project site includes Beech Lick of Meathouse Fork of Middle Island Creek of the Ohio River (HUC# 05030201).

The soils located within the area of disturbance for the Beech Lick Road (CR 25/10) Improvements – Victor Pad Project consist of a mixture of loams, silt loams, and silty clay loams. The soils in this area are primarily well draining soils with a high to slow infiltration rate (Hydrologic Soil Groups A & C). The soils in the area of concern have a low susceptibility to wind erosion and a moderate susceptibility to erosion caused by water. Soil maps showing the entire area of disturbance, a soil unit legend and index map are included in **Appendix D** of the SWPPP.

4.3 Operations That May Potentially Contaminate Groundwater Resources

Project construction is scheduled to begin in August 2014 and finish in October 2014. Construction activities that could affect or contaminate ground water resources include:

- Stockpiling of top soil;
- Potential leakage of fuel or engine fluids from heavy equipment used for clearing, grading, trenching, pipe installation, and backfilling the trench;
- Onsite fuel tanks and mobile refueling;
- Equipment staging and material laydown areas;
- Welding, x-ray testing and coating of pipe joints; and
- Hydrostatic and inline testing.

There is some potential that any of the above activities could contaminate soil and groundwater in the project area. The BMPs described in Sections 4.0 and 5.0 were designed to control the release of contaminants to the ground surface and groundwater supply. Therefore, only minor discharges associated with operating heavy machinery (e.g. an accidental release of brake fluid) are anticipated.

4.4 Procedures Designed to Protect Groundwater from Potential Contamination

The following section provides a description of BMPs -- including physical structures -- employed to protect groundwater resources. The use of a combination of physical BMPs, good work practices, and storing fuels, chemicals, and materials in covered and isolated areas will prevent groundwater impacts.

Construction activities

During project construction, engineering controls and work practices will be employed to prevent potential groundwater impacts resulting from chemical impacts due to storm water coming into

contact with construction materials, fuel products or equipment. Low-lying areas within the ROW will collect storm water runoff and create small water bodies. Within these areas storm water will be allowed to evaporate, infiltrate and flow through erosion control devices into vegetated drainage channels.

Materials Handling

Materials stored in the project area will include supplies such as the pipe, valves and fittings in addition to other materials listed in Section 5.0. Materials handling, loading, and storage areas will be sited away from natural storm water drainages. Construction materials and chemical storage containers (including drip pans placed under equipment fill ports during fueling activities) will be kept covered with secondary containment practices implemented where applicable to prevent groundwater impacts.

Small amounts of storm water impounded within secondary containment structures are expected to be lost through evaporation. Antero or approved subcontractor personnel will inspect large accumulations of storm water, and if no impacts are observed (e.g., oil sheens, oil skims, or other evidence of chemical impact) within the secondary containment, the storm water will be allowed to evaporate. If the impounded storm water exhibits signs of impact, such as a sheen or oil skim, then the storm water will be properly disposed of offsite by a vacuum truck contractor and documented on the Secondary Containment Drainage log.

Equipment Cleaning and Maintenance Activities

Cleaning and maintenance of equipment will not take place within 50 feet of aquatic features. Additionally, these activities will take place within designated containment areas in order to prevent products from entering the groundwater.

Sumps/Tanks Carrying Contaminants

Sumps and tanks will not be located within or adjacent to any aquatic features and will be located in areas equipped with secondary containment.

4.5 Potential Pollution Sources and Proposed Best Management Practices

Table 3.1 provides an inventory of potential materials/pollutants that will be on site during construction. Some of these materials contain potential pollutants that may become associated with groundwater contamination. The table below shows the materials, potential pollutants associated with the materials and the BMPs that will be used on-site to prevent the possible discharge of pollutants. The procedures described in the "Associated BMPs" column of **Table 3.1** are to be employed in the design of any new equipment or operations. These BMPs are also applicable to the General Water Pollution Control Permit - which regulates stormwater, and the 404 Program under the Clean Water Act, which regulates streams and wetlands.

4.6 Conditions

The following conditions apply under the Groundwater Protection Rule (47 C.S.R. 58 § 4.11):

- No wastes should be used for deicing, fills, etc., unless provided for in existing regulations.
- All employees shall be instructed and trained on their responsibility to ensure groundwater protection. Job procedures shall provide direction on how to prevent groundwater contamination.
- Inspections shall take place every seven days as part of the stormwater requirements. Or 24 hours after storm events totaling 0.5 inches per 24 hours. Stormwater inspections will ensure that all elements and equipment associated with the GPP are in place, properly functioning, and appropriately managed.

GROUNDWATER RELATED PERMITS

Permit Number	Permit
	General Water Pollution Control Permit (NPDS)

5.0 STORM WATER MANAGEMENT CONTROLS

The following sections provide a description of BMPs including physical structures, employed to prevent soil erosion, work practices and managerial controls used to prevent storm water impacts, and fuels, chemicals, and materials handling practices. The use of a combination of physical BMPs, good work practices, and storing fuels, chemicals, and materials in covered and isolated areas will prevent storm water impacts.

Storm water management controls include both structural controls and non-structural controls, as summarized below and in the following sections.

Structural Controls

- Soil erosion and sediment controls – including barriers on the leeward side of excavated materials, stabilization of storm water outfalls, and installation of berms to divert storm water from the outfalls, sediment barriers installed on both sides of wetland and stream crossings and stabilized construction entrances (where applicable);
- Dust control measures;
- Construction site housekeeping;
- Final stabilization.

Non-Structural Controls

- Development of a SWPPP document and establishing a SWPPP Team;
- Providing employee training;
- Recordkeeping and reporting; and,
- Revisions to the SWPPP.

Other non-structural controls include:

- Implementing storm water controls before beginning construction;
- Considering wind direction, soil types, topography and drainage features in project design;
- Prohibiting or modifying work practices that may cause or increase erosion; and,
- Scheduling work for times of the year or times of the day when precipitation is less likely.

5.1 Soil Erosion and Sediment Controls

The Erosion and Sediment (E&S) control measures for the pipeline construction activities consist of compost filter sock, silt fence, ROW diversions, trench breakers (plugs), erosion control matting, temporary/permanent seeding, and mulching. BMP installation details and standards for the E&SC Plans can be found in **Appendix E and Appendix G**. Straw/hay bales will not be used as an E&S control.

5.2 General Construction Sequence

1. Prior to beginning land disturbing activities, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area. These shall be clearly marked, both in the field and on the plans, to prevent damage and offsite impacts. In addition, the location and limits of all erosion and sediment control BMP's will be delineated.
2. Install stone construction entrances at all locations where temporary access roads will be accessing a paved roadway.
3. Install temporary E&S controls (silt fence, ROW diversions, etc.) Prior to any excavation work to ensure, to the maximum extent practicable, that no significant erosion or sedimentation occurs.
4. ROW diversions and/or other erosion and sediment control devices will be installed as needed. If clearing and grubbing is required, see below regarding the management and disposal of debris.
5. After access to and along the road has been provided, together with the E&S controls, the general clearing and grubbing of the trees and brush along the road may commence to the width specified in the E&SC Plans. Trees and brush hanging over the road shall be removed. All pollutants, including waste materials and demolition debris, that occur on-site during construction shall be handled and disposed of in a manner that does not cause contamination of surface waters. Woody debris may be chopped and spread on-site. If burning is chosen method for disposal of woody debris, check local ordinance and regulations for requirements and obtain any necessary permits.

6. Grading for road improvements will be conducted where necessary to provide an even surface for safe and efficient operation of construction equipment. Existing rock ledges will be cut at a 1:1 or less to match existing slope. Other slopes in the LOD will be cut at a 1:5:1 or a 2:1 slope. Where indicated, areas will be filled at a ratio of 2:1. Grading will be the minimum amount necessary and BMPs will be installed promptly. Tree stumps, and large rocks and boulders will also be removed for safety at this time.
7. Excavation for and the placement of culverts including rip rap inlet and outlet protection.
8. The proposed road improvement area will be used as a work area for equipment movement and the storage of soil stockpiles, as needed. Equipment soil stockpiles, and other materials area to remain upslope of BMPs during construction activities.
9. Segregation of topsoil and subsoil will be performed where trench excavation takes place in an agricultural, wetland, or residential area.
10. Temporary E&S controls for stream crossings shall be installed at locations shown on the E&SC Plans and associated detail sheets located in **Appendix E**.
11. Exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from erosive forces of raindrops, flowing water and wind. All disturbed areas that are at final grade must be seeded and mulched within seven days and areas that will not be worked again for 21 days or more must be seeded and mulched within seven days. For disturbed areas with slopes of 3:1 or greater, the area will be vertically tracked and erosion control fabric shall be installed after seed, mulch, and soil supplements have been applied. The temporary/permanent seeding and mulch tables, on the detail sheets, consist of the type of seed and application rate that shall be applied, including the nurse crop that shall be used during certain time of the year to promote stabilization of the soil until the perennial seedlings establish.
12. In the unlikely event that there are excess excavated materials remaining after road improvements are complete the material will be disposed of within the existing ROW in an upland area. Material will be spread in a thin layer and tied into existing contours to create positive drainage for stormwater runoff.
13. All E&S controls will be inspected, at a minimum, once every seven calendar days and within 24 hours after any storm event greater than 0.5-inch per 24-hour period until there is a uniform, perennial 70 percent vegetative coverage established. Temporary BMPs will be removed upon achieving vegetative stabilization. The 70 percent requirement refers to the total area vegetated and not a percent of the site.

14. No sediment tracking on the roadway is allowed. In the event that sediment is inadvertently tracked onto the road, the road shall be cleaned thoroughly by the end of each day. Sediment shall be removed from roads by shoveling or pickup sweeping and shall be transported to a controlled sediment disposal area. Street washing of sediments to the storm drain system is not allowed. If street wash wastewater can be controlled from entering the storm drainage system, then it shall be pumped back onto the site, contained and disposed of property.
15. Construction access restoration shall be equal or better than the pre-construction condition and grades that were altered during construction activities shall be restored to original grades and match existing drainage patterns.
16. Applicable practices include, but are not limited to, temporary and permanent seeding, sodding, mulching, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.
17. Selected soil stabilization measures shall be appropriate for the time of year, site conditions, and estimated duration of use.
18. Soil stockpiles must be stabilized and protected with sediment trapping measures.
19. Linear construction activities such as ROW and easement clearing, roadway development, pipelines, and trenching for utilities, shall be conducted to meet the soil stabilization timeframe requirements. Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and re-stabilize the disturbed soils so that the 7-day requirements are met.
20. Excavated material shall be placed on the uphill side of trenches, consistent with safety and space considerations.

5.3 Road Improvement BMP Installation & Removal Sequence

Temporary and permanent BMPs will be used during construction activities to avoid and/or minimize adverse environmental effects of construction activities.

5.4 General BMP Installation Sequence

- A stone construction entrance shall be provided at all locations where construction traffic will be accessing a paved road directly from a disturbed area.

- Temporary sediment barriers, including appropriately sized silt fence will be placed down slope of work areas and around soil stockpiles, as needed.
- Appropriately sized fencing will be placed around wetlands and waterbodies in an adjacent to the work area prior to any excavating activities.
- Stockpile slopes will be two to one or flatter, and stockpiles will not exceed 35 feet in height.
- Temporary stream and wetland crossings shall be installed as indicated on the E&SC Plan sheets and as per the E&SC Detail sheets. For all other surface or stormwater conveyances that are not identified on the plan sheets as streams due to the lack of defined bed and bank conditions, a temporary bridge such as a timber mat or an approved equal shall be installed, prior to crossing the conveyance if there is flowing water present at time of construction in that area.
- The work area will be backfilled following culvert installation or other excavation work. In areas where topsoil has been segregated, the subsoil will be replaced first, and then the topsoil will be spread over the area from which it was removed. Disturbed areas will be restored to their original topographic contours, where possible.
- Immediately following backfilling, all disturbed areas will be graded in preparation for seeding and mulching. The construction site should be stabilized as soon as possible after completion. Establishment of final cover must be initiated no later than seven days after reaching final grade.
- For three to one or steeper slopes the disturbed area will be vertically tracked. Erosion control fabric will be installed.
- Temporary sediment barriers will be maintained, until vegetation has become established with a uniform coverage of density of 70 percent or more within the disturbed ROW. Once this coverage has been obtained, appropriate controls will be removed from the work area. Areas disturbed during the removal of the erosion controls will be stabilized immediately. The 70 percent requirements refers to the total pre-disturbance area vegetated and not a percent of the site.
- All waste material will be transported off-site to be recycled and/or for disposal. Where feasible, construction waste materials will be recycled or will be taken to an approved facility for disposal. As stated previously, excess soil material, if any, will be spread and

revegetated within the ROW. Off-site spoil and/or borrow sites must be operated under a current National Pollutant Discharge Elimination System (NPDES) Permit.

- Erosion control blankets shall not be installed on agricultural areas even if slopes are steeper than three to one. These areas may require special attention/restoration until adequate growth is achieved.
- Temporary stockpiles need silt fence / sock placed adjacent to ROW.
- Contractor is expected to minimize disturbance within the ROW.

This section describes physical erosion and sediment controls to be used for the construction of the Beech Lick Road (CR 25/10) Improvements – Victor Pad Project to minimize sediment impacts to storm water runoff. All control measures will be properly selected, installed and maintained in accordance with manufacturer's specifications and good engineering practices. BMP Technical Installation Details are provided in **Appendix G**.

5.5 Dust Control

Wind is capable of causing erosion, particularly in dry climates or during the dry season. Wind erosion can occur where surface soil is loose and dry. Wind erosion may also occur in areas where vegetation is sparse or absent, and can transport sediments to where they can be washed into receiving waters during the next storm event or snowmelt runoff. Few of the soil deposits in the project area are found to be susceptible to wind erosion.

The prevailing winds in the vicinity of the pipeline are from the northwest. The excavated top soil, ground cover, and overburden materials will be stockpiled for reuse once the road improvements are completed. The stockpiles will be laid out perpendicular to the predominant wind direction where possible and practical.

5.6 Construction Site Housekeeping

Housekeeping will consist of neat and orderly storage of materials and containerized fluids. Wastes will be temporarily stored in sealed containers and regularly collected and disposed of at off-site, suitable facilities. If spills occur, prompt cleanup is required to minimize any comingling of waste materials with storm water runoff.

Cleanup of trash and discarded materials will be conducted at the end of each workday. Cleanup will consist of patrolling the roadway, access areas, and other work areas to pick up trash, scrap debris, and other discarded materials. These materials will be disposed of in roll-off bins for trash/waste collection. Deposited sediment will be removed from paved surfaces using loaders, shovels and/or brooms within 24 hours of tracking the sediment.

The following items will be addressed to maintain a clean and orderly project area.

Operations and Maintenance Techniques

- Develop and maintain inspection schedules; correct deficiencies noted during these inspections; clean and maintain storm water management system components;
- Perform routine trash collection and disposal, and grounds maintenance along the ROW;
- Dispose of trash generated by project activities; and,
- Familiarize employees with good housekeeping procedures, tips, reminders, and pollution prevention concepts.

Petroleum Products, Material Storage and Management

Petroleum products, which may be present at the construction site, include gasoline, diesel fuel, lubricant oils, hydraulic oils, used oils, and solvents. Any portable tanks or containers used to store gasoline, diesel fuel or other refined petroleum products must be stored in secondary containment. Lubricant, hydraulic, and miscellaneous oils and solvents will be stored in 55-gallon or smaller containers. Mobile fueling trucks will be used to re-fill excavation equipment during construction activities. BMPs, including the use of drip pans, mats, and observing transfer activities, must be used during fuel transfers.

Routine maintenance will be limited to fueling and lubrication of equipment. Drip pans, mats or similar methods will be used during routine fueling and maintenance to contain spills or leaks. Any waste product from maintenance will be containerized and transported off site for disposal or recycling. There will be no major equipment overhauls conducted within the project area. Equipment will be transported off site for major overhauls.

Pollutants from petroleum products used during construction activities adhere easily to soil particles and other surfaces. In case of a spill or leak, soils contaminated with petroleum products will be contained and removed to a proper disposal site. Oily wastes such as crankcase oil or other petroleum-based liquids will be placed in proper receptacles and disposed of or recycled. An additional source of petroleum contamination is leaks from equipment and vehicles. Routine daily inspections will be conducted to identify leaks and initiate corrective actions, if needed.

The following guidelines for storing and managing petroleum products will be used:

- All product containers will be clearly labeled and stored in areas away from vehicle traffic;
- All drums will be kept off the ground within secondary containment, labeled, securely fastened and stored under cover if needed;
- Fuel tanks will be stored within secondary containment;
- Emergency spill response procedures will be available at the project area. Persons trained in handling spills will be on call at all times;
- Employees will be familiar with the storage locations for spill clean-up equipment;
- Spill clean-up and containment materials (absorbent, shovels, etc.) will be easily accessible; Spills will be immediately cleaned up and contaminated materials will be properly stored on site until they can be disposed of in accordance with applicable regulations;

- Storage areas and containers will be regularly monitored for leaks and repaired or replaced as necessary. Contractors and subcontractors should be reminded about proper storage, handling and transferring of petroleum products or other hazardous materials during safety meetings; and,
- Chemical substances used in the project area will be identified, properly labeled, inventoried, and the Material Safety Data Sheets (MSDS) will be kept on file.

Any employee discovering a spill will:

- Notify the supervisor
- Contain the spill using, as necessary, the absorbent pads/socks and the loose granular absorbent

In the event of a larger spill, a third party Emergency Response Company will be contacted to address the spill cleanup.

Incidents such as spills, leaks and improper dumping, along with other information describing the quantity and quality of the storm water discharges should be included in the records. Record keeping of quality and quantity of storm water discharges may be accomplished through documentation of visual observations of storm water discharges and BMP installation. Inspection and maintenance records must be kept on Site for review by the WVDEP Director or designed representative.

A hazardous substance release in any amount which enters or threatens to enter waters of the state shall be reported to the National Response Center and to WVDEP. Refer to **Appendix C** for notification information.

State reportable spills and/or releases of petroleum products/materials that result in a visible sheen on water, or a visible deposit on the bottom or shoreline of any water body must be reported to WVDEP at (304) 328-5210 or (304) 328-5166 as soon as practical after discovery. A WVDEP Incident Report Form will be used for any environmental incident or release that is not exempt under RCRA oilfield exemptions.

5.7 Final Stabilization

Areas which have been disturbed are considered to be stabilized when a uniform vegetative cover with a density of 70 percent of the pre-disturbance levels has been established. Once sections of the pipeline construction are completed and the surface is compacted, topsoil will be replaced over the disturbed area, the ROW will be disked as a surface roughness BMP, and the surface will be re-seeded. Some segments may have special landowner seeding requirements/agreements.

The WVDEP has recommended types of seed mixtures for stabilization of disturbed areas. Refer to **Appendix G** details.

Seed mixtures and application rates will be based upon several factors, including surrounding vegetation, soil types, elevation and surface relief. ROW surface slopes with greater than 3:1 slopes are considered critical areas that will be matted. Refer to **Appendix G**.

Sprayed on mulches and other slope stabilization materials may be used in combination with seeding techniques in select areas to promote and establish surface vegetation cover. Access roads, material storage yards, meter stations and other pipeline support work areas will be stabilized with the use of permanent, physical erosion reduction methods that include, but are not limited to:

- Surface hardening – covering of the soil surface with hardened products such as concrete or asphalt pavement.
- Gravel surfacing – gravel surfacing will be applied in areas such as access roads, materials storage yards, and other work surfaces. Gravel surfaces will be replaced or repaired (through grading) when inspection reveals that the gravel surface is no longer effectively covering the soil surface.

Any stream that has been disturbed by the installation of a culvert or road improvement will be restored by stabilizing the stream banks with erosion control blankets and vegetation. For wetland disturbances, the top six to twelve inches of topsoil in wetland areas will be segregated and side cast temporarily during excavation, except in areas of standing water or saturated soils. Once the construction activity is completed, topsoil will be replaced in its original layer. This measure will be undertaken to preserve the wetland seed bank in the soils.

The approximate original contours of the project site will be maintained or replicated; insuring the preservation of the pre-construction drainage pattern and features; and the disturbed areas will be revegetated or otherwise stabilized with pervious material.

Once the road improvement construction is completed, and final stabilization is achieved, there should be little exposure for impacts to storm water. Antero or approved subcontractor personnel will monitor/observe for areas exhibiting signs of excessive erosion during routine inspections of the project area. Any areas exhibiting excessive erosion will need erosion control maintenance. Vehicle traffic along access roads may also result in erosion.

A Notice of Termination (NOT) form will need to be filed with WVDEP following completion of the pipeline installation, final stabilization of all disturbed areas, and removal of all temporary erosion and sediment control measures. The NOT will end the project's coverage under the NPDES General Permit for Stormwater. The project has reached final stabilization when all soil disturbing activities are complete and a uniform perennial vegetative cover with a density of 70%

has been established across the site. Areas that have permanent stabilization through the use of riprap, gabions, geotextiles, etc. will count towards the 70% final stabilization requirement. All temporary erosion and sediment control measures should be removed 30 days after the site has reached final stabilization or these measures should be scheduled to be removed at an appropriate time that is agreed upon with the WVDEP. The temporary measures can also be removed when they are no longer needed if the disturbed areas, treated by the measures, are stabilized prior to the project completion. The WVDEP Notice of Termination form is included in **Appendix J**.

5.8 SWPPP Team

SWPPP Team Administrator

The SWPPP Team Administrator will be Steven Cooper who will be responsible for:

- Dedicating the necessary financial and human resources to implement the SWPPP;
- Implementing spill response clean ups;
- Assigning and working with the SWPPP Team Coordinator and other subcontractor lead managers;
- Signatory authority.

SWPPP Team Coordinator

The SWPPP Team Coordinator is responsible for:

- Notifying the SWPPP Administrator of any spills;
- Coordinating various stages of Plan development and implementation;
- Coordinating employee training and conducting inspections;
- Implementing and improving housekeeping measures;
- Coordinating the implementation of the preventive maintenance program;
- Maintaining all records.

5.9 Employee Training

The SWPPP Team Coordinator will conduct quarterly training to address the areas listed below:

- Purpose and Requirements of the Storm Water Permit;
- Components of the SWPPP and Storm Water Regulations;
- BMPs and Maintenance, Good Housekeeping Procedures;
- Inspections, Record Keeping and Reporting;
- Storm Water & Non-Storm Water Discharges; and,
- Changes to the SWPPP
- Inspections & Precipitation greater than 0.5-inch per 24-hour period

Records of the training, including the topics discussed, attendees, and an evaluation of BMPs in use will be maintained by at the Antero WV office for a minimum of three years. An Employee Training Log is provided in **Appendix H**.

6.0 INSPECTION AND MAINTENANCE PROCEDURES

To meet requirements of the Storm Water Permit Number No. WV0116815, inspection and maintenance of E&SCs must occur during the project. Continued inspection and maintenance is required for specific structures after construction is completed. Inspections will also identify potential sources of pollutants that could impact storm water discharge.

The inspection program will include the following:

1. A trained and qualified person familiar with the SWPPP and storm water controls will conduct road ROW inspections by completing the Antero Midstream Erosion & Sediment Control Report in **Appendix I**. Documentation of training completion will include signing the training log provided in **Appendix H**.
2. Inspections will cover these areas:
 - Disturbed areas without stabilization, slopes and berms;
 - Material storage areas;
 - All BMPs;
 - New access roads and ditches, horizontal boring activities; and,
 - Locations where vehicles enter or exit the site;
 - Areas reclaimed but not vegetated;
 - Equipment and material staging areas.
3. Inspections will occur at least once every 7-calendar days for active construction areas and within 24 hours after a 0.5-inch precipitation event.
4. A log of inspections will be completed and maintained by Antero.
5. Disturbed areas and material storage areas that are exposed to precipitation will be inspected for evidence of pollutants leaving the property boundary.
6. Inspection of all BMPs, including ROW BMPs.
7. Roads used for vehicle access will be inspected for evidence of off-site sediment transport.
8. The results of the inspections will be used to update and revise the list of potential pollutant sources identified in Section 3.1.
9. The SWPPP will be modified as necessary whenever there is a change in design, construction or operation that changes the potential for pollutant discharge to waters of the

state. Actions taken to modify storm water control measures will be recorded and maintained with the SWPPP.

10. Logs of sediment control inspection must be kept with the inspectors construction records and include date, time, and condition of BMPs and any necessary maintenance. The Antero Midstream Erosion & Sediment Control Inspection Report is included in **Appendix I**.
11. Temporary E&S control BMPs should be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed (70% site revegetation). Trapped sediment shall be removed or stabilized on-site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized.
12. Whenever inspection and/or monitoring reveals that the BMPs identified in the E&SC Plans are inadequate, the E&SC Plans shall be modified, as appropriate, in a timely manner.
13. Maintenance of the E&SC Plans - the E&SC Plans shall be retained on-site. The E&SC Plans shall be modified whenever there is a significant change in the design, construction, operation, or maintenance of any BMP.

Maintenance will include prompt repairs and/or adjustments to erosion and sediment control structures that are deteriorating or found to be performing inadequately. Repairs should be made immediately or designated contractor(s) will maintain on-site materials necessary to make any reasonably expected repairs such as ROW diversions, compost filter sock, silt fence, trench breakers (plugs) and erosion control matting.

7.0 RECORDKEEPING PROCEDURES

Records of project inspections, spills, and maintenance activities will be maintained and located at the Antero West Virginia office. If a reportable spill of petroleum hydrocarbons occurs, a Spill Report Form will be completed and reported. Records and reports are required to be maintained for a period of at least three years.

8.0 NON-STORM WATER DISCHARGES

Non-storm water discharges are not expected from construction activities. Possible exceptions include fire prevention/suppression activities and potable water used for dust control.

9.0 CERTIFICATIONS

9.1 Owner/Applicant Certification

I certify under penalty of law that that I have personally examined and am familiar with the information herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment. Information below to be completed prior to construction activities.

Signature: _____
Name: _____
Title: _____
Date: _____

Owner Name: Antero Recourses Corporation

Owner Address: 1625 17th Street, Denver, CO 80202

Site Name and Location: Beech Lick Road (CR 25/10) Improvements – Victor Pad Project
Doddridge County, West Virginia

SWPPP Prepared by: AllStar Ecology, LLC

Figure 1
USGS LOCATION MAP

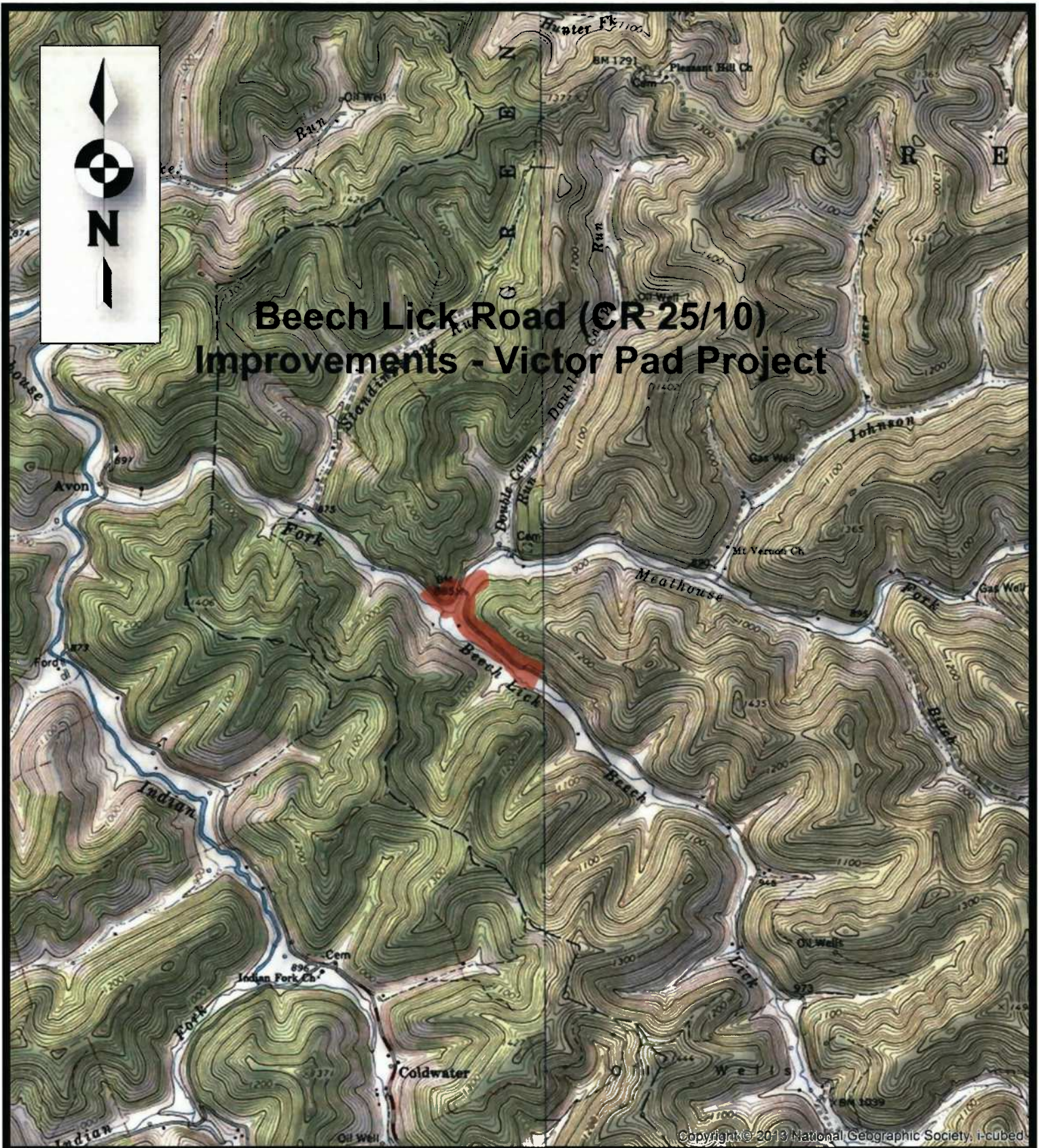


Figure 1
Project Location Map
Beech Lick Road Improvements

Latitude 39.189244° Longitude -80.629260°
 A Portion of the New Milton and Big Isaac 7 1/2'
 Quadrangles

Scale: 1 inch = 2000 feet

Prepared by:



ALLSTAR ECOLOGY
 Natural Resource Specialists

1582 Meadowdale Road, Fairmont, WV 26554
 866-213-2666

Prepared for:



Attachment A

EXISTING GROUNDWATER QUALITY

APPENDIX A

**AUTHORIZATION TO DISCHARGE
WEST VIRGINIA
PERMIT NO. WV0116815**



**STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
601 57th STREET SE
CHARLESTON, WV 25304-2345
GENERAL WATER POLLUTION CONTROL PERMIT**

Permit No. WV0116815

Issue Date: May 13, 2013

Effective Date: June 12, 2013

Expiration Date: May 13, 2018

Subject: Stormwater Associated
with Oil and Gas related Construction Activities

To Whom It May Concern:

This is to certify that any discharge of stormwater runoff from oil and gas field construction activities or operations such as exploration, production, processing or treatment operations or transmission facilities, disturbing one acre or greater of land area are agreeing to be regulated under the terms and conditions of this General Water Pollution Control Permit (General Permit), except for;

1. Activities that result in the disturbance of less than one acre of total land area, which are not part of a larger common plan of development.
2. Stormwater discharges associated with land disturbing activities that may reasonably be expected to be causing or contributing to a violation of a water quality standard as determined by the Director.
3. Activities regulated under the Department of Environmental Protection's Office of Oil and Gas (OOG).
4. Activities covered under the Division of Water and Waste's (DWWM) WV NPDES Stormwater Construction General Permit.

is hereby granted coverage under this General Water Pollution Control Permit to allow stormwater discharges into the surface waters of the State. This General Permit is subject to the following terms and conditions:

The information submitted on and with the site registration application form will hereby be made terms and conditions of the General Permit with like effect as if all such information were set forth herein, and other pertinent terms and conditions set forth in Sections A, B, C, D, E, F, G, H, I and J.

Activities under active construction prior to the effective date of this General Permit are not required to apply for coverage. However, any new activities disturbing one acre or more, after the effective date of the General Permit, are required to obtain coverage under this General Permit.

SECTION A. TERMS OF PERMIT

Discharges covered under this General Permit shall not cause or contribute to a violation of the Legislative rules governing water quality or groundwater protection, namely *Requirements Governing Water Quality Standards* (47 C.S.R. 2) and *Requirements Governing Groundwater Standards* (47 C.S.R. 12), in accordance with W. Va. Code §§ 22-11-8 and 22-12-4. For purposes of this General Permit, the *West Virginia Water Pollution Control Act*, W. Va. Code § 22-11-1, et seq., shall be referred to as the WPCA and the *West Virginia Groundwater Protection Act*, W. Va. Code § 22-12-1, et seq., shall be referred to as the GWPA. Discharges that are not in compliance with these standards are not authorized.

SECTION B. SCHEDULE OF COMPLIANCE

Compliance with this General Permit and the approved Stormwater Pollution Prevention Plan (SWPPP) is required at the start of the construction project.

SECTION C. MANAGEMENT CONDITIONS

- C.1. Duty to Comply. The permittee must comply with all terms and conditions of this General Permit. Permit noncompliance constitutes a violation of the WPCA and/or the GWPA and is grounds for enforcement action; permit modification, suspension or revocation; or denial of a permit renewal application. *See*, W. Va. Code §§ 22-11-12, 22-11-22, 22-11-24, and 22-12-10.
- C.2. If this General Permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with 47CSR10 and remain in force and effect. If a permittee were authorized to discharge under this General Permit prior to the expiration date, any discharges authorized under this permit will automatically remain covered by this General Permit until the earliest of these actions:
 - C.2.a. Authorization for coverage under a reissued General Permit or a replacement of this General Permit following submittal of a timely and complete application requesting authorization to discharge under a new General Permit; or a

C.2.b. Submittal of notification that the activity has ceased ; or issuance or denial of an individual permit for the activities discharge; or

C.2.c. A formal permit decision by the DWWM not to reissue this General Permit, at which time the DWWM will identify a reasonable time period for covered dischargers to seek coverage under an alternative General Permit or an individual permit. Coverage under this General Permit will then cease.

C.3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment.

C.4. Permit Actions

This permit may be modified, revoked and reissued, suspended, or revoked for cause. The filing of a request by the permittee for permit modification, revocation and reissuance, or revocation, or a notification of a planned change or anticipated noncompliance, does not stay any permit condition.

C.5. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

C.6. Signatory Requirements. All applications, reports or information submitted to the Secretary shall be signed and certified by an authorized representative as required by 47 C.S.R. 10 § 4.6. If an authorization becomes inaccurate because a different individual or position has responsibility for the overall operation of the project, a new authorization must be submitted to the Secretary prior to, or together with any reports, information, or applications to be signed by an authorized representative.

C.7. Transferability

This permit is not transferable to any person, except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary.

C.8. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonably specified time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, suspending, or revoking this permit, or to

determine compliance with this permit. This information may include water quality information as specified by the Director. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

C.9. Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall immediately submit such facts or information.

C.10. Inspections and Entry

The permittee shall allow the Director or designated representative upon the presentation of credentials and such other documents as may be required by law:

C.10.a. To enter upon the permittee's premises at all reasonable times in which a discharge or activity is located, or where records must be kept under the conditions of this permit;

C.10.b. To have access to and copy at reasonable times any records that must be kept under the conditions of this permit;

C.10.c. To inspect at reasonable times any activities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;

C.10.d. To sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the WPCA,

C.11. Permit Modification

This permit may be modified, suspended, or revoked in whole or in part during its term in accordance with the provisions of W. Va. Code § 22-11-12. Any permittee wishing to modify coverage under this permit shall submit such request at least 45 days prior to the commencement of the proposed action for modification if no public notice period is required. A modification that will have a public notice period must be submitted at least 90 days prior to construction to allow for the public notice procedure.

C.12. Water Quality

The discharge or discharges covered by this permit are to be of such quality so as to not cause violations of applicable water quality standards.

C.13. Liabilities.

C.13.a. Any person who violates a permit condition is subject to a civil penalty not to exceed \$25,000 per day of such violation as provided in W. Va. Code § 22-11-22. Any person who willfully or negligently violates permit conditions is subject to a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than one year, or both, as provided in W. Va. Code § 22-11-24.

C.13.b. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both, in accordance with W. Va. Code § 22-11-24.

C.13.c. Nothing in sections C.14.a. or C.14.b. shall be construed to limit or prohibit any other authority the Secretary may have under the WPCA or the GWPA.

C.14 Outlet Markers. An outlet marker shall be posted during the term of General Permit coverage in accordance with the *Special Rules* of the DWWM, 47 C.S.R. 11 § 9.

SECTION D. OPERATION AND MAINTENANCE

D.1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all activities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the terms and conditions of the permit.

D.2. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D.3. Bypass

D.3.a. Definitions

D.3.a.1. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility; and

D.3.a.2. "Severe property damage" means substantial physical damage to property, damage to the treatment facility which causes them to become inoperable, or substantial and permanent loss of natural resources that can

reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

D.3.b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of D.3.c. and D.3.d. of this permit.

D.3.c. Notification of bypass

D.3.c.1. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

D.3.c.2. If the permittee does not know in advance of the need for bypass, notice shall be submitted as required in F.2.a. of this permit.

D.3.d. Prohibition of bypass

D.3.d.1. Bypass is permitted only under the following conditions, and the Director may take enforcement action against a permittee for bypass, unless;

D.3.d.1.A. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

D.3.d.1.B. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated sediment, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance. This condition is not satisfied if the sediment and erosion control structures were not installed in the proper sequence; and

D.3.d.1.C. The permittee submitted notices as required under D.3.c. of this permit.

D.3.d.2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in D.3.d.1. of this permit.

D.4. Upset

D.4.a. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with the terms and conditions of the permit and the Stormwater Pollution Prevention Plan because of factors beyond the reasonable

control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

D.4.b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for temporary noncompliance with the terms and conditions of the permit and the Stormwater Pollution Prevention Plan if the requirements of D.4.c. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

D.4.c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

D.4.c.1. An upset occurred and that the permittee can identify the cause(s) of the upset.

D.4.c.2. The permitted activity was at the time being properly operated.

D.4.c.3. The permittee submitted notice of the upset as required in F.2.a. of this permit.

D.4.c.4. The permittee complied with any remedial measures required under C.3. of this permit.

D.4.d. Burden of proof

In any enforcement proceedings the permittee seeking to establish the occurrence of an upset has the burden of proof.

D.5. Removed Substances

Where removed substances are not otherwise covered by the terms and conditions of this permit or other existing permits by the Director, any solids, sludge, filter backwash or other pollutants (removed in the course of treatment or control of wastewater) and which are intended for disposal within the State, shall be disposed of only in a manner and at a site subject to the approval by the Director. If such substances are intended for disposal outside the State or for reuse, i.e., as a material used for making another product, which in turn has another use, the permittee shall notify the Director in writing of the proposed disposal or use of such substances, the identity of the prospective disposer or users, and the intended place of disposal or use, as appropriate.

SECTION E. MONITORING AND REPORTING

Monitoring of discharges is not required for construction activities unless directed by the Director.

E.1. Definitions

“Best management practices” (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, other management practices and various structural practices such as but not limited to silt fence, sediment traps, seeding and mulching, and rip-rap used to prevent or reduce erosion and sediment runoff and the pollution of surface waters of the State. BMPs also include treatment requirements, operating procedures and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

“Buffer zone” means the region near the border of a protected area; a transition zone between areas managed for different objectives.

“Clearing” means cutting and removing vegetation with chain saws, brush axes, brush hogs and other mechanical means where there is little or no soil disturbance.

“Common plan of development” is a contiguous construction project where multiple separate and distinct construction activities may be taking place at different times on different schedules but under one plan. The “plan” is broadly defined as any announcement or piece of documentation or physical demarcation indicating construction activities may occur on a specific plot.

“Control” is a best management practice such as erosion control or sediment control that will reduce sedimentation on a construction project.

“Construction Activity” means land disturbance operations such as grubbing, grading, filling, and excavating during site development for residential, commercial or industrial purposes. This includes, but is not limited to, access roads, borrow and spoil areas and equipment lay down or staging areas.

“Director” means the Director of the Division of Water and Waste Management, Department of Environmental Protection, or his or her designated representative.

“Disturbed area” is the total area of land disturbing activity that will take place during all phases of a construction project, including, but not limited to, waste and borrow sites, equipment lay down or staging areas, utility installation, road building, mass grading, and site development.

“Diversion” means a berm or excavated channel or combination berm and channel constructed across sloping land on a predetermined grade. This includes but is not limited to protecting work areas from upslope runoff and reducing the size of the drainage going to sediment trapping structures (clean water diversion), transporting runoff across a project to

minimize erosion and diverting sediment-laden water to an appropriate sediment-trapping structure.

“Erosion” means the displacement of solids (soil, mud, rock, and other particles) by the agents of wind, water, and ice in response to gravity.

“Establishment” means an industrial establishment, mill, factory, tannery, paper and pulp mill, mine, colliery, breaker or mineral processing operation, quarry, refinery, well and each and every industry or plant or works in the operation or process of which industrial wastes, sewage or other wastes are produced.

“Estimate” means to be based on a technical evaluation of the sources contributing to the discharge.

“Excavating” means large scale grading accomplished usually with heavy machinery.

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

“Grading” means changing surface contours by removing soil and stone from one place and building it up in another.

“Groundwater” means the water occurring in the zone of saturation beneath the seasonal high water table or any perched water zones.

“Groundwater Protection Plan” (GPP) means groundwater protection practices developed and implemented in accordance with the *Groundwater Protection Rule*, 47 C.S.R. 58.

“Grubbing” means physically removing vegetative stumps and roots from the ground and disturbing the earth, usually by heavy machinery.

“Karst” means a type of topography formed over limestone, dolomite, or gypsum resulting in dissolving or solution of the underlying calcareous rock.

“Minor construction activity” means an activity which disturbs one acre or more, but less than three acres.

“Notice of Intent” (NOI) is the form to be submitted by the applicant to register a minor construction project (one that disturbs one to less than three acres) under the General Water Pollution Control Permit for Stormwater Associated with Oil and Gas related Construction Activities. A project that disturbs one to less than three acres but will have a grading phase of construction that will last one year or longer must file a Site Registration Application Form.

“Notice of Termination” (NOT) is the form to be submitted by the permittee to terminate coverage under the General Water Pollution Control Permit, after final stabilization has been completed. See Final Stabilization.

“Permanent detention/retention facility” means: Detention- The process of reducing offsite stormwater discharge rates by temporarily holding the water in a storage basin and then releasing it slowly over a period of time. The objective of a detention facility is to regulate the runoff from a given rainfall event and to control discharge rates to reduce the impact on downstream stormwater systems. Retention- The prevention of stormwater runoff from being discharged into receiving waters by storing it in a storage area. Water is retained and stored until it is lost through percolation, removed by evapotranspiration by plants, or through evaporation from the free water surface. Retention systems are designed to not have any offsite discharges.

“Point source” is any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the state.

“Pollutant” means industrial waste, sewage or other wastes.

“Post-development” means the anticipated final conditions of the project, including rooftops, parking lots, streets, drainage systems, vegetation, and any other structure planned.

“Pre-development” means the condition of the land, the amount and health of the ground cover and vegetation prior to development.

“Secretary” means the Secretary of the Department of Environmental Protection, or her designated representative.

“Sediment” means any particulate matter that can be transported by fluid flow and which eventually is deposited as a layer of solid particles on the bed or bottom of a body of water or other liquid.

“Sedimentation” means the deposition by settling of a suspended material.

“Sediment trap” means a temporary ponding area formed by constructing an embankment or excavation and embankment that will trap the flow of sediment-laden runoff. Sediment traps have a properly stabilized outlet/weir or riser and pipe to detain sediment-laden runoff from small disturbed areas of five acres or less. Outlets must be designed to extend the detention time and allow the majority of the sediment to settle out.

“Sediment basin” means a temporary structure consisting of an earthen embankment, or embankment and excavated area, located in a suitable area to capture sediment-laden runoff from a construction site. A sediment basin reduces the energy of the water through extended detention (48 to 72 hours) to settle out the majority of the suspended solids and sediment and prevent sedimentation in waterways, culverts, streams and rivers. Sediment basins have both

wet and dry storage space to enhance the trapping efficiency and are appropriate in drainage areas of five acres and greater.

“Sinkhole” means a depression in the land surface formed by solution or collapse that directs surface runoff into subsurface or to an underground drainage flow.

“Site Registration Application forms” means the forms designed by the Director for the purpose of registering for coverage under a general permit. Under the General Water Pollution Control Permit for Stormwater Associated with Oil and Gas related Construction Activities there will be two separate forms, one for one to less than three acres (Notice of Intent) and the Site Registration Application form for projects that disturb three acres and greater. A project that disturbs one to less than three acres but will have a grading phase of construction that will last one year or longer must file a Site Registration Application form.

“Stormwater” means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

“Stormwater management facilities” means structures such as ponds, basins, outlets, ditches, velocity dissipaters, infiltration trenches and basins, extended detention basins and ponds, and any other structure used to control the quality and quantity of stormwater from a development project.

“Stormwater Pollution Prevention Plan” (SWPPP) means the erosion and sediment control plan and the post development plan submitted as part of the Site Registration Application form.

“Tier 3 Waters” means waters that meet the definition of “outstanding national resource waters” as that term is defined at 47 C.S.R. 2 § 2.10 and discussed at 47 C.S.R. 2 § 4.1.c.

“Trout Streams” means any waters which meet the definition of “trout waters” as that term is defined at 47 C.S.R. 2 § 2.19.

“25-year, 24-hour precipitation” means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years.

SECTION F. OTHER REPORTING

F.1. Reporting Spill and Accidental Discharges.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to the *Special Rules* of the DWWM regarding reporting spills and accidental discharges as set forth at 47 C.S.R. 11 § 2.

F.2. Immediate Reporting

F.2.a. The permittee shall report any noncompliance which may endanger health or the environment immediately after becoming aware of the circumstances by using the Department's designated spill alert telephone number ((800) 642-3074). A written submission shall be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time, and if, the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

SECTION G. OTHER REQUIREMENTS

G.1. Requiring an Individual Permit or an Alternative General Permit.

The Director may require any person authorized by this permit to apply for and obtain an alternative Permit. Any interested person may petition the Director to take action under this paragraph. The Director may require any owner or operator authorized by this permit to apply for an alternative permit only if the owner or operator has been notified in writing that such a permit application is required.

G.2. Prohibition of Non-Stormwater Discharges

All discharges authorized by this General Permit shall be composed entirely of stormwater. Discharges of material other than stormwater are not authorized by this permit. This permit does not authorize the conveyance, diversion, channeling, directing or otherwise allowing the discharge of stormwater into a sinkhole without an Underground Injection Control Permit.

G.3. Releases in Excess of Reportable Quantities. This permit does not relieve the permittee of the reporting requirements of 40 C.F.R. Part 117, *Determination of Reportable Quantities for Hazardous Substances*, or 40 C.F.R. Part 302, *Designation, Reportable Quantities, and Notification*. The discharge of hazardous substances in the stormwater discharge(s) from a project is not authorized by this General Permit, and in no case shall the discharge(s) contain a hazardous substance equal to or in excess of reporting quantities.

G.4. Stormwater Pollution Prevention Plans and Groundwater Protection Plans (SWPPP/GPP)

A Stormwater Pollution Prevention Plan and a Groundwater Protection Plan shall be developed for each project covered by this permit. These two plans may be combined into one plan if all of the requirements for both plans are met. Alternatively, they may be developed and maintained as separate stand-alone documents

Stormwater Pollution Prevention Plans (SWPPP) shall be prepared in accordance with good engineering practices. The SWPPP shall identify all pollutants and potential sources of pollution that may reasonably be expected to affect the quality of

stormwater discharges associated with construction activity. In addition, the SWPPP shall describe and ensure the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction activity and to assure compliance with the terms and conditions of this permit.

Groundwater Protection Plans (GPP) shall be prepared in accordance with the requirements of the *Groundwater Protection Rule*, 47 C.S.R. 58 § 4.11. The GPP shall identify all operations that may reasonably be expected to contaminate the groundwater resources with an indication of the potential for soil and groundwater contamination from those operations. In addition the GPP shall provide a thorough and detailed description of procedures designed to protect groundwater from the identified potential contamination sources. The GPP is not required to be submitted to the Division of Water and Waste Management for review. Guidance in the completion of a GPP is available from the Division of Water and Waste Management.

G.4.a. The SWPPP and the GPP shall be signed in accordance with Section C.6. and retained onsite.

G.4.b. The application and SWPPP shall be submitted to the Division of Water and Waste Management at least 45 days before construction activity is to begin, except as noted in G.4.b.3. and G.4.b.4. Prospective permittees should submit applications for review prior to accepting construction bids on the project. As the plans are evaluated by the Director or designated representative, the Director or designated representative may notify the permittee during the 45-day review period that the plan does not meet one or more of the minimum requirements of this section. After such notification from the Director or designated representative, the permittee shall make changes to the plan in accordance with the time frames established below, and shall submit to the Director a written certification that the requested changes have been made.

G.4.b.1. Except as provided in G.4.b.2., the permittee shall have 30 days after such notification to make the changes necessary.

G.4.b.2. The permittee shall have 24 hours after such notification to make changes relating to sediment and erosion controls to prevent loss of sediment from an active construction site, unless additional time is provided by the Director or an designated representative.

G.4.b.3. Projects disturbing one to less than three acres that do not discharge to or upstream of Tier 3 Waters and that have a grading phase of construction that will last less than one year shall submit only the Notice of Intent (NOI) Form 10 days prior to initiating construction. Projects disturbing one to less than three acres that discharge upstream of a Tier 3 Water shall submit the NOI Form and Storm Water Pollution Prevention Plan (SWPPP) at least 45 days prior to initiating construction. Projects disturbing one to less than three acres that will have a grading phase of construction that will last one year or

longer shall submit the Site Registration Application Form and Storm Water Pollution Prevention Plan (SWPPP) at least 90 days prior to initiating construction to allow for the public notice procedure.

G.4.b.4. Projects that will discharge to Tier 3 waters or that will disturb 100 or more acres, or that the grading phase of construction will last for more than one year, shall submit the application and SWPPP at least 90 days prior to construction to allow for the public notice procedure.

G.4.b.5. Within 24 hours of filing an NOI (one to less than three acres) or a Site Registration Application form (three acres or more) with DWWM, all projects shall display a sign for the duration of the construction project near the entrance of the project or, for linear projects, at a location near an active part of the project that is accessible by the public, which contains the following information using the template found in the instructions: 1) the registrant's name or the name of a contact person along with a telephone number; 2) A brief description of the project; 3) a statement indicating that the NOI or SWPPP, as applicable, has been filed with the DWWM; 4) the address and telephone number of the agency where the NOI or SWPPP is maintained; and 5) That any person may obtain a copy of the NOI or SWPPP by contacting the DWWM at (800) 654-5227. The sign shall be a minimum of two feet by two feet and at least three feet above ground level, clearly visible and legible from a public roadway or right-of-way. If it is not feasible to display a sign at or near the project, the registrant, with prior approval from the DWWM, may post a notice containing the foregoing information at a local public building, including, but not limited to, a town hall or public library.

G.4.c. The permittee shall modify, using forms provided by DWWM, the SWPPP whenever there is a change in design, construction, scope of operation, or maintenance, which has the potential to adversely impact the surface waters of the State, or if the SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activities. Should conditions warrant, the Director, or the Director's representative, may request changes to the SWPPP during a field inspection. The Director may review changes or modifications to the SWPPP in the same manner as above.

The permittee shall amend the GPP whenever there is a change in design, construction, operation, or maintenance which could reasonably be expected to have an impact on the potential contamination of groundwater.

G.4.d. In addition to the requirements of G.4.e, the SWPPP shall also include, at a minimum, the following items:

G.4.d.1. General management controls

G.4.d.1.A. Preventive maintenance

A preventive maintenance program shall involve inspection and maintenance of sediment and erosion control best management practices to identify and address conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters.

G.4.d.1.B. Good housekeeping

Good housekeeping requires the maintenance of a clean and orderly project.

G.4.d.1.C. Spill prevention and response procedures

Areas where potential spills may occur, and their accompanying drainage points, shall be identified clearly in the SWPPP/GPP. Where appropriate, specify material handling procedures and storage requirements in the SWPPP/GPP. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a cleanup shall be available to personnel, including spill kits.

