

PERMIT NO. [#] 14-122

**DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT
PERMIT**

PURPOSE FOR PERMIT: Water line

ISSUED TO Antero Resources Corp

ADDRESS: 1625 17th St.
Denver, CO 80202

PROJECT ADDRESS: Buffalo Calf Fork

ISSUED BY: Ralph Darden

DATE: 2-25-14

CONSTRUCTION MUST START WITHIN 180 DAYS FROM ISSUED DATE. PERMIT EXPIRES IN 12 MONTHS FROM ISSUED DATE. IF EXTENTION IS NEEDED A REQUEST MUST BE MADE IN WRITING STATING A REASON FOR THE EXTENTION.

THIS PERMIT MUST BE POSTED ON THE PREMISES IN A CONSPICUOUS PLACE SO AS TO BE CLEARLY VISIBLE FROM THE STREET.

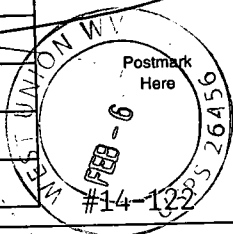
7013 2250 0001 6914 7998

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

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

OFFICE OF WELLNESS

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



Sent To Carolyn N Plaughter
C/O Randy Plaughter
 Street, Apt. No.,
 or PO Box No. Rt 1 Box 407 A
 City, State, ZIP+4 Salem, WV 26426



Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jan-17-2014	46983	\$500.00

VOUCHER	VENDOR INV #	INV DATE	TOTAL AMOUNT	PRIOR PMTS & DISCOUNTS	NET AMOUNT
01-AP-10000	DENFWITOPNWL	01/17/14	500.00	0.00	500.00
Marsden FWI to PN WL - FLOOD PLAIN PERMIT					
TOTAL INVOICES PAID					500.00

Doddridge County, West Virginia

RECEIPT NO: 1398

DATE: 2014/02/07

FROM: ANTERO

AMOUNT: \$ 500.00

FIVE HUNDRED DOLLARS AND 00 CENTS

FOR: PERMIT # 14
 MARSDEN FWI TO PLAUGHER NORTH WATER LINE

00000046983 FP-BUILDING PERMITS

020-318

TOTAL: \$500.00

MICHAEL HEADLEY

SHERIFF & TREASURER

MEC

CLERK

Customer Copy

*Permit # 14-122
 Antero - Marsden FWI to
 Plaughner North Water Line*

Bid Sheet-Marsden FWI to Plaughter North Waterline

Total Construction Cost		
Length of Line	Price per Foot	Cost of Line Install
11,500	\$6.00	\$69,000.00
Portion of Project in Flood Plain Cost		
Length of Line	Price per Foot	Cost of Line Install
1,000	\$6.00	\$6,000.00

Legal Advertisement:
Doddridge County
Floodplain Permit Application

Please take notice that on the 5th February 2014

ANTERO RESOURCES CORPORATION
MARSDEN FWI TO PLAUGHER NORTH WATERLINE
PERMIT # 14-122

filed an

application for a Floodplain Permit to develop land located at or

about: **SURFACE OWNERS: CAROLY N. AND RANDY PLAUGHER**

GREENBRIER DISTRICT, D/B 45/151, AND TAX MAP 4 PARCEL 6

The Application is on file with the Clerk of the County Court and

may be inspected or copied during regular business hours.

Any interested persons who desire to comment shall present

the same in writing by **February 25, 2013**

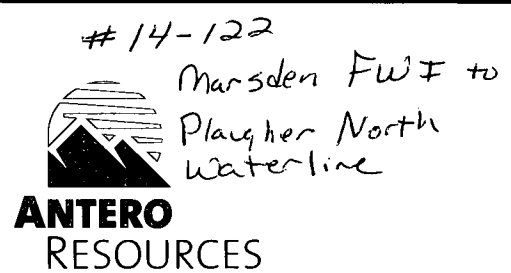
Delivered to the:

Clerk of the County Court

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

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager



January 28, 2014

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

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

Mr. Wellings:

Antero Resources Corporation (Antero) would like to submit a Doddridge County Floodplain permit application for our proposed Marsden FWI to Plaughner North Waterline. Our project is located in Doddridge County, Greenbrier District. The proposed development within the floodplain consists of the site preparation and construction of waterline stream crossing. Per the enclosed HECRAS Study, the proposed activity would not result in significant obstructions below the base flood elevation, it is not anticipated that the proposed activity would have appreciable effects on Water Surface Elevations resulting from a 1-Percent Annual Chance Flood in the vicinity of the project.