G.4.d.2. Consistency with other plans

Stormwater Pollution Prevention Plans may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans or any BMPs or GPPs implemented in accordance with the *Groundwater Protection Rule*, 47 C.S.R. 58 and may incorporate any part of such plans into the SWPPP by reference.

G.4.e. Requirements for construction activities

Construction activity disturbing one or more acres that discharge stormwater are not only subject to the requirements of Section G.4.d. of this permit, but are also subject to the following requirements. The SWPPP shall include, at a minimum, the following items.

G.4.e.1. Site description

Each plan shall, at a minimum, provide a description of the following:

G.4.e.1.A. A description of the nature of the construction activity, including a proposed timetable for major activities;

G.4.e.1.B. Estimates of the following: total area of the site, the part of the site that is expected to undergo excavation or grading, and the total amount of excavation by cut and fill;

G.4.e.1.C. Site maps indicating, with a minimum of five-foot contours, drainage patterns and slopes prior to construction and anticipated conditions after grading activities, topsoil stockpiles, waste areas, borrow sites, locations of sediment control structures identified in the narrative, the location of impervious areas after construction is complete, final stormwater routing including all ditches and pipe systems, property boundaries and easements, nearest receiving stream, access roads, legend and springs, surface waters and any other information necessary to describe the project in detail.

G.4.e.1.D. A description and detail of the proposed construction entrance(s). Each site shall have stone access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads. Except for haul roads, all unpaved roads on the site carrying more than 25 vehicles per day shall be graveled.

G.4.e.2. Controls

Each construction activity covered by this permit shall develop a description of controls appropriate for the project and implement such controls. The description of these controls shall address the following minimum components, including a schedule for implementing such controls.

G.4.e.2.A. Erosion and sediment controls

G.4.e.2.A.i. Vegetative practices

A description of interim and permanent stabilization practices, including site specific implementation schedules of the practices shall be provided. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized as rapidly as possible. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Also include in the plan seedbed preparation requirements and the type and amount of soil amendments necessary to establish a healthy stand of vegetation. A record of the dates when major grading activities will occur, and when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures will be initiated shall be included in the plan.

Except as noted below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven days after the construction activity in that portion of the site has permanently ceased.

G.4.e.2.A.i.a. Where the initiation of stabilization measures by the seventh day after construction activity temporarily or permanently ceases is precluded by natural causes, stabilization measures shall be initiated as soon as conditions allow.

G.4.e.2.A.i.b. Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g., the total time period that construction activity is temporarily halted is less than 21 days) then stabilization measures do not have to be initiated on that portion of the site by the seventh day after construction activities have temporarily ceased.

G.4.e.2.A.i.c. Areas where the seed has failed to germinate adequately (uniform perennial vegetative cover with a density of 70%) within 30 days after seeding and mulching must be reseeded immediately, or as soon as weather conditions allow.

G.4.e.2.A.i.d. Clean water diversions must be stabilized prior to becoming functional.

G.4.e.2.A.ii. Structural practices

A description of the structural practices to be used to divert flows around exposed soils, store flows or otherwise limit runoff from exposed areas and eliminate sediment-laden runoff from the site. Such practices may include but are not limited to silt fences, earth dikes and berms, land grading, diversions, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, rock outlet protection, reinforced soil retention systems and geotextiles, gabions and riprap, and permanent and temporary sediment traps/basins.

G.4.e.2.A.ii.a. For locations on a site that have a drainage area of five acres or less, a sediment trap which provides a storage volume equal to 3,600 cubic feet per acre of drainage area shall be installed. Half of the volume of the trap will be in a permanent pool and half will be dry storage.

G.4.e.2.A.ii.b. For drainage areas of greater than five acres, a sediment basin providing 3,600 cubic feet per drainage acre shall be installed. Half of the volume of the basin shall be in a permanent pool and half shall be dry storage. Sediment basins must be able to dewater the dry storage volume in 48 to 72 hours. A sediment basin must be able to pass through the spillway(s) a 25-year, 24-hour storm event, and still maintain at least one foot of freeboard.

G.4.e.2.A.ii.c. The inlet(s) and outlet(s) for a sediment trapping structure must be protected against erosion by appropriate material such as riprap or other similar media.

G.4.e.2.A.ii.d. If necessary, diversions will be used to direct runoff to the trapping structure. Diversions may need to be stabilized prior to becoming functional.

G.4.e.2.A.ii.e. For locations served by a common drainage where a detention basin providing 3,600 cubic feet of storage is not attainable, additional sediment and erosion controls within the project area are required in lieu of the required sized sediment basin. Justification and a narrative description of the additional measures proposed must be provided for use of any practice(s) other than sediment basins or traps.

G.4.e.2.A.ii.f. Fill slopes must be protected by measures used to divert runoff away from fill slopes to conveyance measures such as pipe slope drains or stable channels.

G.4.e.2.A.ii.g. Sediment trapping structures will be eliminated and the area properly reclaimed and stabilized when the contributing drainage area is stabilized and the structures are no longer needed, unless the structure is converted into a permanent stormwater detention/retention structure.

G.4.e.2.A.ii.h. All trapped sediments will be disposed on an upland area where there is no chance of entering nearby streams.

G.4.e.2.A.ii.i. Breaching the embankment to dewater the structure is not permitted. Dewatering and structure removal shall not cause a violation of water quality standards. Provide a description of the procedures that will be used in removing these structures and the time frame.

G.4.e.2.A.ii.j. No sediment-laden water will be allowed to leave the site without going through an appropriate best management practice.

G.4.e.2.A.ii.k. Hay or straw bales are not acceptable BMPs.

G.4.e.2.A.iii. Presumptive conditions for discharges to Tier 3 waters

Construction activities discharging upstream or to Tier 3 waters will go through the Tier 3.0 antidegradation review process.

G.4.e.2.B. Stormwater management plan

Projects located in areas that have local government requirements and/or criteria for post development stormwater management must meet those requirements and/or criteria. Compliance with this General Permit does not assure compliance with local codes regulations, or ordinances. A description of measures that will be installed during construction to control pollutants in stormwater discharges after the project is completed shall be included in the SWPPP.

The permittee shall submit all calculations, watershed mapping, design drawings, and any other information necessary to explain the technical basis for the stormwater management plan. Since development site conditions vary widely, plan preparers will have significant latitude in designing practices to comply with this provision of the permit. However, design procedures shall follow professionally accepted engineering and hydrologic methodologies. Permanent stormwater management structures that will impound water (detention/retention basins or similar structures) shall be designed and certified by a registered professional engineer.

G.4.e.2.C Other controls

G.4.e.2.C.i. All solid waste and construction/demolition material must be disposed of in accordance with the Code of West Virginia and Legislative Rule Title 33 Series 1, (Solid Waste Management Rule).

G.4.e.2.C.ii. Provisions must be made to control fugitive dust.

G.4.e.2.C.iii. Groundwater Protection Plan (GPP)

The applicant shall prepare a GPP that will satisfy the requirements of the *Groundwater Protection Rule, 47 C.S.R. 58 § 4.11.*

G.4.e.2.C.iv. Employee training

Employee training programs shall inform personnel at all levels of responsibility of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping and routine inspection. Training shall be on a quarterly basis while construction activities are occurring and records of the training shall be maintained on site for review by the Director or designated representative.

G.4.e.2.C.v. Visual inspection

Company personnel shall be identified to inspect as set forth under G.4.e.2.D. A tracking procedure shall be used to ensure that adequate corrective actions have been taken in response to deficiencies identified during an inspection. Records of inspections shall be maintained onsite for review by the Director or designated representative.

G.4.e.2.C.vi. Recordkeeping and internal reporting procedures

Incidents such as spills, leaks and improper dumping, along with other information describing the quality and quantity of stormwater discharges should be included in the records. Record keeping of quality and quantity of stormwater discharges may be accomplished through documentation of visual observations of stormwater discharges and best management practice installation. Inspection and maintenance records must be kept onsite for review by the Director or designated representative.

G.4.e.2.D Maintenance

A description of procedures to maintain in good and effective condition and promptly repair or restore all grade surfaces, walls, dams and structures, vegetation, erosion and sediment control measures and other protective devices identified in the site plan. At a minimum, procedures in a plan shall provide that all erosion controls on the site are inspected at least once every seven calendar days and within 24

hours after any storm event of greater than 0.5 inches of rain per 24-hour period.

G.4.e.2.D.i. All public and private roads adjacent to a construction entrance must be inspected and cleaned of debris originating from the construction site as necessary.

G.4.f. All SWPPPs and GPPs required under this permit are considered reports that shall be available to the public under Section 308(b) of the CWA. The owner or operator of a project with stormwater discharges covered by this permit shall make plans available for review to members of the public upon request. However, the permittee may claim any portion of a SWPPP or GPP as confidential in accordance with 47 CSR10-12.7. (NPDES Program).

G.4.g Compliance with other laws and statutes

Nothing in this General Permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G.5. Discharges to Waters with Approved TMDLs

Dischargers located in a watershed area where a Total Maximum Daily Load (TMDL) has been developed and approved by the U.S. EPA may be required to implement additional BMP's and/or conduct additional monitoring activities, as necessary to comply with an applicable waste load allocation.

SECTION H. Reopener Clause

If there is evidence indicating reasonable potential or realized impacts on water quality due to any stormwater discharge authorized by this General Permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Section G.1. of this permit, or the permit may be modified to include different limitations and/or requirements.

SECTION I.

The conditions, standards, and limitations of this General Permit will be reviewed at the time of reissuance for possible revisions that may lead to more or less stringent conditions, standards, and limitations.

SECTION J.

Permit coverage for construction activities encompassed by this permit expires upon satisfactory stabilization of the site. Satisfactory stabilization means **ALL** disturbed areas shall be covered by some permanent protection. Stabilize includes pavement, buildings,

waterways (riprap, concrete, grass, or pipe), a healthy, vigorous stand of grass or native vegetation that uniformly covers more than 70 percent of the ground, stable outlet channels with velocity dissipation which directs site runoff to a natural watercourse, and any other approved structure or material. The permittee will request a final inspection by sending in the Notice of Termination. Sites not stabilized will continue to have coverage under this permit and will be assessed an annual permit fee as promulgated by the West Virginia Legislature. Sites will be assessed a prorated annual fee based upon the completion date and proper stabilization. The Notice of Termination must be submitted within 30 days after final stabilization is achieved.

The herein-described activity is to be constructed or installed and operated, used and maintained strictly in accordance with the terms and conditions of this permit with any plans, specifications, and information submitted with the individual site registration application form, with any plan of maintenance and method of operation thereof submitted and with any applicable rules and regulations promulgated by the Environmental Quality Board and the Secretary of the Department of Environmental Protection.

Failure to comply with the terms and conditions of this permit; with any plans, specifications or information submitted to the Department; or with any plan of maintenance or method of operation submitted to the Department shall subject the offending individual registrant to suspension or revocation of the registrant's operation from this General Permit and/or to other enforcement action as provided in W. Va. Code §§ 22-11-12, 22-11-22, 22-11-24 or 22-12-10.

This Permit is issued in accordance with W. Va. Code § 22-6-7, which is incorporated into the Horizontal Well Act by W. Va. Code § 22-6A-5(4), which grants the Secretary of the Department of Environmental Protection the authority to issue water pollution control permits. This authority is in addition to the authority vested in the Secretary to issue water pollution control permits in accordance with W. Va. Code § 22-11-8. Pursuant to W. Va. Code § 22-6-7(e), water pollution control permits issued to the oil and gas industry "shall be issued by the [Director] of the [Division of Water and Waste Management] in consultation with Chief of the Office of Oil and Gas."

BY: 
Director

APPENDIX B

**NOTICE OF INTENT FORM
FILED WITH WVDEP**



**NOTICE OF INTENT (NOI)
CONSTRUCTION STORMWATER WV/NPDES GENERAL PERMIT**

GENERAL PERMIT REGISTRATION NO. WVR _____ (office use only)

1. Project name Beech Lick Road (CR 25/10) Improvements - Victor Pad

2. Applicant's name Antero Resources Corporation
 Federal Employer Identification Number (FEIN) 80 - 0162034
Required for Application Processing
 Address 1615 Wynkoop Street
Denver, CO 80202

 Telephone (303) 357-7310
 E-mail Address ckilstrom@anteroresources.com

3. Operator or contractor Unknown at this time.
 Address _____

 Telephone ()

4. Acres disturbed 2.98 (Must be less than 3 acres to use NOI Form)

5. Latitude DEGREES 39 MINUTES 11 SECONDS 22.876
 Longitude DEGREES 80 MINUTES 37 SECONDS 45.079

6. Nearest Town Salem, West Virginia
 County Doddridge County
 County Route County Route 25/10

7. Receiving Stream*(s) Beech Lick and Meathouse Fork
 *(If the receiving stream tier is 2.5 or 3.0, the NOI Form cannot be used)
 Basin Upper Ohio River
 Municipal System Operator (if applicable) N/A

8. Brief Description of Project (Use additional pages if necessary and label as Attachment 8)
Road improvements in the form of culvert replacements, road grading, construction of a
turnaround, storage, and spoil area in order to accommodate large vehicular traffic.

9. Proposed Construction Schedule

1. All erosion and sediment control BMPs will be installed prior to earth disturbing activities as mandated in the WVDEP Erosion and Sediment Control Manual. Approximate construction start date is August 2014.
2. Stone construction entrances will be installed, as necessary.
3. Clearing and grubbing of improvement areas.
4. Road improvement construction, including grading, culvert replacements, and stabilizing side slopes.
5. Final stabilization of all disturbed soil areas once project is complete, including revegetation and erosion control blanket application.
6. Final stabilization and project completion approximately February 2015. Removal of temporary controls following stabilization.

10. Topographic map with site located. (Label as "Attachment 11")
11. Groundwater Protection Plan (Do Not Attach. Maintain on Site)
12. Storm Water Pollution Prevention Plan – (Do Not Attach. Maintain on site.)

Preparer's Name AllStar Ecology, LLC

13. Public Notice Sign (see instructions)

BY COMPLETING AND SUBMITTING THIS APPLICATION, I HAVE REVIEWED AND UNDERSTAND AND AGREE TO THE TERMS AND CONDITIONS OF THE GENERAL PERMIT ISSUED ON NOVEMBER 4, 2007. I UNDERSTAND THAT PROVISIONS OF THE PERMIT ARE ENFORCEABLE BY LAW. VIOLATION OF ANY TERM AND CONDITION OF THE GENERAL PERMIT AND/OR OTHER APPLICABLE LAW OR REGULATIONS CAN LEAD TO ENFORCEMENT ACTION.

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED ON THIS FORM AND THAT IT IS, TO THE BEST OF MY KNOWLEDGE, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.

APPLICANT SIGNATURE _____ DATE 08/07/2014

PRINT NAME Cole Kilstrom

The application fee for construction projects disturbing between 1 to less than 3 acres in size is \$300.00. Prior to filing this application, you may wish to obtain a copy of the legislative rules of the Department of Environmental Protection, Title 47, Series 26, Water Pollution Control permit fee schedule. You may obtain a copy of the referenced rules from the Secretary of State's Office, State Capitol Building, Charleston, WV 25305.

Your check or money order for the application fee must be made payable to the West Virginia Department of Environmental Protection and mailed to:

Division of Water and Waste Management
Construction NPDES
601 57th Street, SE
Charleston, WV 25304

We will process your personal information (email address, mailing address and/or telephone number) in accordance with the State of West Virginia's Privacy Policy for appropriate and customary business purposes. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. The Division of Water and Waste Management will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact the DEP's Chief Privacy officer at depprivacyofficer@wv.gov.

ALL SPILLS OR ACCIDENTAL DISCHARGES ARE REQUIRED TO BE REPORTED IMMEDIATELY TO THE EMERGENCY RESPONSE SPILL ALERT SYSTEM TOLL FREE TELEPHONE NUMBER 1-800-642-3074. CALLS FROM OUT OF STATE SHOULD BE MADE TO 304-348-8899.



Applicant:	ANTERO RESOURCES APPALACHIAN CORPORATION	Type:	New NPDES/State Storm Water Construction
Reference ID:	Beech Lick Road Improvements (08/07/2014)	Permit ID:	New/Pending
Signature Page: Applicant Signature Page			
Status	New	Printed:	Aug. 07, 2014 4:53 PM

BY COMPLETING AND SUBMITTING THIS APPLICATION, I HAVE REVIEWED AND UNDERSTAND AND AGREE TO THE TERMS AND CONDITIONS OF THE GENERAL PERMIT ISSUED ON May 13, 2013. I UNDERSTAND THAT PROVISIONS OF THE PERMIT ARE ENFORCEABLE BY LAW, VIOLATION OF ANY TERM AND CONDITION OF THE GENERAL PERMIT AND/OR OTHER APPLICABLE LAW OR REGULATIONS CAN LEAD TO ENFORCEMENT ACTION.

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED ON THIS FORM AND THAT IT IS, TO THE BEST OF MY KNOWLEDGE, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.

(APPLICANT SIGNATURE)

Print Name: Cole Kilstrom
 Print Title: Environmental Specialist
 Date: 8/7/2014

The application fee for construction projects disturbing between 1 to less than 3 acres in size is \$300.00. Prior to filing this application, you may wish to obtain a copy of the legislative rules of the Department of Environmental Protection, Title 47, Series 26, Water Pollution Control permit fee schedule. You may obtain a copy of the referenced rules from the Secretary of State's Office, State Capitol Building, Charleston, WV 25305.

Your check or money order for the application fee must be made payable to the West Virginia Department of Environmental Protection.

ALL SPILLS OR ACCIDENTAL DISCHARGES ARE REQUIRED TO BE REPORTED IMMEDIATELY TO THE EMERGENCY RESPONSE SPILL ALERT SYSTEM TOLL FREE TELEPHONE NUMBER 1-800-642-3074. CALLS FROM OUT OF STATE SHOULD BE MADE TO 304-348-8899.

Please Print, Sign, Scan and attach this document rather than mailing as a wet ink signature is no longer required.

APPENDIX C

**NOTIFICATION OF
PUBLIC SAFETY OFFICIALS
AND GOVERNMENT AGENCIES**

**NOTIFICATION OF OUTSIDE PARTIES
PUBLIC SAFETY OFFICIALS AND GOVERNMENT AGENCIES**

Beech Lick Road (CR 25/10) Improvements

PUBLIC SAFETY NOTIFICATION

Ambulance911
Fire911
Law Enforcement911

GOVERNMENT AGENCY NOTIFICATIONS - VERBAL

National Response Center.....**1-800-424-8802**
(24 hr/day-7 days/week)

GOVERNMENT AGENCY NOTIFICATIONS - WRITTEN

Report spills that have reached state waters to:

West Virginia Department of Environmental Protection

Environmental Health Section.....(304) 328-5210 or 5166

National Response Center..... (800) 424-8802 (24-Hour)
c/o United States Coast Guard (G-OPF) Room 2611(202) 267-2675
2100 2nd Street, Southwest
Washington, D.C. 20593-0001

APPENDIX D

SOILS MAP & REPORT



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Doddridge County, West Virginia

Beech Lick Road Improvements Project



August 1, 2014

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

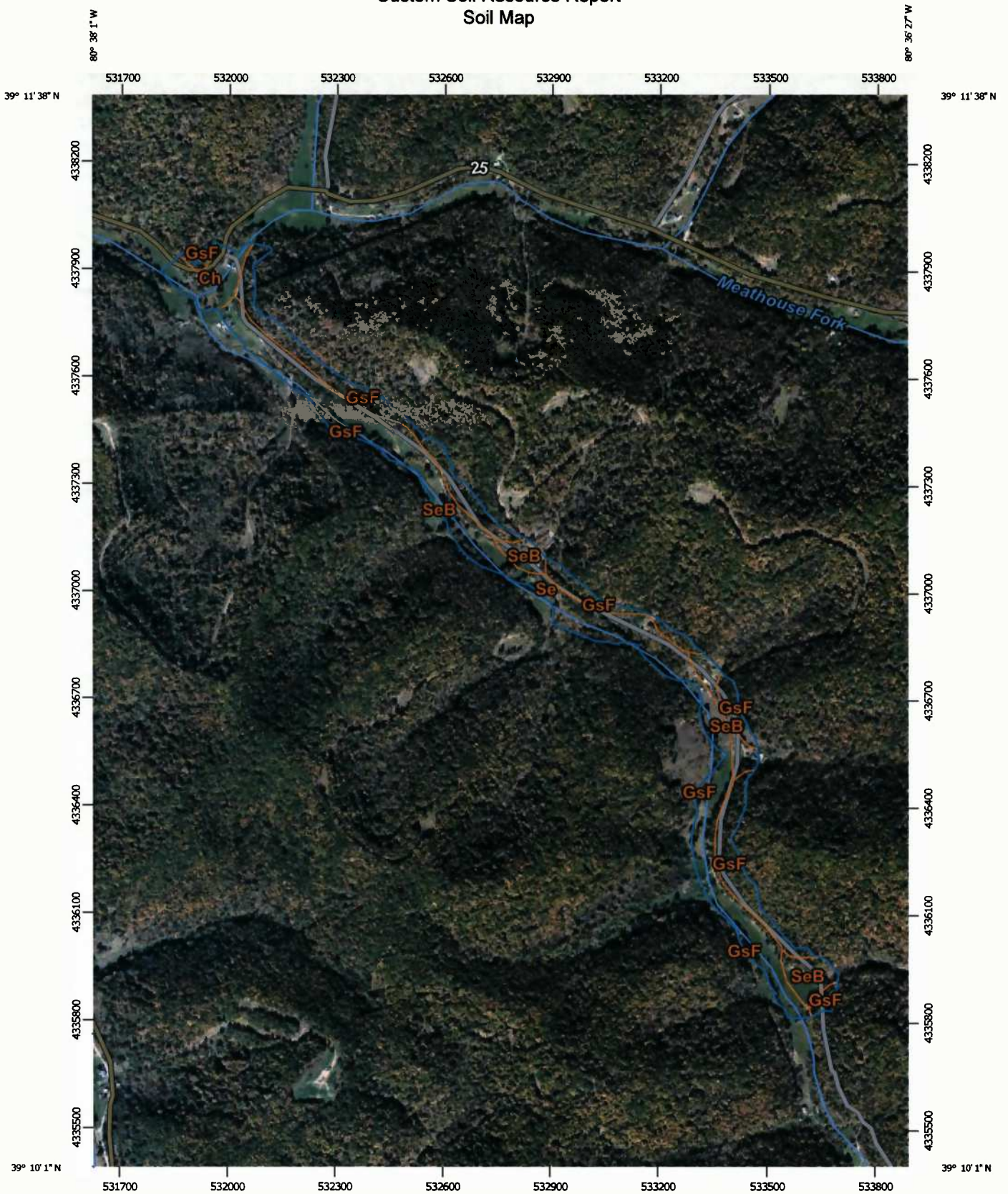
Contents

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Ch—Chagrin silt loam.....	10
GsE—Gilpin-Peabody complex, 15 to 35 percent slopes, very stony.....	11
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Se—Sensabaugh silt loam.....	14
SeB—Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded.....	15

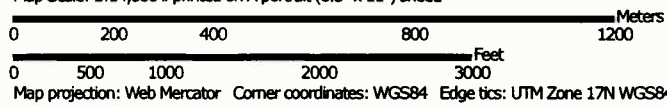
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:14,600 if printed on A portrait (8.5" x 11") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons


 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features


Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Doddridge County, West Virginia
 Survey Area Data: Version 9, Dec 19, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 8, 2011—Oct 25, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Doddridge County, West Virginia (WV017)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ch	Chagrin silt loam	6.3	7.3%
GsE	Gilpin-Peabody complex, 15 to 35 percent slopes, very stony	0.1	0.1%
GsF	Gilpin-Peabody complex, 35 to 70 percent slopes, very stony	26.1	30.0%
Se	Sensabaugh silt loam	45.2	52.0%
SeB	Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded	9.3	10.7%
Totals for Area of Interest		86.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

Custom Soil Resource Report

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Doddridge County, West Virginia

Ch—Chagrín silt loam

Map Unit Setting

Mean annual precipitation: 35 to 52 inches
Mean annual air temperature: 39 to 64 degrees F
Frost-free period: 144 to 173 days

Map Unit Composition

Chagrín and similar soils: 90 percent
Minor components: 3 percent

Description of Chagrín

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 7 inches: silt loam
Bw1 - 7 to 28 inches: loam
Bw2 - 28 to 42 inches: loam
C1 - 42 to 50 inches: loam
C2 - 50 to 65 inches: stratified channery sandy loam to channery loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 5.95 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Farmland classification: All areas are prime farmland
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Other vegetative classification: Moist Loams (ML3)

Minor Components

Melvin

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Custom Soil Resource Report

Across-slope shape: Concave
Other vegetative classification: Wetlands (W3)

GsE—Gilpin-Peabody complex, 15 to 35 percent slopes, very stony

Map Unit Setting

Mean annual precipitation: 35 to 52 inches
Mean annual air temperature: 39 to 64 degrees F
Frost-free period: 144 to 173 days

Map Unit Composition

Gilpin and similar soils: 50 percent
Peabody and similar soils: 35 percent

Description of Gilpin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Very stony fine-loamy residuum weathered from shale and siltstone

Typical profile

A - 0 to 3 inches: silt loam
Bt1 - 3 to 10 inches: silt loam
Bt2 - 10 to 23 inches: channery silty clay loam
Bt3 - 23 to 33 inches: very channery silt loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Other vegetative classification: Very Rocky, Acid Soils (RA3)

Custom Soil Resource Report

Description of Peabody

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Very stony clayey residuum weathered from interbedded sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam

Bt1 - 3 to 7 inches: silty clay loam

Bt2 - 7 to 21 inches: clay

BC - 21 to 27 inches: very channery silty clay

Cr - 27 to 33 inches: bedrock

R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock; 20 to 40 inches to paralithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

GsF—Gilpin-Peabody complex, 35 to 70 percent slopes, very stony

Map Unit Setting

Mean annual precipitation: 35 to 52 inches

Mean annual air temperature: 39 to 64 degrees F

Frost-free period: 144 to 173 days

Map Unit Composition

Gilpin and similar soils: 50 percent

Peabody and similar soils: 30 percent

Custom Soil Resource Report

Description of Gilpin

Setting

Landform: Hillslopes

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Crest, nose slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Very stony fine-loamy residuum weathered from shale and siltstone

Typical profile

A - 0 to 3 inches: silt loam

Bt1 - 3 to 10 inches: silt loam

Bt2 - 10 to 23 inches: channery silty clay loam

Bt3 - 23 to 33 inches: very channery silt loam

R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 35 to 70 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Other vegetative classification: Very Rocky, Acid Soils (RA3)

Description of Peabody

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Very stony clayey residuum weathered from interbedded sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam

Bt1 - 3 to 7 inches: silty clay loam

Bt2 - 7 to 21 inches: clay

BC - 21 to 27 inches: very channery silty clay

Cr - 27 to 33 inches: bedrock

R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 35 to 70 percent

Custom Soil Resource Report

Depth to restrictive feature: 20 to 40 inches to lithic bedrock; 20 to 40 inches to paralithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Se—Sensabaugh silt loam

Map Unit Setting

Mean annual precipitation: 35 to 52 inches

Mean annual air temperature: 39 to 64 degrees F

Frost-free period: 144 to 173 days

Map Unit Composition

Sensabaugh and similar soils: 75 percent

Minor components: 3 percent

Description of Sensabaugh

Setting

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Gravelly fine-loamy alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam

Bw1 - 6 to 19 inches: silt loam

Bw2 - 19 to 25 inches: loam

BC - 25 to 30 inches: channery loam

C1 - 30 to 39 inches: very channery sandy loam

C2 - 39 to 49 inches: extremely channery sandy loam

C3 - 49 to 65 inches: channery sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 5.95 in/hr)

Depth to water table: About 48 to 72 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Farmland classification: All areas are prime farmland

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Other vegetative classification: Moist Loams (ML3)

Minor Components

Melvin

Percent of map unit: 3 percent

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Other vegetative classification: Wetlands (W3)

SeB—Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded

Map Unit Setting

Mean annual precipitation: 35 to 52 inches

Mean annual air temperature: 39 to 64 degrees F

Frost-free period: 144 to 173 days

Map Unit Composition

Sensabaugh and similar soils: 80 percent

Description of Sensabaugh

Setting

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Gravelly fine-loamy alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam

Bw1 - 6 to 19 inches: silt loam

Bw2 - 19 to 25 inches: loam

BC - 25 to 30 inches: channery loam

Custom Soil Resource Report

- C1 - 30 to 39 inches: very channery sandy loam
- C2 - 39 to 49 inches: extremely channery sandy loam
- C3 - 49 to 65 inches: channery sandy loam

Properties and qualities

- Slope:* 3 to 8 percent
- Depth to restrictive feature:* More than 80 inches
- Natural drainage class:* Well drained
- Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
- Depth to water table:* About 48 to 72 inches
- Frequency of flooding:* Rare
- Frequency of ponding:* None
- Available water storage in profile:* Moderate (about 7.3 inches)

Interpretive groups

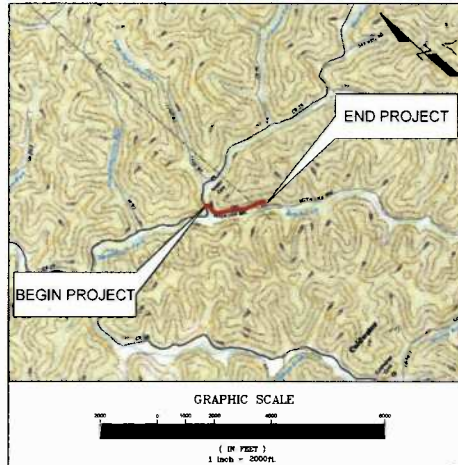
- Farmland classification:* All areas are prime farmland
- Land capability classification (irrigated):* None specified
- Land capability classification (nonirrigated):* 2e
- Hydrologic Soil Group:* A
- Other vegetative classification:* Moist Loams (ML3)

APPENDIX E

E&SC PLANS

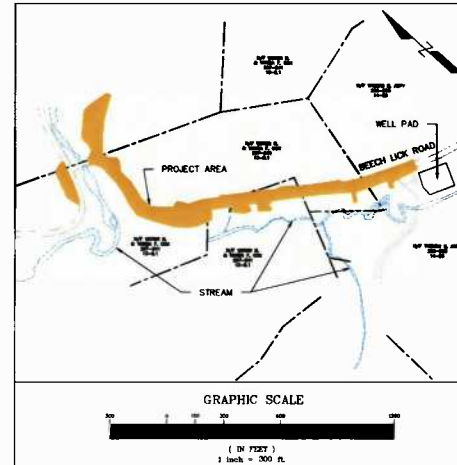
ANTERO RESOURCES CORPORATION NEW MILTON DISTRICT DODDRIDGE COUNTY, WEST VIRGINIA BEECH LICK ROAD (CR 25-10) IMPROVEMENTS - VICTOR PAD JUNE 2014

PROJECT LOCATION MAP



SOURCE:
USGS NEW MILTON & BIG ISAAC, WV. QUADRANGLE
(SCALE 1" = 2,000')

OVERALL PROJECT LAYOUT



INDEX OF DRAWINGS	
DWG. NO.	TITLE
C-01	CONSTRUCTION NOTES
C-02	EXISTING FEATURES PLAN
C-03	GRADING PLAN SHEET 1 OF 2
C-04	GRADING PLAN SHEET 2 OF 2
C-05	EROSION & SEDIMENT CONTROL PLAN
C-06	CONSTRUCTION DETAILS 1 OF 2
C-07	CONSTRUCTION DETAILS 2 OF 2
C-08	E&S DETAILS 1 OF 2
C-09	E&S DETAILS 2 OF 2
C-10	CROSS SECTIONS SHEET 1 OF 6
C-11	CROSS SECTIONS SHEET 2 OF 6
C-12	CROSS SECTIONS SHEET 3 OF 6
C-13	CROSS SECTIONS SHEET 4 OF 6
C-14	CROSS SECTIONS SHEET 5 OF 6
C-15	CROSS SECTIONS SHEET 6 OF 6

RESOURCE IMPACT TABLE	
LIMIT OF DISTURBANCE (TOTAL)	4.32 AC.
LIMIT OF DISTURBANCE (EXCLUDING EXISTING ROAD)	3.84 AC.
LIMIT OF DISTURBANCE (EXCLUDING EXISTING R.O.W.)	2.88 AC.
TREE CLEARING	1.97 AC.
WATERS/WETLANDS	324 S.F.

STREAM IMPACTS TABLE SHEET C-03								
EXISTING STRUCTURE	ACTIVITY PROPOSED	CENTERLINE STATION	ACTIVITY IMPACT (LF)	INLET PROTECTION (LF)	OUTLET PROTECTION (LF)	TOTAL IMPACT (LF)	RESOURCE	AREA DISTURBED (S.F.)
15" CMP	REPLACE WITH 18" ADS N-12	9+50	20	4	12	36	STREAM 03	324

PREPARED BY:



P.O. Box 488
2912 Old Salem Road
Pipersville, PA 19347 USA
P.O. Box 794
1189 Riverchase Drive
Suite 52
Martinsburg, WV 26025
www.earthres.com
PA Office 215.765.1211
WV Office 206.232.0886
Toll Free 800.264.4533

PREPARED FOR:



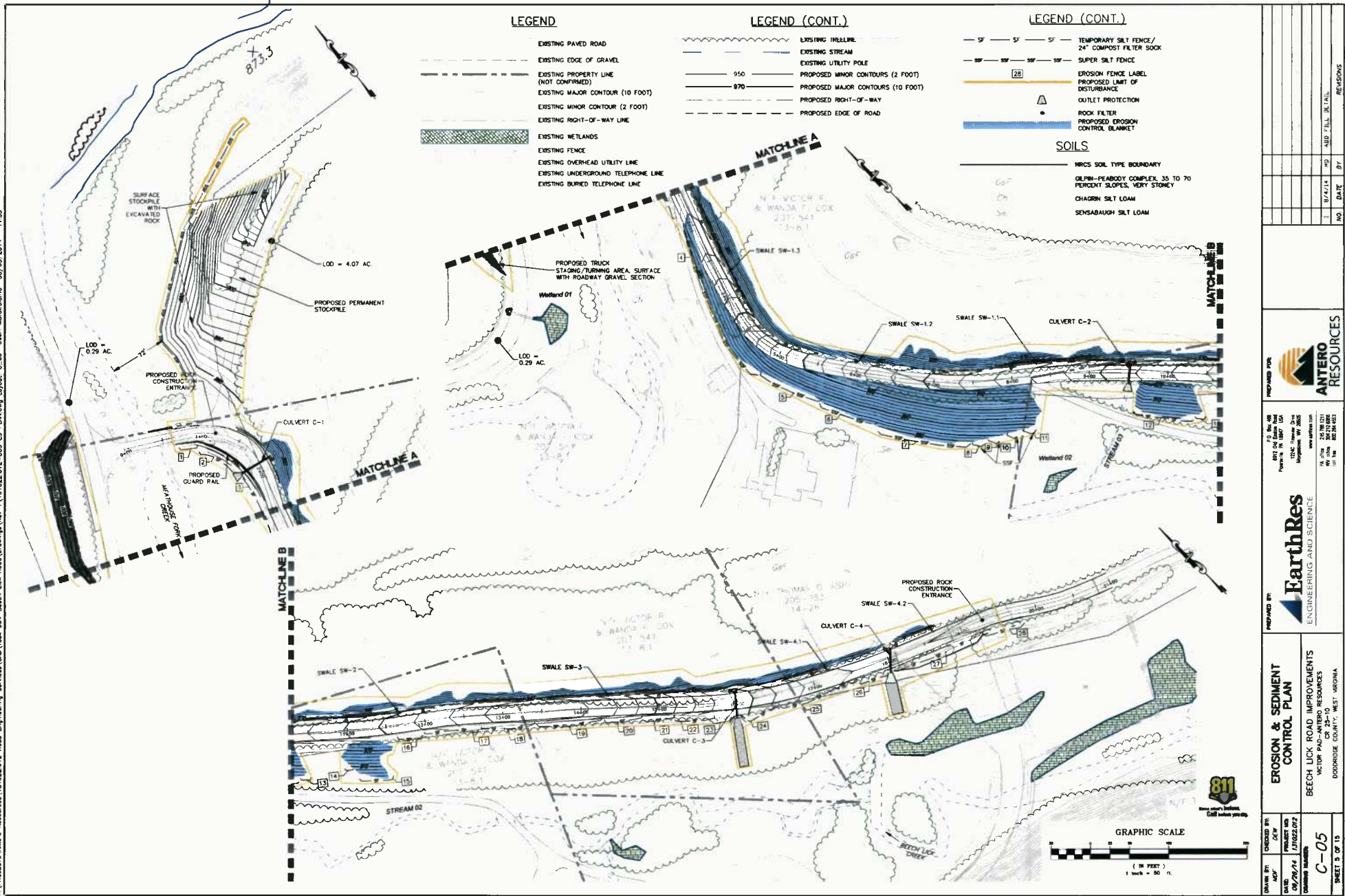
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175-D ELKCREEK ROAD
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LEGEND

- EXISTING PAVED ROAD
- EXISTING EDGE OF GRAVEL
- EXISTING PROPERTY LINE (NOT CONFIRMED)
- EXISTING MAJOR CONTOUR (10 FOOT)
- EXISTING MINOR CONTOUR (2 FOOT)
- EXISTING RIGHT-OF-WAY LINE
- EXISTING WETLANDS
- EXISTING FENCE
- EXISTING OVERHEAD UTILITY LINE
- EXISTING UNDERGROUND TELEPHONE LINE
- EXISTING BURIED TELEPHONE LINE

LEGEND (CONT.)

- EXISTING TRENCH
- EXISTING STREAM
- EXISTING UTILITY POLE
- PROPOSED MAJOR CONTOURS (2 FOOT)
- PROPOSED MAJOR CONTOURS (10 FOOT)
- PROPOSED RIGHT-OF-WAY
- PROPOSED EDGE OF ROAD

LEGEND (CONT.)

- 5' 5' 5' 5' TEMPORARY SILT FENCE / 24" COMPOST FILTER SOCK
- 5' 5' 5' 5' SUPER SILT FENCE
- 28' EROSION FENCE LABEL
- PROPOSED LIMIT OF DISTURBANCE
- OUTLET PROTECTION
- ROCK FILTER
- PROPOSED EROSION CONTROL BLANKET

SOILS

- NRCS SOIL TYPE BOUNDARY
- GULPH-PEABODY COMPLEX, 35 TO 70 PERCENT SLOPES, VERY STONEY
- CHAQRN SILT LOAM
- SENSBAUGH SILT LOAM

NO.	DATE	BY	REVISIONS
1	9/4/14	NO	ADD FULL DETAILED

PREPARED FOR:
ANTERO RESOURCES

PREPARED BY:
EarthRes
 ENGINEERING AND SCIENCE

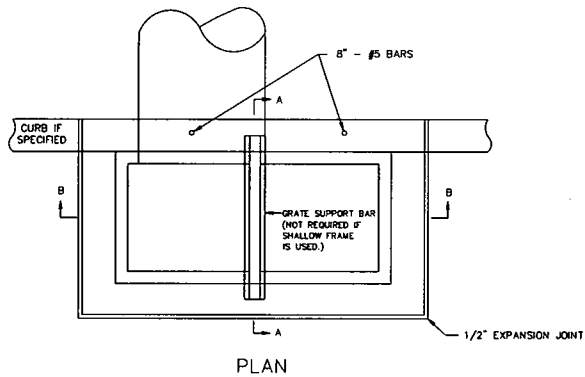
PROJECT:
EROSION & SEDIMENT CONTROL PLAN
 BEECH LICK ROAD IMPROVEMENTS
 VICTOR PARKWAY, ANTERO RESOURCES
 DODDRIE COUNTY, WEST VIRGINIA

DATE:
 08/05/2014
 DRAWN BY:
 JHD
 CHECKED BY:
 JHD
 PROJECT NO.:
 131022.012
 SHEET NO.:
C-05
 SHEET 5 OF 15

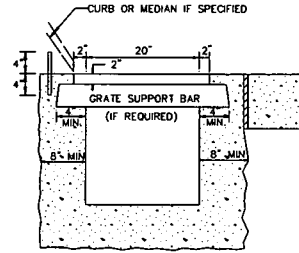
APPENDIX F
SECONDARY CONTAINMENT
DRAINAGE LOG

APPENDIX G

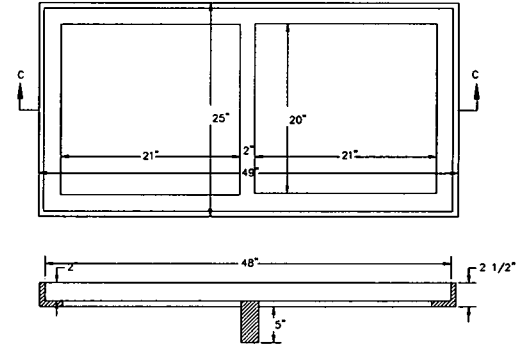
**BMP TECHNICAL
INSTALLATION DETAILS**



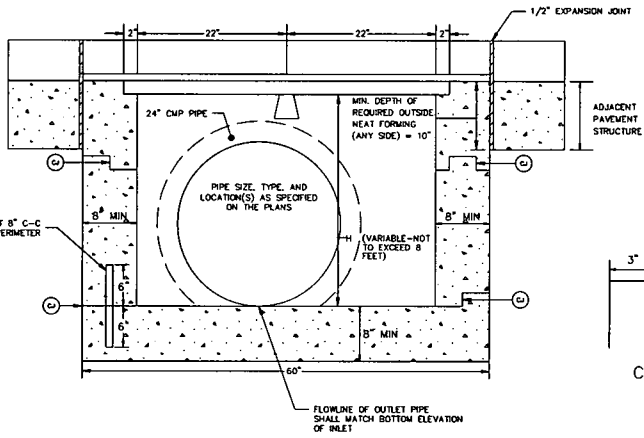
PLAN



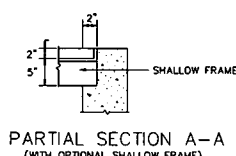
SECTION A-A



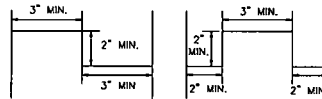
SECTION C-C
DOUBLE-GRATE SHALLOW FRAME



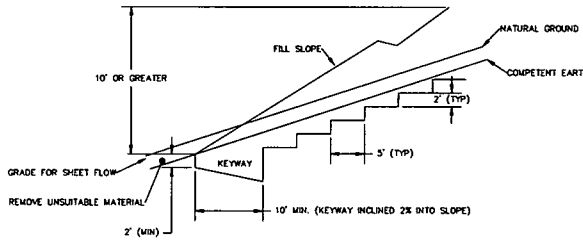
SECTION B-B



PARTIAL SECTION A-A
(WITH OPTIONAL SHALLOW FRAME)



CONSTRUCTION JOINT DETAILS



FILL BENCHING AND KEYWAY
NOT TO SCALE

- NOTES:
- BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO, OR EXCEED 5:1 OR WHEN RECOMMENDED BY ENGINEER.
 - FILL MATERIAL SHALL BE PLACED, SPREAD AND COMPACTED IN LOOSE LIFTS NOT TO EXCEED 8-INCHES IN THICKNESS. LIFTS SHALL BE PLACED HORIZONTALLY WHERE PRACTICAL BASED ON FILL DEPTH AND EQUIPMENT USED.

NOTES:

- THIS INLET SHOULD ONLY BE SPECIFIED WHEN ABUTTING CONCRETE PAVEMENT.
- THE FINAL INSTALLED TOP SURFACE OF INLET AND GRATE SHALL BE FLUSH WITH ADJACENT FINISHED SURFACES SUCH AS PAVEMENT, CURBS, AND SIDEWALKS. TOP OF GRATE ELEVATION, IF SHOWN ON THE PLANS, IS FOR INFORMATION ONLY.
- CONSTRUCTION MAY BE CAST-IN-PLACE, PRECAST IN ONE OR MULTIPLE SECTIONS, OR ANY COMBINATION OF CAST-IN-PLACE AND PRECAST.
- REBARS ARE TO BE INSTALLED AT THE POINTS TO CONNECT CURB TO INLET. REBARS ARE NOT REQUIRED IF CURB IS POURED MONOLITHICALLY WITH INLET OR IF TYPE V OR VI MEDIAN IS SPECIFIED ON THE PLANS.
- FOR DETAILS OF GRATE SUPPORT BAR, SHALLOW FRAME, AND GRATES (TWO REQUIRED), SEE INLET CASTINGS STANDARD SHEET DRG-X. USE OF THE SHALLOW FRAME WILL BE LIMITED TO ROADWAYS CONSTRUCTED OF CONCRETE PAVEMENT. IF ADJACENT ROADWAY IS BUILT OF HOT MIX ASPHALT PAVEMENT, THE FRAME AS REQUIRED FOR A TYPE F INLET (STANDARD SHEET DRG7) WILL BE REQUIRED.
- THE CONTRACTOR MAY, AT HIS OPTION, OMIT USE OF THE FRAME BY FORMING A LEDGE IN THE CONCRETE.
- SPECIAL CARE SHALL BE EXERCISED BY FORMING THE 2" WIDE CONCRETE LEDGE TO PROVIDE A SMOOTH, EVEN SURFACE FOR SUPPORTING THE GRATES IF THE SHALLOW FRAME IS NOT USED. NO PROJECTIONS SHALL EXIST ON THE BEARING SURFACES OF THE LEDGE OR THE GRATES, AND THE GRATES SHALL SEAT ON THE LEDGE WITHOUT ROCKING.
- OPTIONAL CONSTRUCTION JOINTS LABELED "CJ" MAY BE ROUGHED CONCRETE, KEYS OR DOWELS AS PER THE TYPICAL DETAILS SHOWN HEREIN OR AS APPROVED BY THE ENGINEER. HIGH STRENGTH GROUT MEETING THE REQUIREMENTS OF SUBSECTION 713.5 OF THE SPECIFICATIONS MAY BE USED TO A DEPTH OF 1/2" FOR LEVELING BETWEEN PRECAST SECTIONS. THICKER DEFS WILL BE ALLOWED IF AS PER THE MANUFACTURER'S RECOMMENDATIONS.
- PC (URBANIUM PIPE COVER) SHALL BE 12" BELOW INLET TOP FOR PIPES PLACED UNDER SIDEWALK OR GRASSED AREA OR 24" BELOW INLET TOP FOR PIPES PLACED UNDER PAVEMENT OR SHOULDER.
- CURB, IF SPECIFIED, MAY BE EITHER CONCRETE PLACED ON THE INLET BACKWALL AS DETAILED HEREIN OR AN APPROVED CURB BOX AS MANUFACTURED WITH THE GRATE AND FRAME. DIMENSIONS OF THE CURB AS SPECIFIED ON THE PLANS. THE CURB WILL BE PAID FOR PER SECTION 810, IN EITHER CASE.
- THIS INLET SHALL NOT BE PLACED IN A PEDESTRIAN CROSS WALK.
- THE MINIMUM DISTANCE FROM THE TOP OF ANY PIPE OPENING TO ANY CONSTRUCTION JOINT ABOVE THE OPENING SHALL BE FOUR (4) INCHES.
- THE NUMBER AND LOCATION OF PIPE OPENINGS SHALL BE SHOWN IN THE PLANS. THE CONTRACTOR AT NO ADDITIONAL COST SHALL BE RESPONSIBLE FOR ANY TEMPORARY BRACING REQUIRED TO TRANSPORT PRECAST INLET SECTIONS DUE TO MULTIPLE OPENINGS.

NO.	DATE	BY	REVISIONS
1	8/7/14	MD	ADD FILL DETAIL

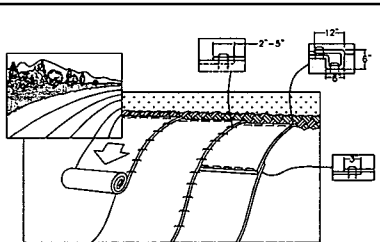


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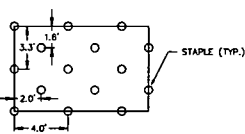
CONSTRUCTION DETAILS
(SHEET 2 OF 2)
BEECH LICK ROAD IMPROVEMENTS
VICOR PAVING RESOURCES
DODDRIEGE COUNTY, WEST VIRGINIA

DESIGNED BY:	MD
CHECKED BY:	MD
DATE:	08/26/2014
PROJECT NO.:	110222012
DRAWING NUMBER:	C-07
SHEET # OF 13	2



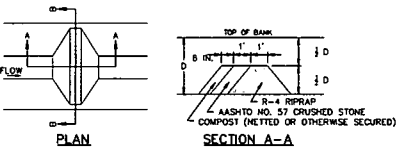
**TEMPORARY EROSION CONTROL MAT DETAIL
SLOPE INSTALLATION**

- NOTES:
1. EROSION CONTROL MAT TO BE USED ON SLOPES STEEPER THAN 3H:1V.
 2. EROSION CONTROL MAT TO BE MACHINE-PRODUCED 100% BIO-DEGRADABLE MAT SC150 AS MANUFACTURED BY NORTH AMERICAN GREEN, OR EQUIVALENT.
 3. USE AN AVERAGE OF 2 STAPLES OR STAPLES PER SQUARE YARD MINIMUM.
 4. REFER TO MANUFACTURER'S INSTRUCTIONS FOR EROSION CONTROL MAT SLOPE INSTALLATION.



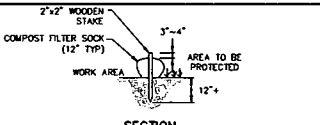
**STAPLE PATTERN DETAIL
1.7 STAPLES PER SQUARE YARD**

- NOTES:
1. TEMPORARY EROSION CONTROL MAT TO BE MACHINE-PRODUCED 100% BIO-DEGRADABLE MAT SC150 AS MANUFACTURED BY NORTH AMERICAN GREEN, OR EQUIVALENT.
 2. PERMANENT EROSION CONTROL MAT SHALL BE MIRAN MPMAT TMB AS MANUFACTURED BY TEN CATE MIDOLON, OR EQUIVALENT.
 3. USE AN AVERAGE OF 1.7 STAPLES OR STAPLES PER SQUARE YARD MINIMUM. ADDITIONAL STAPLES SHOULD BE INSTALLED AS NECESSARY TO SECURE CRITICAL POINTS ALONG THE CHANNEL SURFACE.
 4. REFER TO MANUFACTURER'S INSTRUCTIONS FOR EROSION CONTROL MAT CHANNEL INSTALLATION.



ROCK FILTER DETAIL

- NOTES:
1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTERS.
 2. IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.



COMPOST FILTER SOCK DETAIL

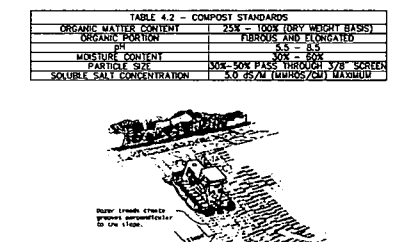
- NOTES:
1. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
 2. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
 3. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE AND DEPOSITED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
 4. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
 5. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS. PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

TABLE 4.1 - COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS

MATERIAL TYPE	3 MIL HDPE	5 MIL HDPE	5 MIL HDPE	MULTI-FILAMENT POLYPROPYLENE (MPPPP)	HEAVY DUTY MULTI-FILAMENT POLYPROPYLENE (MPPPP)
CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12" 18" 24"	12" 18" 24"	12" 18" 24"	12" 18" 24"	12" 18" 24"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	3/8"
TENSILE STRENGTH	28 PSI	28 PSI	28 PSI	44 PSI	202 PSI
ULTRAVIOLET STABILITY X ORIGINAL STRENGTH (ASTM G-155)	23% AT 1,000 HR.	23% AT 1,000 HR.		100% AT 1,000 HR.	100% AT 1,000 HR.
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS

TABLE 4.2 - COMPOST STANDARDS

ORGANIC MATTER CONTENT	25% - 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS LINK EXTRACTABLE
MOISTURE CONTENT	30% - 50% PASS THROUGH 3/8" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 G/2M (MILIGRAMS/CM) MAXIMUM



TRACKING A FILL SLOPE DETAIL

- NOTES:
1. TRACKING SLOPES IS DONE BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR.
 2. IF A BULLDOZER IS USED, THE BLADE SHOULD BE UP.



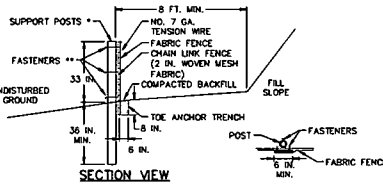
SECTION VIEW

STANDARD SILT FENCE (18" HIGH) DETAIL

- NOTES:
1. FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS SHOWN IN SECTION 3.28 OF THE M.V. EROSION AND SEDIMENT CONTROL BMP MANUAL.
 2. FABRIC WIDTH SHALL BE 30 IN. MINIMUM. STAKES SHALL BE HARDWOOD OR EQUIVALENT STEEL (U OR T) STAKES.
 3. SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
 4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
 5. ANY SECTION OF SILT FENCE WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET.
 6. FENCE SHALL BE REMOVED AND PROPERLY DISPOSED WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.

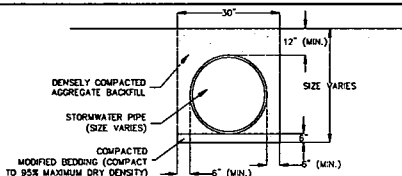
TABLE 4.4 - MAXIMUM SLOPE LENGTH FOR SILT FENCE

SLOPE - PERCENT	STANDARD (18" HIGH) SILT FENCE	REINFORCED (30" HIGH) SILT FENCE	SUPER SILT FENCE
2 (OR LESS)	100	200	1000
3	100	200	500
4	100	200	300
5	100	200	200
6	100	200	150
7	100	200	100
8	100	200	75
9	100	200	50
10	100	200	30
15	100	200	20
20	100	200	15
25	100	200	10
30	100	200	5



SUPER SILT FENCE DETAIL

- NOTES:
1. FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS SHOWN IN SECTION 3.27 OF THE M.V. EROSION AND SEDIMENT CONTROL BMP MANUAL.
 2. FABRIC WIDTH SHALL BE 42 IN. MINIMUM.
 3. POSTS SHALL BE INSTALLED USING A POSTHOLE DRILL.
 4. CHAIN LINK SHALL BE GALVANIZED NO. 11.5 GA. STEEL WIRE WITH 2-1/4 IN. OPENING, NO. 11 GA. ALUMINUM COATED STEEL WIRE IN ACCORDANCE WITH ASTM-A-491, OR GALVANIZED NO. 9 GA. STEEL WIRE TOP AND BOTTOM WITH GALVANIZED NO. 11 GA. STEEL INTERMEDIATE WIRES. NO. 7 GAGE TENSION WIRE TO BE INSTALLED HORIZONTALLY THROUGH HOLES AT TOP AND BOTTOM OF CHAIN-LINK FENCE OR ATTACHED WITH HOD RODS AT 5 FT MAX. CENTERS.
 5. SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
 6. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
 7. FENCE SHALL BE REMOVED AND PROPERLY DISPOSED WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.

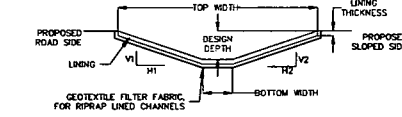


TYPICAL STORMWATER PIPE

STORMWATER DRAINAGE PIPE SCHEDULE

PIPE NO.	PIPE TYPE	PIPE DIAMETER	INLET INVERT ELEVATION (FT)	OUTLET INVERT ELEVATION (FT)	LENGTH (FT)	PIPE SLOPE
C-1	ADS N-12	18	877.25	876.41	42	2.00%
C-2	ADS N-12	18	918.26	917.78	24	2.00%
C-3	ADS N-12	18	918.24	917.56	34	2.00%
C-4	ADS N-12	18	910.97	910.31	33	2.00%

- NOTES:
1. MAINTAIN AND COMPACT A MINIMUM OF 6" OF BACKFILL MATERIAL ALONG ALL SIDES OF PIPE. REFER TO ADS SPECIFICATIONS.
 2. FULL STONE BACKFILL TO BOTTOM OF PAVED SECTION FOR PIPE INSTALLED WITHIN 2' OF PAVED AREAS.
 3. ADJUST/REDUCE CEMENT STABILIZED SOIL THICKNESS AT CULVERT CROSSINGS TO AVOID DAMAGE TO PIPE.

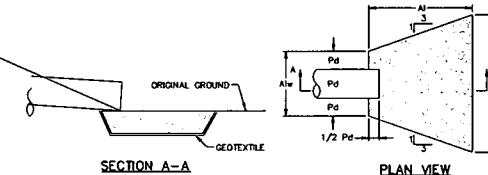


CHANNEL DETAIL

- NOTES:
1. REFER TO DRAWING NOS. C-03 AND C-04 "GRADING PLAN" FOR LOCATIONS OF CHANNELS.

CHANNEL DESIGN SCHEDULE

CHANNEL NO.	SLOPE (FT/FT)	LINING TYPE	LINING THICKNESS (FT)	SIDESLOPES H1:V1	SIDESLOPES H2:V2	DESIGN DEPTH (FT)	BOTTOM WIDTH (FT)	TOP WIDTH (FT)
SW 1.1	0.0440	R-4	1.5	4:1	1.5:1	1	0	5.5
SW 1.2	0.1007	R-4	1.5	4:1	1.5:1	1	0	5.5
SW 1.3	0.0310	R-4	1.5	4:1	1.5:1	1.25	0	6.0
SW 2	0.0440	R-4	1.5	4:1	1.5:1	1	0	5.5
SW 3	0.0828	R-4	1.5	4:1	1.5:1	1	0	5.5
SW 4.1	0.0230	R-4	1.5	4:1	1.5:1	1	0	5.5
SW 4.2	0.0100	R-4	1.5	4:1	1.5:1	1	0	5.5

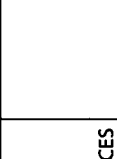


RIP-RAP APRON AT PIPE OUTLET DETAIL

- NOTES:
1. ALL APRONS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN. TERMINAL WIDTHS SHALL BE ADJUSTED AS NECESSARY TO MATCH RECEIVING CHANNELS.
 2. ALL APRONS SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RUNOFF EVENT. DISPLACED RIPRAP WITHIN THE APRON SHALL BE REPLACED IMMEDIATELY.
 3. EXTEND RIPRAP ON BACK SIDE OF APRON TO AT LEAST 1/2 DEPTH OF PIPE ON BOTH SIDES TO PREVENT SCOUR AROUND THE PIPE.

PROJECT: 131025.012 - Road Engineering Services (C-08) - DE.NMS.org
 SHEET: E&S DETAILS SHEET (1 OF 2)
 DATE: 07/26/2014
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

NO.	DATE	BY	REVISIONS
1	8/4/14	MD	ADD FILL DETAIL

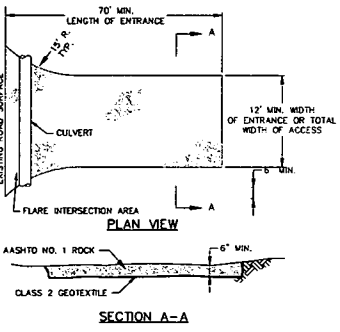


PREPARED FOR:
 ANTERO RESOURCES
 12345 Main Street
 Denver, CO 80202
 www.atero.com



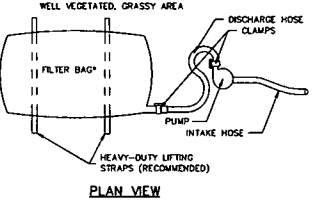
E&S DETAILS SHEET (1 OF 2)
 BEECH LICK ROAD IMPROVEMENTS
 VECTOR PARK DRIVE
 DOORIDGE COUNTY, WEST VIRGINIA

CHECKED BY: [Name]
 DATE: 07/26/2014
 DRAWING NUMBER: C-08
 SHEET 8 OF 13



ROCK CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE

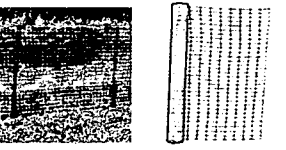
NOTE:
1. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.



PUMPED WATER FILTER BAG DETAIL
NOT TO SCALE

PROPERTY	TEST METHOD	MINIMUM STANDARD
Avg. Mesh Width	ASTM D-4844	60 (20/10)
Clab Strength	ASTM D-4844	100 LB
Punching	ASTM D-4844	100 LB
Moisture	ASTM D-4844	100%
UV Resistant	ASTM D-4844	70%
Ads. Retained	ASTM D-4751	80 SECT

- NOTES:**
1. FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE SEAM WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE ABOVE STANDARDS.
 2. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME HALF FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT.
 3. BAGS SHALL BE LOCATED IN WELL VEGETATED AREAS AND DISCHARGED ONTO STABLE, EROSION RESISTANT AREAS. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
 4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
 5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ONE-HALF OF THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.



WETLAND PROTECTION FENCE

SEEDING SPECIFICATIONS
(WEST VIRGINIA EROSION AND SEDIMENT CONTROL FIELD MANUAL, MAY 2012)

- A. GENERAL SEEDING**
1. TEMPORARY CONDITIONS WHERE PRACTICE APPLIES, WHERE EXPOSED SOIL SURFACES ARE NOT TO BE FINE-GRADED OR WORKED FOR PERIODS LONGER THAN 30 DAYS, TEMPORARY VEGETATIVE COVER WITH SEDIMENT CONTROLS MUST BE ESTABLISHED WHERE RUNOFF WILL GO DIRECTLY INTO A STREAM, IMMEDIATELY UPON CONSTRUCTION OF THE SITE (SITE INCLUDES ROAD AND LOCATION). VEGETATION MUST BE ESTABLISHED ON ROAD BANKS AND LOCATION SLOPES. A PERMANENT VEGETATIVE COVER SHALL BE APPLIED TO AREAS THAT WILL BE LEFT UNWORKED FOR A PERIOD OF MORE THAN 6 MONTHS.
- B. SEED MIXTURES AND PLANTING DATES**
REFER TO TABLES 2-4 FOR RECOMMENDED DATES TO ESTABLISH VEGETATIVE COVER AND THE APPROVED LISTS OF TEMPORARY AND PERMANENT PLANT SPECIES, AND PLANTING RATES. TABLE 3 GIVES RECOMMENDED TYPES OF TEMPORARY VEGETATION, RATES OF APPLICATION, AND OPTIMUM SEEDING DATES. IN SITUATIONS WHERE ANOTHER COVER IS DESIRED CONTACT THE LOCAL SOIL CONSERVATION DISTRICT FOR SEEDING RECOMMENDATIONS.
- C. SEED APPLICATION**
APPLY SEED BY BROADCASTING, DRILLING, OR BY HYDROSEEDING ACCORDING TO THE RATES INDICATED IN TABLE IV-3. PERFORM ALL PLANTING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. NECESSARY SITE PREPARATION, ROUGHENING OF THE SOIL SURFACE, SHOULD BE DONE JUST PRIOR TO SEEDING. SEEDING PREPARATION MAY NOT BE REQUIRED ON NEWLY DISTURBED AREAS.

TABLE IV-1. RECOMMENDED SEEDING DATES FOR PERMANENT AND TEMPORARY COVER UNLESS OTHERWISE SPECIFIED.

PLANTING DATES	SUITABILITY
MARCH 1 - APRIL 15 AND AUGUST 1 - OCTOBER 1	BEST SEEDING PERIODS
APRIL 15 - AUGUST 1	HIGH RISK - MOISTURE STRESS LIKELY
OCTOBER 1 - DEC 1	HIGH RISK - FROSTIC DAMAGE TO YOUNG SEEDLINGS
DEC 1 - MARCH 1	POOR SEEDING PERIOD. DORMANT SEEDING.

TABLE 2. ACCEPTABLE FERTILIZATION RECOMMENDATION IN ABSENCE OF A SOIL TEST.

SPECIES	N (LBS/AC)	P205 (LBS/AC)	K2O (LBS/AC)	EXAMPLE REC. (PER ACRE)
COOL SEASON GRASS	40	80	80	400 LBS 10-20-20
SO GRASS & LEGUME	30	60	60	300LBS 10-20-20
TEMPORARY COVER	40	40	40	200LBS 19-19-19

TABLE 3. TEMPORARY COVER SUITABLE FOR ESTABLISHMENT IN WEST VIRGINIA.

SPECIES	SEEDING RATE (LBS/ACRE)	OPTIMUM SEEDING DATES	DRAINAGE	PH RANGE
ANNUAL RYEGRASS	40	3/1 - 6/15 or 8/15 - 9/15	WELL - POORLY	5.5-7.5
FIELD BROMEGRASS	40	3/1 - 6/15 or 8/15 - 9/15	WELL - MOD. WELL	6.0-7.0
SPRING OATS	96	3/1 - 6/15	WELL - POORLY	5.5-7.0
SLUDGRASS	40	5/15 - 8/15	WELL - POORLY	5.5-7.5
WINTER RYE	168	8/15 - 10/15	WELL - POORLY	5.5-7.5
WINTER WHEAT	180	8/15 - 11/15	WELL - MOD. WELL	5.5-7.0
JAPANESE WILLET	30	6/15 - 8/15	WELL	4.5-7.0
REDDOP	5	3/1 - 6/15	WELL	4.0-7.5
ANNUAL RYEGRASS	26	3/1 - 6/15	WELL-POORLY	5.5-7.5
SPRING OATS	84	3/1 - 6/15	WELL-POORLY	5.5-7.5

NOTE: THESE RATES SHOULD BE INCREASED BY 50% IF PLANTED APRIL 15 - AUGUST 1 AND OCTOBER 1 - MARCH 1

- 2. PERMANENT SEEDING**
A. GENERAL
PERMANENT VEGETATIVE COVER WILL BE ESTABLISHED WHERE NO FURTHER SOIL DISTURBANCE IS ANTICIPATED OR NEEDED. SOIL FERTILITY AND PH LEVEL SHOULD BE TESTED AND ADJUSTED ACCORDING TO SPECIES PLANTED. PLANTING OF PERMANENT VEGETATIVE COVERS MUST BE PERFORMED ON ALL DISTURBED AREAS AFTER THE COMPLETION OF THE DRILLING PROCESS. ANY SITE THAT CONTAINS SIGNIFICANT AMOUNTS OF TOPSOIL SHALL HAVE THE TOPSOIL REMOVED AND STOCKPILED WHEN FEASIBLE. TOPSOIL SHOULD NOT BE ADDED TO SLOPES STEEPER THAN 2:1 UNLESS A GOOD BONDING TO THE SUB-LAYER CAN BE ACHIEVED. AFTER PROPER GRADING AND SEEDING PREPARATION, THE VEGETATION WILL REESTABLISH GROUND COVER FOR THE CONTROL OF SURFACE WATER RUNOFF AND EROSION.

ALL REQUIRED SEEDING PREPARATION, LOOSENING OF SOIL BY DISKING OR DOZER TRACKING, SHOULD BE PERFORMED JUST PRIOR TO SEEDING. IF SEEDING PREPARATION IS NOT FEASIBLE, 50% MORE SEED SHALL BE ADDED TO THE RECOMMENDED RATES SHOWN IN TABLES 4A AND IV-4.

WHEN HYDROSEEDING, SEEDING PREPARATION MAY NOT BE NECESSARY IF ADEQUATE SITE PREPARATION WAS PERFORMED. INCORPORATE THE APPROPRIATE AMOUNT OF LINE AND/OR FERTILIZER IN THE SLURRY MIX WHEN HYDROSEEDING.

WHEN HYDROSEEDING, FIRST MIX THE LINE, FERTILIZER, AND HYDRO-MULCH IN THE RECOMMENDED AMOUNT OF WATER. MIX THE SEED AND INOCULATE TOGETHER WITHIN ONE HOUR PRIOR TO PLANTING, AND ADD TO THE SLURRY JUST BEFORE SEEDING. APPLY THE SLURRY UNIFORMLY OVER THE PREPARED SITE. ASSURE THAT AGITATION IS CONTINUOUS THROUGHOUT THE SEEDING OPERATION AND THAT THE MIX IS APPLIED WITHIN ONE HOUR OF INITIAL MIXING.

- B. LINE AND FERTILIZER**
1. LINE SHALL BE APPLIED TO ALL PERMANENT SEEDINGS. THE PH OF THE SOIL IS TO BE DETERMINED AND LINE APPLIED ACCORDINGLY. ONCE THE PH IS KNOWN, SELECT THE AMOUNT OF LINE TO BE APPLIED FROM TABLE IV-2.
2. FERTILIZER SHALL BE APPLIED IN ALL PERMANENT SEEDINGS. APPLY THE EQUIVALENT OF 100-0-0 FERTILIZER PER ACRE OR USE THE AMOUNT OF FERTILIZER AND LINE RECOMMENDED BY A CERTIFIED SOIL TEST.
3. APPLICATION FOR BEST RESULTS AND MAXIMUM BENEFITS THE LINE AND FERTILIZER ARE TO BE APPLIED AT THE TIME OF SEEDING PREPARATION.

- C. PERMANENT SEED MIXTURES**
PLANNERS SHOULD TAKE INTO CONSIDERATION THE SPECIES MAKEUP OF THE EXISTING PASTURE AND THE LANDOWNER'S FUTURE PASTURE MANAGEMENT PLANS WHEN RECOMMENDING SEED MIXTURES. SELECTION: FROM TABLES IV 4A AND B. PERMANENT SEEDING MIXTURES SUITABLE FOR ESTABLISHMENT IN WEST VIRGINIA. NOTES:
1. ALL LEGUMES MUST BE PLANTED WITH THE PROPER INOCULANT PRIOR TO SEEDING.
2. LATHOOF FLATPEA IS POTENTIALLY POISONOUS TO SOME LIVESTOCK.
3. ONLY ENDOPHYTIC FREE VARIETIES OF TALL FESCUE SHOULD BE USED. TALL FESCUE AND CROWNWHEAT ARE ALSO A VERY INVASIVE SPECIES NON-NATIVE TO WV.
4. FOR UNPREPARED SEEDS OR SEEDING OUTSIDE THE OPTIMUM TIMEFRAMES, ADD 50% MORE SEED TO THE SPECIFIED RATE.
MIXTURES IN TABLE 4B ARE MORE WILDLIFE- AND FARM-FRIENDLY; THOSE LISTED IN BOLD ARE SUITABLE FOR USE IN SHADED WOODLAND SETTINGS. MIXTURES IN ITALICS ARE SUITABLE FOR USE IN FILTER STRIPS.

- D. SEEDING FOR WILDLIFE HABITAT**-CONSIDER THE USE OF NATIVE PLANTS OR LOCALLY ADAPTED PLANTS WHEN SELECTING COVER TYPES AND SPECIES FOR WILDLIFE HABITAT. WILDLIFE FRIENDLY SPECIES OR MIXES THAT HAVE MULTIPLE VALUES SHOULD BE CONSIDERED. SEE WILDLIFE FRIENDLY SPECIES/PLANTS IN TABLE IV-4B. CONSIDER SELECTING NO OR LOW MAINTENANCE LONG-LIVED PLANTS ADAPTABLE TO SITES WHICH MAY BE DIFFICULT TO MAINTAIN WITH EQUIPMENT.

- D. MULCHING**
1. GENERAL ORGANIC MULCHES
THE APPLICATION OF STRAW, HAY OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION, STRAW MADE FROM WHEAT OR OATS IS THE PREFERRED MULCH. THE USE OF HAY IS PREFERABLE, BUT NOT ENCOURAGED DUE TO THE RISK OF SPREADING INVASIVE SPECIES. MULCH MUST BE APPLIED TO ALL TEMPORARY AND PERMANENT SEEDING ON ALL DISTURBED AREAS, DEPENDING ON SITE CONDITIONS, IN CRITICAL AREAS SUCH AS WATERWAYS OR STEEP SLOPES, ADDITIONAL OR SUBSTITUTE SOIL PROTECTIVE MEASURES MAY BE USED IF DEEMED NECESSARY. EXAMPLES INCLUDE AJE MESH AND SOIL STABILIZATION SLANKETS OR EROSION CONTROL MATTING.

AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDING SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING. MULCHES CONSERVE DESIRABLE SOIL PROPERTIES, REDUCE SOIL MOISTURE LOSS, PREVENT CRUSTING AND SEALING OF THE SOIL SURFACE AND PROVIDE A SUITABLE MICROCLIMATE FOR SEED GERMINATION.

AREAS THAT CANNOT BE SEEDING BECAUSE OF THE SEASON SHOULD BE MULCHED TO PROVIDE SOME PROTECTION TO THE SOIL SURFACE. AN ORGANIC MULCH, STRAW OR HAY, SHOULD BE USED AND THE AREA MULCHED AS SOON AS WEATHER OR SEASONAL CONDITIONS PERMIT. DO NOT USE FIBER MULCH (CELLULOSE-HYDROSEED) ALONE FOR THIS PRACTICE. AT NORMAL APPLICATION RATES IT WILL NOT GIVE THE SOIL PROTECTION OF OTHER TYPES OF MULCH.

WOOD CELLULOSE FIBER MULCH, IS USED IN HYDROSEEDING OPERATIONS AND APPLIED AS PART OF THE SLURRY. IT CREATES THE BEST SEED-SOIL CONTACT WHEN APPLIED OVER TOP OF (AS A SEPARATE OPERATION) NEWLY SEEDING AREAS. FIBER MULCH DOES NOT ALONE PROVIDE SUFFICIENT PROTECTION ON HIGHLY ERODIBLE SOILS, OR DURING LESS THAN FAVORABLE GROWING CONDITIONS. FIBER MULCH SHOULD NOT BE USED ALONE DURING THE SUMMER MONTHS OR WHEN USED FOR LATE FALL MULCH COVER. USE STRAW MULCH DURING THESE PERIODS, AND FIBER MULCH WILL BE USED TO TACK (ANCHOR) THE STRAW MULCH. FIBER MULCH WILL SUIT FOR STEEP SLOPES, CRITICAL AREAS, AND AREAS SUSCEPTIBLE TO WIND.

TABLE 4A. PERMANENT SEEDING MIXTURES SUITABLE FOR ESTABLISHMENT IN WV.

SPECIES/MIXTURE	SEEDING RATE (LBS/AC)	SOIL DRAINAGE PREFERENCE	PH RANGE
CROWN VETCH	10 - 15	WELL - MOD. WELL	5.0 - 7.5
TALL FESCUE	30	WELL - MOD. WELL	5.0 - 7.5
CROWN VETCH	10 - 15	WELL - MOD. WELL	5.0 - 7.5
PERENNIAL RYEGRASS	20	WELL - MOD. WELL	5.0 - 7.5
FLATPEA OR PERENNIAL PEA / TALL FESCUE	15	WELL - MOD. WELL	4.0 - 8.0
LADINO CLOVER / SERICIA LESPEDEZA / TALL FESCUE	30	WELL - MOD. WELL	4.5 - 7.5
TALL FESCUE	2		
TALL FESCUE / LADINO CLOVER / REDTOP	40	WELL - MOD. WELL	5.0 - 7.5
CROWN VETCH / TALL FESCUE / REDTOP	10	WELL - MOD. WELL	5.0 - 7.5
TALL FESCUE / REDTOP	3		
TALL FESCUE / BIRDSFOOT TREFLO / REDTOP	40	WELL - MOD. WELL	5.0 - 7.5
SERICIA LESPEDEZA / TALL FESCUE / REDTOP	25	WELL - MOD. WELL	4.5 - 7.5
TALL FESCUE / REDTOP	3		
TALL FESCUE / CREEPING RED	50	WELL - MOD. WELL	5.0 - 7.5
TALL FESCUE	50	WELL - POORLY	4.5 - 7.5
PERENNIAL RYEGRASS / TALL FESCUE / LATHOOF FLATPEA*	10 / 15 / 120	WELL - POORLY	5.0 - 8.0

TABLES IV-4 TAKEN FROM NATURAL RESOURCES CONSERVATION SERVICE MANUAL CRITICAL AREA PLANTING

TABLE 4B. MIXTURES IN THE TABLE BELOW ARE MORE WILDLIFE AND FARM FRIENDLY. SPECIES/MIXTURE SEEDING RATE (LBS/ACRE) SOIL DRAINAGE PREFERENCE PH RANGE

SPECIES/MIXTURE	SEEDING RATE (LBS/ACRE)	SOIL DRAINAGE PREFERENCE	PH RANGE
KY BLUEGRASS / REDTOP	20 / 3	WELL - MOD. WELL	5.5 - 7.5
LADINO CLOVER OR BIRDSFOOT TREFLO	3/16		
TIMOTHY / ALFALFA	5 / 1	WELL - MOD. WELL	6.5 - 8.0
TIMOTHY / BIRDSFOOT TREFLO	5 / 8	WELL - POORLY	5.5 - 7.5
ORCHARDGRASS / LADINO CLOVER / REDTOP	10 / 2 / 3	WELL - MOD. WELL	5.5 - 7.5
ORCHARDGRASS / LADINO CLOVER	10 / 2	WELL - MOD. WELL	5.5 - 7.5
ORCHARDGRASS / PERENNIAL RYEGRASS	20 / 10	WELL - MOD. WELL	5.5 - 7.5
ORCHARDGRASS / PERENNIAL RYEGRASS	10 / 10	WELL - MOD. WELL	5.5 - 7.5
CREEPING RED FESCUE / PERENNIAL RYEGRASS	30 / 30	WELL - MOD. WELL	5.5 - 7.5
ORCHARDGRASS OR KY BLUEGRASS	20	WELL - MOD. WELL	6.0 - 7.5
BIRDSFOOT TREFLO / REDTOP	10 / 5	WELL - MOD. WELL	5.5 - 7.5
ORCHARDGRASS	20		
LATHOOF FLAT PEA / PERENNIAL RYEGRASS	30 / 20	WELL - MOD. WELL	5.5 - 7.5
LATHOOF FLAT PEA / ORCHARDGRASS	30 / 20	WELL - MOD. WELL	5.5 - 7.5

MIXTURES LISTED IN BOLD ARE SUITABLE FOR USE IN SHADED WOODLAND SETTINGS; THOSE IN ITALICS ARE SUITABLE FOR USE IN FILTER STRIPS.
* LATHOOF FLATPEA IS POTENTIALLY POISONOUS TO SOME LIVESTOCK. ALL LEGUMES SHOULD BE PLANTED WITH PROPER INOCULANTS PRIOR TO SEEDING. FOR UNPREPARED SEEDS OR SEEDING OUTSIDE THE OPTIMUM TIMEFRAMES, ADD 50% MORE SEED TO THE SPECIFIED RATE.

TABLE IV-5. LINE AND FERTILIZER APPLICATION TABLE

PH OF SOIL	LINE IN TONS PER ACRE	FERTILIZER LBS. PER ACRE 10-20-20 OR EQUIVALENT
ABOVE 6.0	2	500
5.0 TO 6.0	3	500
BELOW 5.0	4	500

THE PH CAN BE DETERMINED WITH A PORTABLE PH TESTING KIT OR BY SENDING THE SOIL SAMPLES TO A SOIL TESTING LABORATORY. WHEN 4 TONS OF LINE PER ACRE ARE APPLIED IT MUST BE INCORPORATED INTO THE SOIL BY DISKING, BACKLOADING OR TRACKING UP AND DOWN THE SLOPE.

TABLE IV-6. MULCH MATERIALS RATES AND USES

MATERIAL	MINIMUM RATES PER ACRE	COVERAGE	REMARKS
HAY OR STRAW	2 TO 3 TONS / 100 TO 150 BALES	COVER 75% TO 90% OF SURFACE	SUBJECT TO WIND BLOWING OR WASHING UNLESS TIED DOWN
WOOD FIBER			
PULP FIBER	1000 TO 1500 LBS	COVER ALL DISTURBED AREAS	FOR HYDROSEEDING
WOOD-CELLULOSE RECYCLED PAPER			

2. CHEMICAL MULCHES, SOIL BINDERS AND TACKERS
A WIDE RANGE OF SYNTHETIC, SPRAY-ON MATERIALS IS MARKETED TO STABILIZE AND PROTECT THE SOIL SURFACE. THESE ARE MIXED WITH WATER AND SPRAYED OVER THE MULCH AND TO THE SOIL. THEY MAY BE USED ALONE IN SOME CASES AS TEMPORARY STABILIZERS, OR IN CONJUNCTION WITH FIBER MULCH, STRAW OR HAY. WHEN USED ALONE MOST CHEMICAL MULCHES DO NOT HAVE THE CAPABILITY TO INSULATE THE SOIL OR RETAIN SOIL MOISTURE THAT ORGANIC MULCHES HAVE.

3. SPECIFICATIONS
FROM TABLE IV-6 SELECT THE TYPE OF MULCH AND RATE OF APPLICATION THAT WILL BEST SUIT THE CONDITIONS AT THE SITE.

4. ANCHORING
DEPENDING ON THE FIELD SITUATION, MULCH MAY NOT STAY IN PLACE BECAUSE OF WIND ACTION OR RATED WATER RUNOFF. IN SUCH CASES, MULCH IS TO BE ANCHORED MECHANICALLY OR WITH MULCH NETTING.

A. MECHANICAL ANCHORING
APPLY MULCH AND PULL A MULCH ANCHORING TOOL OVER THE MULCH. WHEN A DISK IS USED, SET THE DISK STRAIGHT AND PULL ACROSS THE SLOPE. MULCH MATERIAL SHOULD BE TUCKED INTO THE SOIL ABOUT THREE INCHES.

B. MULCH NETTING
FOLLOW MANUFACTURER'S RECOMMENDATIONS WHEN POSITIONING AND STAPLING THE MULCH NETTING IN THE SOIL.

DRAWN BY: [blank]
 CHECKED BY: [blank]
 DATE: 08/29/2014
 PROJECT NO: 131022012
 DRAWING NUMBER: C-09

REVISIONS
 NO. DATE BY

EarthRes
ENGINEERING AND SCIENCE

PREPARED FOR:
BEECH LUCKY ROAD IMPROVEMENTS
INCORPORATED
25-10 WEST VIRGINIA
DODDRIEDGE COUNTY, WEST VIRGINIA

PREPARED BY:
EES DETAILS
(SHEET 2 OF 2)

C-09
SHEET 2 OF 13

APPENDIX H

**BEECH LICK ROAD (CR 25/10) IMPROVEMENTS
STORM WATER POLLUTION PREVENTION
TRAINING LOG**

APPENDIX I

**ANTERO MIDSTREAM EROSION &
SEDIMENT CONTROL REPORT**



WV Midstream Erosion & Sediment Control - Inspection Report

Project Name: _____	
Type of Inspection: (check one)	<input checked="" type="checkbox"/> 24 hr (After a >0.5" Rain Event) <input type="checkbox"/> 7-Day <input type="checkbox"/> Other _____
Project Description:	Project Location:
Area or section(s) of project inspected: Survey Point _____ to Survey Point _____	Date of Inspection: / /
Inspection Completed By:	Time of Inspection: (Time in 24hr Format) Start _____:_____:_____
Weather Conditions:	Finish _____:_____:_____
Amount of Precipitation (Past 24 hrs):	Rain Gauge _____ inches OR Internet Source _____ inches

BMP Checklist

**All items needing maintenance or corrective actions shall be repaired as soon as possible. Standards are based off of the West Virginia DEP Division of Water and Waste Management - Erosion & Sediment Control Best Management Practice Manual.*

Read questions and check the appropriate box for each	Yes	No	N/A	Comments
1) Are all BMP controls properly installed, functional, and maintained in accordance with the State approved E&S Plan ?				<i>If No, see page 2</i>
2) Are all BMP controls properly installed, functional, and maintained in accordance with Antero's Conditional Construction Release Stipulations ?				<i>If No, see page 2</i>
3) Is there any evidence of sediment leaving the site?				
4) Are site Access Roads stabilized and being maintained properly?				
5) Are construction entrances properly stoned and working effectively?				
6) Are abutting public roads free from debris, sediment, waste, etc. coming off of the ROW and/or Access Roads?				
7) Have stabilization measures been implemented in areas where construction activity has temporarily or permanently ceased?				
8) Are spoil piles stabilized? And are measures in place so that they do not mix with topsoil piles?				
9) Are there any visible signs of slope slips?				
10) Are proper "House Keeping" measures taking place on site?				
11) Is there evidence of spills or leaking equipment visibly present on site?				
12) Are spill-response kits present on site?				
13) Are secondary containments in place and working effectively where needed; and are materials being stored properly?				
14) Are additional dust control measures needed?				
15) Are there visible signs of erosion occurring in areas being reclaimed?				
16) Has final stabilization (>70% vegetation) been achieved?				
17) Are poorly vegetated areas in reclaimed sections being re-seeded?				
18) Is a copy of the SWPPP and the GPP present on site?				
19) Is the contact information sign present on site and clearly visible and legible to the public?				

*** Use page 2 to accurately describe your BMP inspection results, maintenance requirements, and repair dates.**

Print Name

Signature

Date



WV Midstream Erosion & Sediment Control - Inspection Report

Location of BMP(s)	Select type of BMP(s)	Describe if BMP Needs Maintenance and/or if additional BMP's need Installed	Follow Up Information		
			(Check if Repaired)	Date Repaired	Initials
	<input type="checkbox"/> Silt Fence <input type="checkbox"/> Safety Fence <input type="checkbox"/> Super Silt Fence <input type="checkbox"/> Filter Sock <input type="checkbox"/> Straw wattle <input type="checkbox"/> Corrugated Metal <input type="checkbox"/> Fencing Erosion Control Matting <input type="checkbox"/> Waterbar <input type="checkbox"/> Stone Pad <input type="checkbox"/> Seed/Mulch <input type="checkbox"/> Rip Rap <input type="checkbox"/> Other _____		<input type="checkbox"/>		
	<input type="checkbox"/> Silt Fence <input type="checkbox"/> Safety Fence <input type="checkbox"/> Super Silt Fence <input type="checkbox"/> Filter Sock <input type="checkbox"/> Straw Wattle <input type="checkbox"/> Corrugated Metal <input type="checkbox"/> Erosion Control Matting <input type="checkbox"/> Waterbar <input type="checkbox"/> Stone Pad <input type="checkbox"/> Seed/Mulch <input type="checkbox"/> Rip Rap <input type="checkbox"/> Other _____		<input type="checkbox"/>		
	<input type="checkbox"/> Silt Fence <input type="checkbox"/> Safety Fence <input type="checkbox"/> Super Silt Fence <input type="checkbox"/> Filter Sock <input type="checkbox"/> Straw Wattle <input type="checkbox"/> Corrugated Metal <input type="checkbox"/> Fencing Erosion Control Matting <input type="checkbox"/> Waterbar <input type="checkbox"/> Stone Pad <input type="checkbox"/> Seed/Mulch <input type="checkbox"/> Rip Rap <input type="checkbox"/> Other _____		<input type="checkbox"/>		
	<input type="checkbox"/> Silt Fence <input type="checkbox"/> Safety Fence <input type="checkbox"/> Super Silt Fence <input type="checkbox"/> Filter Sock <input type="checkbox"/> Straw Wattle <input type="checkbox"/> Corrugated Metal Fencing <input type="checkbox"/> Erosion Control Matting <input type="checkbox"/> Waterbar <input type="checkbox"/> Stone Pad <input type="checkbox"/> Seed/Mulch <input type="checkbox"/> Rip Rap <input type="checkbox"/> Other _____		<input type="checkbox"/>		
	<input type="checkbox"/> Silt Fence <input type="checkbox"/> Safety Fence <input type="checkbox"/> Super Silt Fence <input type="checkbox"/> Filter Sock <input type="checkbox"/> Straw Wattle <input type="checkbox"/> Corrugated Metal Fencing <input type="checkbox"/> Erosion Control Matting <input type="checkbox"/> Waterbar <input type="checkbox"/> Stone Pad <input type="checkbox"/> Seed/Mulch <input type="checkbox"/> Rip Rap <input type="checkbox"/> Other _____		<input type="checkbox"/>		
	<input type="checkbox"/> Silt Fence <input type="checkbox"/> Safety Fence <input type="checkbox"/> Super Silt Fence <input type="checkbox"/> Filter Sock <input type="checkbox"/> Straw Wattle <input type="checkbox"/> Corrugated Metal Fencing <input type="checkbox"/> Erosion Control Matting <input type="checkbox"/> Waterbar <input type="checkbox"/> Stone Pad <input type="checkbox"/> Seed/Mulch <input type="checkbox"/> Rip Rap <input type="checkbox"/> Other _____		<input type="checkbox"/>		

*If any above sections are filled out, please initial and date:

_____ _____
Initial Date

APPENDIX J

WVDEP NOTICE OF TERMINATION FORM

Please See Instructions Before Completing This Form

NPDES
FORM



Notice of Termination (NOT) of Coverage Under the NPDES General Permit for Stormwater Discharges Associated with Construction Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge stormwater associated with construction activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General

Date Storm Water Discharge Terminated: _____

Permit Registration Number: WVR _____

II. Facility Operator Information

Name: _____ Phone: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

III. Facility/Site Location Information

Name: _____

Address: _____

City: _____ ZIP Code: _____

County: _____

Latitude: _____ Longitude: _____

IV. Certification: I certify under penalty of law that all stormwater discharges associated with construction activity from the identified facility that are authorized by a NPDES General Permit have been eliminated and request final inspection by the WV DEP; or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge stormwater associated with construction activity under this General Permit, and that discharging pollutants in stormwater associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: _____ Date: _____

Signature: _____

Instructions for Completing Notice Of Termination (NOT) Form

Who May File a Notice of Termination (NOT) Form

Permittees who are presently covered under a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any stormwater discharges associated with construction activity.

For construction activities, elimination of all stormwater discharges associated with construction activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all stormwater discharges associated with construction activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Send this form to the Charleston address below:

WV DEP - DWWM
Permitting and Engineering Branch
601 57th Street SE
Charleston, WV 25304 -2345

We will process your personal information (email address, mailing address and/or telephone number) in accordance with the State of West Virginia's Privacy Policy for appropriate and customary business purposes. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. The Division of Water and Waste Management will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact the DEP's Chief Privacy officer at depprivacvofficer@wv.gov.

Instructions
Notice of Termination (NOT) of Coverage Under The NPDES General Permit
for Stormwater Discharges Associated With Construction Activity

Section I Permit Information

Enter the existing NPDES Construction Stormwater General Permit registration number assigned to the facility or site identified in Section III.

Enter the date that the construction project was terminated and all disturbed areas were stabilized as required by the General Permit. A final inspection to determine the adequacy of the stabilization will be conducted by this agency.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, county and ZIP code.

Section IV Certification

State statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principal executive officer or ranking elected official.

The completed form is to be submitted to the Charleston address for all projects.



Antero Resources
Beech Lick Road (CR 25/10)
Doddridge County, West Virginia

FLOODPLAIN ANALYSIS
MEATHOUSE FORK AND BEECH LICK
STREAMS

(EarthRes Project 131022.012/08)

August 2014

DEBRA JOHNSON
COUNTY CLERK
DODDRIDGE COUNTY, WV

2014 SEP -8 PM 12: 27

FILED

Prepared By:



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2.0	Doddridge County Floodplain Ordinance	1
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Appendices

Appendix A:	FIRM Map Panels
Appendix B:	Existing Conditions Plan
Appendix C:	Proposed Conditions Plan
Appendix D:	Stream Hydrology Calculations
Appendix E:	HEC-RAS Modeling Results

1.0 Introduction

Antero Resources, LLC engaged EarthRes Engineering and Science to complete a floodplain analysis of the Meathouse Fork and Beech Lick streams located in southwest Doddridge County, WV. Antero is proposing a number of improvements to both Meathouse Fork Road (CR 25) and Beech Lick Road (CR 25/10) to accommodate truck size and traffic volume associated with exploration and production activities on their nearby well pads. For CR 25, roadway improvements include excavation of a truck turning area to accommodate turning onto and across the bridge over Meathouse Fork along with an excess cut deposit located to the Northeast of the bridge. The approximately 0.4 mile improvements to CR 25/10 include radius adjustments to accommodate larger trucks, general widening, and installation of additional drainage culverts. Some of this work will include placement of fills in the vicinity of the 2 streams in question. No new structures or stream crossings are proposed as part of this project.

The Army Corps of Engineers Hydraulic Engineering Center's River Analysis System (HEC-RAS) computer program was used to establish the Base Flood Elevation (BFE) and check for impacts to the water surface profile created by the proposed fills within the study area of both streams.

2.0 Doddridge County Floodplain Ordinance

Both the Meathouse Fork and Beech Lick streams in the project vicinity are shown on FEMA Flood Insurance Rate Map, Doddridge County West Virginia, Panel 235 of 325, dated October 4, 2011. The floodplain for both streams is designated as Zone A, No Base Flood Elevations Determined and Floodway Boundaries Not Provided. As part of due diligence for the project, our office inquired if there was a hydraulic analysis prepared for the recent CR 25/10 bridge replacement project, WVDOT indicated that there was not a study for the replacement project available.

Section 4.4.B of the Doddridge County Floodplain Ordinance includes requirements for Zone A Floodplains and states that when data from an acceptable source is not available, the Floodplain Administrator shall review, or shall cause to be reviewed; all proposed development to determine (1) the amount being invested and (2) the specific flood risk at the site. The Floodplain Administrator shall then require the application to determine the elevation above which the development and adjacent properties including but not limited to existing buildings will be reasonably safe from flooding using hydrologic and hydraulic analyses and other techniques. Section D goes on to require no new construction or development shall be allowed unless it is demonstrated that the cumulative impact of the proposed development, when combined with all other existing and anticipated development, will not increase the elevation of the 100-year flood more than one (1) foot at any point. This study was completed to determine the impact of the roadway projects fill to the floodplain of both streams.

Section 6.1.E Fill, provides requirements and guidelines for placement of fill in a floodplain or floodway. Note that the proposed fill slope of the fill area is designed as 1.5H:1V considering that the material will be blast rock from the proposed truck turning area on CR 25 which will be stable and erosion resistant at this slope.

3.0 Stream Hydrology

This floodplain analysis was completed to establish floodplain boundaries and elevations for reaches of both the Meathouse Fork and Beech Lick streams resulting from a 100-year storm event. The study area includes approximately 0.4 miles of Meathouse Fork beginning approximately 600' downstream of the junction with Beech Lick and extending to approximately 650' upstream of the CR 25/10 bridge. Approximately 0.3 miles of the Beech Lick Stream was studied beginning downstream at the stream junction and ending at an access road serving an existing convention well. The study area was selected to include proposed roadway improvement work involving placement of fill with the potential to impact the adjacent stream(s). There are no roadway slope fills associated with this road project beyond the study limits.

As there are no stream gauges on either the Meathouse Fork or Beech Lick in the vicinity of the study area, a 100-year return frequency stream flow was calculated for both streams. The drainage areas for each stream was established using the New Milton and Big Isaacs USGS Quadrangle maps. A drainage area of 11.37 square miles was calculated for Meathouse Fork and 2.41 square miles for Beech Lick. As the drainage area to the Meathouse Fork is greater than the WVDOH minimum of 10 square miles, the USGS Regional Regression Equations for Rural Areas (2010),

Western Plateaus Region, as found in the WVDOH Drainage Manual was used to calculate the peak stream flow of 2,867 cfs.

Considering the 2.41 square mile drainage area of the Beech Lick being less than the WVDOH recommended minimum 10 square miles for use of the regression equation, the NRCS TR-55 Method was used to calculate the peak flow for this stream of 1173 cfs.

4.0 Stream Hydraulics

The Army Corps of Engineers HEC-RAS River Analysis System was used to estimate both the floodplain and floodway within the study area of both streams. For the Meathouse Fork, cross sections were located to model the junction with Beech Lick, the existing bridge and the proposed stockpile. For the Beech Lick, cross sections were located to model the junction with Meathouse Fork, stream channel meanders, and existing residential property and an existing pond. Bridge cross section were field surveyed by Jackson Surveying, Inc. to collect the necessary details of the structure and surrounding features. Four (4) cross sections including 2 upstream and 2 downstream of the bridge were included in the model to account for the expansion and contraction. The remaining Meathouse Fork and Beech Lick cross sections were generated using aerial topographic mapping provided by Blue Mountain Aerial Mapping. The aerial mapping of the stream channels were field verified and adjusted to reflect actual conditions.

The existing residential structures to the north of Beech Lick were included in the modeling as an obstruction.

Manning's n values were selected based on field inspection and review of aerial photography. Varying conditions for both the channel and floodplain roughness conditions were present for both streams. Stream channel conditions varied from clean and straight with some weeds to the presence of gravels and more extensive weeds. Floodplain conditions varied from maintained lawn to heavily wooded conditions. The chart below summarizes the Manning's n values used in this analysis.

Manning's n Value	Description	Section Used
0.035	Natural channel, somewhat irregular side slopes; fairly even, clean and regular bottom; in light gray silty clay to light tan silt loam; very little variation in cross section	Channel
0.04	Ditch in clay and sandy loam; irregular side slopes, bottom, and cross section; grass on slopes	Channel
0.045	Natural channel, irregular side slopes and bottom, in black, waxy clay at top to yellow clay at bottom, sides covered with small saplings and brush, slight and gradual variations in cross section. Light to medium brush in the floodplain	Channel and Floodplains
0.050	Natural channel with very irregular side slopes and bottom, in dark colored waxy clay, with growth of woods and grass. Slight variation in shape of cross section for variation in size. Medium brush in floodplain	Channel and Floodplains
0.060	Medium to dense brush in floodplain	Floodplains

Source: Chow, Open Channel Hydraulics, 1959

5.0 Results

Impacts of the proposed construction activities were calculated by completing a proposed conditions model incorporating the fill area on the Cox property to the northeast of the bridge and also the fills associated with the associated with the widening of CR 25/10. The following table provides a summary comparison of the existing and proposed water surface elevations and velocities at each of the study cross sections. As shown the maximum increase in proposed water surface elevation was found to be 0.01' and the increase converges to 0.00' by the uppermost cross section of each stream.

Stream	Station	W.S. Elevations			Velocity		
		Existing	Proposed	Difference	Existing	Proposed	Difference
BEECH LICK	15+08	883.49	883.49	0.00	9.85	9.85	0.00
	13+14	880.81	880.81	0.00	8.43	8.43	0.00
	10+39	880.21	880.21	0.00	4.44	4.44	0.00
	8+83	880.24	880.24	0.00	1.66	1.66	0.00
	7+51	880.22	880.22	0.00	1.46	1.46	0.00
	5+89	880.19	880.19	0.00	1.87	1.87	0.00
	4+93	880.19	880.19	0.00	1.47	1.47	0.00
MEATHOUSE FORK	21+16	881.24	881.25	0.01	2.53	2.53	0.00
	18+68	881.21	881.22	0.01	2.21	2.28	0.07
	16+65	881.19	881.19	0.00	2.22	2.48	0.26
	15+64	881.17	881.15	-0.02	2.60	2.87	0.27
	14+74	880.36	880.36	0.00	6.93	6.93	0.00
	14+64 BR U	880.36	880.36	0.00	4.87	4.87	0.00
	14+64 BR D	880.36	880.36	0.00	5.46	5.46	0.00
	14+36	879.80	879.80	0.00	8.29	8.29	0.00
	13+35	880.18	880.18	0.00	2.90	2.90	0.00
	12+35	880.17	880.17	0.00	2.90	2.90	0.00
	11+41	880.19	880.19	0.00	1.57	1.57	0.00
	5+26	874.64	874.64	0.00	4.39	4.39	0.00
	1+21	873.30	873.30	0.00	7.92	7.92	0.00

6.0 Conclusion

Results of this floodplain analysis demonstrate that the proposed fill activities associated with Meathouse Fork (CR 25) and Beech Lick Road (CR 25/10) will result in no or de minimis impacts to 100-year flood elevation of both the Meathouse Fork and Beech Lick streams. The analysis also shows that there are no impacts to adjacent property owners located upstream or downstream of the project as demonstrated by comparison of the existing and proposed water surface elevations. The maximum calculated increase of 0.01' is well below the maximum 1.0' allowed.

**Appendix A - FEMA FIRM Panel
54017C0235C**



260000 FT

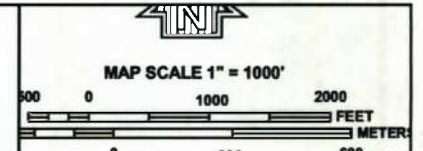
255000 FT

1640000 FT

1645000 FT

39° 11' 15"
80° 37' 30"

JOINS PANEL 0250



NFIP

PANEL 0235C

FIRM

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

PANEL 235 OF 325
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	54024	235	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
54017C0235C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

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



LEGEND



SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the "base flood", is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.



FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.



OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.



OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.



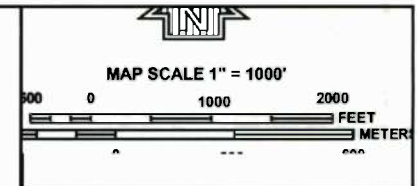
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS



OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- Base Flood Elevation line and value; elevation in feet*



PANEL 0235C

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

PANEL 235 OF 325
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:			
COMMUNITY	ISSUES	PANEL	SUFFIX
DODDRIDGE COUNTY	54024	0235	C

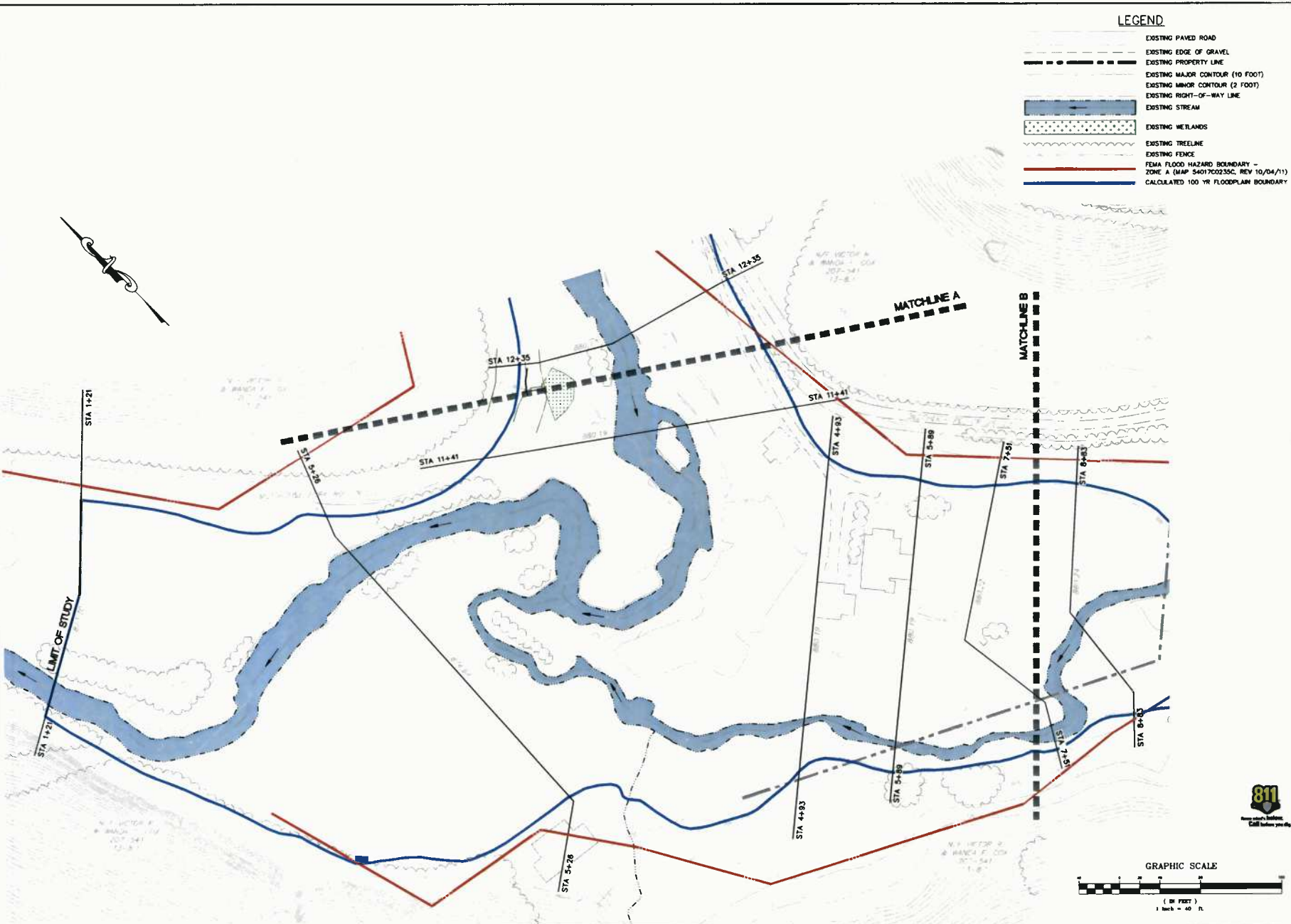
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0235C
MAP REVISED
OCTOBER 4, 2011
Federal Emergency Management Agency

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

Appendix B – Existing Conditions Plan

F:\PROJECTS\Antero Resources\131022.012 Road Engineering Services\CAD\Task 004-Beech_Lick_Road\Drawings\Rev 2\131022.012-FL-1-FL-6.dwg Layout FL-2 User: MDE\Grooms 08/27/2014 15:01

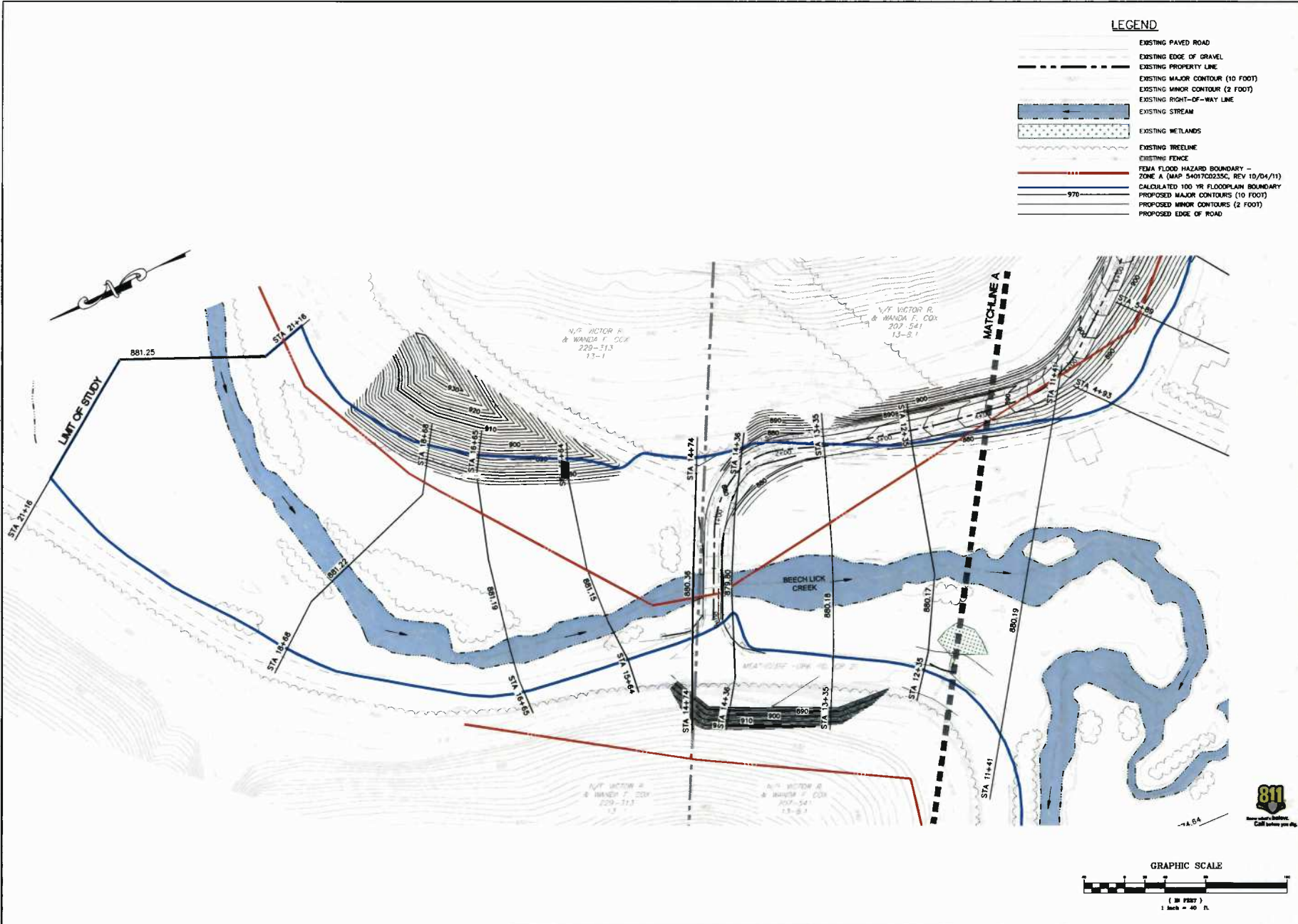


LEGEND

	EXISTING PAVED ROAD
	EXISTING EDGE OF GRAVEL
	EXISTING PROPERTY LINE
	EXISTING MAJOR CONTOUR (10 FOOT)
	EXISTING MINOR CONTOUR (2 FOOT)
	EXISTING RIGHT-OF-WAY LINE
	EXISTING STREAM
	EXISTING WETLANDS
	EXISTING TREELINE
	EXISTING FENCE
	FEMA FLOOD HAZARD BOUNDARY - ZONE A (MAP 54017C0235C, REV 10/04/11)
	CALCULATED 100 YR FLOODPLAIN BOUNDARY

<p>811 Call before you dig</p>	<p>EarthRes ENGINEERING AND SCIENCE</p> <p>PREPARED BY: 4400 Old Dixie Rd. #88 Front Royal, VA 22625 USA (540) 667-7474 www.earthres.com</p>	<p>PREPARED FOR: ANTERO RESOURCES</p>								
<p>DATE: 08/26/14 DRAWN: MDE CHECKED BY: MDE</p>	<p>EXISTING CONDITIONS PLAN (SHEET 2 OF 3)</p> <p>BEECH LICK ROAD IMPROVEMENTS VICTOR PARKWAY RESOURCES GORDONSBORO COUNTY, WEST VIRGINIA</p>	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>REVISIONS</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	BY	REVISIONS				
NO.	DATE	BY	REVISIONS							
<p>FL-2 SHEET 2 OF 6</p>	<p>PROJECT: Antero Resources\131022.012 Road Engineering Services\CAD\Task 004-Beech_Lick_Road\Drawings\Rev 2\131022.012-FL-1-FL-6.dwg Layout FL-2 User: MDE\Grooms 08/27/2014 15:01</p>									

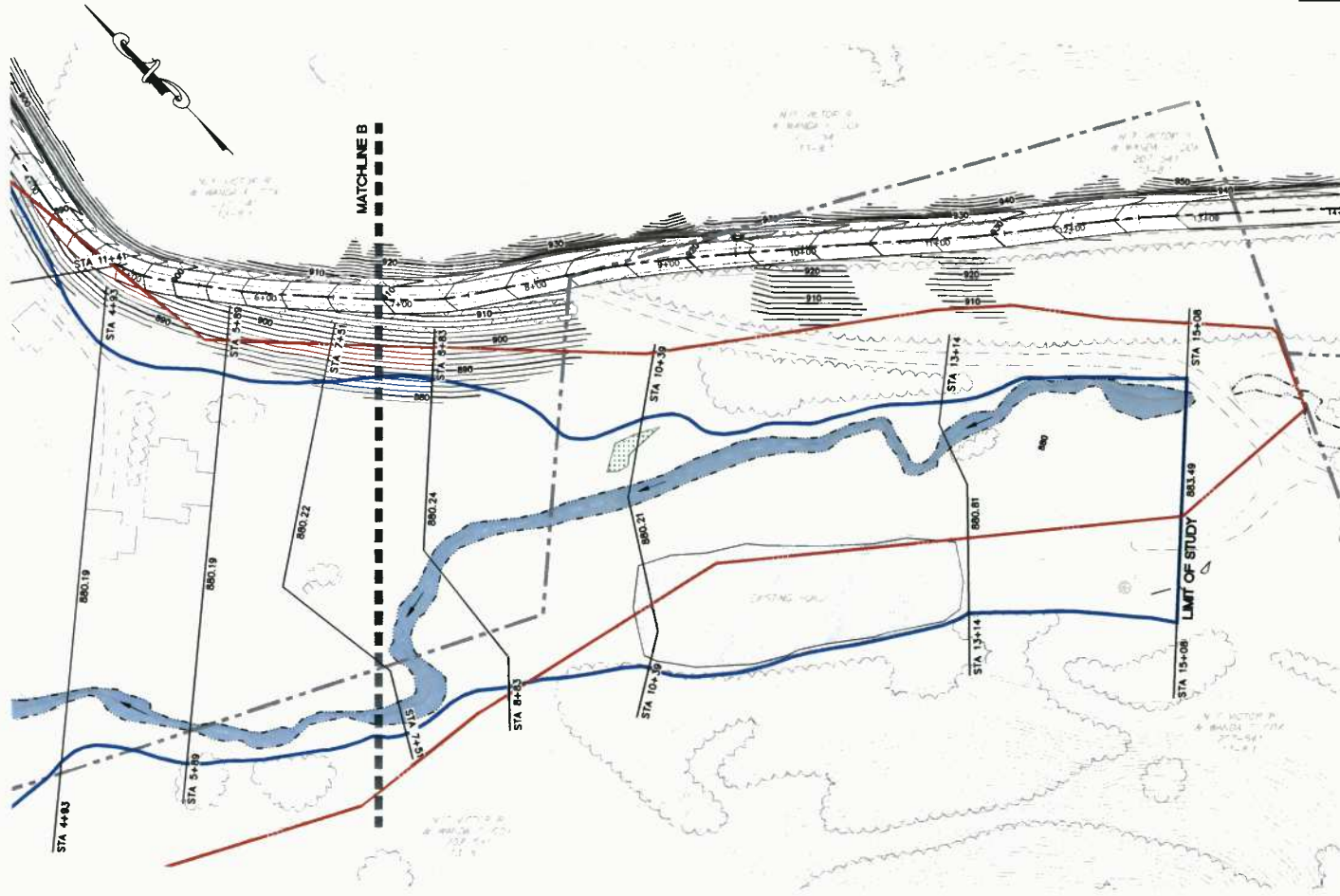
Appendix C – Proposed Conditions Plan



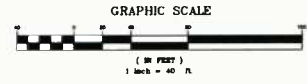
LEGEND

	EXISTING PAVED ROAD
	EXISTING EDGE OF GRAVEL
	EXISTING PROPERTY LINE
	EXISTING MAJOR CONTOUR (10 FOOT)
	EXISTING MINOR CONTOUR (2 FOOT)
	EXISTING RIGHT-OF-WAY LINE
	EXISTING STREAM
	EXISTING WETLANDS
	EXISTING TREELINE
	EXISTING FENCE
	FEMA FLOOD HAZARD BOUNDARY - ZONE A (MAP 540702235C, REV 10/04/11)
	CALCULATED 100 YR FLOODPLAIN BOUNDARY
	PROPOSED MAJOR CONTOURS (10 FOOT)
	PROPOSED MINOR CONTOURS (2 FOOT)
	PROPOSED EDGE OF ROAD

<p>811 <small>www.811.com</small> <small>Call before you dig</small></p>	<p>EarthRes ENGINEERING AND SCIENCE</p>	<p>PREPARED FOR: ANTERO RESOURCES</p>
<p>DESIGNED BY: MDC</p> <p>DRAWN BY: MDC</p> <p>CHECKED BY: MDC</p> <p>DATE: 08/26/14</p> <p>PROJECT NO: 131022.012</p> <p>DRAWING NUMBER: FL-4</p>	<p>PREPARED BY: MDC</p> <p>12000 Parkway Drive Huntington, WV 25701 www.earthres.com WV Reg. No. 240720001 101 Elm Street Charleston, WV 25304</p>	<p>PROPOSED CONDITIONS PLAN (SHEET 1 OF 3)</p> <p>BEECH LICK ROAD IMPROVEMENTS VICTOR ROAD CORNER DOORIDGE COUNTY, WEST VIRGINIA</p>
<p>NO. DATE BY</p>	<p>REVISIONS</p>	<p>SHEET 4 OF 6</p>

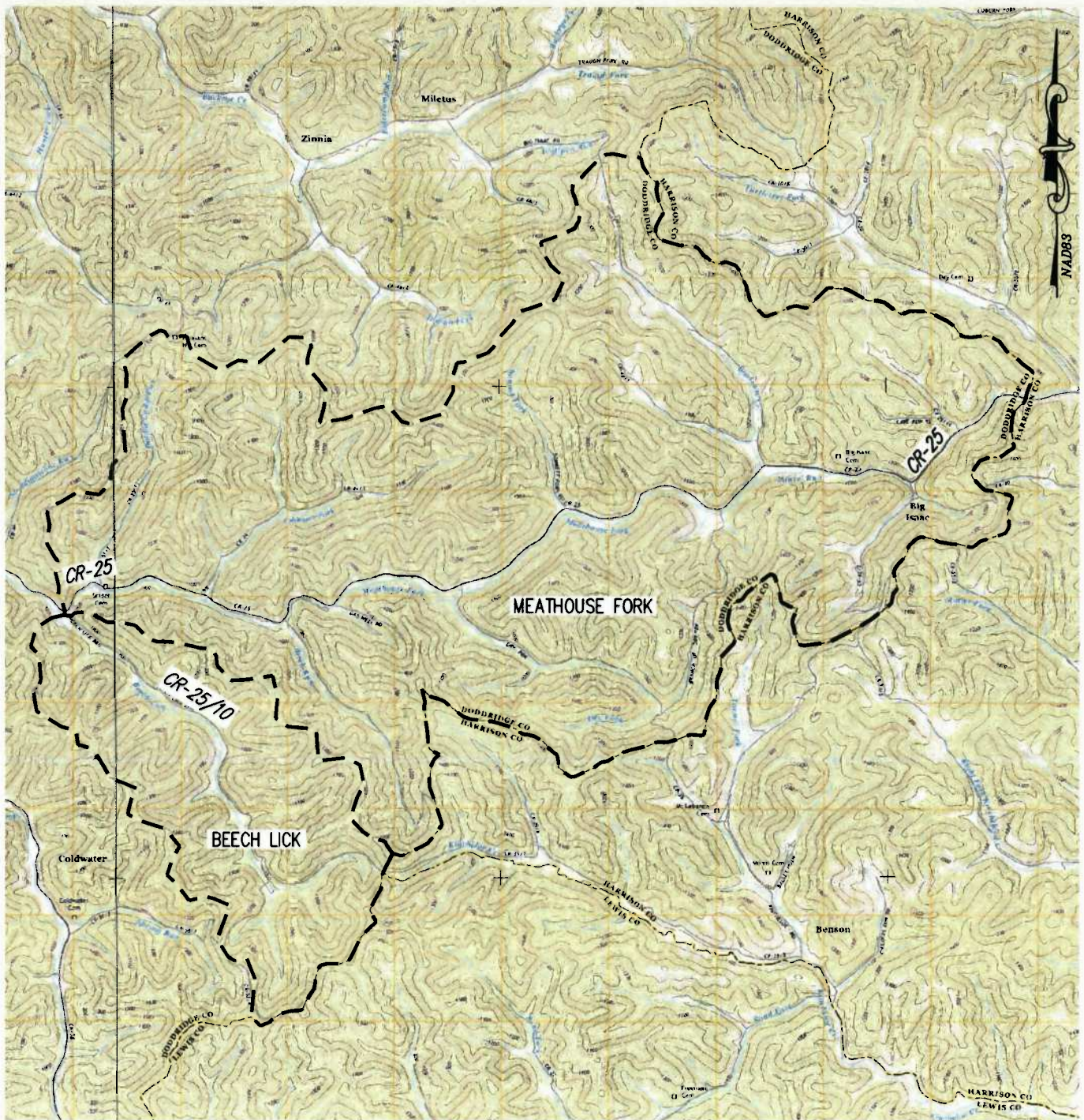


- LEGEND**
- EXISTING PAVED ROAD
 - - - EXISTING EDGE OF GRAVEL
 - - - EXISTING PROPERTY LINE
 - - - EXISTING MAJOR CONTOUR (10 FOOT)
 - - - EXISTING MINOR CONTOUR (2 FOOT)
 - - - EXISTING RIGHT-OF-WAY LINE
 - EXISTING STREAM
 - EXISTING POND
 - EXISTING WETLANDS
 - EXISTING TREELINE
 - EXISTING FENCE
 - FEMA FLOOD HAZARD BOUNDARY - ZONE A (MAP 5401700235C, REV 10/04/11)
 - CALCULATED 100 YR FLOODPLAIN BOUNDARY
 - PROPOSED MAJOR CONTOURS (10 FOOT)
 - PROPOSED MINOR CONTOURS (2 FOOT)
 - PROPOSED EDGE OF ROAD



<p>ORDERED BY: [] DATE: 08/26/14 DRAWING NUMBER: FL-6</p>		<p>PROJECT: PROPOSED CONDITIONS PLAN (SHEET 3 OF 3) BEECH LICK ROAD IMPROVEMENTS VICTOR PARK RESOURCES DODDRIE COUNTY, WEST VIRGINIA</p>		<p>PREPARED BY: [] PROJECT NO: 131022.012 DATE: 08/26/14 DRAWING NO: FL-6</p>		<p>PREPARED FOR: ANTERO RESOURCES 7000 10th Ave Colorado Springs, CO 80901 719.575.8000 www.atero.com</p>		<p>NO. DATE BY</p>		<p>REVISIONS</p>	
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Appendix D – Stream Hydrology Calculations



BASEMAP SOURCE:
 NEW MILTON - USGS 7.5 MINUTE QUADRANGLE
 BIG ISAAC - USGS 7.5 MINUTE QUADRANGLE

DRAINAGE AREA	AREA (SQ. MI.)	100 YR PEAK FLOW (CFS)
BEECH LICK	2.41	1,173
MEATHOUSE FORK	11.37	2,867



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DRAWN BY:
 MD

CHECKED BY:
 DEW

DATE:
 08/26/14

PROJECT NO:
 131022.012

DRAWING SCALE:

1" = 4,500'



DRAINAGE AREA EXHIBIT

BEECH LICK ROAD IMPROVEMENTS
 VICTOR PAD-ANTERO RESOURCES
 CR 25-10
 DODDRIDGE COUNTY, WEST VIRGINIA

USGS METHOD FOR MEATHOUSE FORK	
Drainage Area	11.37 mi ²
Hydrologic Region	Western Plateaus
100 yr. Storm Regression Equation	557A ^{0.674}
Peak Flow	2867.07 cfs

Source: WVDOH Drainage Manual, 2007

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1172.88	2	784	12,614,330	-----	-----	-----	Beech Lick Drainage Area

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

Tuesday, 08 / 26 / 2014

Hyd. No. 1

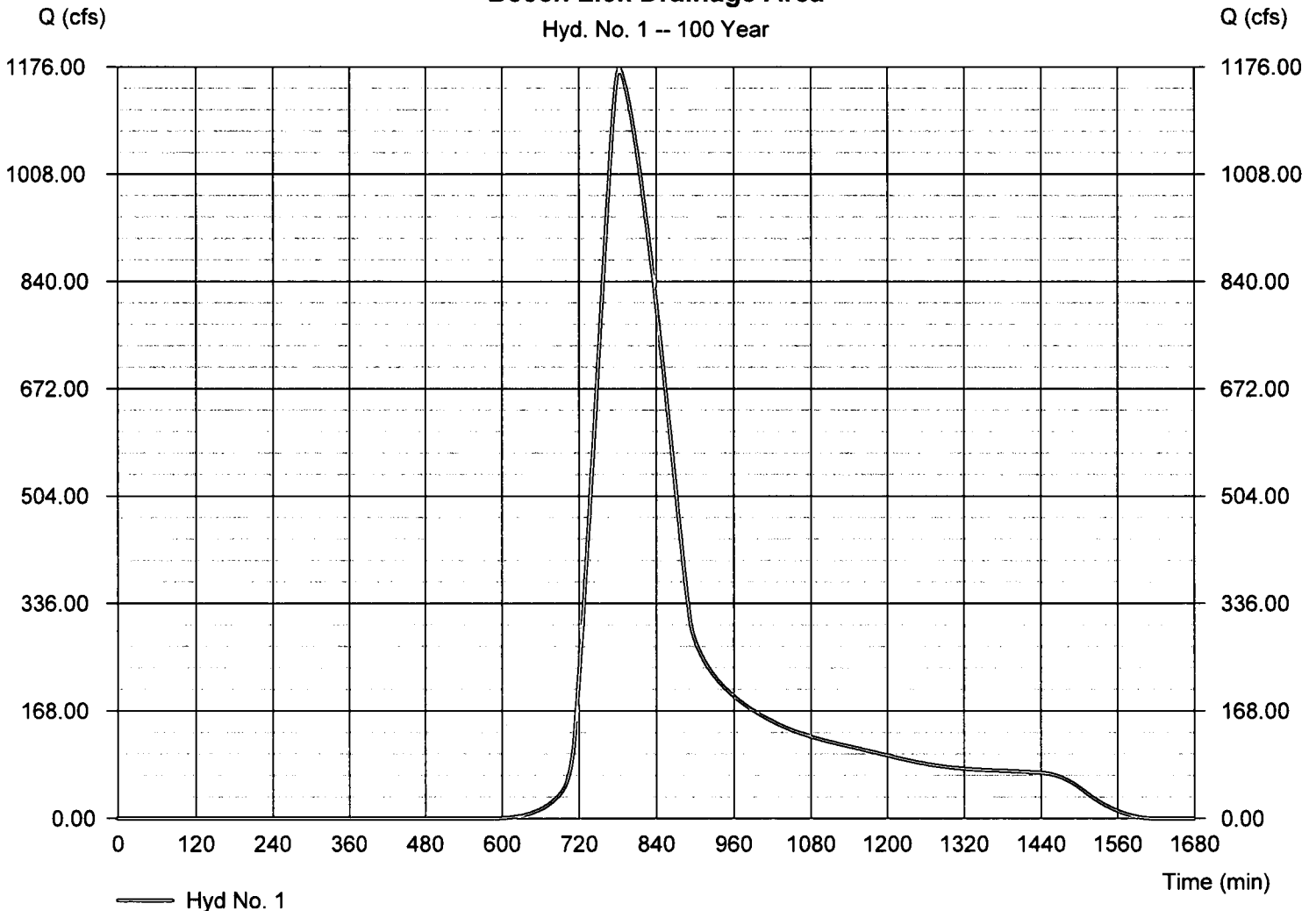
Beech Lick Drainage Area

Hydrograph type	= SCS Runoff	Peak discharge	= 1172.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 784 min
Time interval	= 2 min	Hyd. volume	= 12,614,330 cuft
Drainage area	= 1541.650 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 112.40 min
Total precip.	= 5.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(154.170 x 36) + (955.820 x 73) + (431.660 x 79)] / 1541.650

Beech Lick Drainage Area

Hyd. No. 1 -- 100 Year



— Hyd. No. 1

Appendix E – HEC-RAS Modeling Results

MEATHOUSE FORK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 2116.11 Profile: PF 1

E.G. Elev (ft)	881.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	881.24	Reach Len. (ft)	236.22	248.07	249.93
Crit W.S. (ft)		Flow Area (sq ft)	434.10	462.80	943.56
E.G. Slope (ft/ft)	0.000163	Area (sq ft)	434.10	462.80	943.56
Q Total (cfs)	2867.00	Flow (cfs)	678.85	1171.25	1016.90
Top Width (ft)	332.89	Top Width (ft)	57.95	44.31	230.63
Vel Total (ft/s)	1.56	Avg. Vel. (ft/s)	1.56	2.53	1.08
Max Chl Dpth (ft)	10.74	Hydr. Depth (ft)	7.49	10.44	4.09
Conv. Total (cfs)	224348.2	Conv. (cfs)	53121.3	91652.4	79574.6
Length Wtd. (ft)	244.90	Wetted Per. (ft)	60.85	45.94	231.17
Min Ch EI (ft)	870.50	Shear (lb/sq ft)	0.07	0.10	0.04
Alpha	1.49	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	17.76	12.77	9.47
C & E Loss (ft)	0.00	Cum SA (acres)	2.59	1.00	1.69

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1868.04 Profile: PF 1

E.G. Elev (ft)	881.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	881.21	Reach Len. (ft)	196.08	203.42	171.50
Crit W.S. (ft)		Flow Area (sq ft)	875.50	565.12	424.41
E.G. Slope (ft/ft)	0.000118	Area (sq ft)	875.50	565.12	424.41
Q Total (cfs)	2867.00	Flow (cfs)	1098.56	1246.53	521.91
Top Width (ft)	252.31	Top Width (ft)	133.05	53.48	65.78
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)	1.25	2.21	1.23
Max Chl Dpth (ft)	11.01	Hydr. Depth (ft)	6.58	10.57	6.45
Conv. Total (cfs)	263715.0	Conv. (cfs)	101048.5	114659.2	48007.2
Length Wtd. (ft)	196.64	Wetted Per. (ft)	133.97	54.09	66.94
Min Ch EI (ft)	870.20	Shear (lb/sq ft)	0.05	0.08	0.05
Alpha	1.27	Stream Power (lb/ft s)	299.17	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	14.21	9.84	5.55
C & E Loss (ft)	0.00	Cum SA (acres)	2.07	0.72	0.84

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1664.62 Profile: PF 1

E.G. Elev (ft)	881.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	881.19	Reach Len. (ft)	102.57	100.87	99.12
Crit W.S. (ft)		Flow Area (sq ft)	1296.83	490.28	71.14
E.G. Slope (ft/ft)	0.000111	Area (sq ft)	1296.83	490.28	71.14
Q Total (cfs)	2867.00	Flow (cfs)	1735.98	1086.20	44.82
Top Width (ft)	240.22	Top Width (ft)	170.70	42.77	26.75
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)	1.34	2.22	0.63
Max Chl Dpth (ft)	11.69	Hydr. Depth (ft)	7.60	11.46	2.66
Conv. Total (cfs)	271993.0	Conv. (cfs)	164692.7	103048.1	4252.2
Length Wtd. (ft)	101.91	Wetted Per. (ft)	171.94	44.51	29.21
Min Ch EI (ft)	869.50	Shear (lb/sq ft)	0.05	0.08	0.02
Alpha	1.24	Stream Power (lb/ft s)	282.77	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	9.32	7.38	4.57
C & E Loss (ft)	0.00	Cum SA (acres)	1.39	0.49	0.66

MEATHOUSE FORK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1563.75 Profile: PF 1

E.G. Elev (ft)	881.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	881.16	Reach Len. (ft)	83.59	89.76	95.16
Crit W.S. (ft)		Flow Area (sq ft)	1198.21	348.61	93.35
E.G. Slope (ft/ft)	0.000148	Area (sq ft)	1198.21	348.61	93.35
Q Total (cfs)	2867.00	Flow (cfs)	1897.19	905.55	64.26
Top Width (ft)	219.55	Top Width (ft)	151.61	29.21	38.73
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)	1.58	2.60	0.69
Max Chl Dpth (ft)	12.16	Hydr. Depth (ft)	7.90	11.93	2.41
Conv. Total (cfs)	235935.5	Conv. (cfs)	156126.2	74520.8	5288.6
Length Wtd. (ft)	87.77	Wetted Per. (ft)	152.86	30.85	41.54
Min Ch EI (ft)	869.00	Shear (lb/sq ft)	0.07	0.10	0.02
Alpha	1.24	Stream Power (lb/ft s)	255.53	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	6.38	6.41	4.38
C & E Loss (ft)	0.18	Cum SA (acres)	1.01	0.41	0.58

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1473.99 Profile: PF 1

E.G. Elev (ft)	881.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.36	Reach Len. (ft)	10.11	10.11	10.11
Crit W.S. (ft)	875.09	Flow Area (sq ft)	140.62	360.23	88.01
E.G. Slope (ft/ft)	0.001115	Area (sq ft)	248.26	360.23	88.01
Q Total (cfs)	2867.00	Flow (cfs)	174.66	2497.39	194.95
Top Width (ft)	173.47	Top Width (ft)	114.37	30.51	28.59
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	1.24	6.93	2.22
Max Chl Dpth (ft)	11.86	Hydr. Depth (ft)	1.23	11.81	3.08
Conv. Total (cfs)	85877.5	Conv. (cfs)	5231.8	74806.2	5839.5
Length Wtd. (ft)	10.11	Wetted Per. (ft)	117.58	33.30	30.90
Min Ch EI (ft)	868.50	Shear (lb/sq ft)	0.08	0.75	0.20
Alpha	1.78	Stream Power (lb/ft s)	287.88	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	4.99	5.68	4.19
C & E Loss (ft)		Cum SA (acres)	0.75	0.35	0.51

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1463.88 BR U Profile: PF 1

E.G. Elev (ft)	881.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.			
W.S. Elev (ft)	880.36	Reach Len. (ft)	18.06	18.06	18.06
Crit W.S. (ft)	875.09	Flow Area (sq ft)	173.29	346.50	69.06
E.G. Slope (ft/ft)		Area (sq ft)	223.38	346.50	68.12
Q Total (cfs)	2867.00	Flow (cfs)	487.87	2190.77	188.91
Top Width (ft)	85.49	Top Width (ft)	85.49		
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	2.82	6.32	2.74
Max Chl Dpth (ft)	11.86	Hydr. Depth (ft)	2.03		
Conv. Total (cfs)		Conv. (cfs)			
Length Wtd. (ft)	18.06	Wetted Per. (ft)	118.45	63.81	29.85
Min Ch EI (ft)	868.50	Shear (lb/sq ft)			
Alpha	1.35	Stream Power (lb/ft s)	287.88	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	4.94	5.60	4.17
C & E Loss (ft)		Cum SA (acres)	0.73	0.34	0.51

MEATHOUSE FORK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1463.88 BR D Profile: PF 1

E.G. Elev (ft)	880.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.			
W.S. Elev (ft)	880.36	Reach Len. (ft)	10.14	10.14	10.14
Crit W.S. (ft)	875.78	Flow Area (sq ft)	170.96	298.52	55.78
E.G. Slope (ft/ft)		Area (sq ft)	145.75	298.52	55.78
Q Total (cfs)	2867.00	Flow (cfs)	467.63	2243.05	156.88
Top Width (ft)	94.08	Top Width (ft)	94.08		
Vel Total (ft/s)	5.46	Avg. Vel. (ft/s)	2.74	7.51	2.81
Max Chl Dpth (ft)	11.86	Hydr. Depth (ft)	1.82		
Conv. Total (cfs)		Conv. (cfs)			
Length Wtd. (ft)	10.14	Wetted Per. (ft)	127.93	56.02	31.65
Min Ch EI (ft)	868.50	Shear (lb/sq ft)			
Alpha	1.45	Stream Power (lb/ft s)	290.82	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	4.86	5.46	4.14
C & E Loss (ft)		Cum SA (acres)	0.69	0.34	0.51

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1435.68 Profile: PF 1

E.G. Elev (ft)	880.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	879.79	Reach Len. (ft)	100.38	100.27	100.04
Crit W.S. (ft)		Flow Area (sq ft)	72.15	295.47	54.12
E.G. Slope (ft/ft)	0.001784	Area (sq ft)	99.07	295.47	54.12
Q Total (cfs)	2867.00	Flow (cfs)	251.35	2451.26	164.39
Top Width (ft)	106.20	Top Width (ft)	65.60	26.33	14.27
Vel Total (ft/s)	6.80	Avg. Vel. (ft/s)	3.48	8.30	3.04
Max Chl Dpth (ft)	11.29	Hydr. Depth (ft)	4.83	11.22	3.79
Conv. Total (cfs)	67882.3	Conv. (cfs)	5951.3	58038.6	3892.3
Length Wtd. (ft)	100.26	Wetted Per. (ft)	18.27	29.69	16.83
Min Ch EI (ft)	868.50	Shear (lb/sq ft)	0.44	1.11	0.36
Alpha	1.31	Stream Power (lb/ft s)	290.82	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	4.83	5.39	4.13
C & E Loss (ft)	0.42	Cum SA (acres)	0.67	0.34	0.50

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1335.41 Profile: PF 1

E.G. Elev (ft)	880.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.17	Reach Len. (ft)	102.63	100.02	97.38
Crit W.S. (ft)		Flow Area (sq ft)	514.54	597.70	293.55
E.G. Slope (ft/ft)	0.000190	Area (sq ft)	514.54	597.70	293.55
Q Total (cfs)	2867.00	Flow (cfs)	703.08	1732.54	431.38
Top Width (ft)	196.68	Top Width (ft)	97.31	51.25	48.12
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)	1.37	2.90	1.47
Max Chl Dpth (ft)	11.67	Hydr. Depth (ft)	5.29	11.66	6.10
Conv. Total (cfs)	208148.8	Conv. (cfs)	51044.8	125785.0	31319.0
Length Wtd. (ft)	100.17	Wetted Per. (ft)	98.81	54.16	50.54
Min Ch EI (ft)	868.50	Shear (lb/sq ft)	0.06	0.13	0.07
Alpha	1.41	Stream Power (lb/ft s)	309.21	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	4.13	4.37	3.73
C & E Loss (ft)	0.00	Cum SA (acres)	0.48	0.25	0.43

MEATHOUSE FORK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1235.39 Profile: PF 1

E.G. Elev (ft)	880.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.16	Reach Len. (ft)	100.07	100.01	108.12
Crit W.S. (ft)		Flow Area (sq ft)	511.94	547.72	460.67
E.G. Slope (ft/ft)	0.000195	Area (sq ft)	511.94	547.72	460.67
Q Total (cfs)	2867.00	Flow (cfs)	671.72	1592.26	603.02
Top Width (ft)	247.92	Top Width (ft)	106.19	46.66	95.07
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	1.31	2.91	1.31
Max Chl Dpth (ft)	11.96	Hydr. Depth (ft)	4.82	11.74	4.85
Conv. Total (cfs)	205060.5	Conv. (cfs)	48044.5	113885.5	43130.5
Length Wtd. (ft)	102.27	Wetted Per. (ft)	106.85	50.53	96.49
Min Ch El (ft)	868.20	Shear (lb/sq ft)	0.06	0.13	0.06
Alpha	1.53	Stream Power (lb/ft s)	293.62	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	2.92	3.05	2.89
C & E Loss (ft)	0.02	Cum SA (acres)	0.24	0.14	0.27

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1141.39 Profile: PF 1

E.G. Elev (ft)	880.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (ft)	880.18	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)	571.20	843.86	937.21
E.G. Slope (ft/ft)	0.000127	Area (sq ft)	571.20	843.86	937.21
Q Total (cfs)	2867.00	Flow (cfs)	485.21	1394.50	987.29
Top Width (ft)	306.38	Top Width (ft)	106.41	75.44	124.53
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)	0.85	1.65	1.05
Max Chl Dpth (ft)	12.18	Hydr. Depth (ft)	5.37	11.19	7.53
Conv. Total (cfs)	254792.8	Conv. (cfs)	43121.5	123930.1	87741.2
Length Wtd. (ft)	100.00	Wetted Per. (ft)	107.33	76.81	127.51
Min Ch El (ft)	868.00	Shear (lb/sq ft)	0.04	0.09	0.06
Alpha	1.23	Stream Power (lb/ft s)	428.71	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	1.67	1.45	1.15
C & E Loss (ft)		Cum SA (acres)			

Plan: Meat House Fork Meat House Fork Main Branch DS RS: 526.18 Profile: PF 1

E.G. Elev (ft)	874.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	874.64	Reach Len. (ft)	364.10	405.51	399.37
Crit W.S. (ft)		Flow Area (sq ft)	886.37	421.59	66.28
E.G. Slope (ft/ft)	0.001292	Area (sq ft)	886.37	421.59	66.28
Q Total (cfs)	4040.00	Flow (cfs)	2088.17	1850.16	101.67
Top Width (ft)	361.29	Top Width (ft)	270.58	53.39	37.32
Vel Total (ft/s)	2.94	Avg. Vel. (ft/s)	2.36	4.39	1.53
Max Chl Dpth (ft)	8.14	Hydr. Depth (ft)	3.28	7.90	1.78
Conv. Total (cfs)	112384.8	Conv. (cfs)	58088.6	51467.9	2828.3
Length Wtd. (ft)	393.21	Wetted Per. (ft)	270.67	59.30	38.53
Min Ch El (ft)	866.50	Shear (lb/sq ft)	0.26	0.57	0.14
Alpha	1.36	Stream Power (lb/ft s)	531.72	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	3.80	3.40	2.32
C & E Loss (ft)	0.05	Cum SA (acres)	1.17	0.43	0.95

MEATHOUSE FORK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch DS RS: 120.67 Profile: PF 1

E.G. Elev (ft)	873.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	873.30	Reach Len. (ft)			
Crit W.S. (ft)	872.45	Flow Area (sq ft)	22.44	309.03	439.13
E.G. Slope (ft/ft)	0.003851	Area (sq ft)	22.44	309.03	439.13
Q Total (cfs)	4040.00	Flow (cfs)	71.65	2447.59	1520.77
Top Width (ft)	216.86	Top Width (ft)	8.30	38.47	170.10
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	3.19	7.92	3.46
Max Chl Dpth (ft)	8.30	Hydr. Depth (ft)	2.71	8.03	2.58
Conv. Total (cfs)	65098.6	Conv. (cfs)	1154.5	39439.2	24504.9
Length Wtd. (ft)		Wetted Per. (ft)	9.86	40.67	170.67
Min Ch El (ft)	865.00	Shear (lb/sq ft)	0.55	1.83	0.62
Alpha	1.55	Stream Power (lb/ft s)	363.89	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

MEATHOUSE FORK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 2116.11 Profile: PF 1

E.G. Elev (ft)	881.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	881.25	Reach Len. (ft)	237.23	249.08	250.94
Crit W.S. (ft)		Flow Area (sq ft)	434.67	463.24	945.84
E.G. Slope (ft/ft)	0.000163	Area (sq ft)	434.67	463.24	945.84
Q Total (cfs)	2867.00	Flow (cfs)	678.55	1170.19	1018.25
Top Width (ft)	332.98	Top Width (ft)	57.96	44.31	230.71
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)	1.56	2.53	1.08
Max Chl Dpth (ft)	10.75	Hydr. Depth (ft)	7.50	10.45	4.10
Conv. Total (cfs)	224904.8	Conv. (cfs)	53229.8	91797.1	79877.9
Length Wtd. (ft)	246.26	Wetted Per. (ft)	60.86	45.94	231.25
Min Ch El (ft)	870.50	Shear (lb/sq ft)	0.07	0.10	0.04
Alpha	1.49	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	16.64	13.18	9.41
C & E Loss (ft)	0.00	Cum SA (acres)	2.37	1.04	1.69

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1869.05 Profile: PF 1

E.G. Elev (ft)	881.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.045
W.S. Elev (ft)	881.22	Reach Len. (ft)	198.09	205.43	173.51
Crit W.S. (ft)		Flow Area (sq ft)	762.52	622.40	409.28
E.G. Slope (ft/ft)	0.000128	Area (sq ft)	762.52	622.40	409.28
Q Total (cfs)	2867.00	Flow (cfs)	925.87	1421.15	519.98
Top Width (ft)	233.34	Top Width (ft)	109.40	59.66	64.28
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)	1.21	2.28	1.27
Max Chl Dpth (ft)	11.02	Hydr. Depth (ft)	6.97	10.43	6.37
Conv. Total (cfs)	252985.9	Conv. (cfs)	81699.3	125403.4	45883.3
Length Wtd. (ft)	199.03	Wetted Per. (ft)	111.39	60.20	65.42
Min Ch El (ft)	870.20	Shear (lb/sq ft)	0.05	0.08	0.05
Alpha	1.31	Stream Power (lb/ft s)	298.80	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	13.38	10.08	5.51
C & E Loss (ft)	0.00	Cum SA (acres)	1.92	0.74	0.84

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1665.62 Profile: PF 1

E.G. Elev (ft)	881.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.035	0.045
W.S. Elev (ft)	881.19	Reach Len. (ft)	104.57	102.87	101.12
Crit W.S. (ft)		Flow Area (sq ft)	1163.72	492.27	71.46
E.G. Slope (ft/ft)	0.000139	Area (sq ft)	1163.72	492.27	71.46
Q Total (cfs)	2867.00	Flow (cfs)	1596.58	1219.86	50.56
Top Width (ft)	218.00	Top Width (ft)	148.26	42.98	26.76
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	1.37	2.48	0.71
Max Chl Dpth (ft)	11.69	Hydr. Depth (ft)	7.85	11.45	2.67
Conv. Total (cfs)	242983.2	Conv. (cfs)	135312.9	103385.3	4285.0
Length Wtd. (ft)	103.83	Wetted Per. (ft)	150.37	44.74	29.20
Min Ch El (ft)	869.50	Shear (lb/sq ft)	0.07	0.10	0.02
Alpha	1.33	Stream Power (lb/ft s)	283.29	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	9.00	7.45	4.55
C & E Loss (ft)	0.00	Cum SA (acres)	1.33	0.50	0.66

MEATHOUSE FORK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1564.75 Profile: PF 1

E.G. Elev (ft)	881.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.035	0.045
W.S. Elev (ft)	881.15	Reach Len. (ft)	84.59	90.76	96.16
Crit W.S. (ft)		Flow Area (sq ft)	1088.35	365.61	81.52
E.G. Slope (ft/ft)	0.000184	Area (sq ft)	1088.35	365.61	81.52
Q Total (cfs)	2867.00	Flow (cfs)	1758.79	1049.33	58.88
Top Width (ft)	201.37	Top Width (ft)	133.20	30.91	37.26
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)	1.62	2.87	0.72
Max Chl Dpth (ft)	12.15	Hydr. Depth (ft)	8.17	11.83	2.19
Conv. Total (cfs)	211525.7	Conv. (cfs)	129762.5	77419.1	4344.1
Length Wtd. (ft)	88.92	Wetted Per. (ft)	135.44	32.82	39.76
Min Ch EI (ft)	869.00	Shear (lb/sq ft)	0.09	0.13	0.02
Alpha	1.33	Stream Power (lb/ft s)	255.28	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	6.30	6.44	4.38
C & E Loss (ft)	0.18	Cum SA (acres)	0.99	0.41	0.58

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1473.99 Profile: PF 1

E.G. Elev (ft)	881.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.36	Reach Len. (ft)	10.11	10.11	10.11
Crit W.S. (ft)	875.09	Flow Area (sq ft)	140.60	360.24	88.02
E.G. Slope (ft/ft)	0.001114	Area (sq ft)	248.29	360.24	88.02
Q Total (cfs)	2867.00	Flow (cfs)	174.62	2497.42	194.96
Top Width (ft)	173.47	Top Width (ft)	114.37	30.51	28.59
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	1.24	6.93	2.21
Max Chl Dpth (ft)	11.86	Hydr. Depth (ft)	1.23	11.81	3.08
Conv. Total (cfs)	85880.2	Conv. (cfs)	5230.7	74809.4	5840.1
Length Wtd. (ft)	10.11	Wetted Per. (ft)	117.58	33.30	30.90
Min Ch EI (ft)	868.50	Shear (lb/sq ft)	0.08	0.75	0.20
Alpha	1.78	Stream Power (lb/ft s)	287.88	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	5.00	5.68	4.19
C & E Loss (ft)		Cum SA (acres)	0.75	0.35	0.51

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1463.88 BR U Profile: PF 1

E.G. Elev (ft)	881.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.			
W.S. Elev (ft)	880.36	Reach Len. (ft)	18.06	18.06	18.06
Crit W.S. (ft)	875.09	Flow Area (sq ft)	173.26	346.50	69.07
E.G. Slope (ft/ft)		Area (sq ft)	223.40	346.50	68.12
Q Total (cfs)	2867.00	Flow (cfs)	487.82	2191.18	188.95
Top Width (ft)	85.49	Top Width (ft)	85.49		
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	2.82	6.32	2.74
Max Chl Dpth (ft)	11.86	Hydr. Depth (ft)	2.03		
Conv. Total (cfs)		Conv. (cfs)			
Length Wtd. (ft)	18.06	Wetted Per. (ft)	118.46	63.81	29.85
Min Ch EI (ft)	868.50	Shear (lb/sq ft)			
Alpha	1.35	Stream Power (lb/ft s)	287.88	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	4.94	5.60	4.17
C & E Loss (ft)		Cum SA (acres)	0.73	0.34	0.51

MEATHOUSE FORK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1463.88 BR D Profile: PF 1

E.G. Elev (ft)	880.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.			
W.S. Elev (ft)	880.36	Reach Len. (ft)	10.14	10.14	10.14
Crit W.S. (ft)	875.78	Flow Area (sq ft)	170.99	298.52	55.78
E.G. Slope (ft/ft)		Area (sq ft)	145.78	298.52	55.78
Q Total (cfs)	2867.00	Flow (cfs)	467.57	2243.47	156.91
Top Width (ft)	94.08	Top Width (ft)	94.08		
Vel Total (ft/s)	5.46	Avg. Vel. (ft/s)	2.73	7.52	2.81
Max Chl Dpth (ft)	11.86	Hydr. Depth (ft)	1.82		
Conv. Total (cfs)		Conv. (cfs)			
Length Wtd. (ft)	10.14	Wetted Per. (ft)	127.93	56.02	31.65
Min Ch EI (ft)	868.50	Shear (lb/sq ft)			
Alpha	1.45	Stream Power (lb/ft s)	290.82	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	4.87	5.46	4.15
C & E Loss (ft)		Cum SA (acres)	0.69	0.34	0.51

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1435.68 Profile: PF 1

E.G. Elev (ft)	880.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	879.80	Reach Len. (ft)	100.38	100.27	100.04
Crit W.S. (ft)		Flow Area (sq ft)	72.24	295.62	54.20
E.G. Slope (ft/ft)	0.001780	Area (sq ft)	99.46	295.62	54.20
Q Total (cfs)	2867.00	Flow (cfs)	251.52	2450.93	164.56
Top Width (ft)	106.36	Top Width (ft)	65.75	26.33	14.28
Vel Total (ft/s)	6.79	Avg. Vel. (ft/s)	3.48	8.29	3.04
Max Chl Dpth (ft)	11.30	Hydr. Depth (ft)	4.83	11.23	3.80
Conv. Total (cfs)	67951.1	Conv. (cfs)	5961.3	58089.7	3900.2
Length Wtd. (ft)	100.26	Wetted Per. (ft)	18.28	29.69	16.85
Min Ch EI (ft)	868.50	Shear (lb/sq ft)	0.44	1.11	0.36
Alpha	1.31	Stream Power (lb/ft s)	290.82	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	4.84	5.40	4.13
C & E Loss (ft)	0.42	Cum SA (acres)	0.67	0.34	0.50

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1335.41 Profile: PF 1

E.G. Elev (ft)	880.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.18	Reach Len. (ft)	102.63	100.02	97.38
Crit W.S. (ft)		Flow Area (sq ft)	515.07	597.98	293.81
E.G. Slope (ft/ft)	0.000189	Area (sq ft)	515.07	597.98	293.81
Q Total (cfs)	2867.00	Flow (cfs)	703.39	1732.56	431.05
Top Width (ft)	196.87	Top Width (ft)	97.38	51.25	48.24
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)	1.37	2.90	1.47
Max Chl Dpth (ft)	11.68	Hydr. Depth (ft)	5.29	11.67	6.09
Conv. Total (cfs)	208307.9	Conv. (cfs)	51106.4	125882.7	31318.8
Length Wtd. (ft)	100.17	Wetted Per. (ft)	98.89	54.16	50.66
Min Ch EI (ft)	868.50	Shear (lb/sq ft)	0.06	0.13	0.07
Alpha	1.41	Stream Power (lb/ft s)	309.21	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	4.13	4.37	3.73
C & E Loss (ft)	0.00	Cum SA (acres)	0.48	0.25	0.43

MEATHOUSE FORK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1235.39 Profile: PF 1

E.G. Elev (ft)	880.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.17	Reach Len. (ft)	100.07	100.01	108.12
Crit W.S. (ft)		Flow Area (sq ft)	512.52	547.97	461.19
E.G. Slope (ft/ft)	0.000195	Area (sq ft)	512.52	547.97	461.19
Q Total (cfs)	2867.00	Flow (cfs)	672.12	1591.51	603.37
Top Width (ft)	247.93	Top Width (ft)	106.19	46.66	95.08
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)	1.31	2.90	1.31
Max Chl Dpth (ft)	11.97	Hydr. Depth (ft)	4.83	11.74	4.85
Conv. Total (cfs)	205317.8	Conv. (cfs)	48133.3	113974.3	43210.1
Length Wtd. (ft)	102.34	Wetted Per. (ft)	106.85	50.53	96.49
Min Ch EI (ft)	868.20	Shear (lb/sq ft)	0.06	0.13	0.06
Alpha	1.53	Stream Power (lb/ft s)	293.62	0.00	0.00
Frcn Loss (ft)	0.02	Cum Volume (acre-ft)	2.92	3.05	2.89
C & E Loss (ft)	0.02	Cum SA (acres)	0.24	0.14	0.27

Plan: Meat House Fork Meat House Fork Main Branch US RS: 1141.39 Profile: PF 1

E.G. Elev (ft)	880.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.060	0.055	0.060
W.S. Elev (ft)	880.19	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)	571.82	844.30	937.93
E.G. Slope (ft/ft)	0.000138	Area (sq ft)	571.82	844.30	937.93
Q Total (cfs)	2867.00	Flow (cfs)	507.96	1326.05	1033.00
Top Width (ft)	306.42	Top Width (ft)	106.42	75.44	124.56
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)	0.89	1.57	1.10
Max Chl Dpth (ft)	12.19	Hydr. Depth (ft)	5.37	11.19	7.53
Conv. Total (cfs)	243796.7	Conv. (cfs)	43194.2	112761.1	87841.4
Length Wtd. (ft)	100.00	Wetted Per. (ft)	107.34	76.81	127.54
Min Ch EI (ft)	868.00	Shear (lb/sq ft)	0.05	0.09	0.06
Alpha	1.16	Stream Power (lb/ft s)	428.71	0.00	0.00
Frcn Loss (ft)		Cum Volume (acre-ft)	1.67	1.45	1.15
C & E Loss (ft)		Cum SA (acres)			

Plan: Meat House Fork Meat House Fork Main Branch DS RS: 526.18 Profile: PF 1

E.G. Elev (ft)	874.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	874.64	Reach Len. (ft)	364.10	405.51	399.37
Crit W.S. (ft)		Flow Area (sq ft)	886.37	421.59	66.28
E.G. Slope (ft/ft)	0.001292	Area (sq ft)	886.37	421.59	66.28
Q Total (cfs)	4040.00	Flow (cfs)	2088.17	1850.16	101.67
Top Width (ft)	361.29	Top Width (ft)	270.58	53.39	37.32
Vel Total (ft/s)	2.94	Avg. Vel. (ft/s)	2.36	4.39	1.53
Max Chl Dpth (ft)	8.14	Hydr. Depth (ft)	3.28	7.90	1.78
Conv. Total (cfs)	112384.8	Conv. (cfs)	58088.6	51467.9	2828.3
Length Wtd. (ft)	393.21	Wetted Per. (ft)	270.67	59.30	38.53
Min Ch EI (ft)	866.50	Shear (lb/sq ft)	0.26	0.57	0.14
Alpha	1.36	Stream Power (lb/ft s)	531.72	0.00	0.00
Frcn Loss (ft)	0.81	Cum Volume (acre-ft)	3.80	3.40	2.32
C & E Loss (ft)	0.05	Cum SA (acres)	1.17	0.43	0.95

MEATHOUSE FORK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Main Branch DS RS: 120.67 Profile: PF 1

E.G. Elev (ft)	873.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	873.30	Reach Len. (ft)			
Crit W.S. (ft)	872.45	Flow Area (sq ft)	22.44	309.03	439.13
E.G. Slope (ft/ft)	0.003851	Area (sq ft)	22.44	309.03	439.13
Q Total (cfs)	4040.00	Flow (cfs)	71.65	2447.59	1520.77
Top Width (ft)	216.86	Top Width (ft)	8.30	38.47	170.10
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	3.19	7.92	3.46
Max Chl Dpth (ft)	8.30	Hydr. Depth (ft)	2.71	8.03	2.58
Conv. Total (cfs)	65098.6	Conv. (cfs)	1154.5	39439.2	24504.9
Length Wtd. (ft)		Wetted Per. (ft)	9.86	40.67	170.67
Min Ch El (ft)	865.00	Shear (lb/sq ft)	0.55	1.83	0.62
Alpha	1.55	Stream Power (lb/ft s)	363.89	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

BEECH LICK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Beech Lick RS: 1507.82 Profile: PF 1

E.G. Elev (ft)	884.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	883.49	Reach Len. (ft)	199.63	193.58	195.40
Crit W.S. (ft)	883.49	Flow Area (sq ft)	167.60	53.77	54.48
E.G. Slope (ft/ft)	0.006950	Area (sq ft)	167.60	53.77	54.48
Q Total (cfs)	1173.00	Flow (cfs)	390.61	529.72	252.67
Top Width (ft)	161.74	Top Width (ft)	139.28	7.65	14.80
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)	2.33	9.85	4.64
Max Chl Dpth (ft)	7.49	Hydr. Depth (ft)	1.20	7.03	3.68
Conv. Total (cfs)	14070.4	Conv. (cfs)	4685.5	6354.1	3030.8
Length Wtd. (ft)	195.49	Wetted Per. (ft)	139.74	11.58	16.18
Min Ch EI (ft)	876.00	Shear (lb/sq ft)	0.52	2.02	1.46
Alpha	2.78	Stream Power (lb/ft s)	285.38	0.00	0.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	9.25	7.02	14.37
C & E Loss (ft)	0.00	Cum SA (acres)	1.96	0.49	2.34

Plan: Meat House Fork Meat House Fork Beech Lick RS: 1314.24 Profile: PF 1

E.G. Elev (ft)	881.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	880.81	Reach Len. (ft)	276.63	275.23	273.05
Crit W.S. (ft)	880.81	Flow Area (sq ft)	130.87	100.79	28.58
E.G. Slope (ft/ft)	0.005354	Area (sq ft)	130.87	100.79	28.58
Q Total (cfs)	1173.00	Flow (cfs)	251.15	849.82	72.03
Top Width (ft)	158.38	Top Width (ft)	119.98	21.30	17.10
Vel Total (ft/s)	4.51	Avg. Vel. (ft/s)	1.92	8.43	2.52
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)	1.09	4.73	1.67
Conv. Total (cfs)	16031.4	Conv. (cfs)	3432.4	11614.5	984.5
Length Wtd. (ft)	275.25	Wetted Per. (ft)	120.08	22.54	17.42
Min Ch EI (ft)	875.50	Shear (lb/sq ft)	0.36	1.49	0.55
Alpha	2.59	Stream Power (lb/ft s)	254.39	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	8.57	6.68	14.19
C & E Loss (ft)	0.19	Cum SA (acres)	1.37	0.43	2.27

Plan: Meat House Fork Meat House Fork Beech Lick RS: 1039.01 Profile: PF 1

E.G. Elev (ft)	880.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	880.21	Reach Len. (ft)	153.15	156.07	162.38
Crit W.S. (ft)		Flow Area (sq ft)	193.35	113.16	115.91
E.G. Slope (ft/ft)	0.001704	Area (sq ft)	193.35	113.16	115.91
Q Total (cfs)	1173.00	Flow (cfs)	369.44	502.96	300.60
Top Width (ft)	182.48	Top Width (ft)	116.28	22.38	43.82
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)	1.91	4.44	2.59
Max Chl Dpth (ft)	5.21	Hydr. Depth (ft)	1.66	5.06	2.64
Conv. Total (cfs)	28417.9	Conv. (cfs)	8950.3	12185.1	7282.5
Length Wtd. (ft)	157.52	Wetted Per. (ft)	116.49	22.93	44.16
Min Ch EI (ft)	875.00	Shear (lb/sq ft)	0.18	0.52	0.28
Alpha	1.47	Stream Power (lb/ft s)	278.72	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	7.54	6.00	13.73
C & E Loss (ft)	0.05	Cum SA (acres)	0.62	0.29	2.08

BEECH LICK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Beech Lick RS: 882.94 Profile: PF 1

E.G. Elev (ft)	880.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	880.24	Reach Len. (ft)	146.64	132.41	129.52
Crit W.S. (ft)		Flow Area (sq ft)	353.27	85.32	515.28
E.G. Slope (ft/ft)	0.000218	Area (sq ft)	353.27	85.32	515.28
Q Total (cfs)	1173.00	Flow (cfs)	426.05	141.51	605.44
Top Width (ft)	242.99	Top Width (ft)	90.37	14.96	137.65
Vel Total (ft/s)	1.23	Avg. Vel. (ft/s)	1.21	1.66	1.17
Max Chl Dpth (ft)	5.94	Hydr. Depth (ft)	3.91	5.70	3.74
Conv. Total (cfs)	79359.6	Conv. (cfs)	28824.3	9573.8	40961.5
Length Wtd. (ft)	133.21	Wetted Per. (ft)	90.95	16.25	137.95
Min Ch El (ft)	874.30	Shear (lb/sq ft)	0.05	0.07	0.05
Alpha	1.04	Stream Power (lb/ft s)	317.07	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.58	5.65	12.56
C & E Loss (ft)	0.00	Cum SA (acres)	0.25	0.22	1.74

Plan: Meat House Fork Meat House Fork Beech Lick RS: 750.53 Profile: PF 1

E.G. Elev (ft)	880.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.22	Reach Len. (ft)	159.72	161.36	167.70
Crit W.S. (ft)		Flow Area (sq ft)	22.78	163.13	1031.99
E.G. Slope (ft/ft)	0.000118	Area (sq ft)	22.78	163.13	1031.99
Q Total (cfs)	1173.00	Flow (cfs)	14.88	238.42	919.71
Top Width (ft)	299.19	Top Width (ft)	7.66	28.18	263.34
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)	0.65	1.46	0.89
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)	2.97	5.79	3.92
Conv. Total (cfs)	107938.0	Conv. (cfs)	1369.1	21938.8	84630.1
Length Wtd. (ft)	165.60	Wetted Per. (ft)	9.28	28.93	263.68
Min Ch El (ft)	874.10	Shear (lb/sq ft)	0.02	0.04	0.03
Alpha	1.15	Stream Power (lb/ft s)	364.63	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	5.95	5.27	10.26
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	0.16	1.14

Plan: Meat House Fork Meat House Fork Beech Lick RS: 589.16 Profile: PF 1

E.G. Elev (ft)	880.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.19	Reach Len. (ft)	95.97	95.97	95.97
Crit W.S. (ft)		Flow Area (sq ft)	59.46	244.91	667.83
E.G. Slope (ft/ft)	0.000111	Area (sq ft)	59.46	244.91	667.83
Q Total (cfs)	1173.00	Flow (cfs)	47.48	458.46	667.07
Top Width (ft)	192.74	Top Width (ft)	15.72	25.29	151.73
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)	0.80	1.87	1.00
Max Chl Dpth (ft)	11.12	Hydr. Depth (ft)	3.78	9.68	4.40
Conv. Total (cfs)	111449.1	Conv. (cfs)	4510.8	43558.8	63379.5
Length Wtd. (ft)	95.97	Wetted Per. (ft)	17.07	28.56	158.30
Min Ch El (ft)	869.07	Shear (lb/sq ft)	0.02	0.06	0.03
Alpha	1.35	Stream Power (lb/ft s)	366.98	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	5.80	4.51	6.98
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.06	0.35

BEECH LICK - EXISTING SECTION DATA

Plan: Meat House Fork Meat House Fork Beech Lick RS: 493.19 Profile: PF 1

E.G. Elev (ft)	880.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.19	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)		Flow Area (sq ft)	93.96	266.86	857.84
E.G. Slope (ft/ft)	0.000067	Area (sq ft)	93.96	266.86	857.84
Q Total (cfs)	1173.00	Flow (cfs)	59.16	392.35	721.50
Top Width (ft)	215.15	Top Width (ft)	25.65	27.62	161.88
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)	0.63	1.47	0.84
Max Chl Dpth (ft)	11.17	Hydr. Depth (ft)	3.66	9.66	5.30
Conv. Total (cfs)	142911.1	Conv. (cfs)	7207.5	47801.0	87902.6
Length Wtd. (ft)	500.00	Wetted Per. (ft)	26.54	30.79	173.77
Min Ch EI (ft)	869.02	Shear (lb/sq ft)	0.01	0.04	0.02
Alpha	1.27	Stream Power (lb/ft s)	457.90	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	5.63	3.95	5.30
C & E Loss (ft)		Cum SA (acres)			

BEECH LICK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Beech Lick RS: 1507.82 Profile: PF 1

E.G. Elev (ft)	884.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	883.49	Reach Len. (ft)	199.63	193.58	195.40
Crit W.S. (ft)	883.49	Flow Area (sq ft)	167.60	53.77	54.48
E.G. Slope (ft/ft)	0.006950	Area (sq ft)	167.60	53.77	54.48
Q Total (cfs)	1173.00	Flow (cfs)	390.61	529.72	252.67
Top Width (ft)	161.74	Top Width (ft)	139.28	7.65	14.80
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)	2.33	9.85	4.64
Max Chl Dpth (ft)	7.49	Hydr. Depth (ft)	1.20	7.03	3.68
Conv. Total (cfs)	14070.4	Conv. (cfs)	4685.5	6354.1	3030.8
Length Wtd. (ft)	195.49	Wetted Per. (ft)	139.74	11.58	16.18
Min Ch EI (ft)	876.00	Shear (lb/sq ft)	0.52	2.02	1.46
Alpha	2.78	Stream Power (lb/ft s)	285.38	0.00	0.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	9.25	7.02	14.37
C & E Loss (ft)	0.00	Cum SA (acres)	1.96	0.49	2.34

Plan: Meat House Fork Meat House Fork Beech Lick RS: 1314.24 Profile: PF 1

E.G. Elev (ft)	881.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	880.81	Reach Len. (ft)	276.63	275.23	273.05
Crit W.S. (ft)	880.81	Flow Area (sq ft)	130.87	100.79	28.58
E.G. Slope (ft/ft)	0.005354	Area (sq ft)	130.87	100.79	28.58
Q Total (cfs)	1173.00	Flow (cfs)	251.15	849.82	72.03
Top Width (ft)	158.38	Top Width (ft)	119.98	21.30	17.10
Vel Total (ft/s)	4.51	Avg. Vel. (ft/s)	1.92	8.43	2.52
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)	1.09	4.73	1.67
Conv. Total (cfs)	16031.4	Conv. (cfs)	3432.4	11614.5	984.5
Length Wtd. (ft)	275.25	Wetted Per. (ft)	120.08	22.54	17.42
Min Ch EI (ft)	875.50	Shear (lb/sq ft)	0.36	1.49	0.55
Alpha	2.59	Stream Power (lb/ft s)	254.39	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	8.57	6.68	14.19
C & E Loss (ft)	0.19	Cum SA (acres)	1.37	0.43	2.27

Plan: Meat House Fork Meat House Fork Beech Lick RS: 1039.01 Profile: PF 1

E.G. Elev (ft)	880.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	880.21	Reach Len. (ft)	153.15	156.07	162.38
Crit W.S. (ft)		Flow Area (sq ft)	193.35	113.16	115.91
E.G. Slope (ft/ft)	0.001704	Area (sq ft)	193.35	113.16	115.91
Q Total (cfs)	1173.00	Flow (cfs)	369.44	502.96	300.60
Top Width (ft)	182.48	Top Width (ft)	116.28	22.38	43.82
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)	1.91	4.44	2.59
Max Chl Dpth (ft)	5.21	Hydr. Depth (ft)	1.66	5.06	2.64
Conv. Total (cfs)	28417.9	Conv. (cfs)	8950.3	12185.1	7282.5
Length Wtd. (ft)	157.52	Wetted Per. (ft)	116.49	22.93	44.16
Min Ch EI (ft)	875.00	Shear (lb/sq ft)	0.18	0.52	0.28
Alpha	1.47	Stream Power (lb/ft s)	278.72	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	7.54	6.00	13.73
C & E Loss (ft)	0.05	Cum SA (acres)	0.62	0.29	2.08

BEECH LICK - PROPOSED SECTION DATA

Plan: Meat House Fork Meat House Fork Beech Lick RS: 882.94 Profile: PF 1

E.G. Elev (ft)	880.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	880.24	Reach Len. (ft)	146.64	132.41	129.52
Crit W.S. (ft)		Flow Area (sq ft)	353.27	85.32	515.28
E.G. Slope (ft/ft)	0.000218	Area (sq ft)	353.27	85.32	515.28
Q Total (cfs)	1173.00	Flow (cfs)	426.05	141.51	605.44
Top Width (ft)	242.99	Top Width (ft)	90.37	14.96	137.65
Vel Total (ft/s)	1.23	Avg. Vel. (ft/s)	1.21	1.66	1.17
Max Chl Dpth (ft)	5.94	Hydr. Depth (ft)	3.91	5.70	3.74
Conv. Total (cfs)	79359.6	Conv. (cfs)	28824.3	9573.8	40961.5
Length Wtd. (ft)	133.21	Wetted Per. (ft)	90.95	16.25	137.95
Min Ch El (ft)	874.30	Shear (lb/sq ft)	0.05	0.07	0.05
Alpha	1.04	Stream Power (lb/ft s)	317.07	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.58	5.65	12.56
C & E Loss (ft)	0.00	Cum SA (acres)	0.25	0.22	1.74

Plan: Meat House Fork Meat House Fork Beech Lick RS: 750.53 Profile: PF 1

E.G. Elev (ft)	880.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.22	Reach Len. (ft)	159.72	161.36	167.70
Crit W.S. (ft)		Flow Area (sq ft)	22.78	163.13	1031.99
E.G. Slope (ft/ft)	0.000118	Area (sq ft)	22.78	163.13	1031.99
Q Total (cfs)	1173.00	Flow (cfs)	14.88	238.42	919.71
Top Width (ft)	299.19	Top Width (ft)	7.66	28.18	263.34
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)	0.65	1.46	0.89
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)	2.97	5.79	3.92
Conv. Total (cfs)	107938.0	Conv. (cfs)	1369.1	21938.8	84630.1
Length Wtd. (ft)	165.60	Wetted Per. (ft)	9.28	28.93	263.68
Min Ch El (ft)	874.10	Shear (lb/sq ft)	0.02	0.04	0.03
Alpha	1.15	Stream Power (lb/ft s)	364.63	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	5.95	5.27	10.26
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	0.16	1.14

Plan: Meat House Fork Meat House Fork Beech Lick RS: 589.16 Profile: PF 1

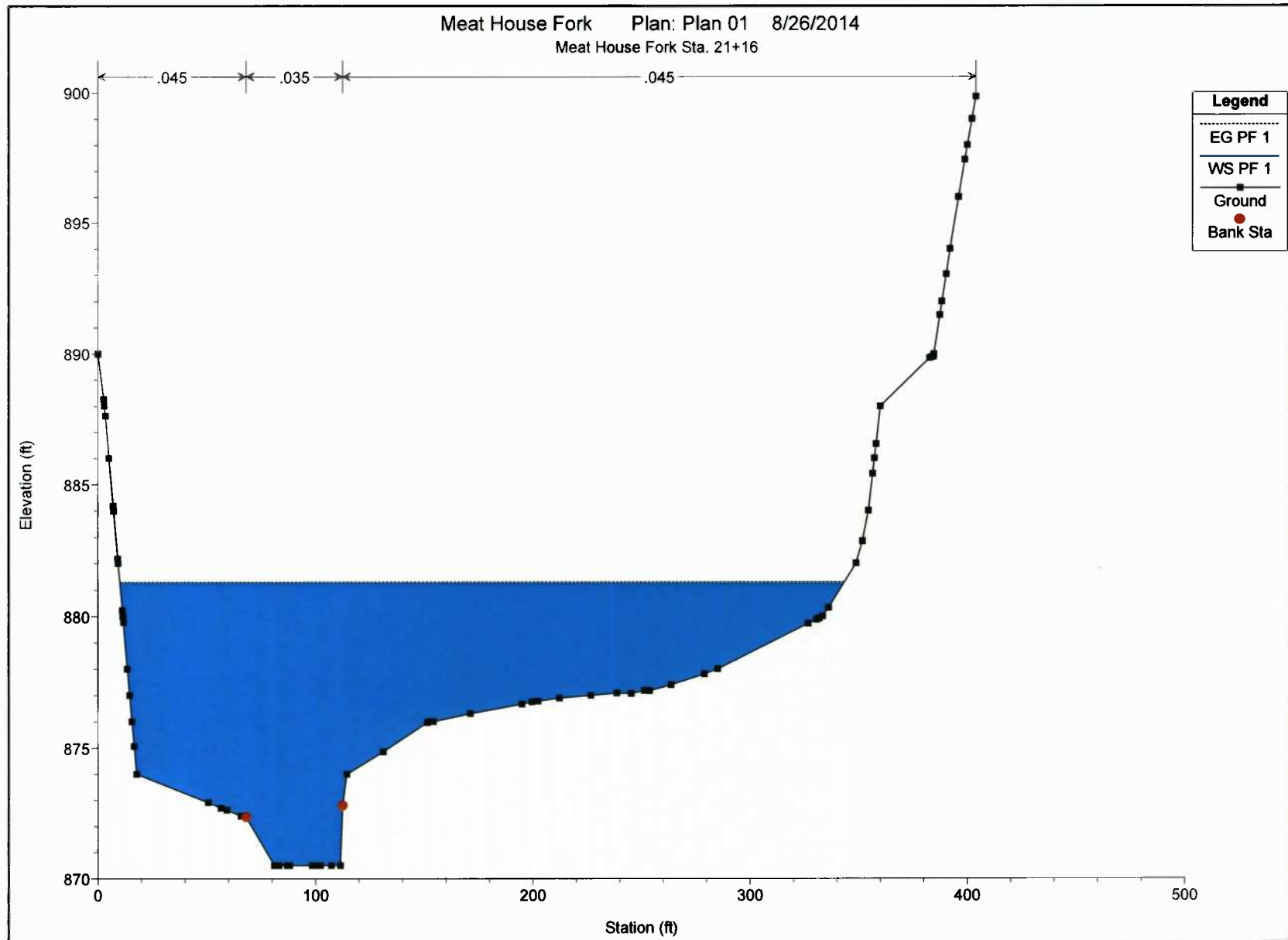
E.G. Elev (ft)	880.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.19	Reach Len. (ft)	95.97	95.97	95.97
Crit W.S. (ft)		Flow Area (sq ft)	59.46	244.91	667.83
E.G. Slope (ft/ft)	0.000111	Area (sq ft)	59.46	244.91	667.83
Q Total (cfs)	1173.00	Flow (cfs)	47.48	458.46	667.07
Top Width (ft)	192.74	Top Width (ft)	15.72	25.29	151.73
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)	0.80	1.87	1.00
Max Chl Dpth (ft)	11.12	Hydr. Depth (ft)	3.78	9.68	4.40
Conv. Total (cfs)	111449.1	Conv. (cfs)	4510.8	43558.8	63379.5
Length Wtd. (ft)	95.97	Wetted Per. (ft)	17.07	28.56	158.30
Min Ch El (ft)	869.07	Shear (lb/sq ft)	0.02	0.06	0.03
Alpha	1.35	Stream Power (lb/ft s)	366.98	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	5.80	4.51	6.98
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.06	0.35

BEECH LICK - PROPOSED SECTION DATA

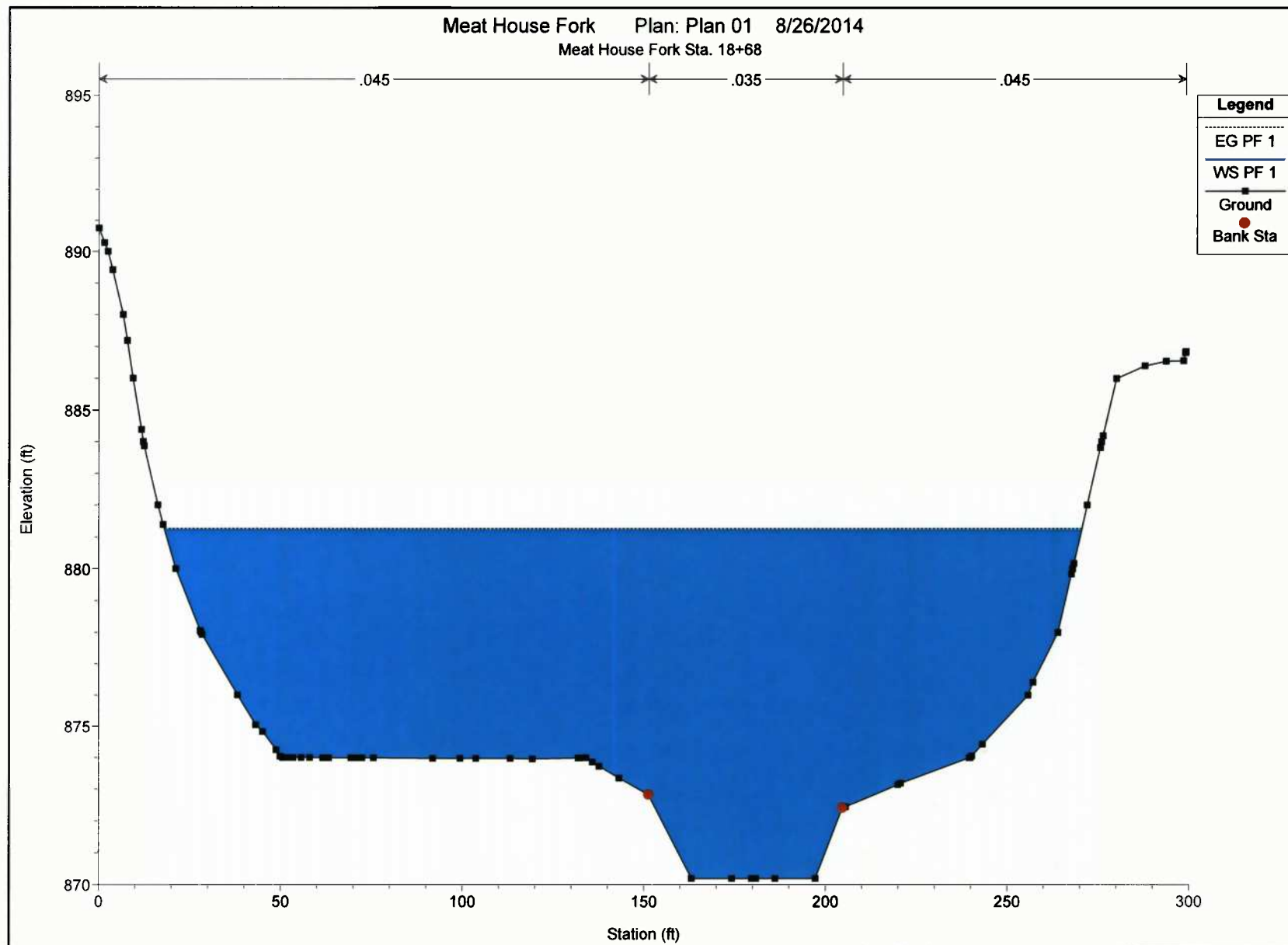
Plan: Meat House Fork Meat House Fork Beech Lick RS: 493.19 Profile: PF 1

E.G. Elev (ft)	880.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	880.19	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)		Flow Area (sq ft)	93.96	266.86	857.84
E.G. Slope (ft/ft)	0.000067	Area (sq ft)	93.96	266.86	857.84
Q Total (cfs)	1173.00	Flow (cfs)	59.16	392.35	721.50
Top Width (ft)	215.15	Top Width (ft)	25.65	27.62	161.88
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)	0.63	1.47	0.84
Max Chl Dpth (ft)	11.17	Hydr. Depth (ft)	3.66	9.66	5.30
Conv. Total (cfs)	142911.1	Conv. (cfs)	7207.5	47801.0	87902.6
Length Wtd. (ft)	500.00	Wetted Per. (ft)	26.54	30.79	173.77
Min Ch EI (ft)	869.02	Shear (lb/sq ft)	0.01	0.04	0.02
Alpha	1.27	Stream Power (lb/ft s)	457.90	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	5.63	3.95	5.30
C & E Loss (ft)		Cum SA (acres)			

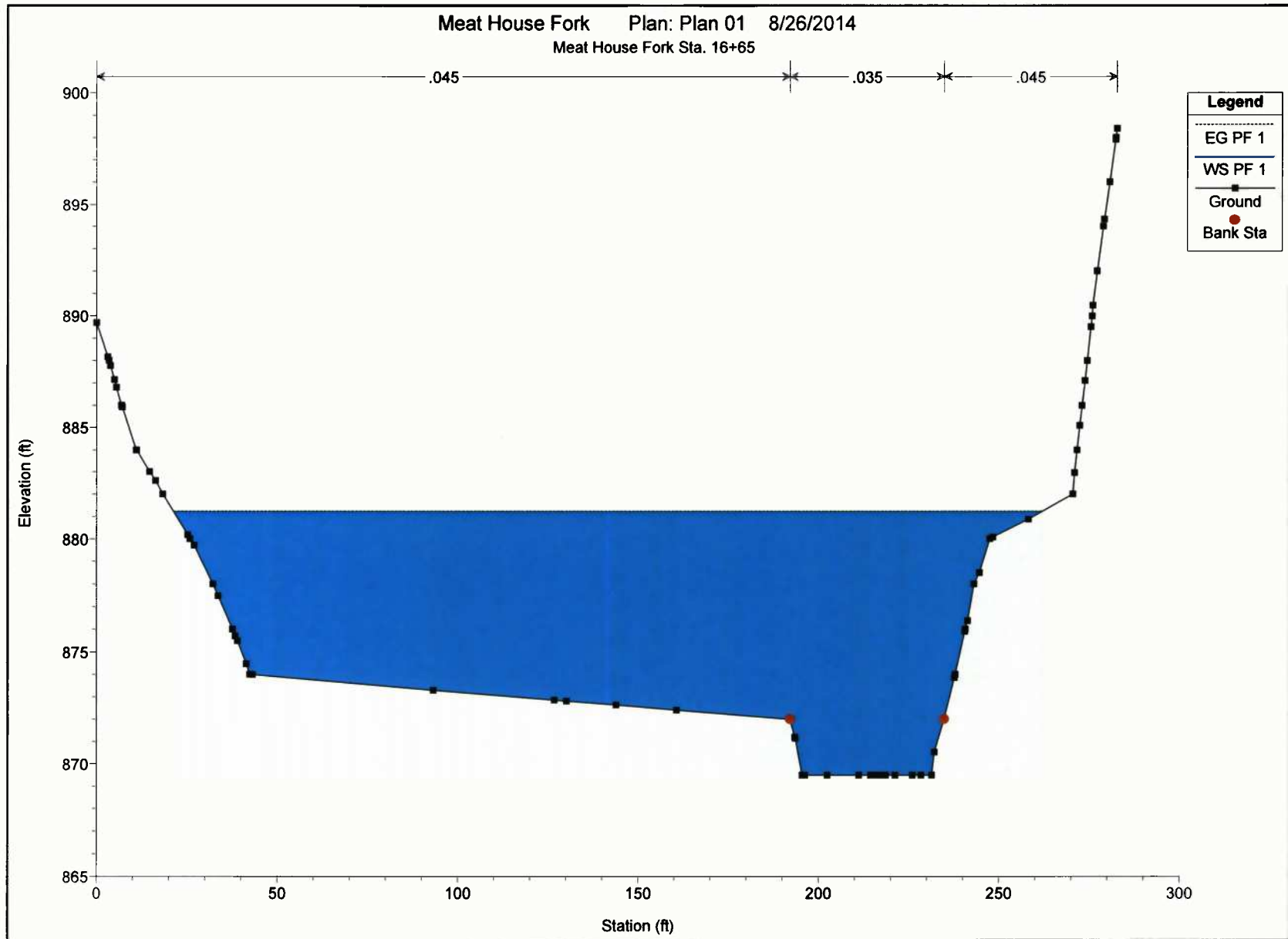
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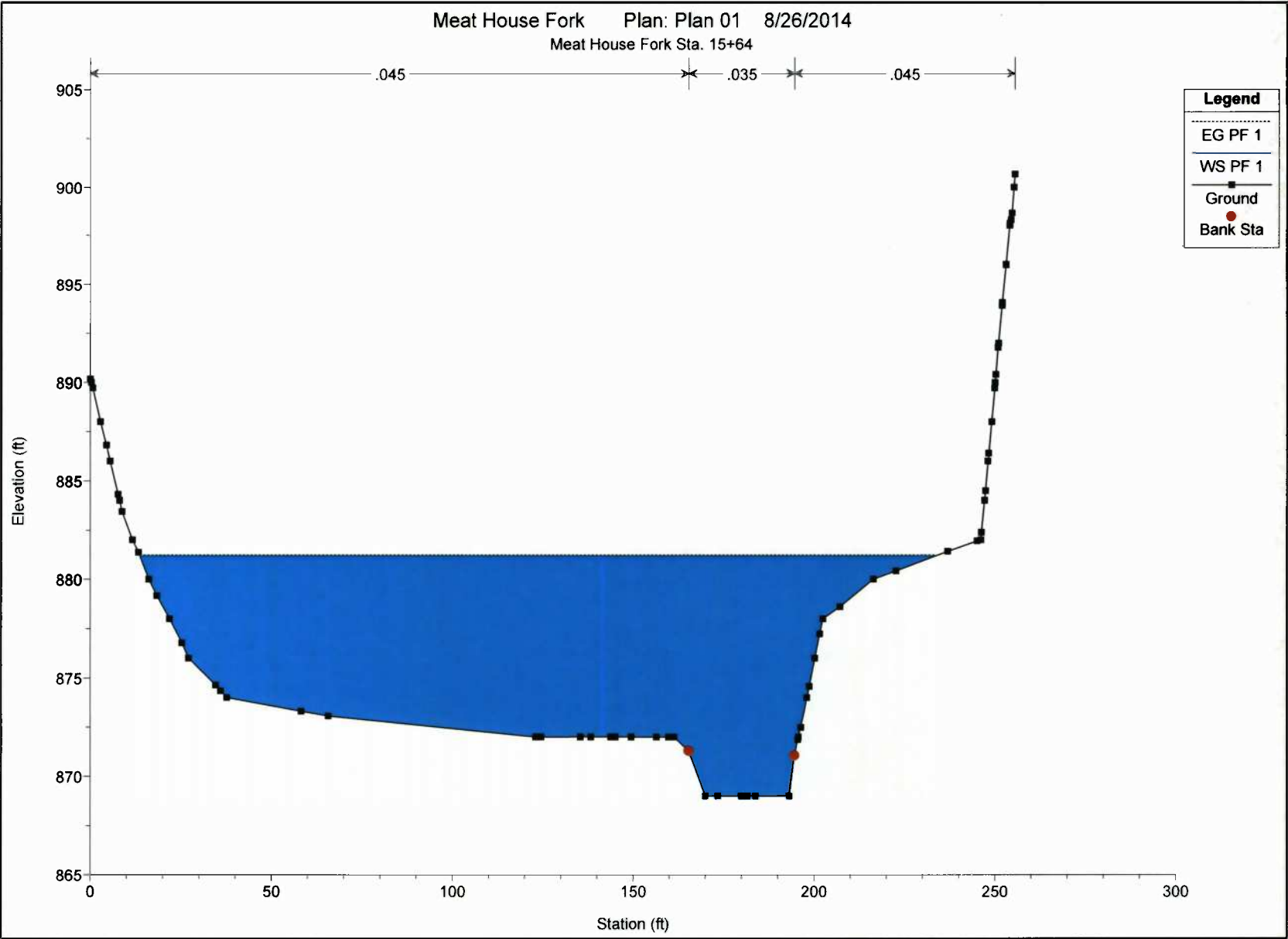
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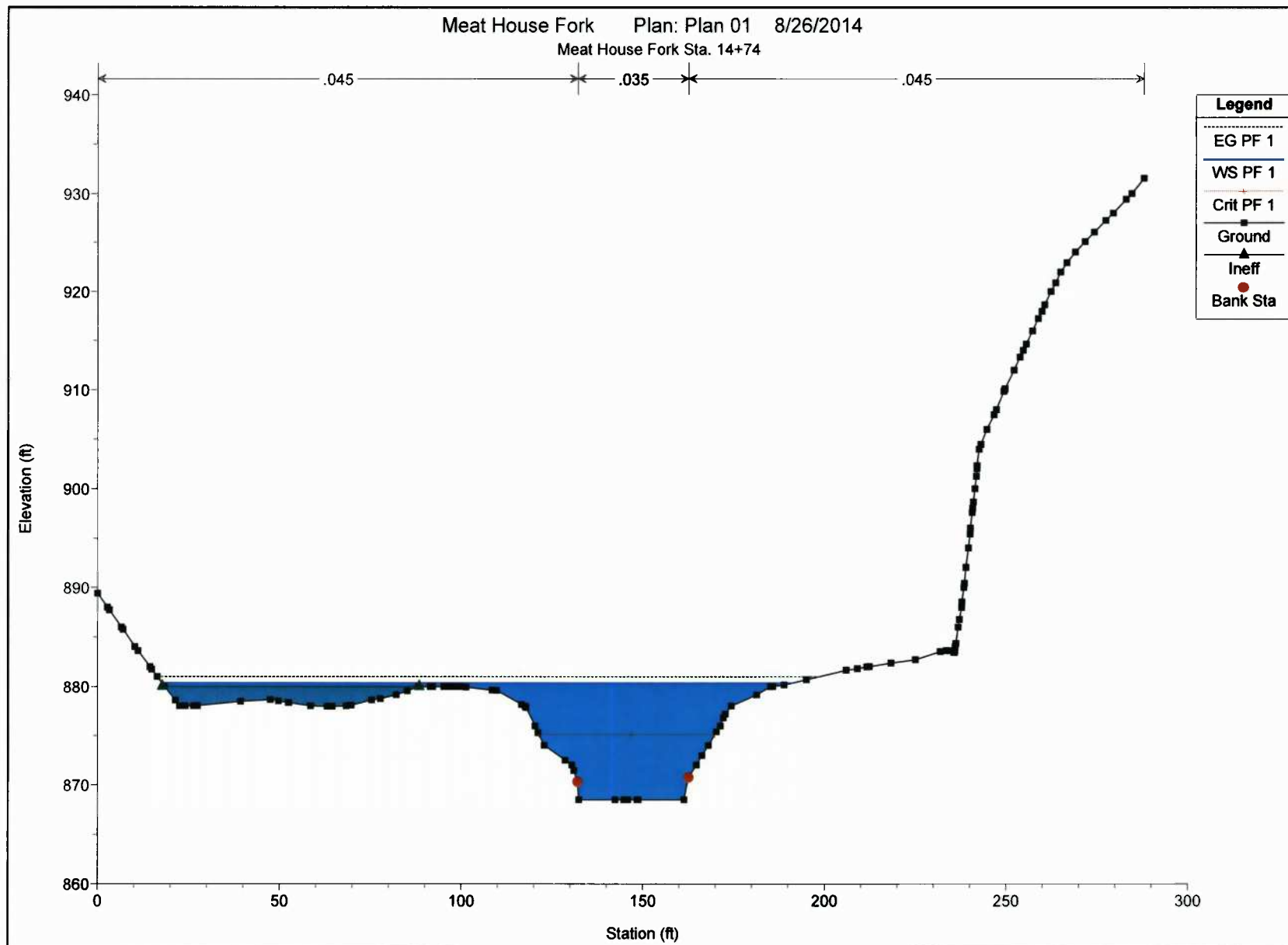
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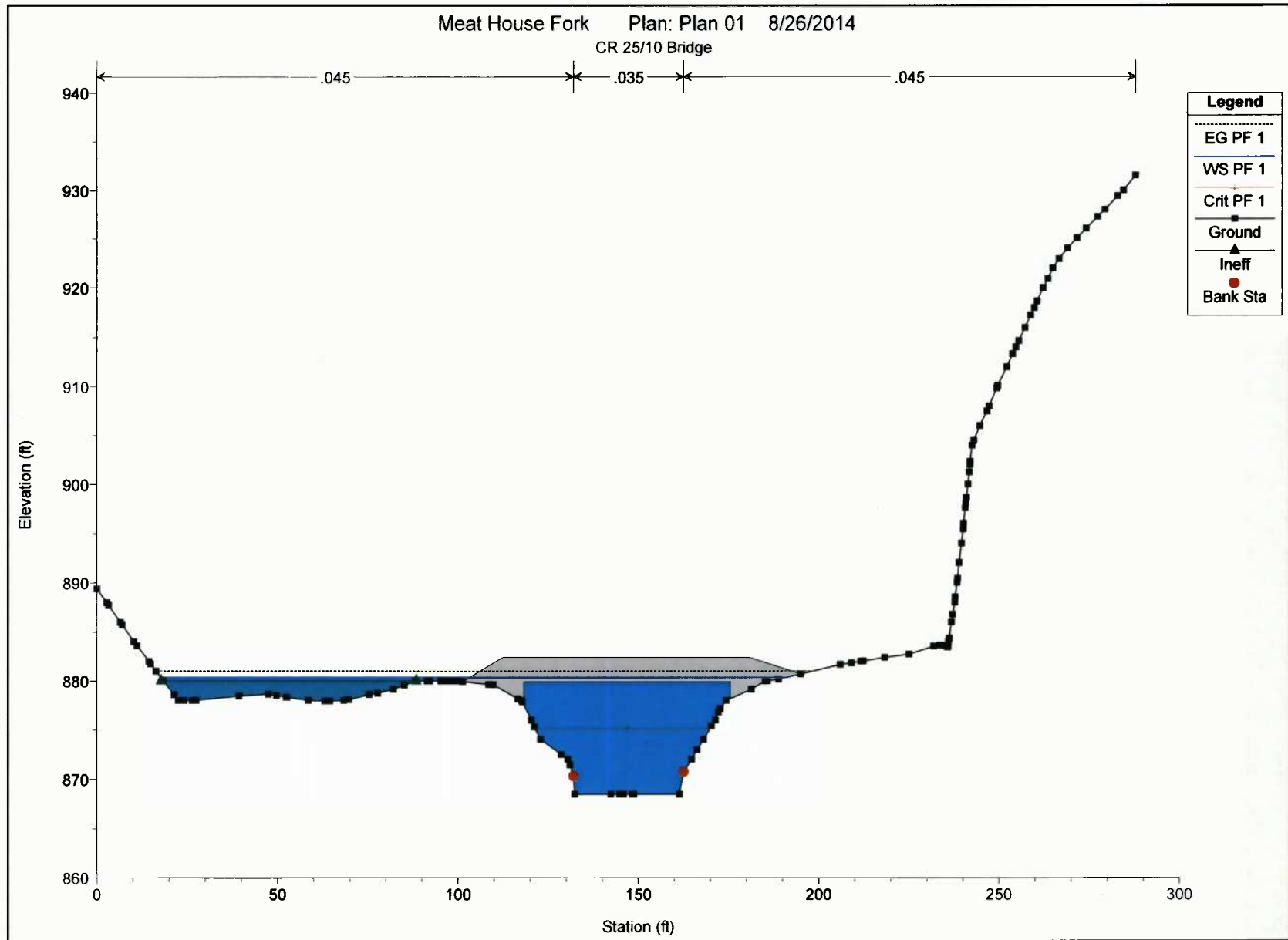
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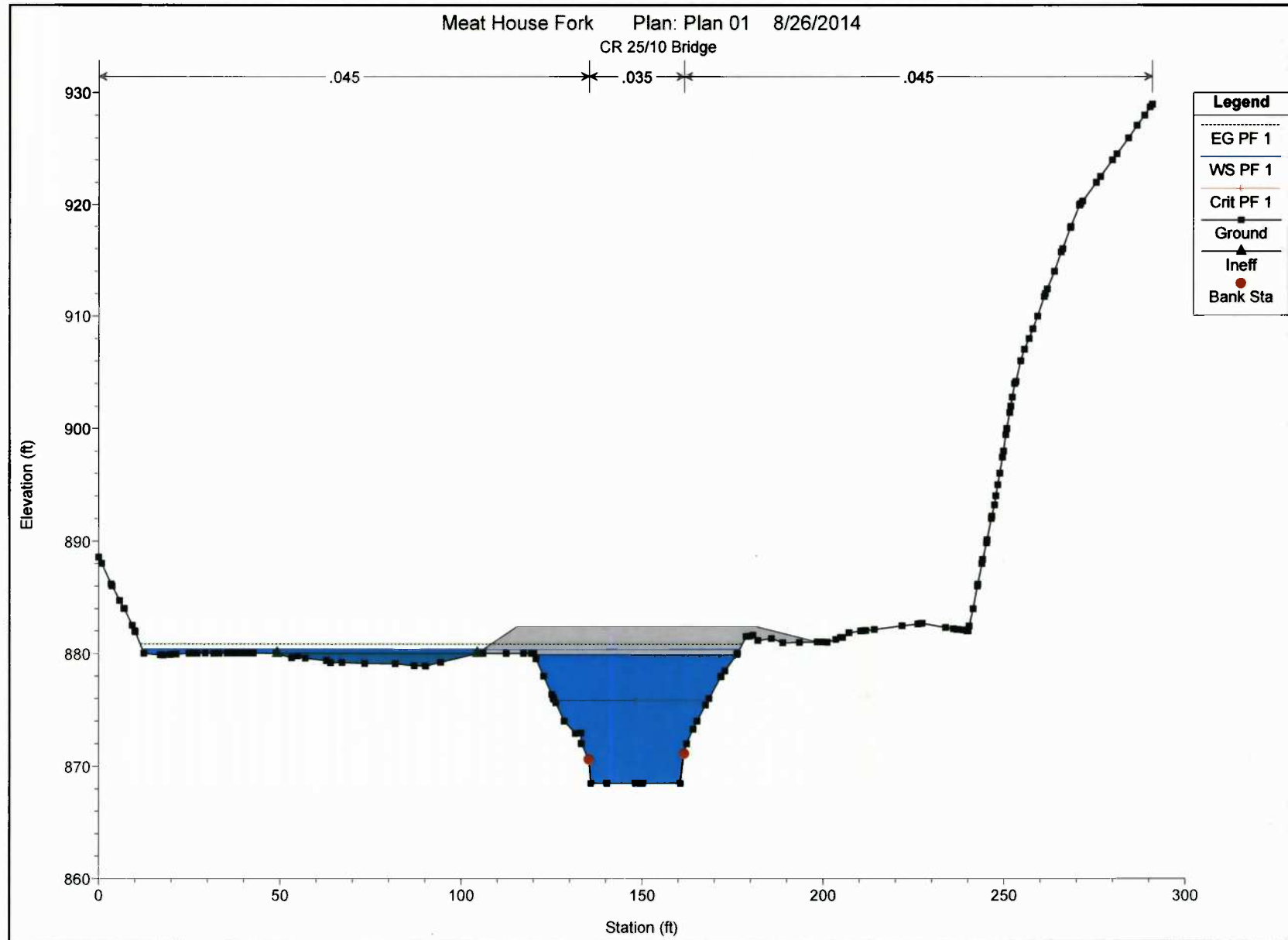
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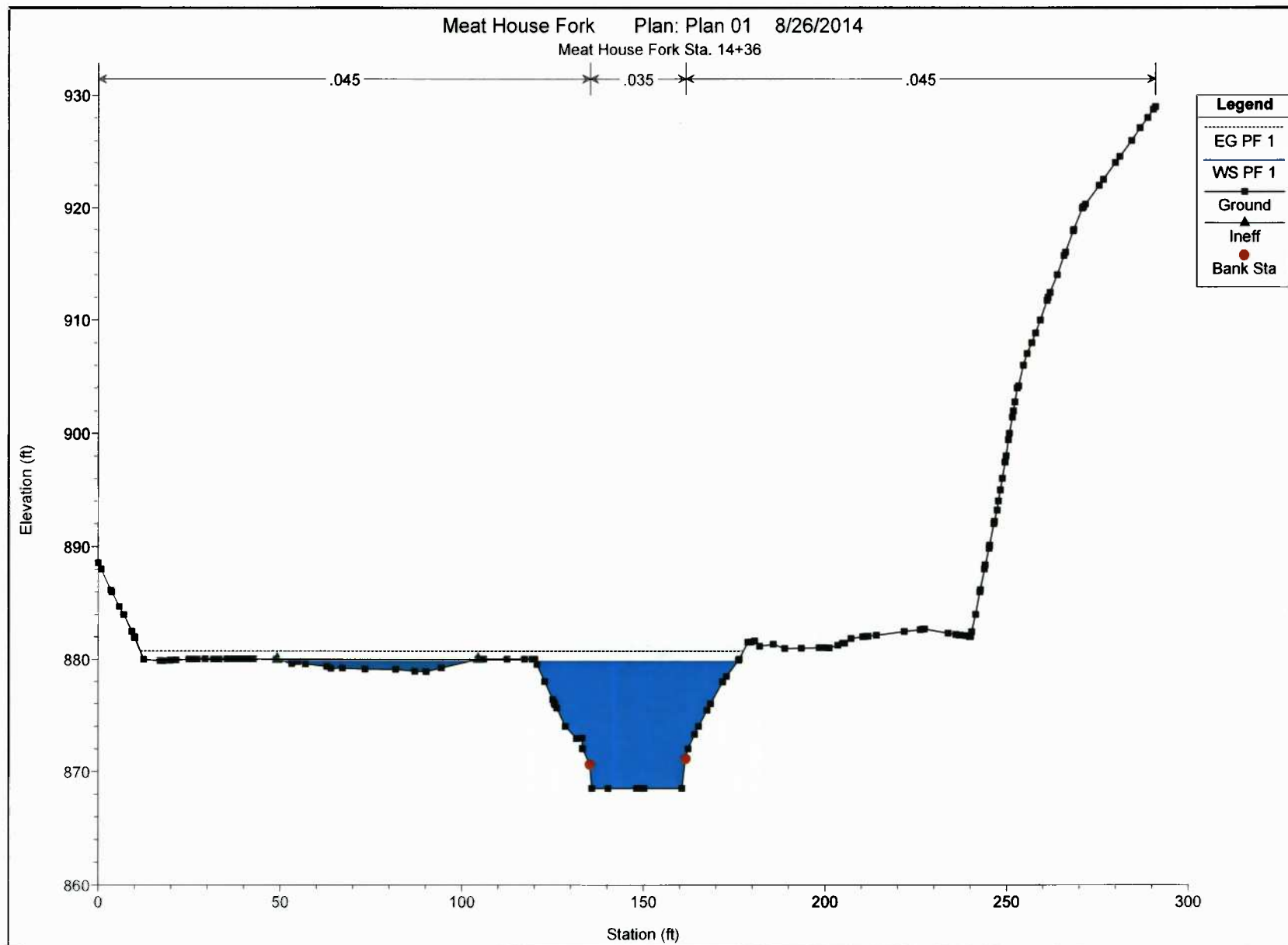
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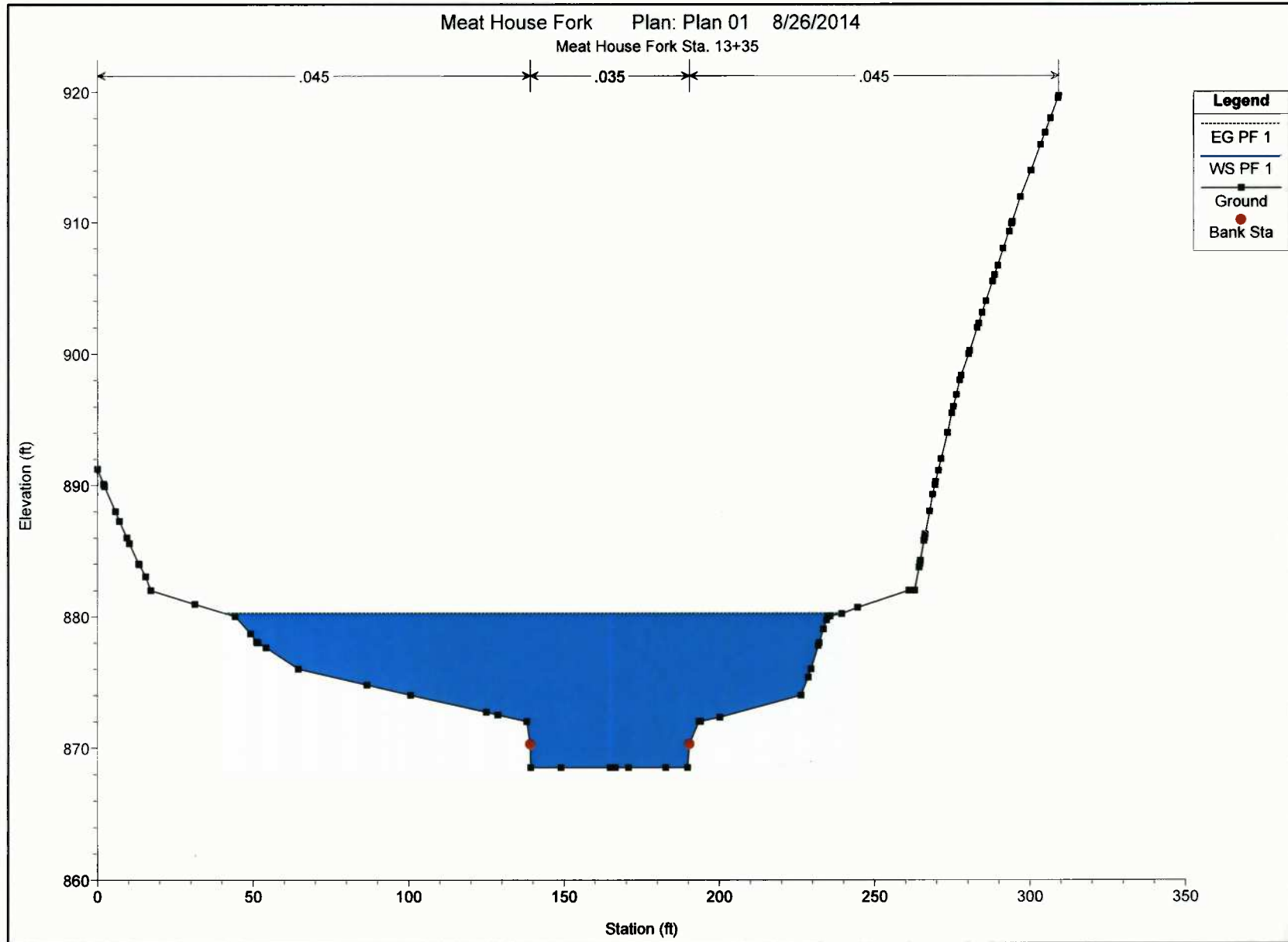
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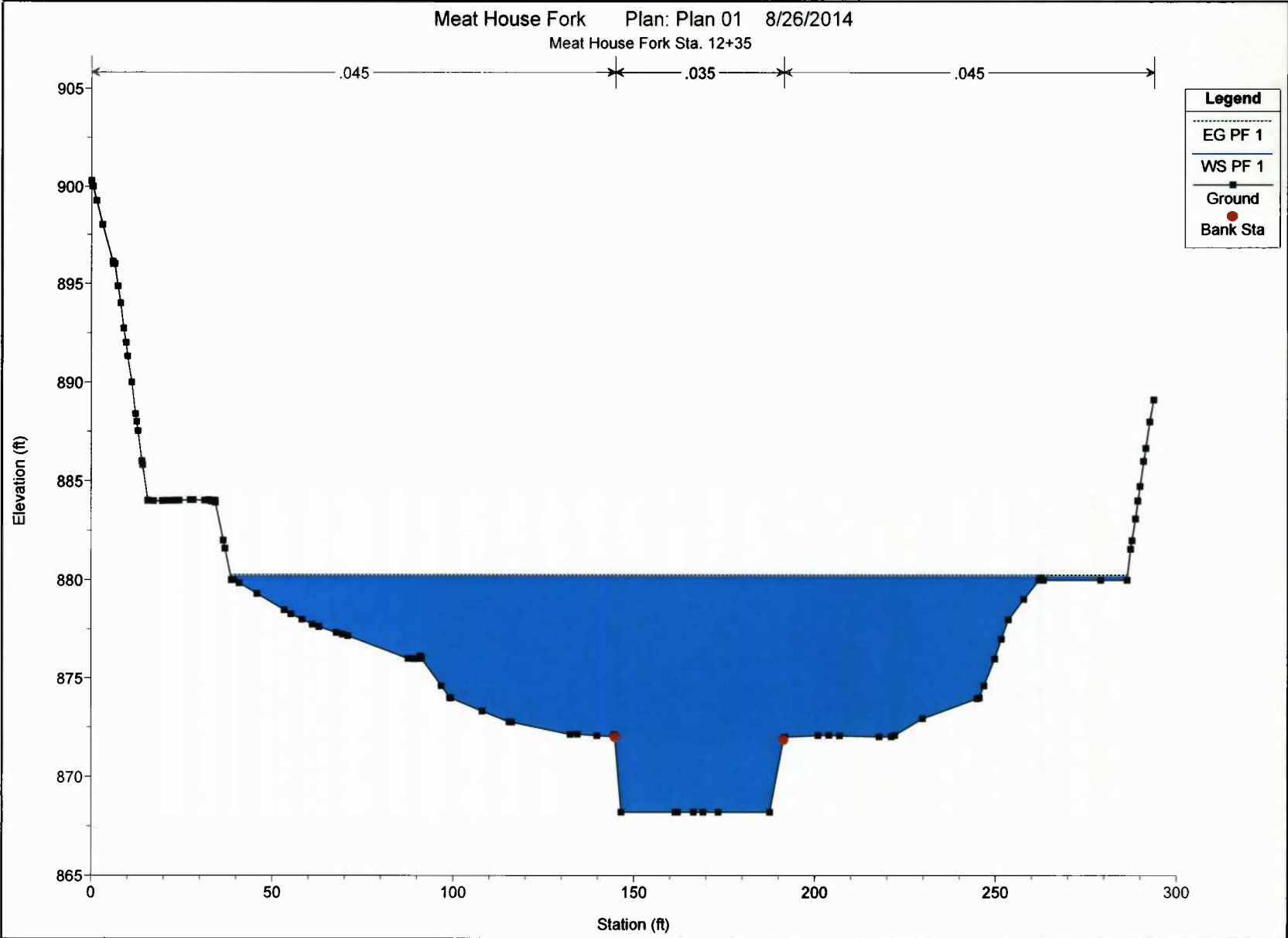
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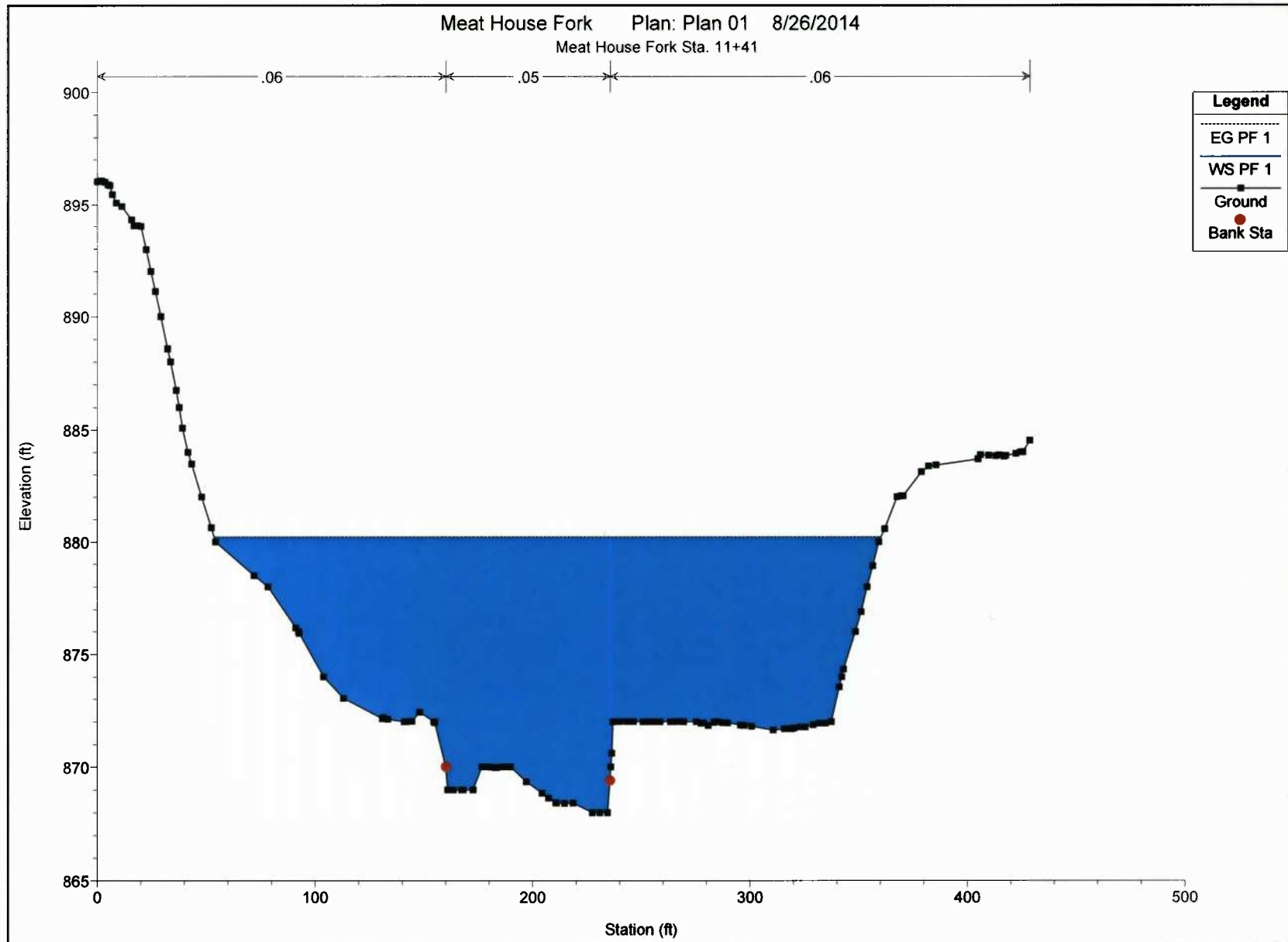
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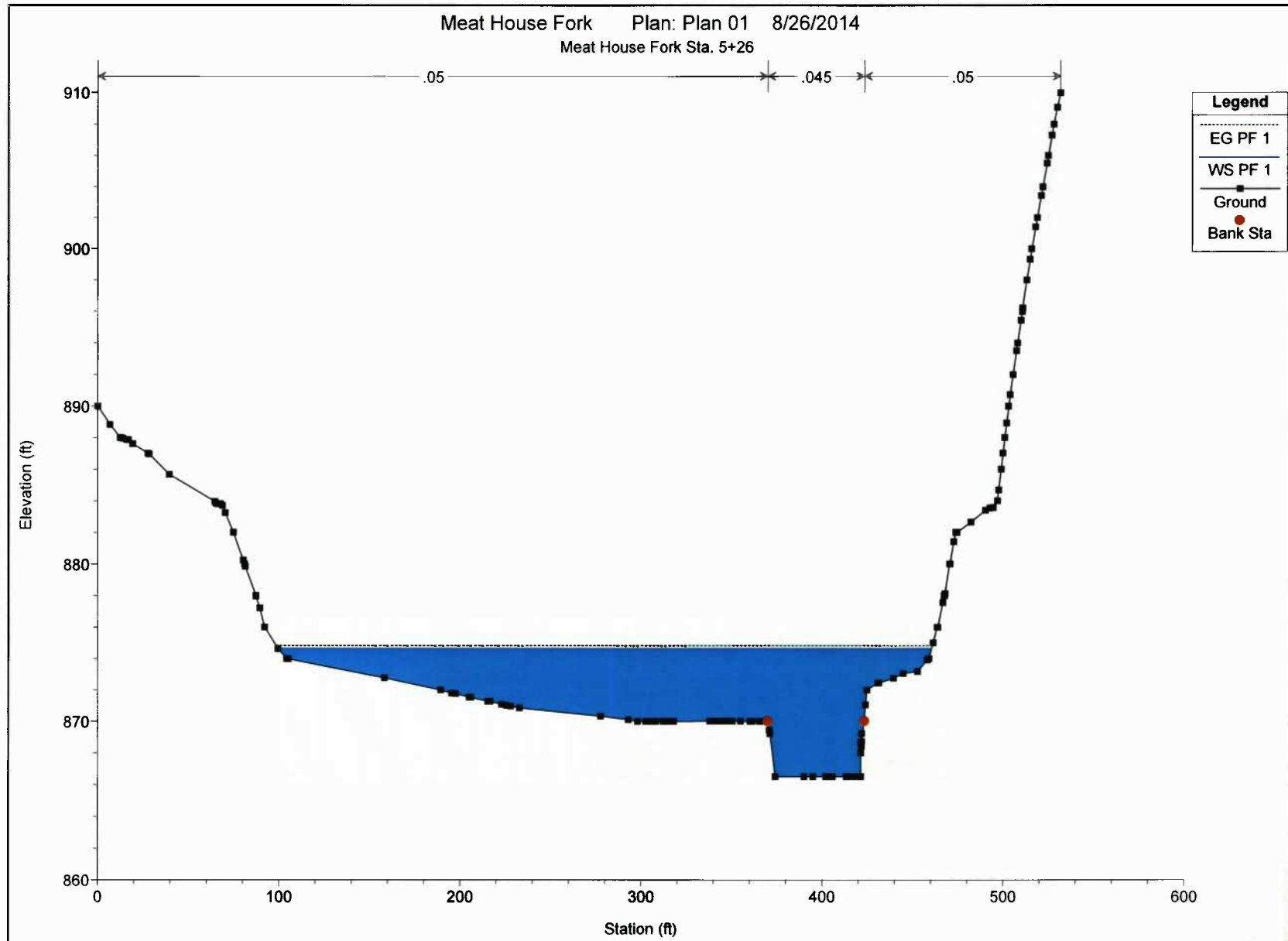
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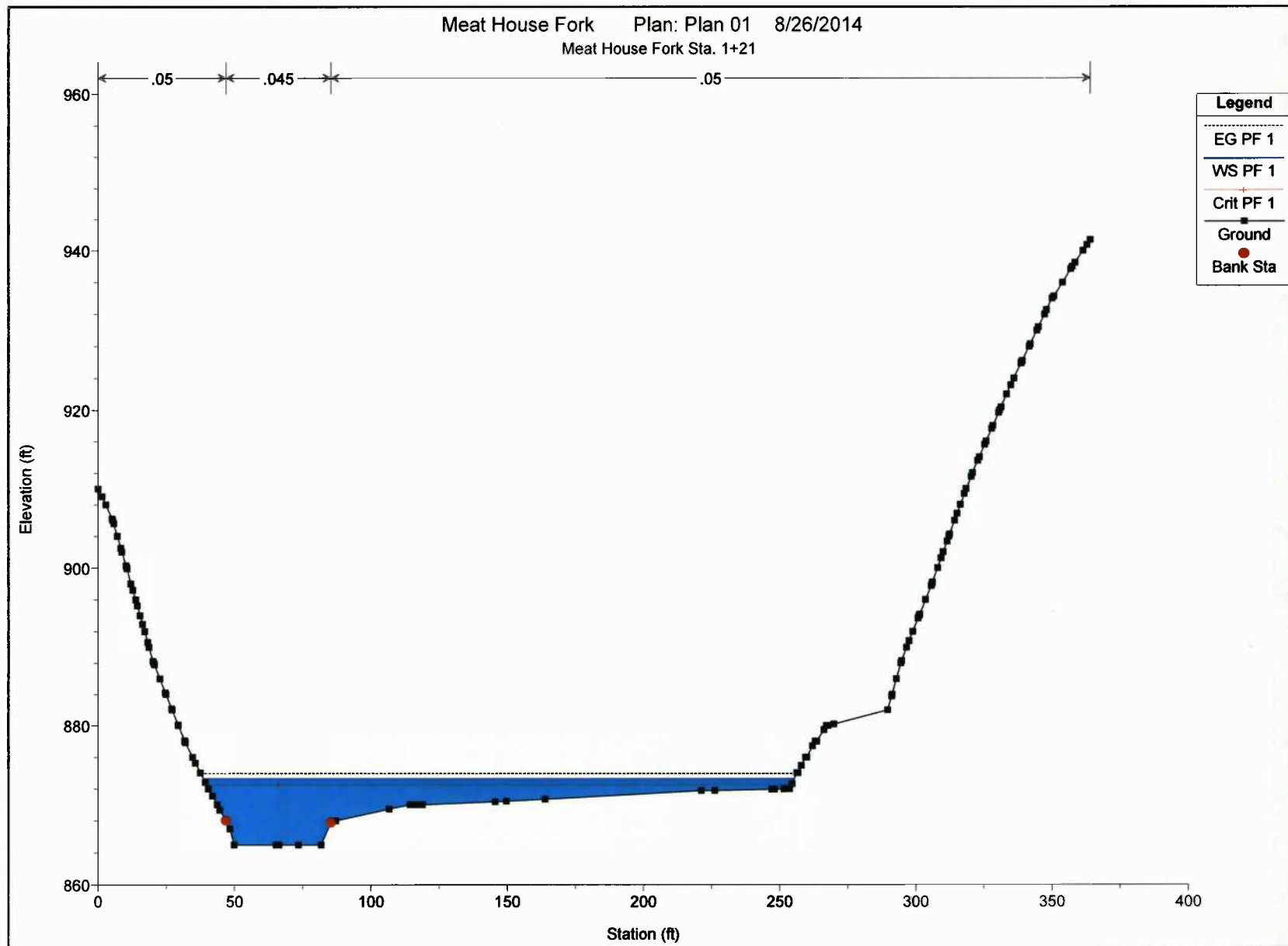
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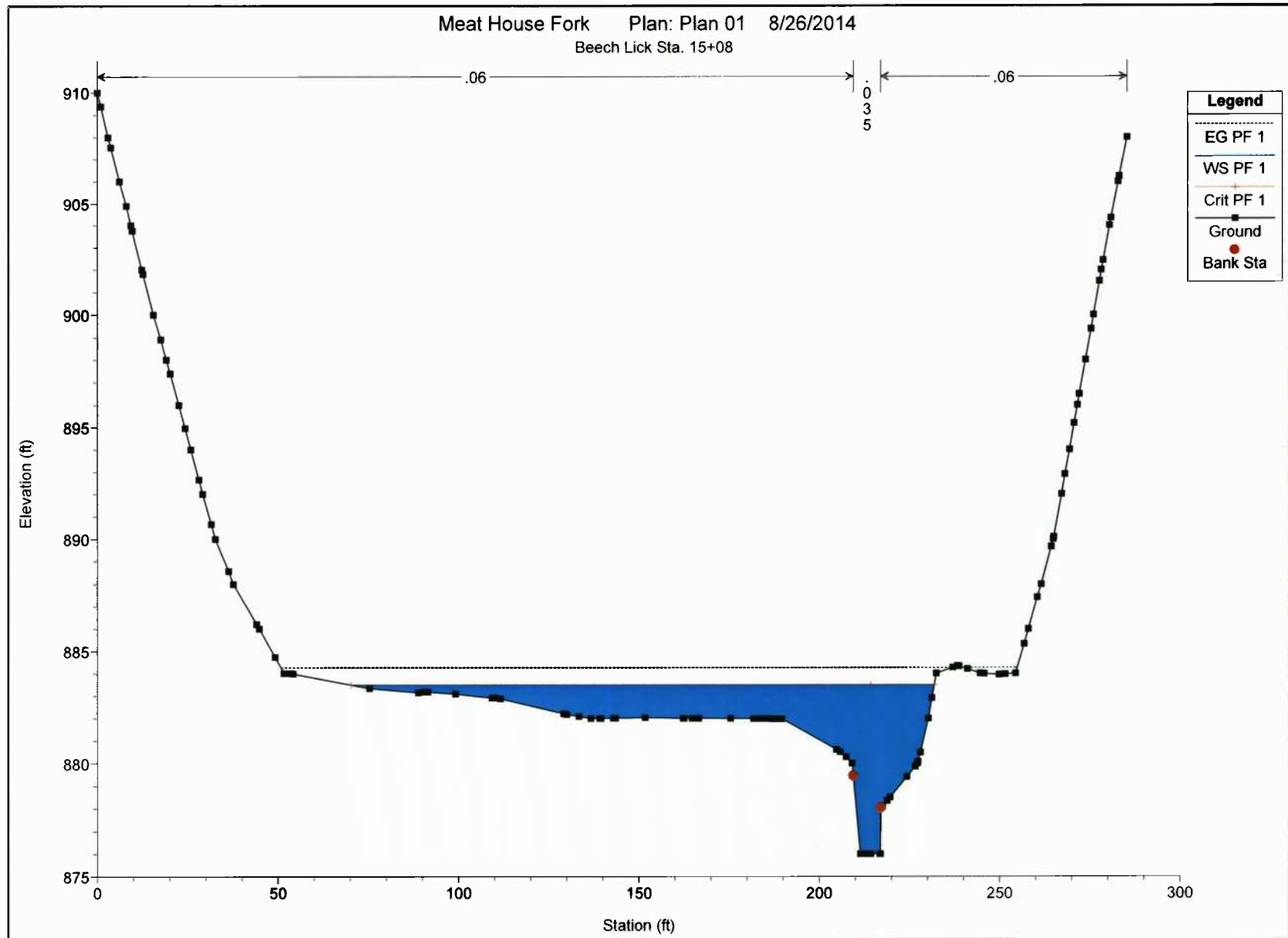
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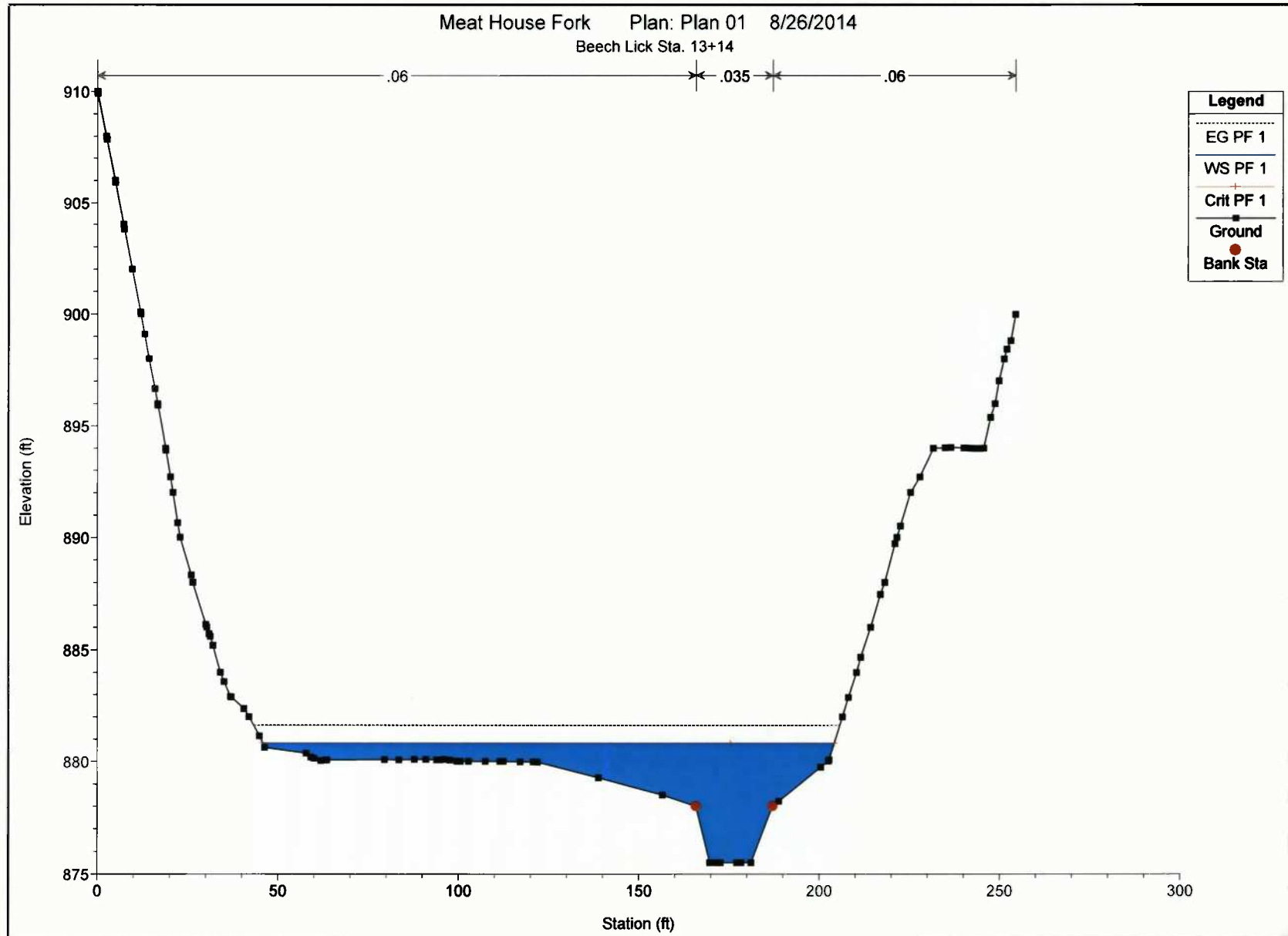
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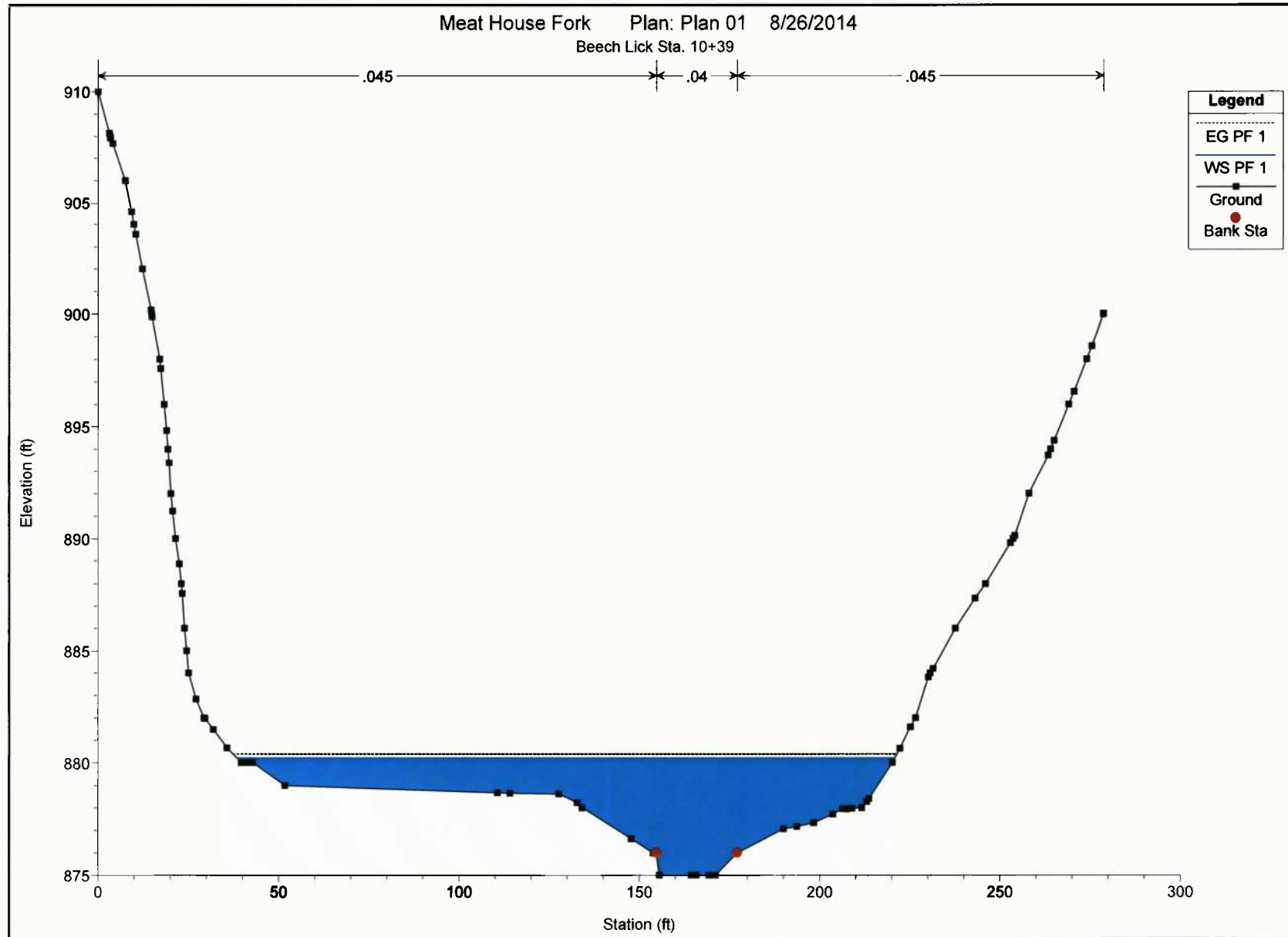
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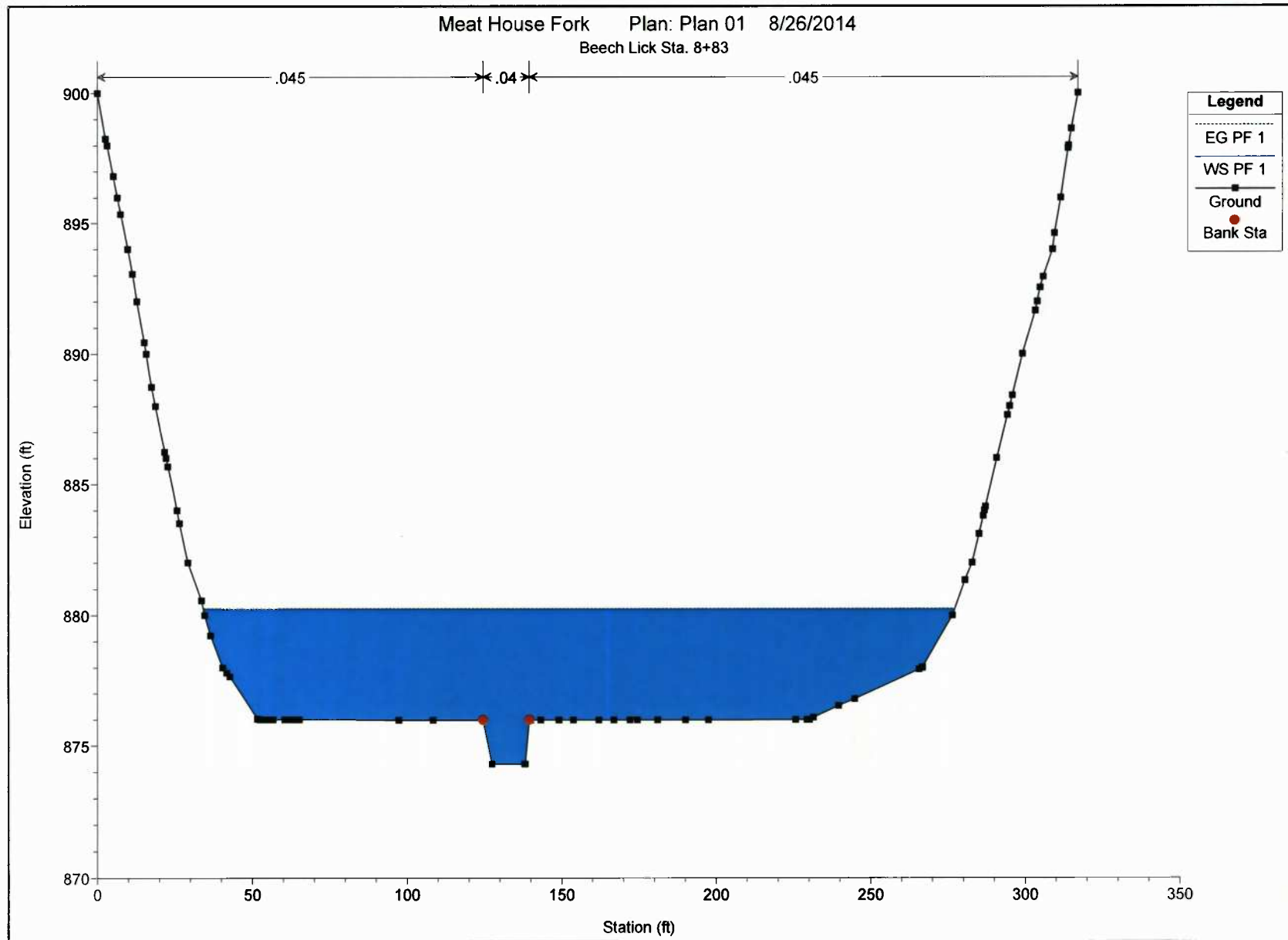
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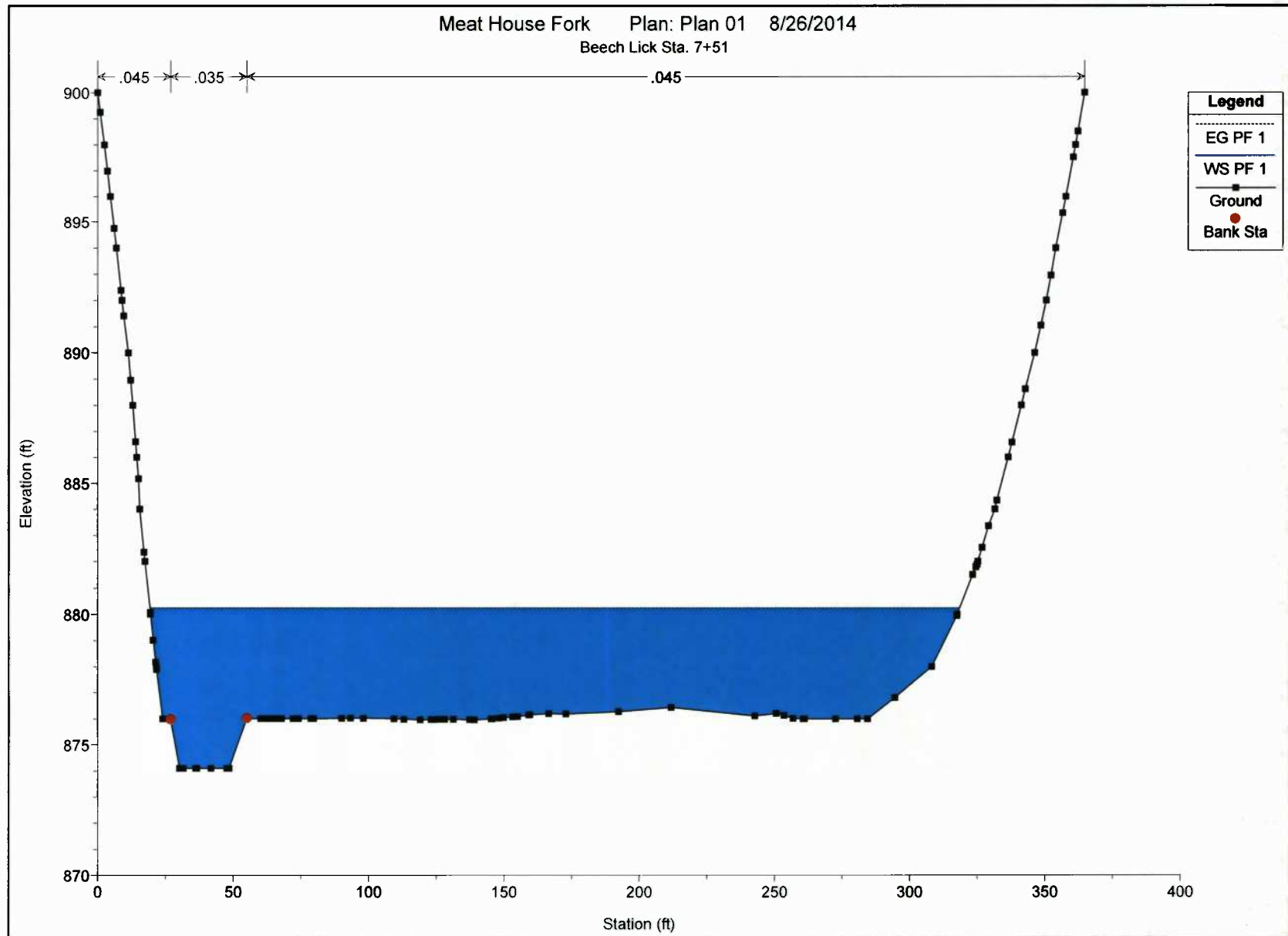
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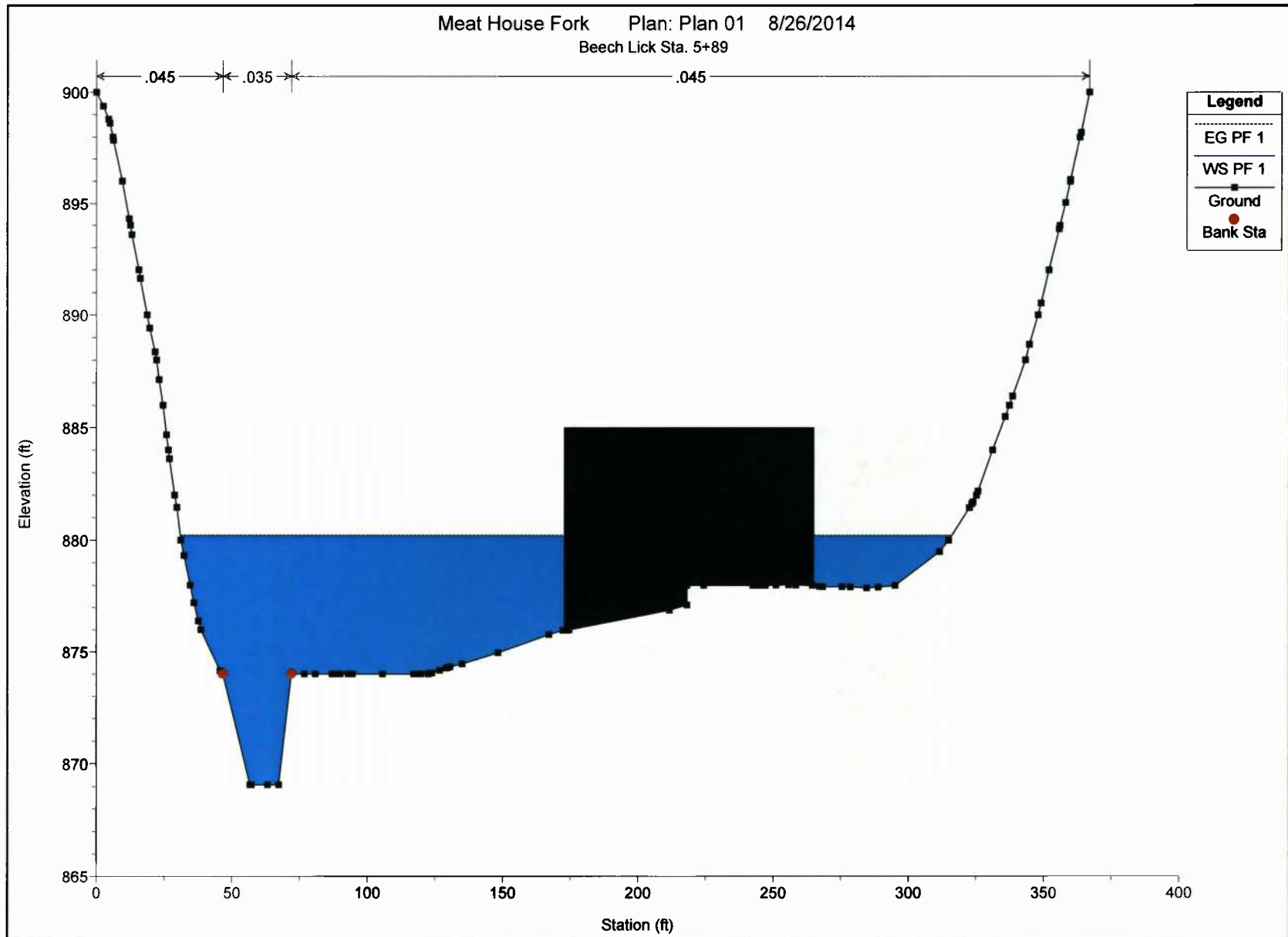
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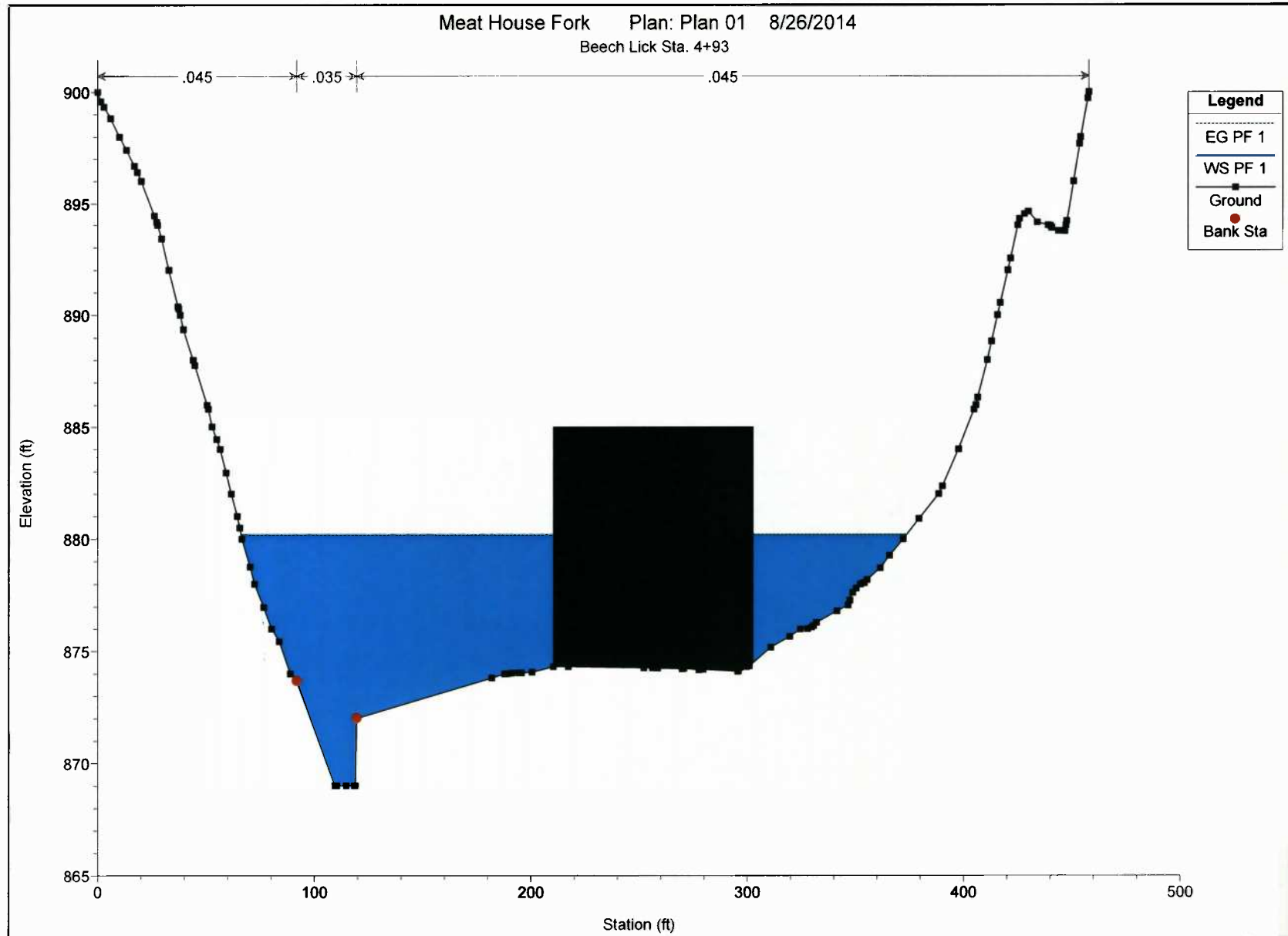
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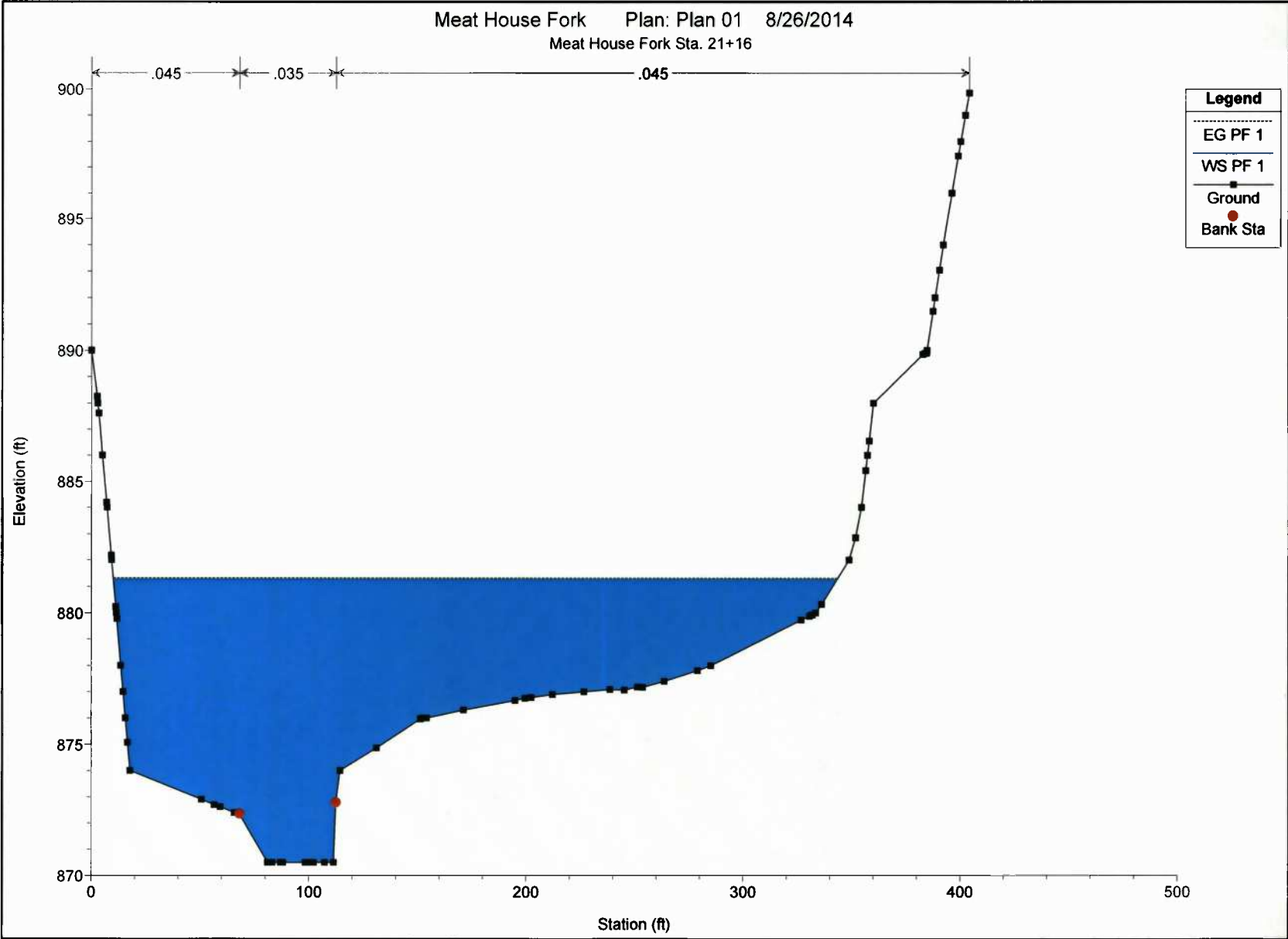
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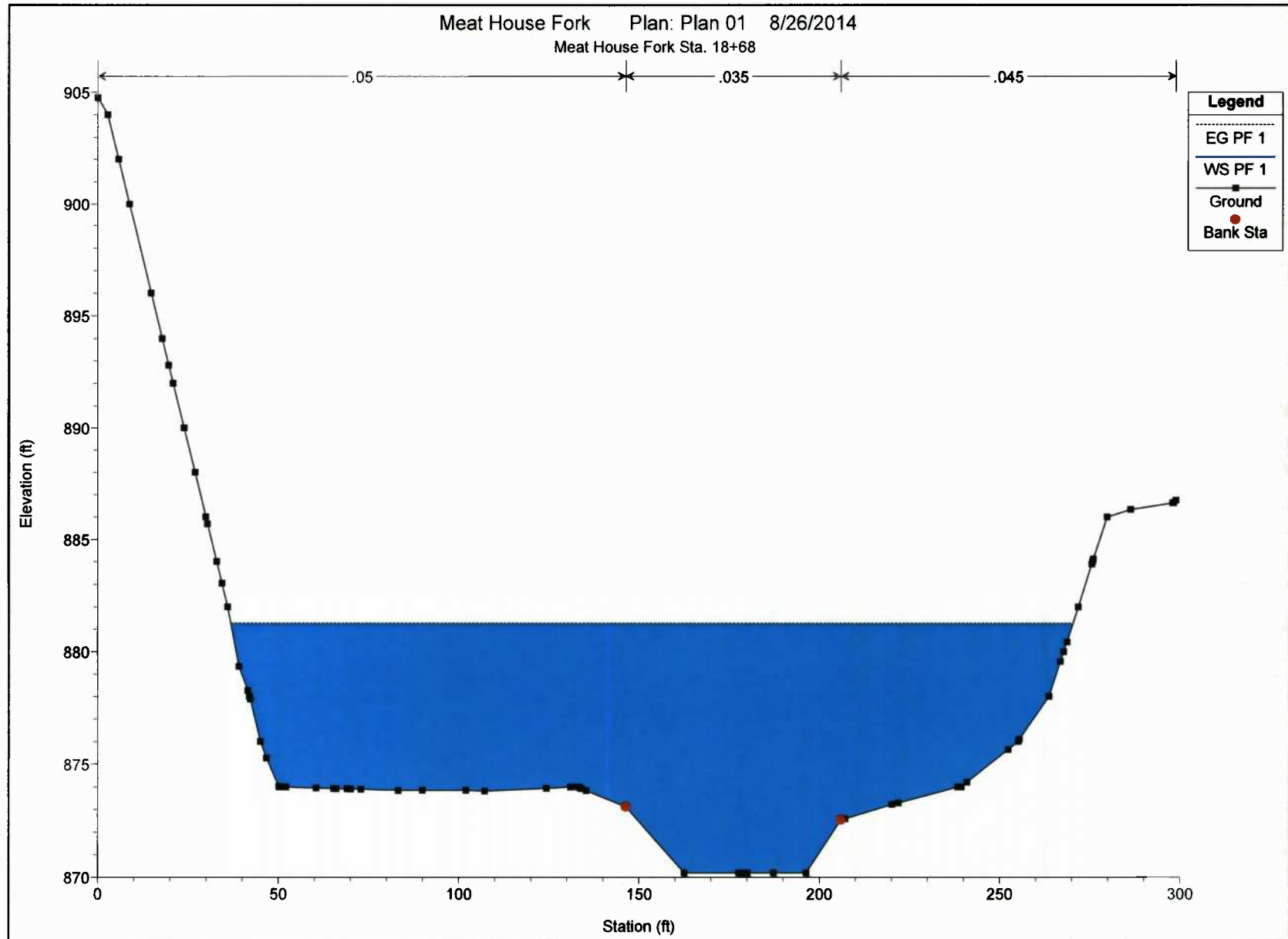
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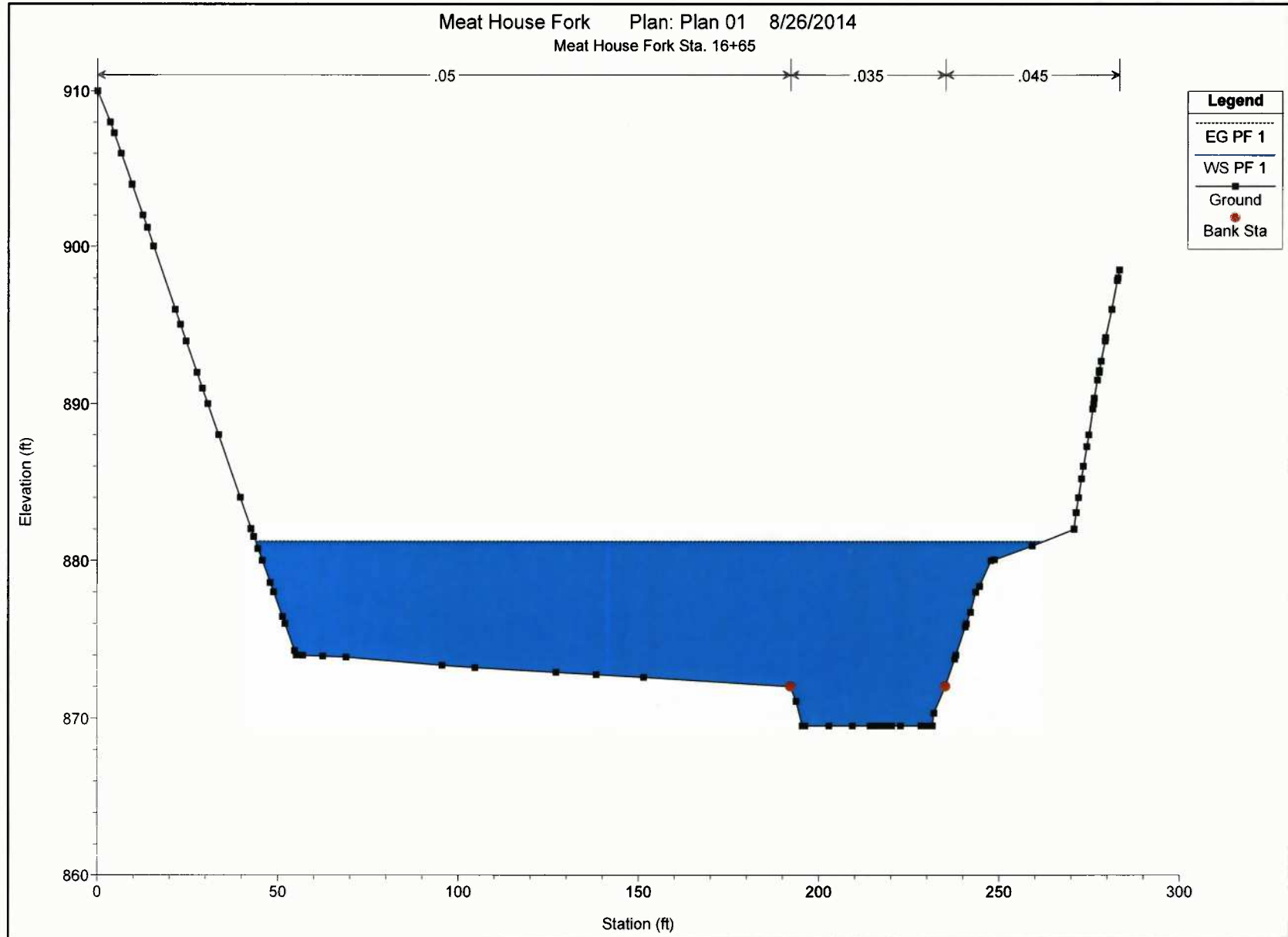
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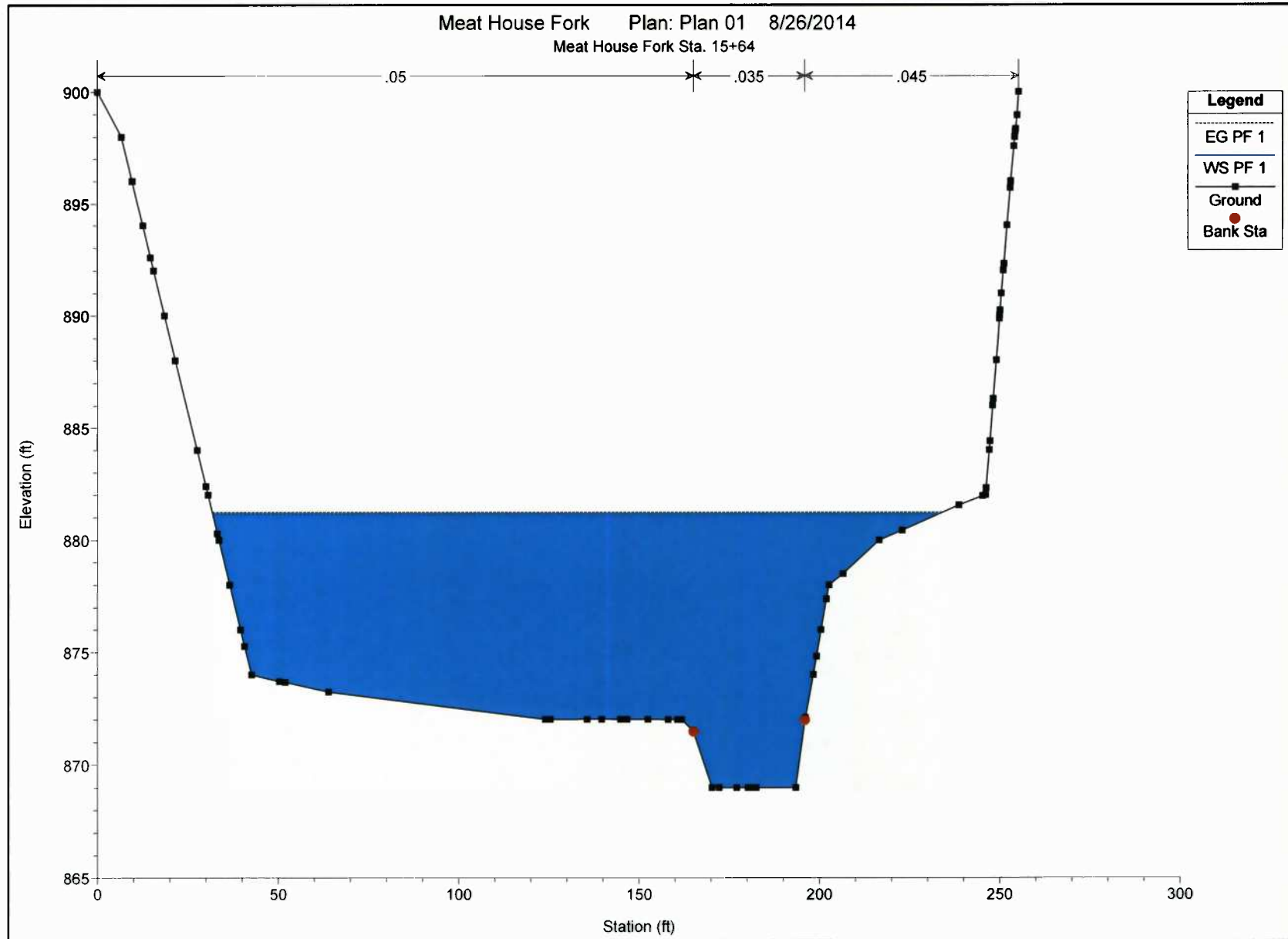
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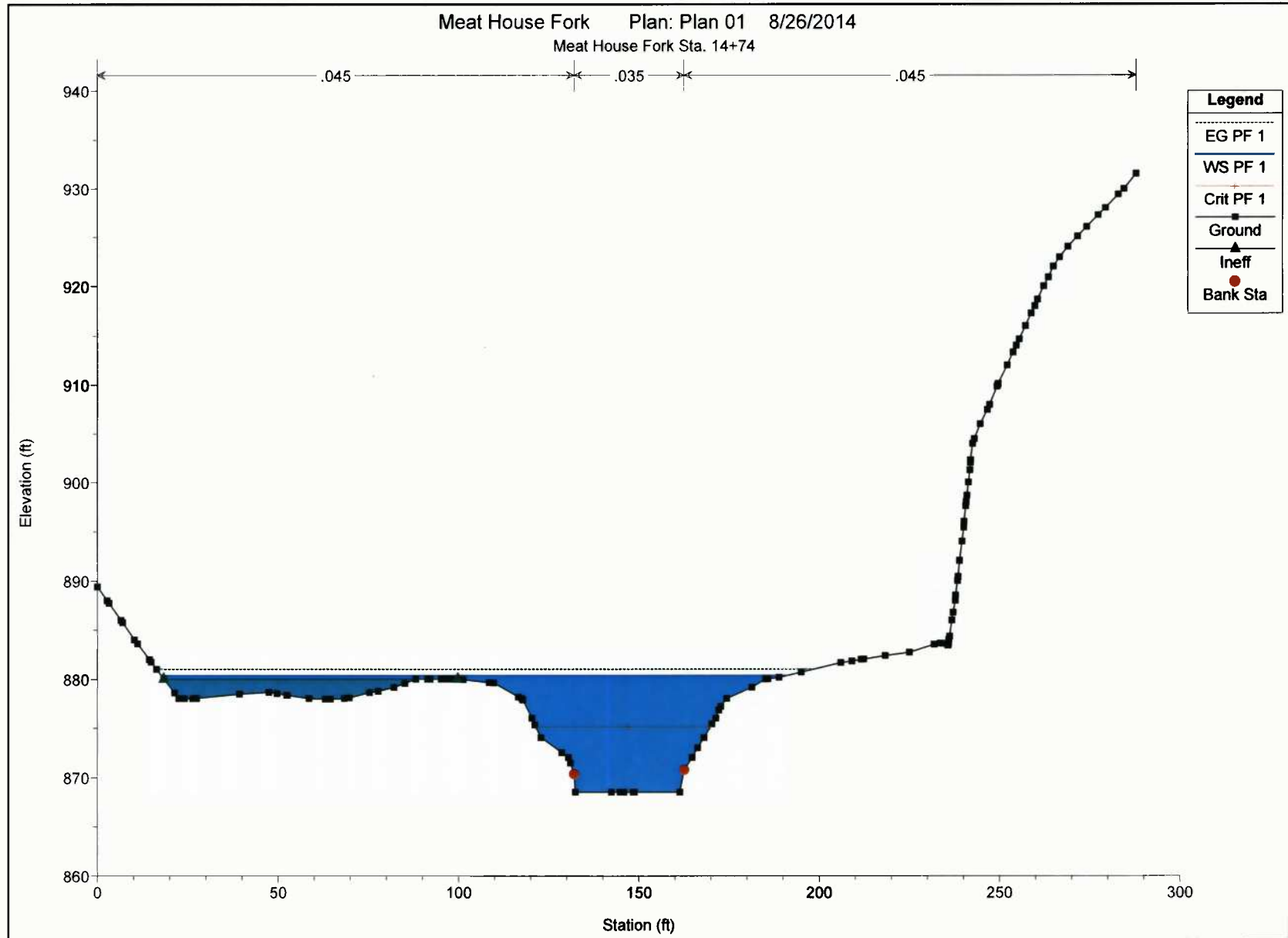
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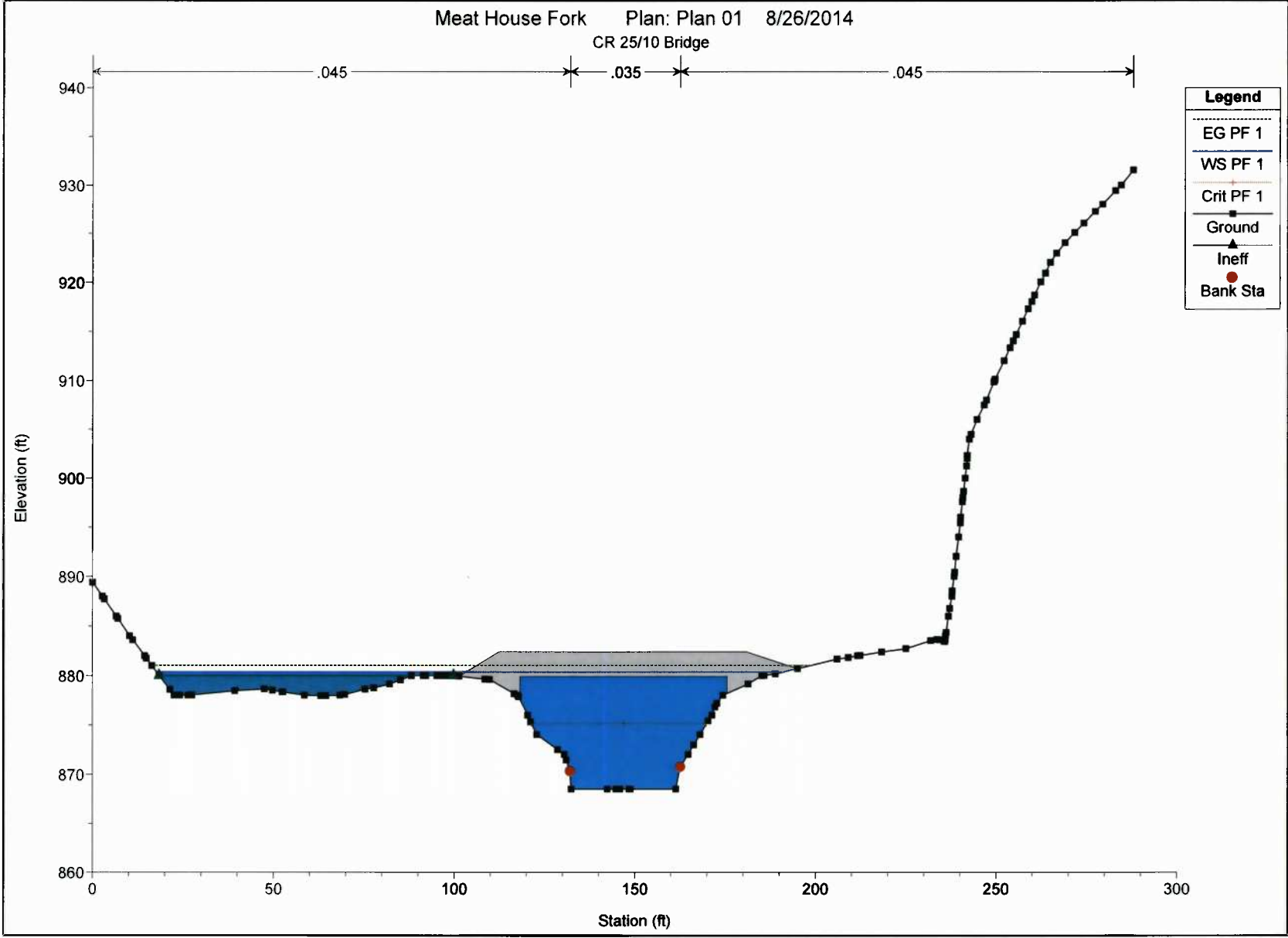
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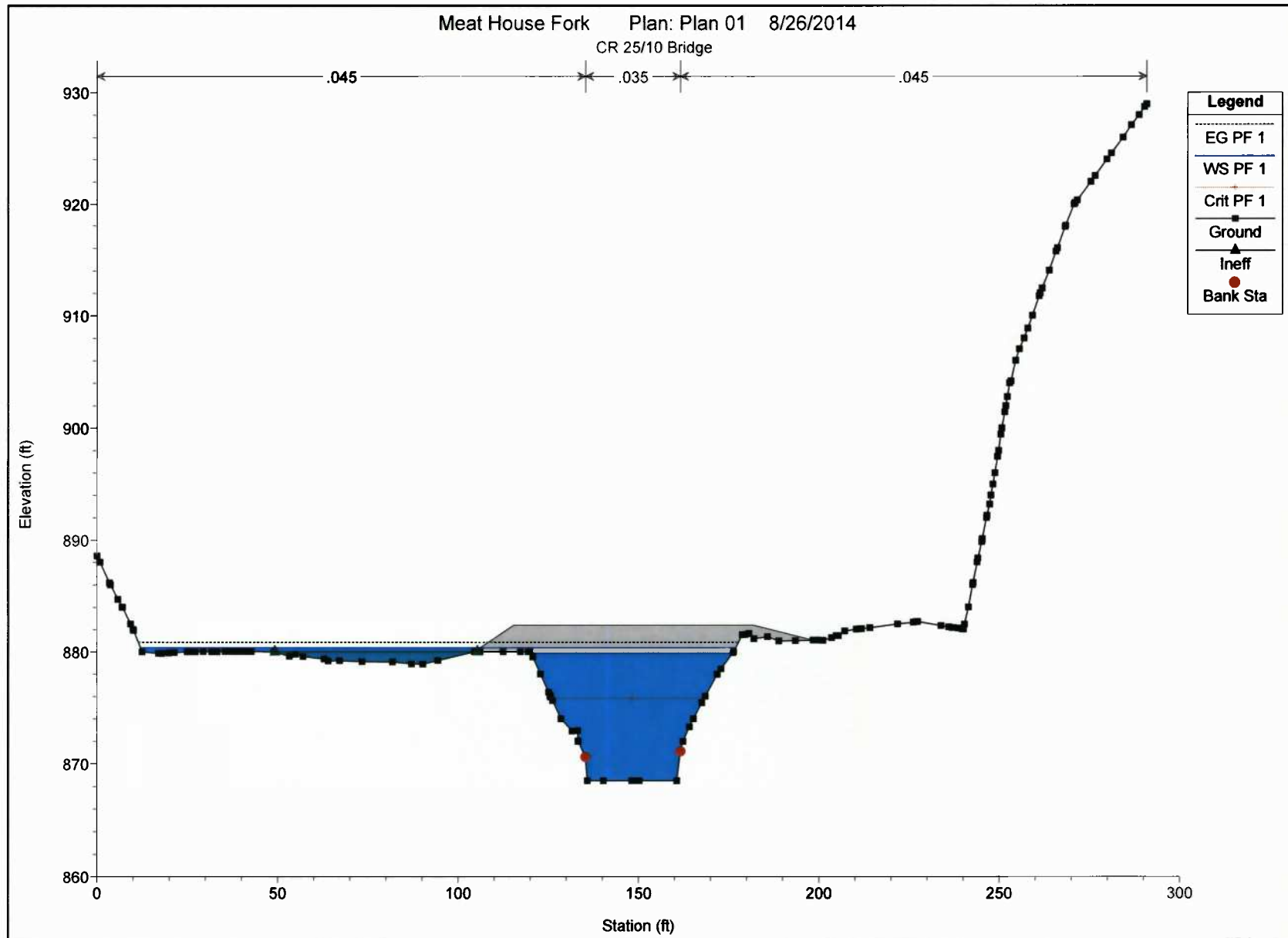
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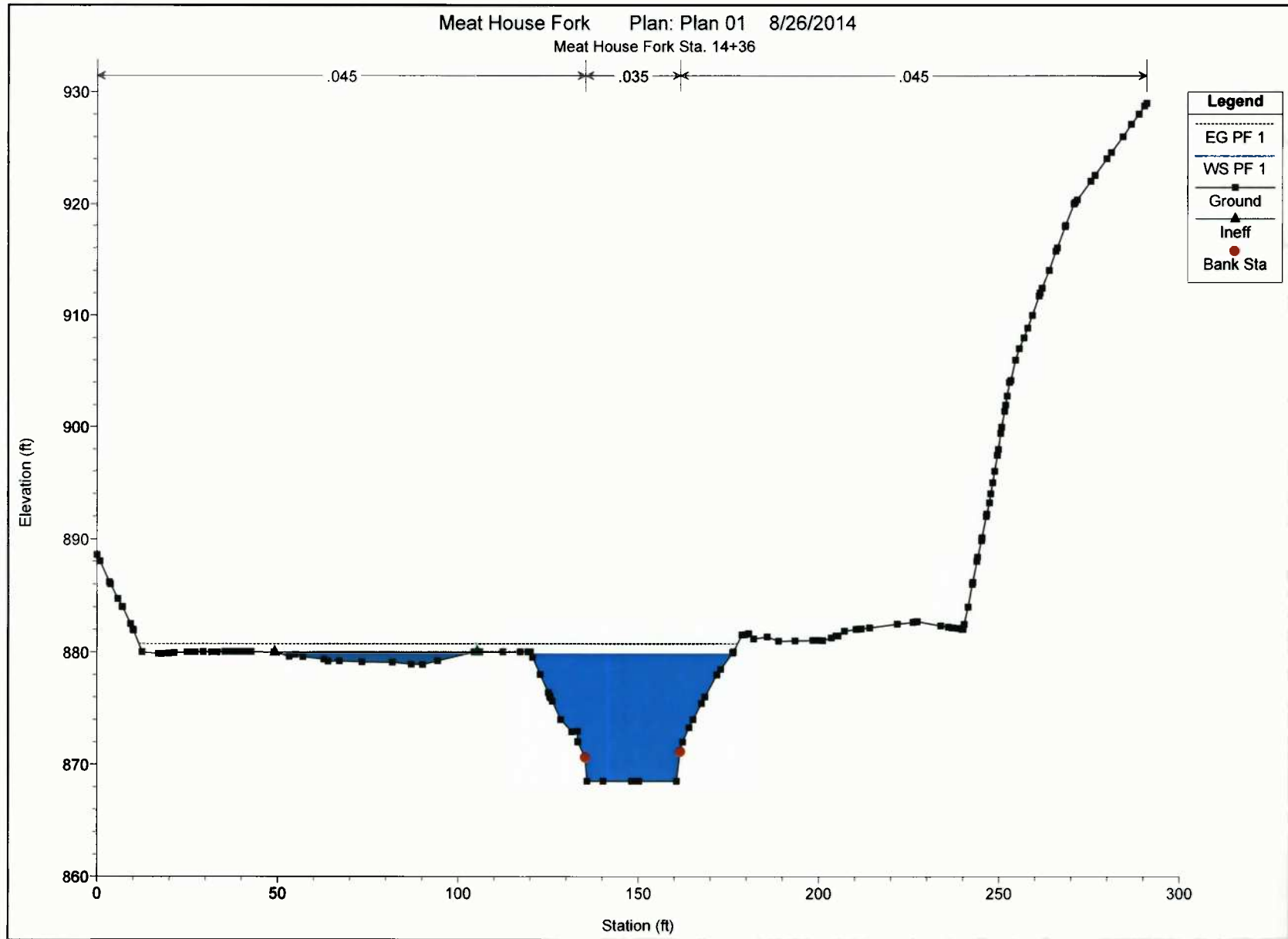
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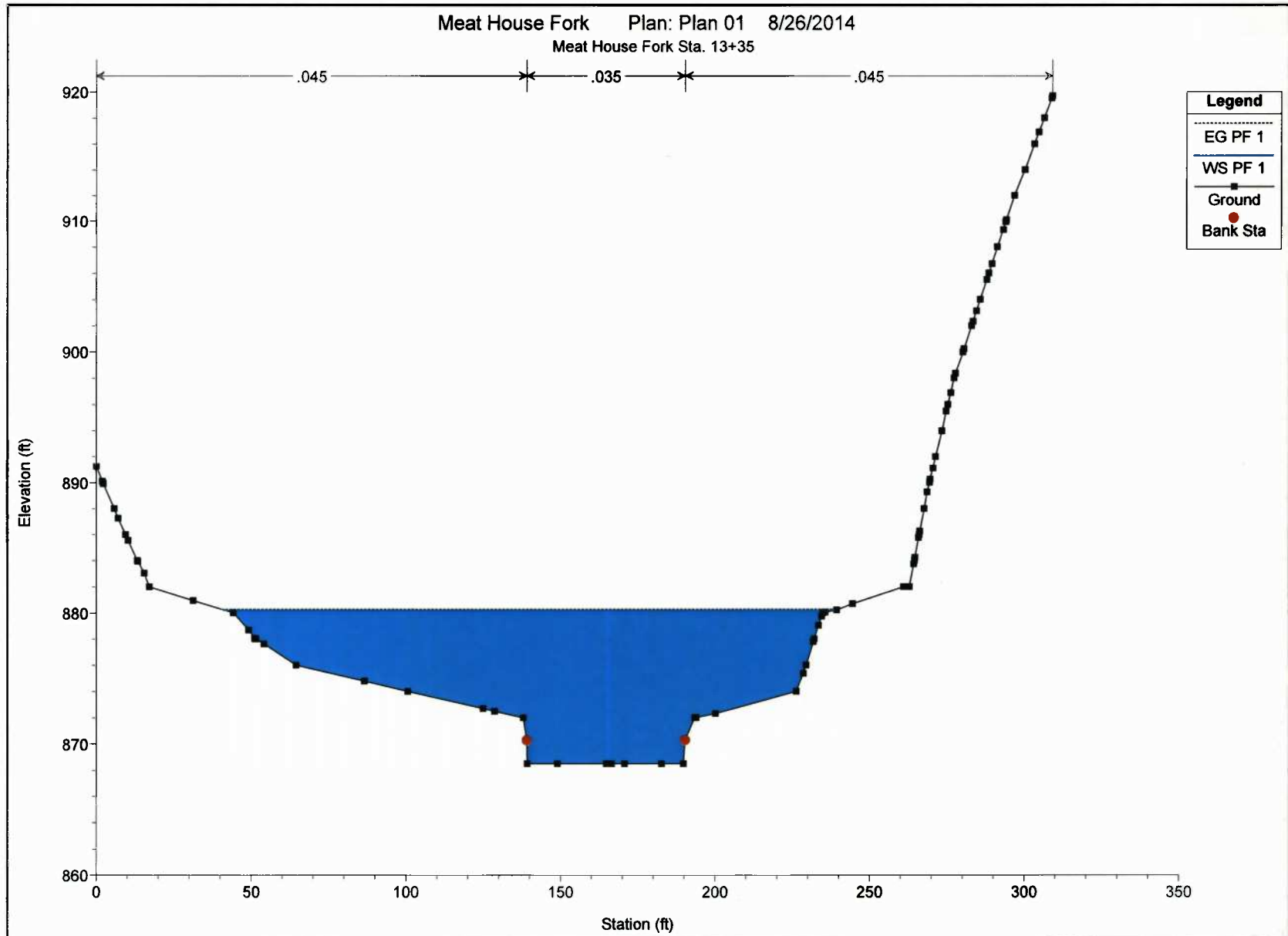
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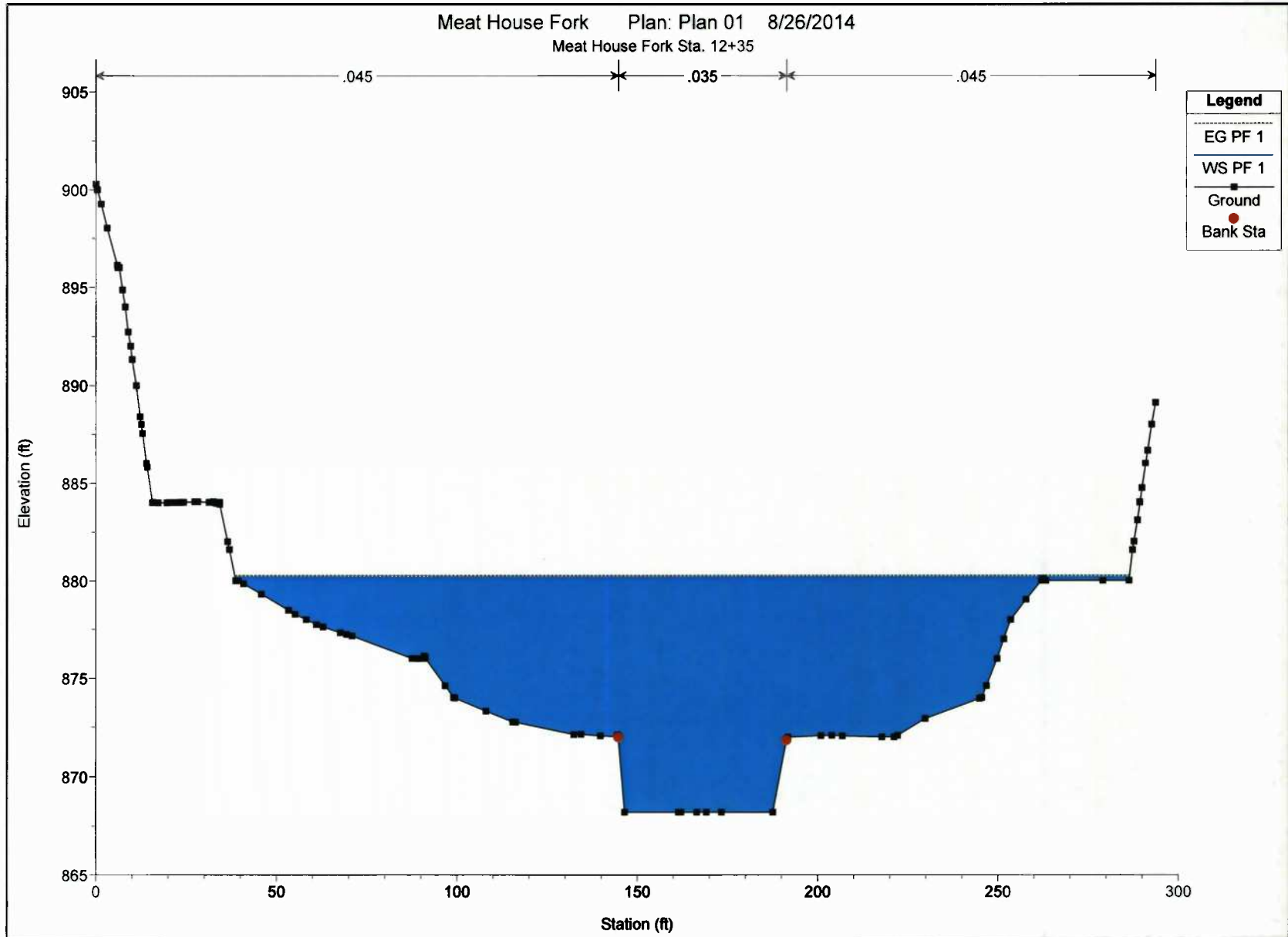
MEATHOUSE FORK - PROPOSED CROSS-SECTIONS



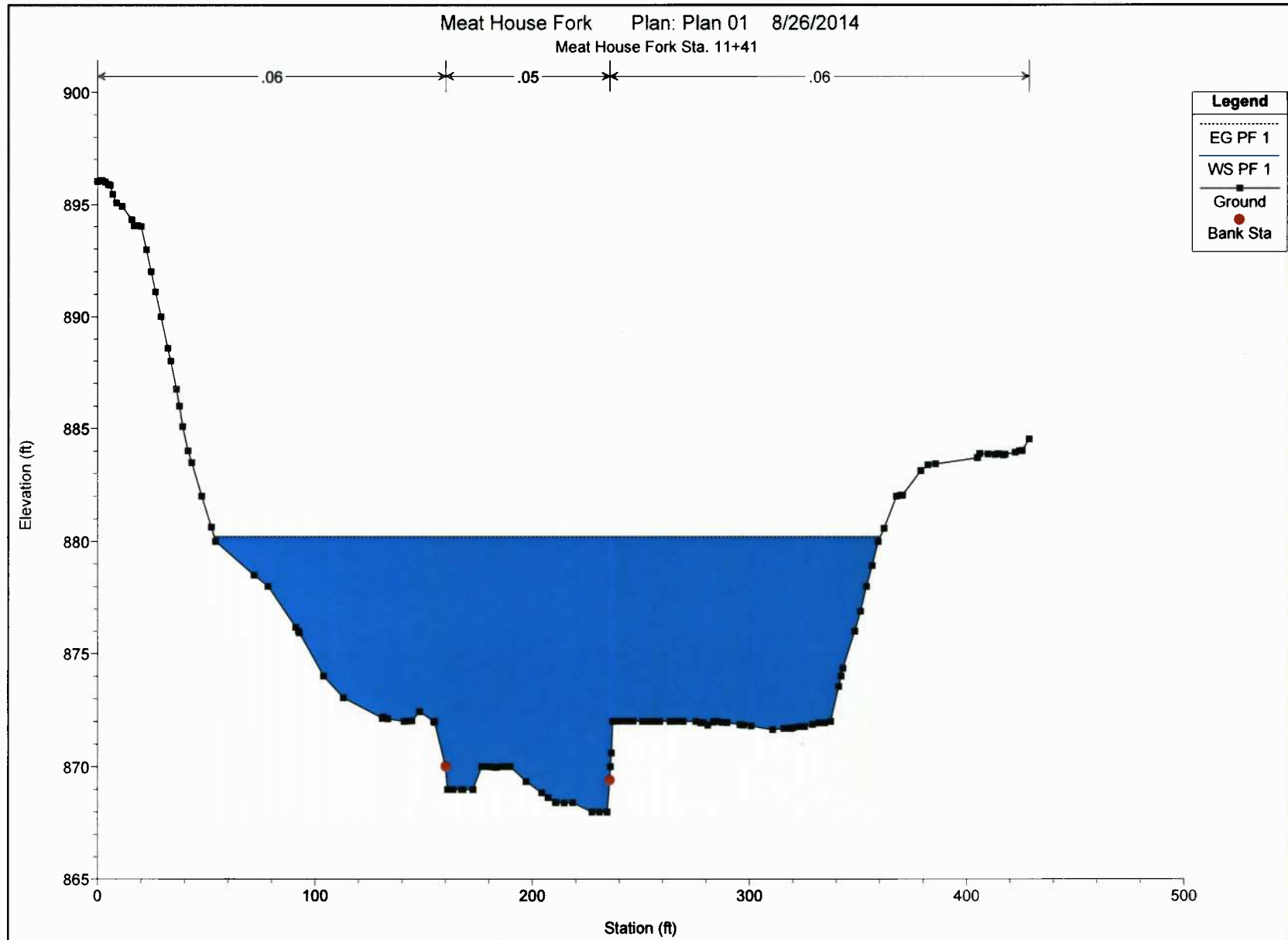
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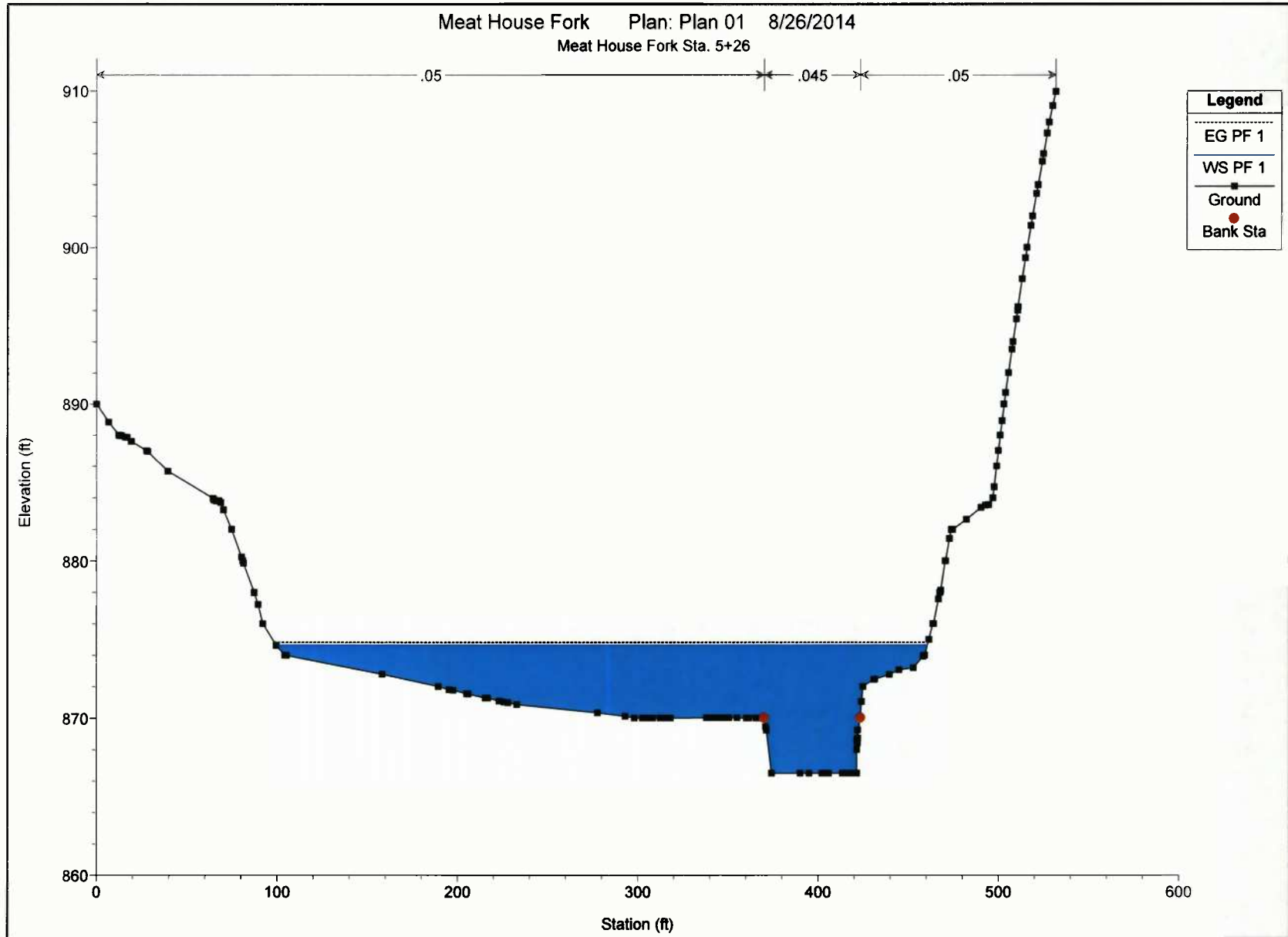
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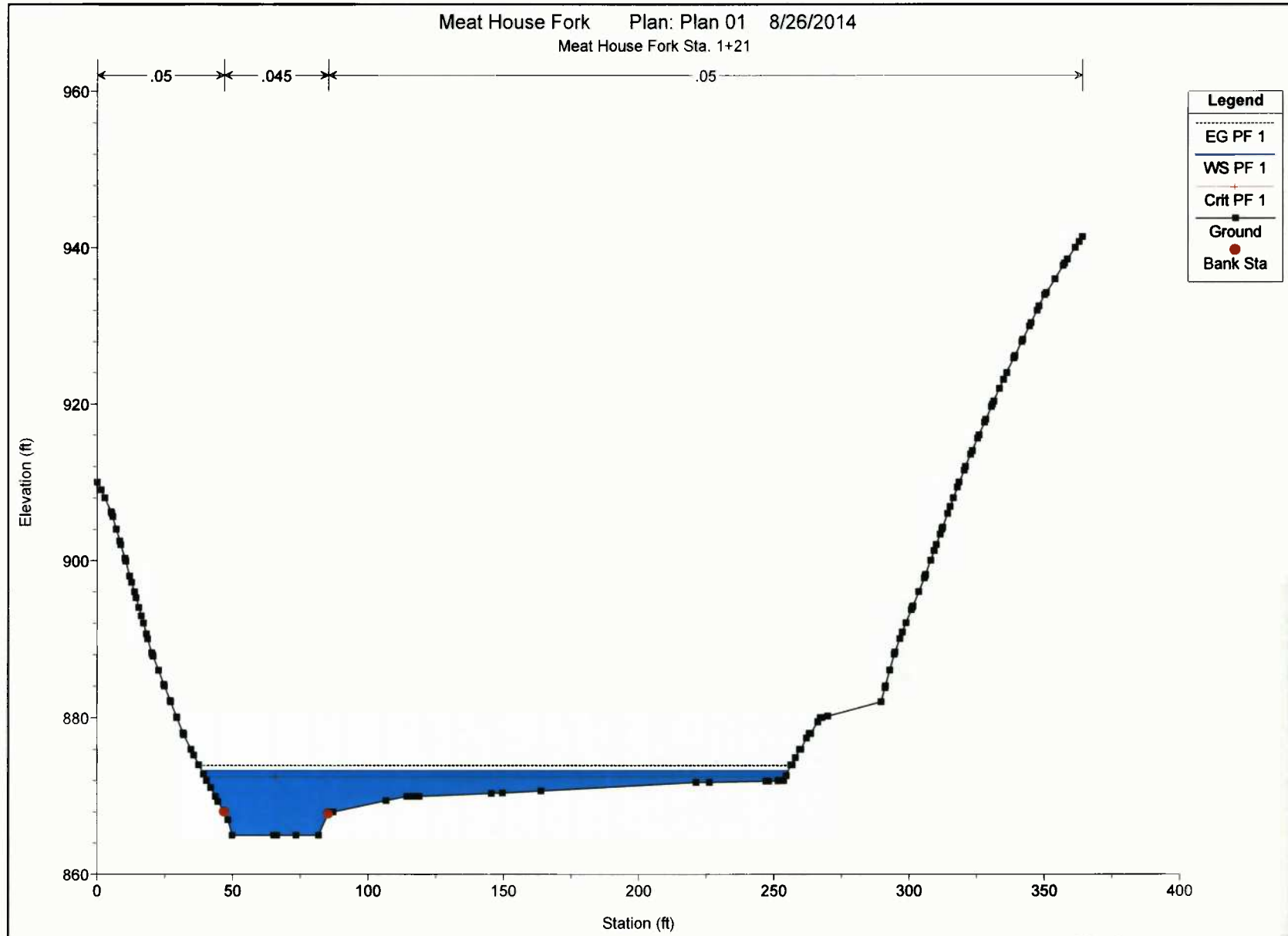
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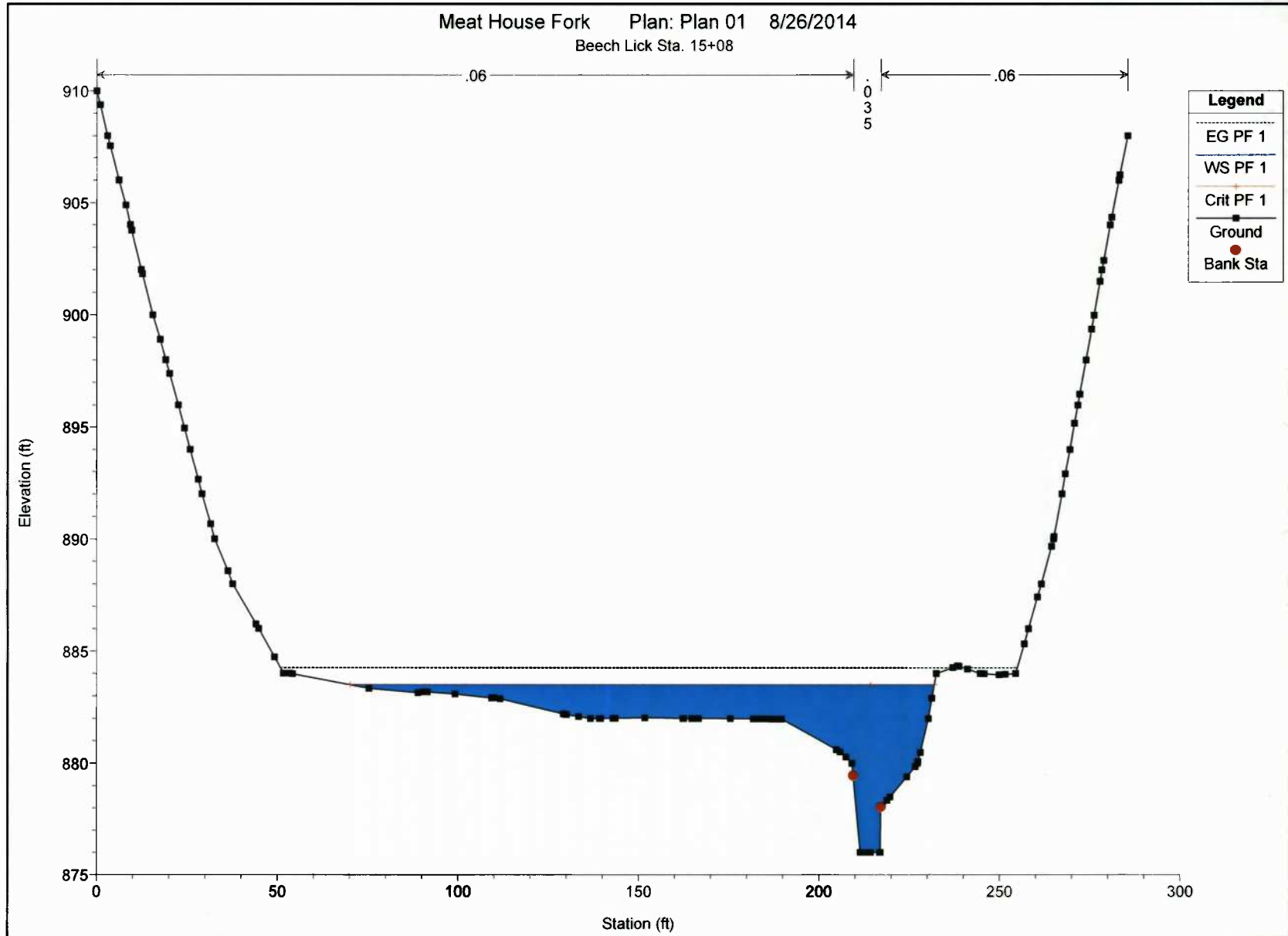
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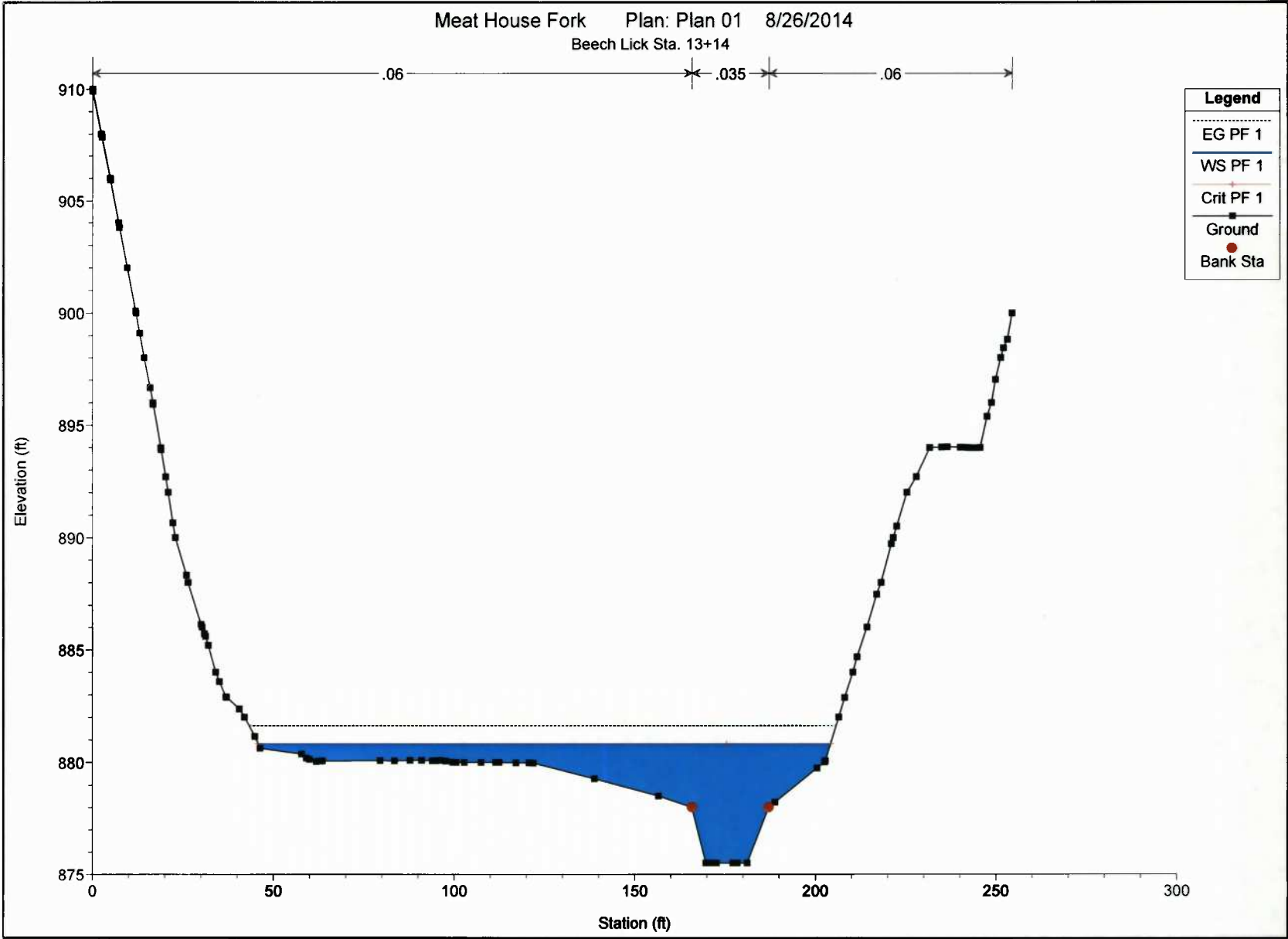
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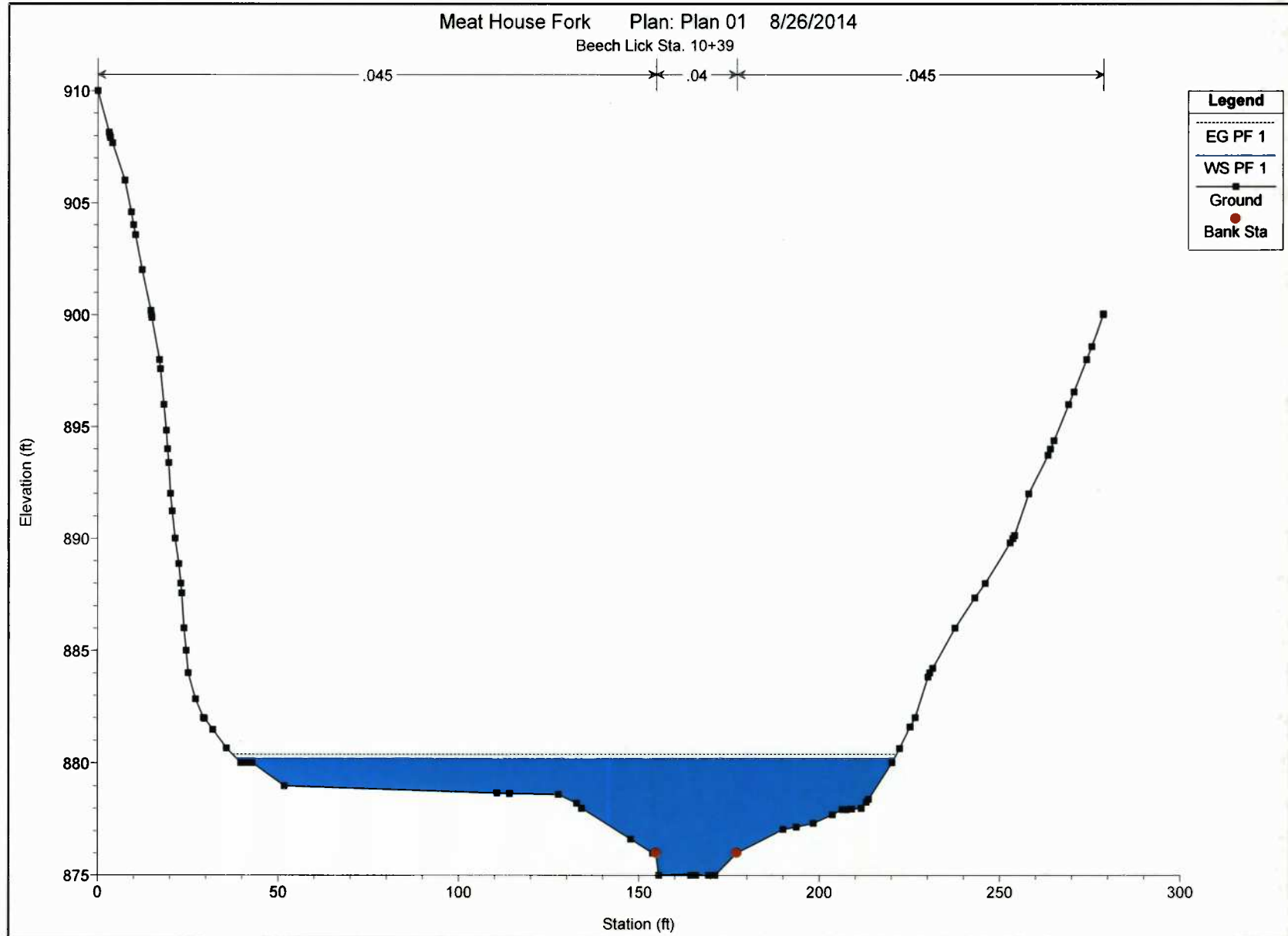
BEECH LICK - PROPOSED CROSS-SECTIONS



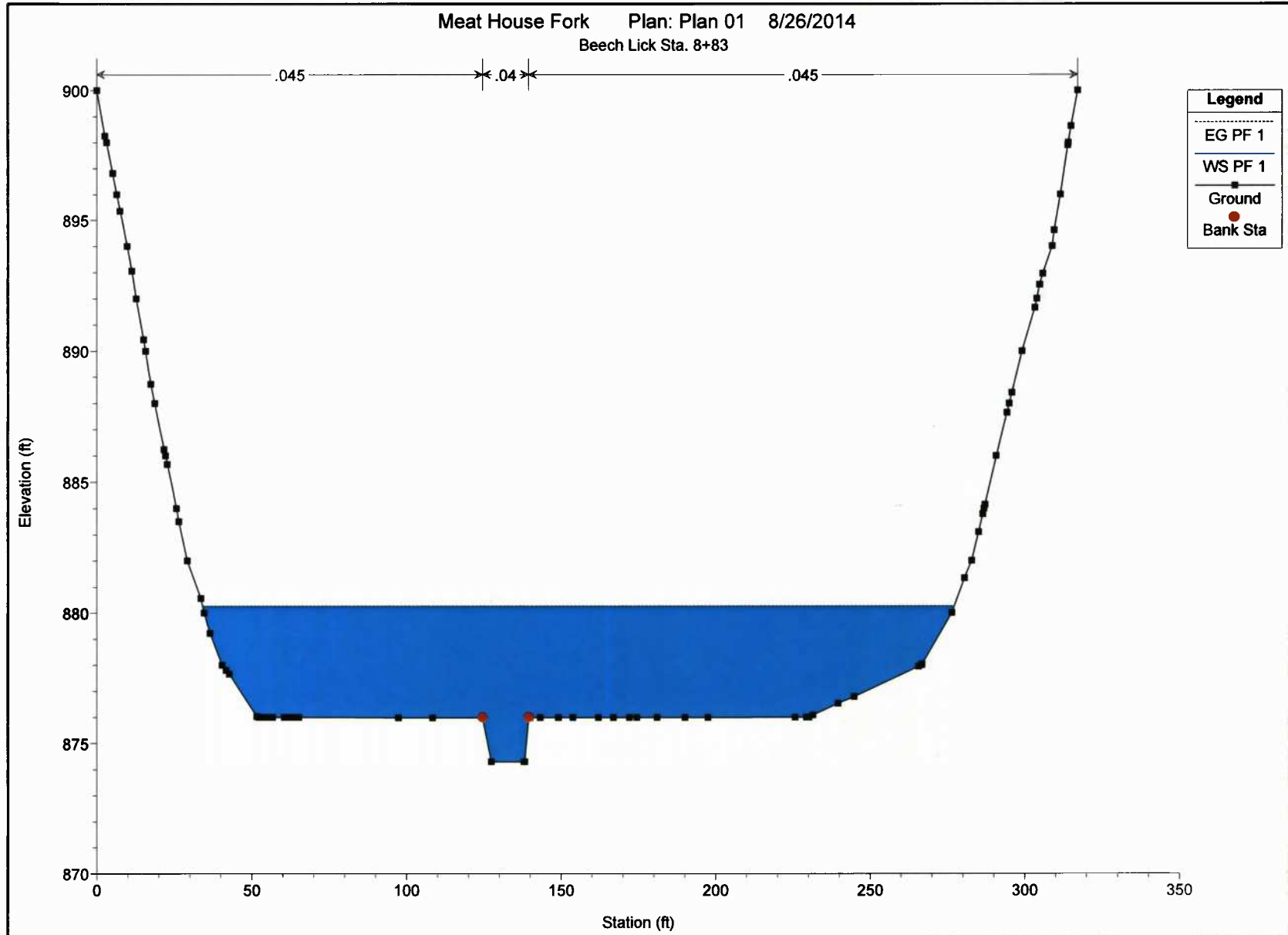
BEECH LICK - PROPOSED CROSS-SECTIONS



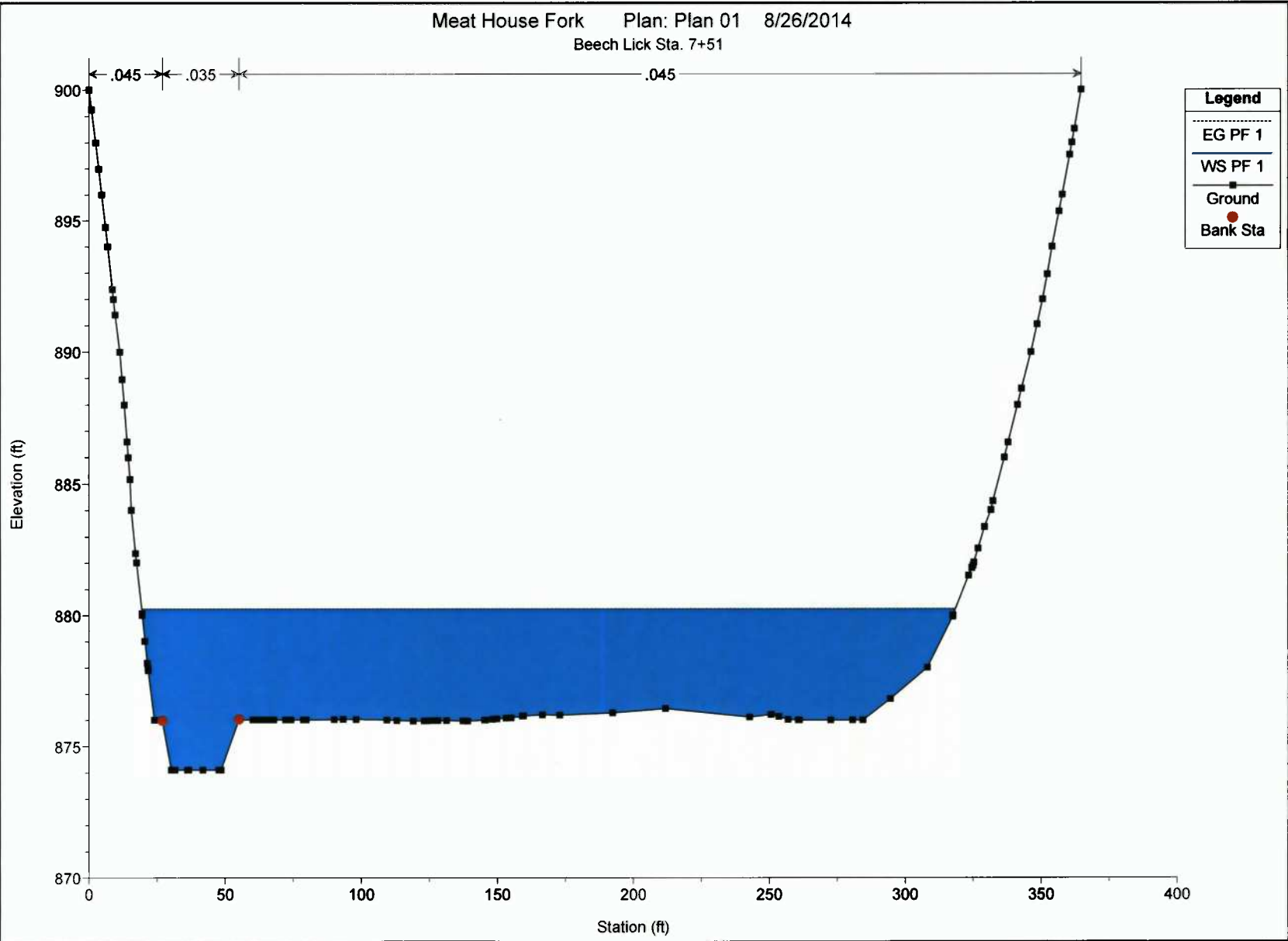
BEECH LICK - PROPOSED CROSS-SECTIONS



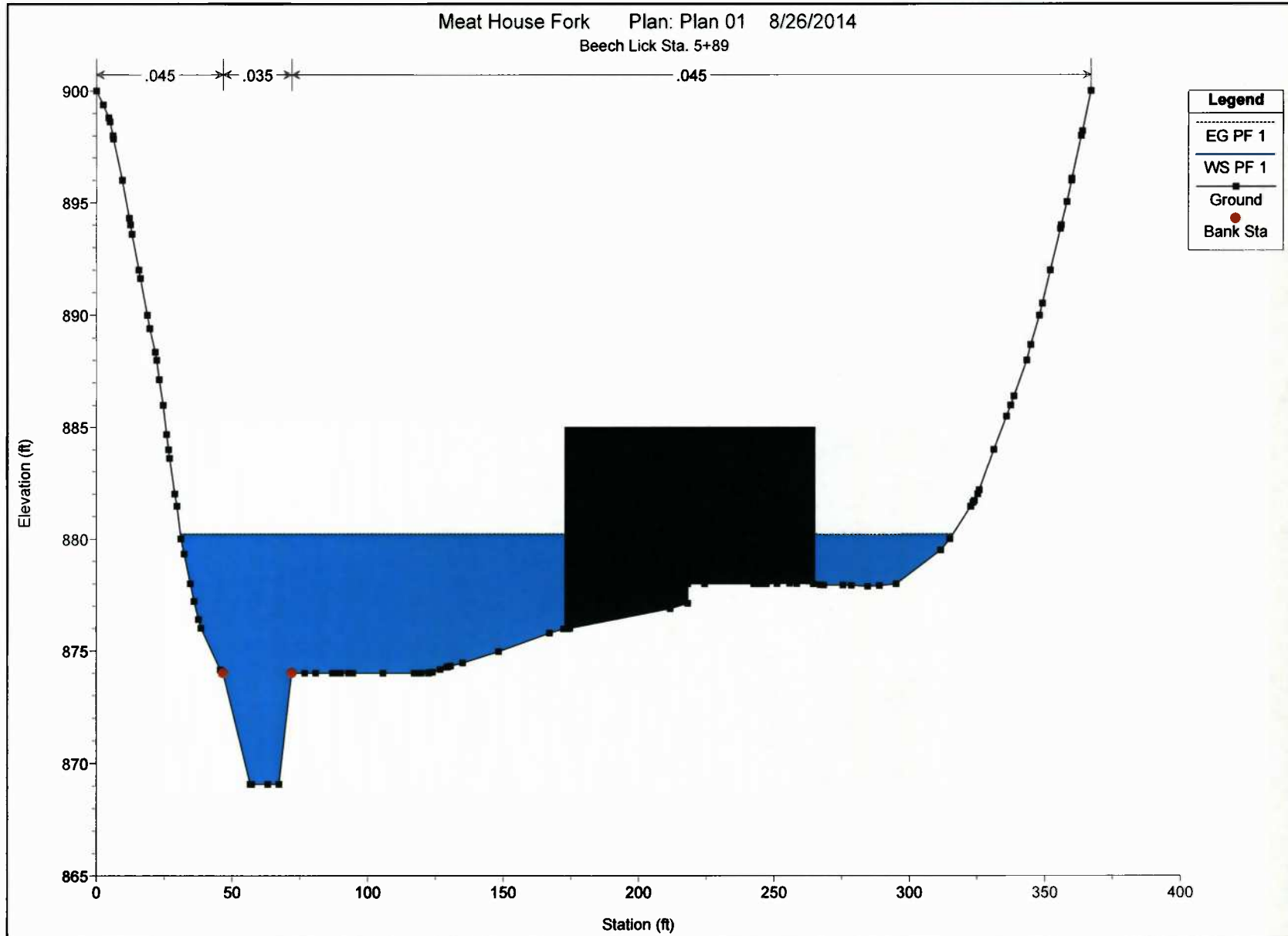
BEECH LICK - PROPOSED CROSS-SECTIONS



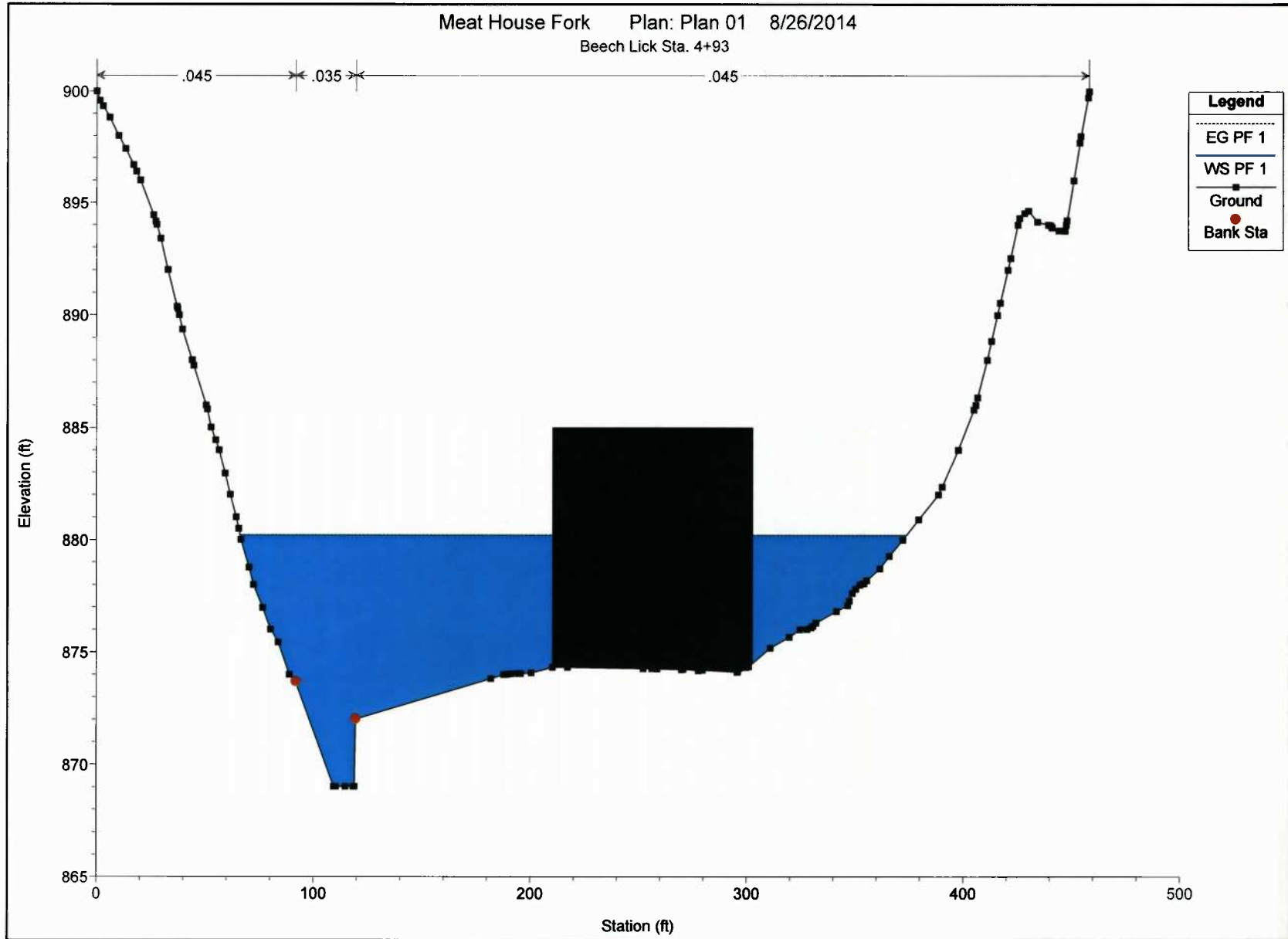
BEECH LICK - PROPOSED CROSS-SECTIONS



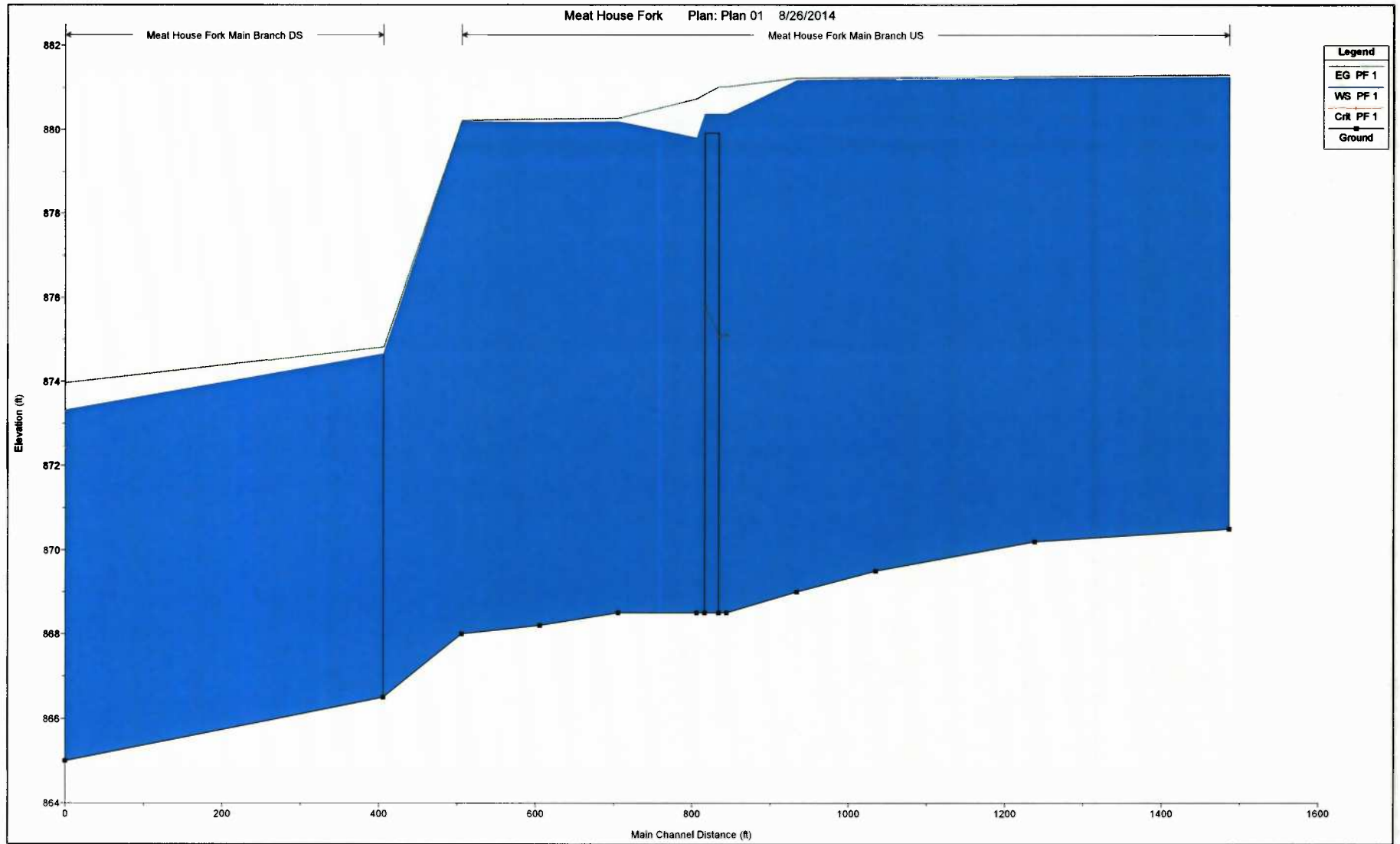
BEECH LICK - PROPOSED CROSS-SECTIONS



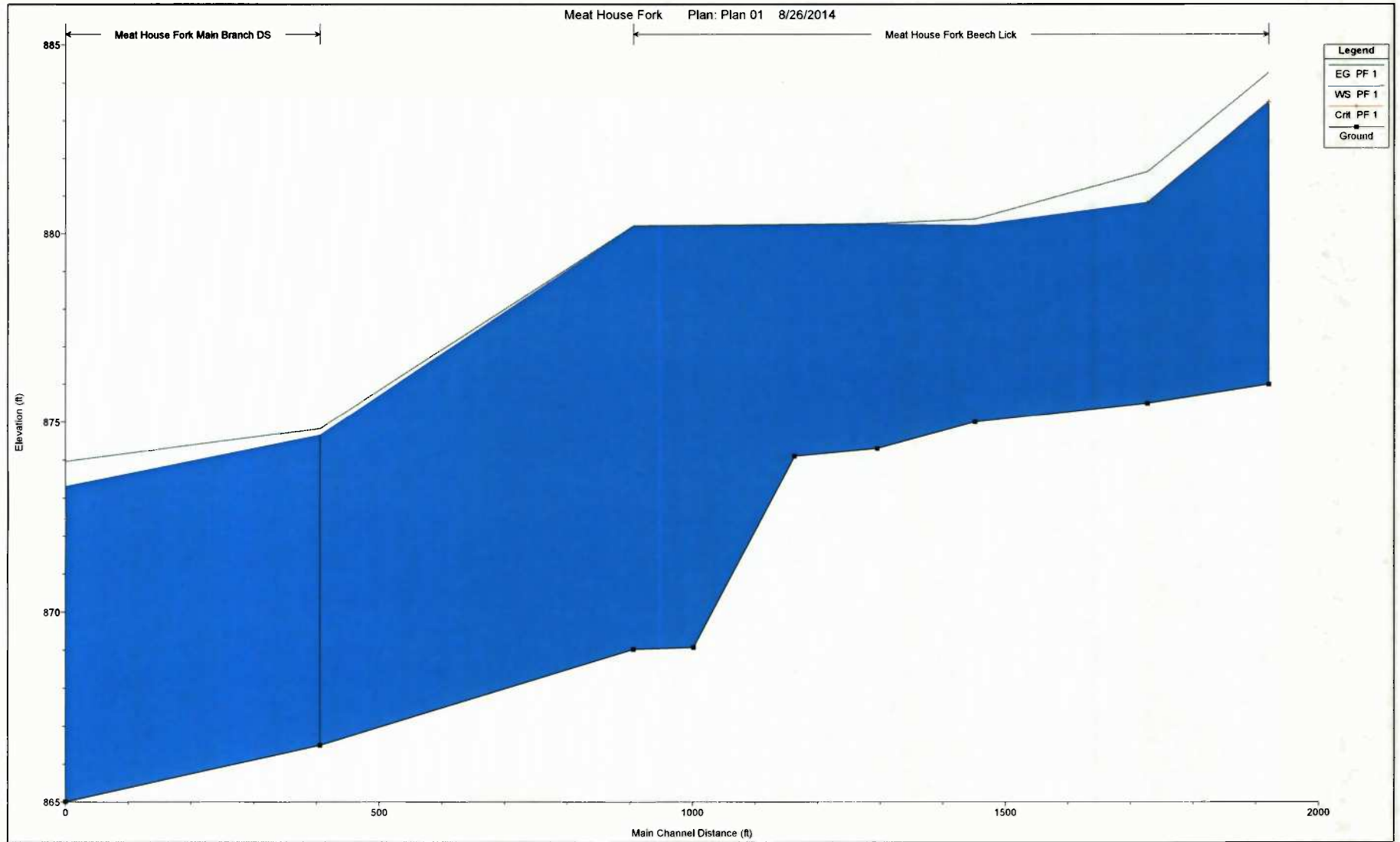
BEECH LICK - PROPOSED CROSS-SECTIONS



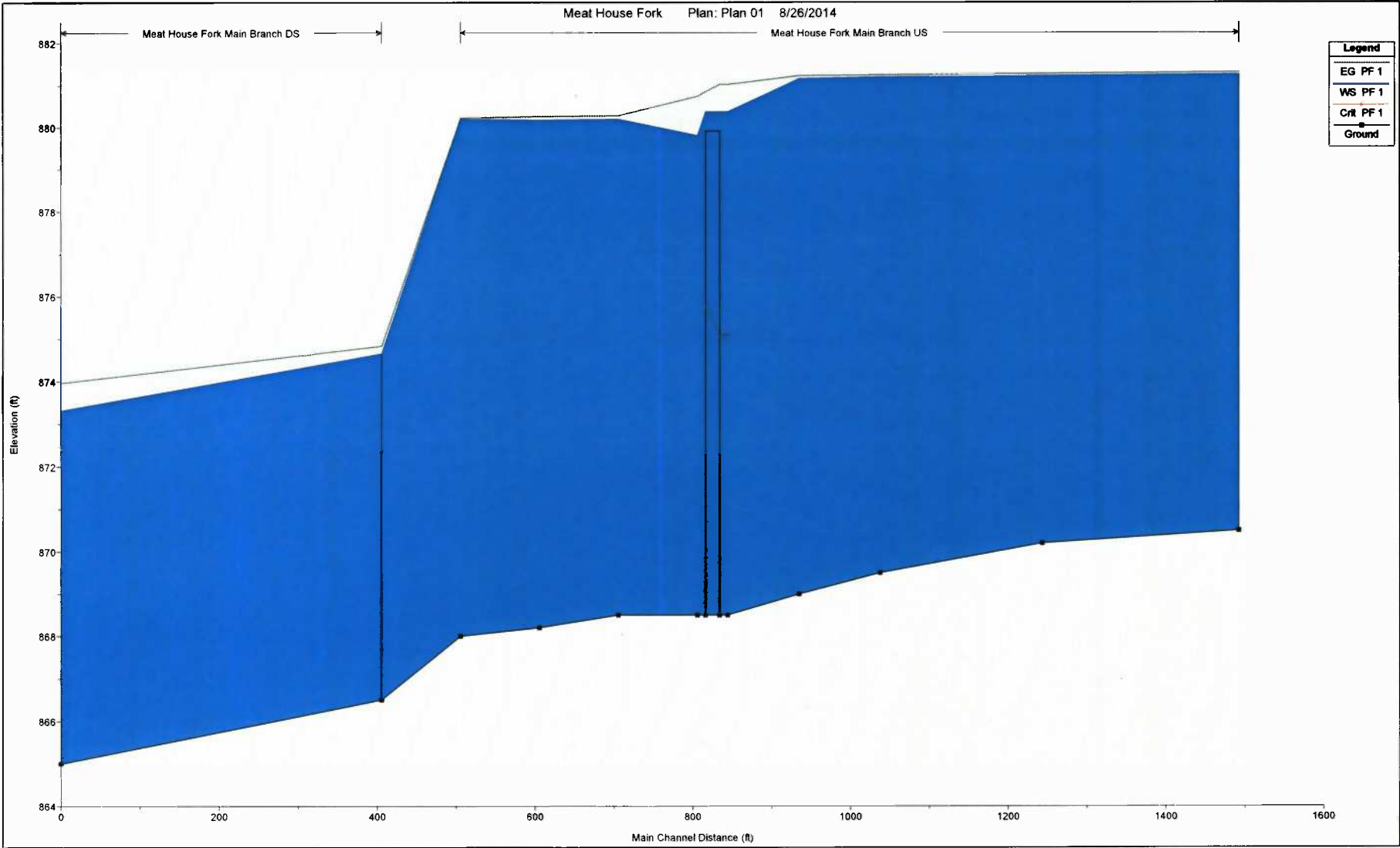
MEATHOUSE FORK - EXISTING PROFILE



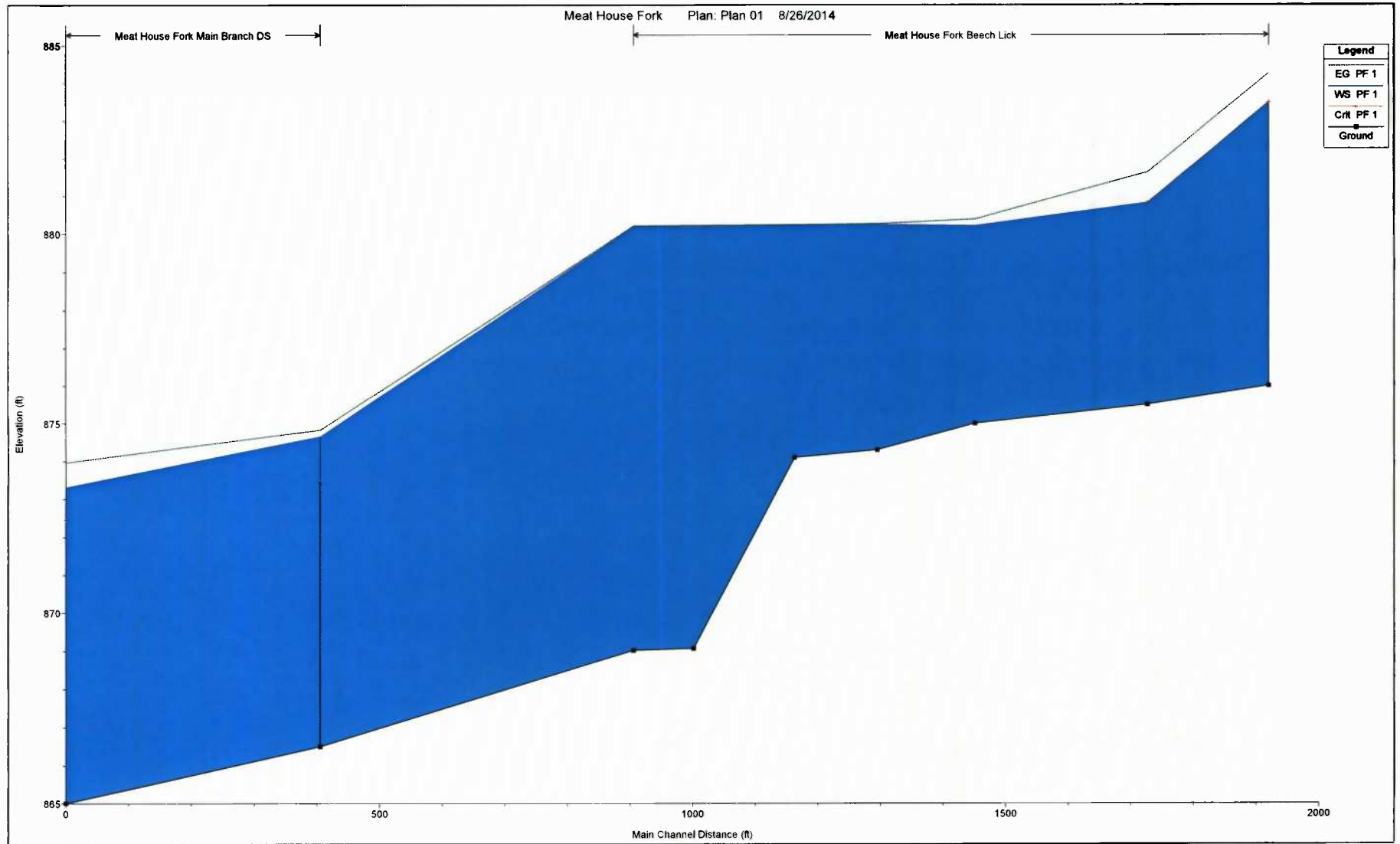
BEECH LICK - EXISTING PROFILE



MEATHOUSE FORK - PROPOSED PROFILE



BEECH LICK - PROPOSED PROFILE



EXISTING SUMMARY DATA

HEC-RAS Plan: Meat House Fork Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Beech Lick	1507.82	PF 1	1173.00	876.00	883.49	883.49	884.27	0.006950	9.85	275.85	161.74	0.65
Beech Lick	1314.24	PF 1	1173.00	875.50	880.81	880.81	881.63	0.005354	8.43	260.24	158.38	0.68
Beech Lick	1039.01	PF 1	1173.00	875.00	880.20		880.38	0.001716	4.46	421.33	182.42	0.35
Beech Lick	882.94	PF 1	1173.00	874.30	880.23		880.26	0.000219	1.66	952.48	242.96	0.12
Beech Lick	750.53	PF 1	1173.00	874.10	880.22		880.23	0.000119	1.46	1216.16	299.16	0.11
Beech Lick	589.16	PF 1	1173.00	869.07	880.18		880.21	0.000111	1.87	971.05	192.70	0.11
Beech Lick	493.19	PF 1	1173.00	869.02	880.18		880.20	0.000068	1.47	1217.42	215.09	0.08
Main Branch US	2116.11	PF 1	2867.00	870.50	881.24		881.30	0.000163	2.53	1840.46	332.89	0.14
Main Branch US	1868.04	PF 1	2867.00	870.20	881.21		881.26	0.000118	2.21	1865.03	252.31	0.12
Main Branch US	1664.62	PF 1	2867.00	869.50	881.19		881.24	0.000111	2.22	1858.26	240.22	0.12
Main Branch US	1563.75	PF 1	2867.00	869.00	881.16		881.22	0.000148	2.60	1640.18	219.55	0.13
Main Branch US	1473.99	PF 1	2867.00	868.50	880.36	875.09	881.02	0.001115	6.93	588.87	173.47	0.36
Main Branch US	1463.88		Bridge									
Main Branch US	1435.68	PF 1	2867.00	868.50	879.79		880.73	0.001784	8.30	421.73	106.20	0.44
Main Branch US	1335.41	PF 1	2867.00	868.50	880.17		880.27	0.000190	2.90	1405.80	196.68	0.15
Main Branch US	1235.39	PF 1	2867.00	868.20	880.16		880.24	0.000195	2.91	1520.33	247.92	0.15
Main Branch US	1141.39	PF 1	2867.00	868.00	880.18		880.21	0.000127	1.65	2352.27	306.38	0.09
Main Branch DS	526.18	PF 1	4040.00	866.50	874.64		874.83	0.001292	4.39	1374.24	361.29	0.28
Main Branch DS	120.67	PF 1	4040.00	865.00	873.30	872.45	873.96	0.003851	7.92	770.61	216.86	0.49

PROPOSED SUMMARY DATA

HEC-RAS Plan: Meat House Fork Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev. (ft)	Crit W.S. (ft)	E.G. Elev. (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Beech Lick	1507.82	PF 1	1173.00	876.00	883.49	883.49	884.27	0.006950	9.85	275.85	161.74	0.65
Beech Lick	1314.24	PF 1	1173.00	875.50	880.81	880.81	881.63	0.005354	8.43	260.24	158.38	0.68
Beech Lick	1039.01	PF 1	1173.00	875.00	880.21		880.38	0.001704	4.44	422.42	182.48	0.35
Beech Lick	882.94	PF 1	1173.00	874.30	880.24		880.26	0.000218	1.66	953.86	242.99	0.12
Beech Lick	750.53	PF 1	1173.00	874.10	880.22		880.24	0.000118	1.46	1217.89	299.19	0.11
Beech Lick	589.16	PF 1	1173.00	869.07	880.19		880.22	0.000111	1.87	972.19	192.74	0.11
Beech Lick	493.19	PF 1	1173.00	869.02	880.19		880.21	0.000067	1.47	1218.67	215.15	0.08
Main Branch US	2116.11	PF 1	2867.00	870.50	881.25		881.31	0.000163	2.53	1843.75	332.98	0.14
Main Branch US	1869.05	PF 1	2867.00	870.20	881.22		881.27	0.000128	2.28	1794.20	233.34	0.12
Main Branch US	1665.62	PF 1	2867.00	869.50	881.19		881.24	0.000139	2.48	1727.45	218.00	0.13
Main Branch US	1564.75	PF 1	2867.00	869.00	881.15		881.23	0.000184	2.87	1535.48	201.37	0.15
Main Branch US	1473.99	PF 1	2867.00	868.50	880.36	875.09	881.02	0.001114	6.93	588.87	173.47	0.36
Main Branch US	1463.88		Bridge									
Main Branch US	1435.68	PF 1	2867.00	868.50	879.80		880.74	0.001780	8.29	422.06	106.36	0.44
Main Branch US	1335.41	PF 1	2867.00	868.50	880.18		880.27	0.000189	2.90	1406.87	196.87	0.15
Main Branch US	1235.39	PF 1	2867.00	868.20	880.17		880.25	0.000195	2.90	1521.69	247.93	0.15
Main Branch US	1141.39	PF 1	2867.00	868.00	880.19		880.22	0.000138	1.57	2354.05	306.42	0.08
Main Branch DS	526.18	PF 1	4040.00	866.50	874.64		874.83	0.001292	4.39	1374.24	361.29	0.28
Main Branch DS	120.67	PF 1	4040.00	865.00	873.30	872.45	873.96	0.003851	7.92	770.61	216.86	0.49

STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO WIT

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

..... *Floodplain Permit*
..... # *14-275*

.....
was published in said paper for ... *2*

successive weeks beginning with the issue
of ... *September 16th* ... 2014 and
ending with the issue of

..... *September 23rd* ... 2014 and

that said notice contains ... *189*

WORD SPACE at ... *115* ... cents a word

amounts to the sum of \$.. *21.74*

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

\$.. *16.31*

and each publication thereafter

\$.. *38.05*

TOTAL

EDITOR

..... *Virginia Nicholson*

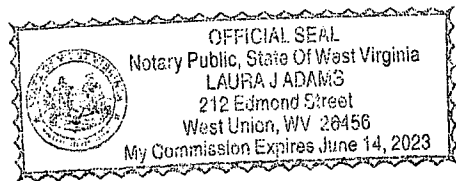
SWORN TO AND SUBSCRIBED

BEFORE ME THIS THE ... *25th* ... DAY
OF ... *September* ... 2014

NOTARY PUBLIC

..... *Laura J. Adams*

LEGAL ADVERTISEMENT
Doddridge County
Floodplain Permit Application
Please take notice that on the 8th day of September
2014 Antero Resources filed an application for a
Floodplain Permit to develop land located at or about
New Milton District 39:189970N/80:629683W Permit
#14-275 Beech Lick Road Improvements The
Application is on file with the Clerk of the County Court
and may be inspected or copied during regular business
hours. Any interested persons who desire to comment
shall present the same in writing by October 6, 2014.
Delivered to the
Clerk of the County Court
118 E. Court Street West Union, WV 26456
Beth A. Rogers, Doddridge County Clerk
Edwin L. "Bo" Wriston, Doddridge County Flood Plain
Manager
9-16-21b





1645000 FT

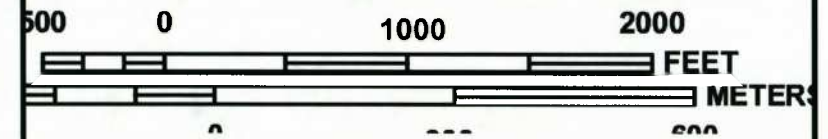
39° 11' 15"

80° 37' 30"

255000 FT



MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235C

FIRM

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

PANEL 235 OF 325
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0235	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.



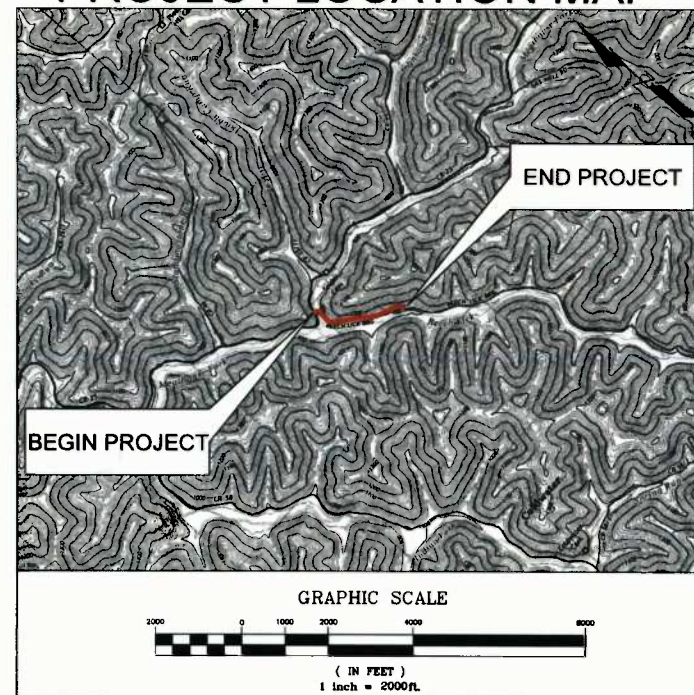
MAP NUMBER
54017C0235C
MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

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

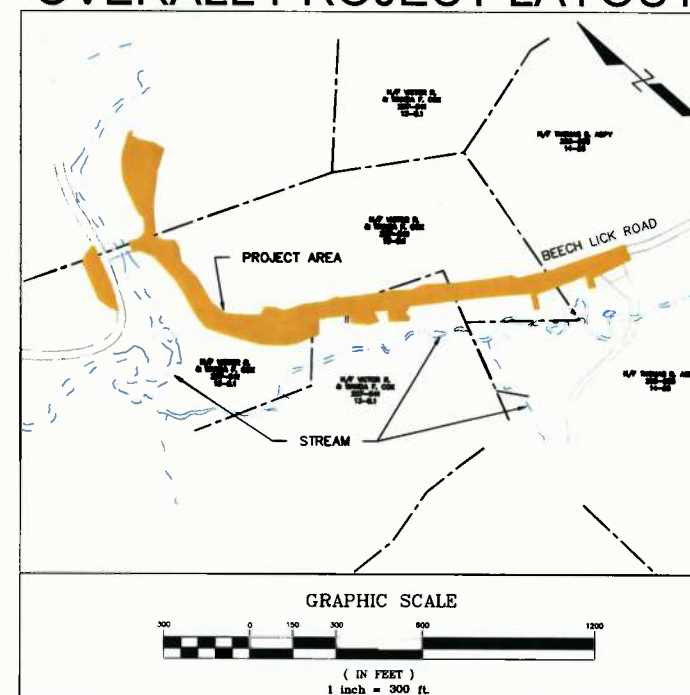
ANTERO RESOURCES CORPORATION NEW MILTON DISTRICT DODDRIDGE COUNTY, WEST VIRGINIA BEECH LICK ROAD (CR 25-10) IMPROVEMENTS - VICTOR PAD SEPTEMBER 2014

PROJECT LOCATION MAP



SOURCE:
USGS NEW MILTON & BIG ISAAC, WV. QUADRANGLE
(SCALE 1" = 2,000')

OVERALL PROJECT LAYOUT



INDEX OF DRAWINGS	
DWG. NO.	TITLE
C-01	CONSTRUCTION NOTES
C-02	EXISTING FEATURES PLAN
C-03	GRADING PLAN SHEET 1 OF 2
C-04	GRADING PLAN SHEET 2 OF 2
C-05	EROSION & SEDIMENT CONTROL PLAN
C-06	CONSTRUCTION DETAILS 1 OF 2
C-07	CONSTRUCTION DETAILS 2 OF 2
C-08	E&S DETAILS 1 OF 2
C-09	E&S DETAILS 2 OF 2
C-10	CROSS SECTIONS SHEET 1 OF 6
C-11	CROSS SECTIONS SHEET 2 OF 6
C-12	CROSS SECTIONS SHEET 3 OF 6
C-13	CROSS SECTIONS SHEET 4 OF 6
C-14	CROSS SECTIONS SHEET 5 OF 6
C-15	CROSS SECTIONS SHEET 6 OF 6

RESOURCE IMPACT TABLE	
LIMIT OF DISTURBANCE (TOTAL)	4.33 AC.
LIMIT OF DISTURBANCE (EXCLUDING EXISTING ROAD)	3.88 AC.
LIMIT OF DISTURBANCE (EXCLUDING EXISTING R.O.W.)	2.75 AC.
TREE CLEARING	1.96 AC.

PREPARED BY:



P.O. Box 468
6912 Old Easton Road
Pipersville, PA 18947 USA

P.O. BOX 794
1189 Pineview Drive
Suite G2
Morgantown, WV 26506

www.earthres.com

PA office 215.766.1211
WV office 304.212.6866
toll free 800.264.4553

PREPARED FOR:

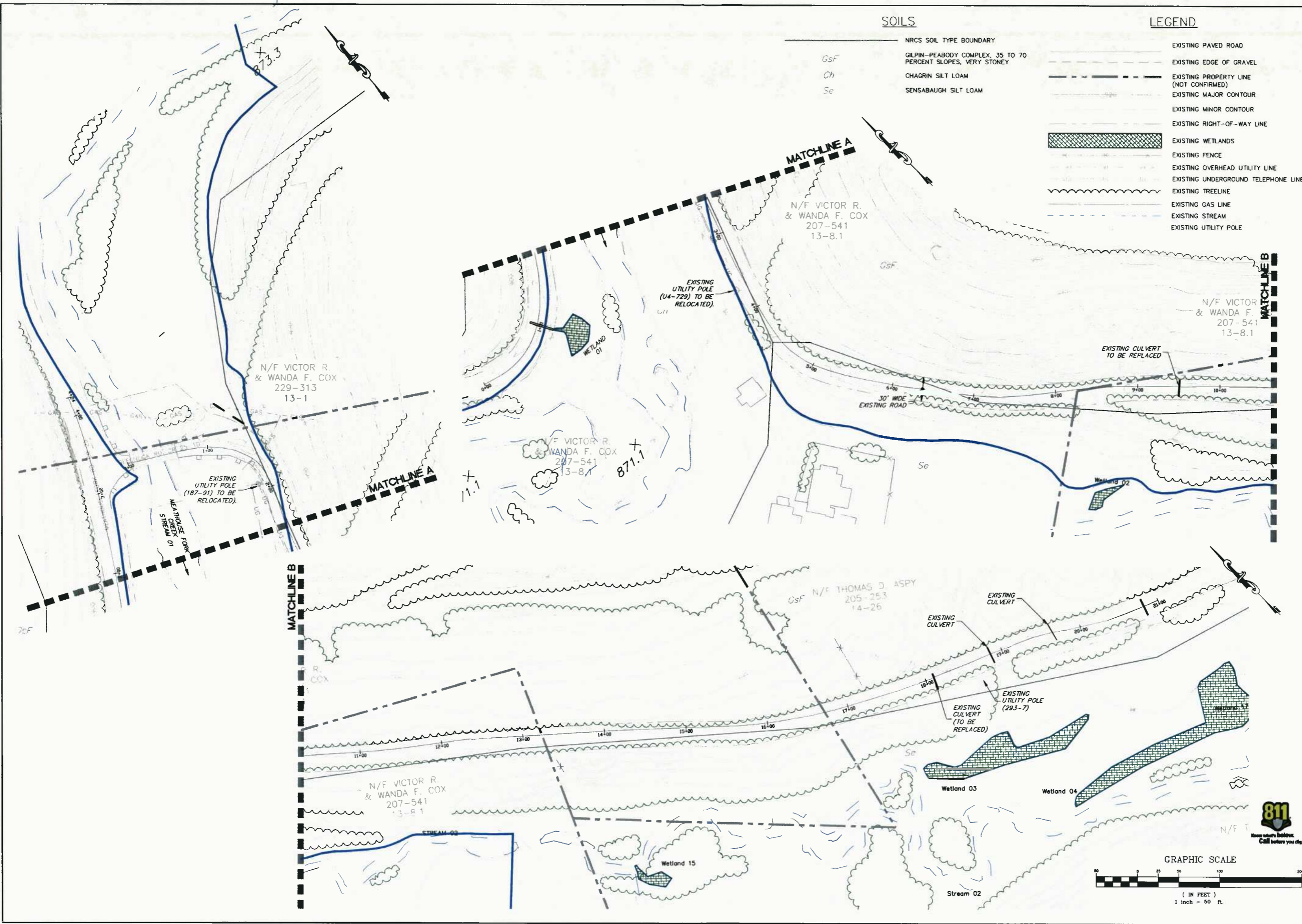


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www.WV811.com

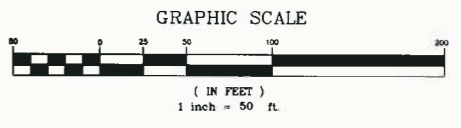


SOILS

- NRCS SOIL TYPE BOUNDARY
- GILPIN-PEABODY COMPLEX, 35 TO 70 PERCENT SLOPES, VERY STONEY
- CHAGRIN SILT LOAM
- SENSABAUGH SILT LOAM

LEGEND

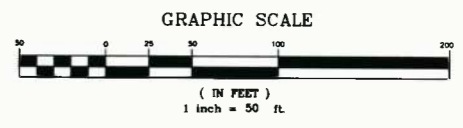
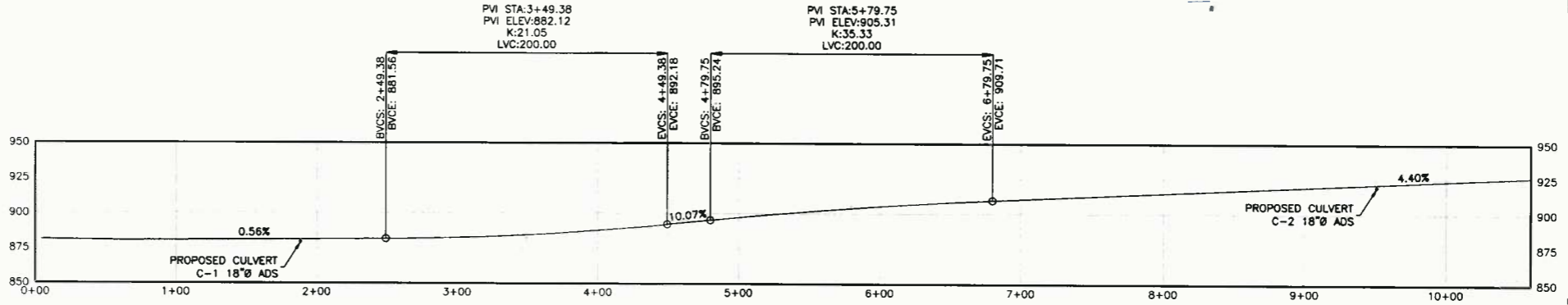
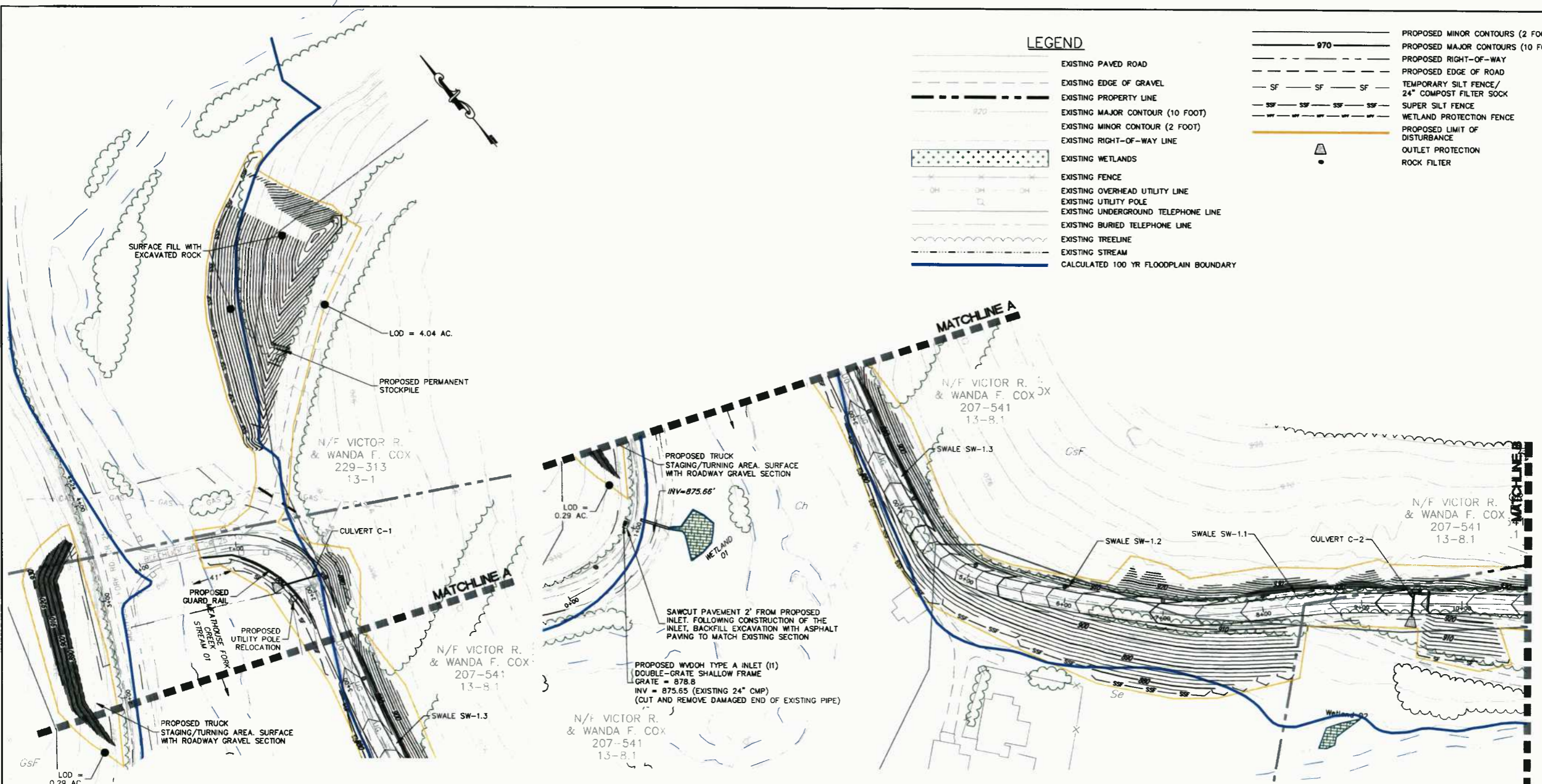
- EXISTING PAVED ROAD
- EXISTING EDGE OF GRAVEL
- EXISTING PROPERTY LINE (NOT CONFIRMED)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING RIGHT-OF-WAY LINE
- EXISTING WETLANDS
- EXISTING FENCE
- EXISTING OVERHEAD UTILITY LINE
- EXISTING UNDERGROUND TELEPHONE LINE
- EXISTING TREELINE
- EXISTING GAS LINE
- EXISTING STREAM
- EXISTING UTILITY POLE



<p>EarthRes ENGINEERING AND SCIENCE</p>		<p>ANTERO RESOURCES</p>	
<p>PREPARED BY:</p>		<p>PREPARED FOR:</p>	
<p>810 Old Easton Road Pottsville, PA 17857 USA 1204C Parkway Drive Morgantown, WV 26505 www.earthres.com PA office 215.766.1211 WV office 304.212.6866 toll free 800.254.4553</p>		<p>NO. DATE BY</p> <p>2 9/2/14 VJC COX FILL, LOD ADJUST, STREAM 03</p> <p>1 8/4/14 MD ADD FILL DETAIL</p>	
<p>EXISTING FEATURES PLAN</p>		<p>BEECH LICK ROAD IMPROVEMENTS VICTOR PARCEL-ANTERO RESOURCES DODDRIDGE COUNTY, WEST VIRGINIA</p>	
<p>CHECKED BY: DEW</p> <p>PROJECT NO: 131022.012</p> <p>DATE: 06/26/14</p> <p>DRAWING NUMBER: C-02</p>		<p>SHEET 2 OF 15</p>	

LEGEND

- EXISTING PAVED ROAD
- EXISTING EDGE OF GRAVEL
- EXISTING PROPERTY LINE
- EXISTING MAJOR CONTOUR (10 FOOT)
- EXISTING MINOR CONTOUR (2 FOOT)
- EXISTING RIGHT-OF-WAY LINE
- EXISTING WETLANDS
- EXISTING FENCE
- EXISTING OVERHEAD UTILITY LINE
- EXISTING UTILITY POLE
- EXISTING UNDERGROUND TELEPHONE LINE
- EXISTING BURIED TELEPHONE LINE
- EXISTING TREELINE
- EXISTING STREAM
- CALCULATED 100 YR FLOODPLAIN BOUNDARY
- PROPOSED MINOR CONTOURS (2 FOOT)
- PROPOSED MAJOR CONTOURS (10 FOOT)
- PROPOSED RIGHT-OF-WAY
- PROPOSED EDGE OF ROAD
- TEMPORARY SILT FENCE/ 24" COMPOST FILTER SOCK
- SUPER SILT FENCE
- WETLAND PROTECTION FENCE
- PROPOSED LIMIT OF DISTURBANCE
- OUTLET PROTECTION
- ROCK FILTER



EarthRes ENGINEERING AND SCIENCE		ANTERO RESOURCES										
PREPARED BY: P.O. Box 468 6916 Old Economy Road Piquette, PA 16741 USA 1224C Pineview Drive Morgantown, WV 26505 www.earthres.com PA office: 252.766.7211 WV office: 252.766.7211 US line: 800.764.4553	PREPARED FOR: N/F VICTOR R. & WANDA F. COX 207-541 13-8.1 N/F VICTOR R. & WANDA F. COX 229-313 13-1 N/F VICTOR R. & WANDA F. COX 207-541 13-8.1	PROJECT NO: 131022.012 DATE: 06/26/14 DRAWING NUMBER: C-03 SHEET 3 OF 15	REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>8/4/14</td> <td>MD</td> </tr> <tr> <td>2</td> <td>9/2/14</td> <td>VJC</td> </tr> </tbody> </table>	NO.	DATE	BY	1	8/4/14	MD	2	9/2/14	VJC
NO.	DATE	BY										
1	8/4/14	MD										
2	9/2/14	VJC										
GRADING PLAN (SHEET 1 OF 2) BEECH LICK ROAD IMPROVEMENTS VICTOR PAD-ANTERO RESOURCES CR 25-10 DODDRIDGE COUNTY, WEST VIRGINIA												