Enclosed you will find the following:

- Doddridge County Floodplain Permit Application & Fee \$500.00 (industrial structures which do not exceed \$100,000.00)
- FIRM Map
- No Significant Impact Certificate
- Proposed Plans
- Flood Hazard Analysis Report

If you have any questions please feel free to contact me at (303) 357-6412.

Thank you in advance.

Sincerely,



Shaye Marshall
Permit Representative
Antero Resources Corporation

Enclosures

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

2014 JAN 29 PM 3:06

FILED

#14-122

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

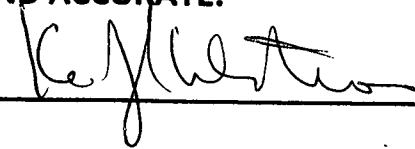
SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

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.**

2011 JAN 28 PM 3:06
 BETH A. ROGERS
 COUNTY CLERK
 DODDRIDGE COUNTY, MN

FILED

APPLICANT'S SIGNATURE _____



DATE 1/28/14

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

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

APPLICANT'S NAME: Antero Resources Corporation - Kevin Kilstrom

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: Contact Shauna DeMattee 303-357-6820

BUILDER'S NAME: Antero Resources Corporation

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: (303) 357-7310

ENGINEER'S NAME: Kelly Surveying

ADDRESS: PO BOX 254, Dailey WV 26259

TELEPHONE NUMBER: 304-338-6985

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) _____

Carolyn N. and Randy Plaughter

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) _____

RT 1 Box 407A, Salem WV

DISTRICT: Greenbrier District

DATE/FROM WHOM PROPERTY

PURCHASED: _____

LAND BOOK DESCRIPTION: 328.92

DEED BOOK REFERENCE: 45/151

TAX MAP REFERENCE: Tax Map 4/ Parcel 6

EXISTING BUILDINGS/USES OF PROPERTY: N/A

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

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

C. STANDARD SITE PLAN OR SKETCH

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

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN \$ 6,000

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

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

NAME: _____ Please see attached _____
 ADDRESS: _____ Exhibit A _____

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: _____
 ADDRESS: _____

NAME: _____
 ADDRESS: _____

NAME: _____
 ADDRESS: _____

NAME: _____
 ADDRESS: _____

E. CONFIRMATION FORM

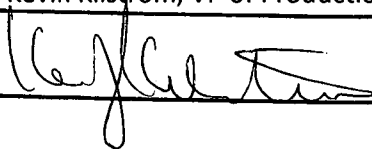
THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

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

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

NAME (PRINT): Kevin Kilstrom, VP of Production

SIGNATURE: _____



DATE: 1/28/14

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 165C

Dated: 10/4/11

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 *Robert L. ...*

DATE 2-25-14

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

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

- A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.
- Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also _____
- Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).
- Plans showing the extent of watercourse relocation and/or landform alterations.
- Top of new fill elevation _____ Ft. NGVD (MSL).
For floodproofing structures applicant must attach certification from registered engineer or architect.
- Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.
- Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).

Other:

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

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

SIGNED _____ DATE _____

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

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

CONDITIONS: _____

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

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

COMPLETE 1 OR 2 BELOW:

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

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

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

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

INSPECTIONS:

DATE: _____ BY: _____
DEFICIENCIES ? Y/N

COMMENTS _____

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

Certificate of Compliance issued: DATE: _____ BY: _____

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

PERMIT NUMBER: _____

PERMIT DATE: _____

PURPOSE –

CONSTRUCTION LOCATION: _____

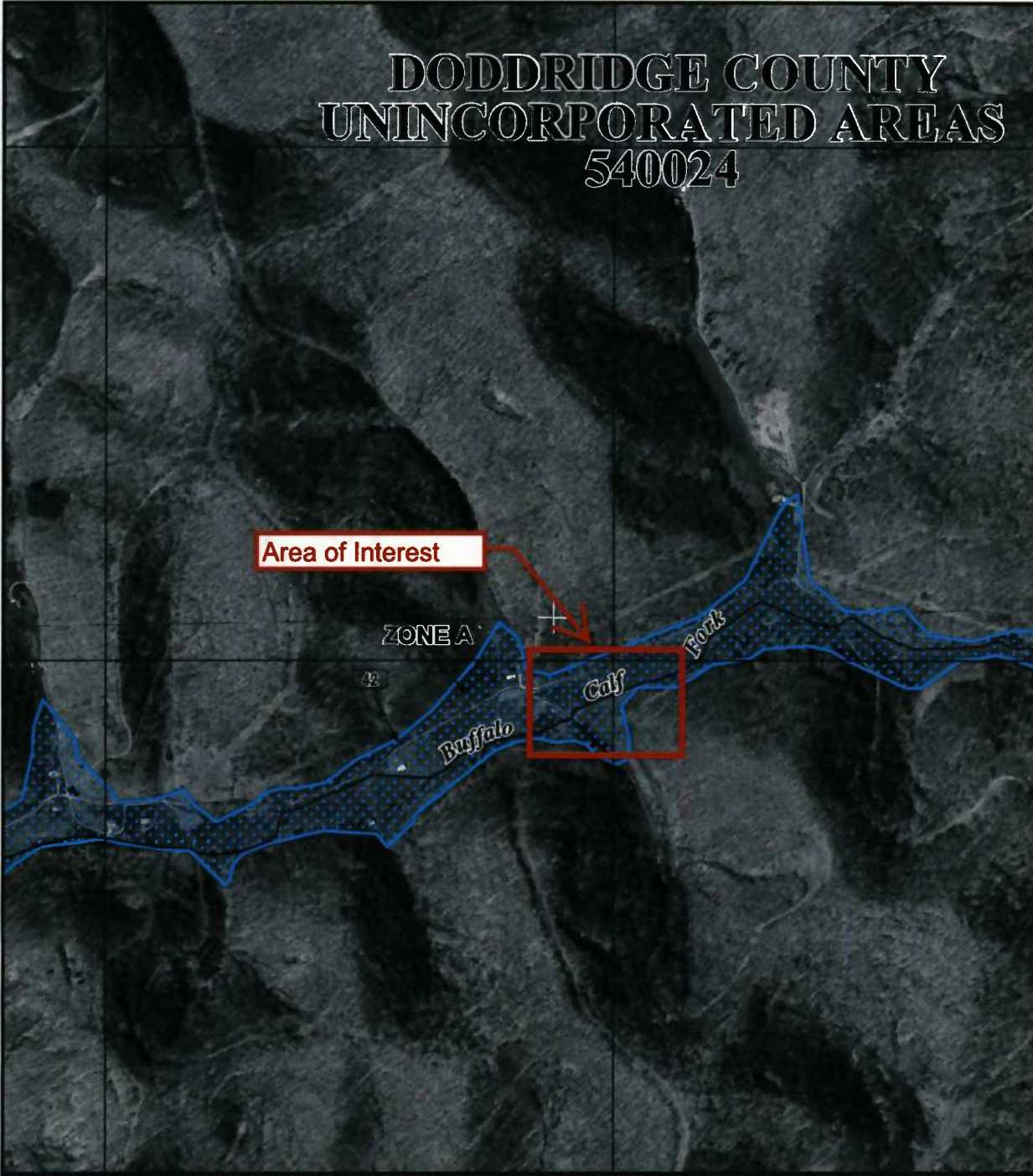
OWNER'S ADDRESS: _____

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

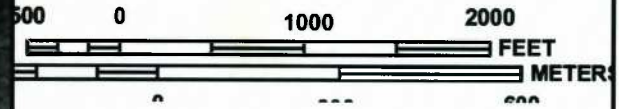
**COMPLIANCE IS HEREBY CERTIFIED WITH THE REQUIREMENT OF THE
FLOODPLAIN ORDINANCE ADOPTED BY THE COUNTY COMMISSION OF
DODDRIDGE COUNTY ON MAY 21, 2013.**

SIGNED _____ **DATE** _____

DODDRIDGE COUNTY UNINCORPORATED AREAS 540024



MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0165C

FIRM

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

PANEL 165 OF 325
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0165	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
54017C0165C

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



P.O. Box 254
Dailey, WV 26259
(304)338-6985

"NO SIGNIFICANT IMPACT" CERTIFICATION

This letter is to certify that Kelly Surveying, PLLC has evaluated the potential adverse impacts of a proposed development in the regulatory floodplain identified on Flood Insurance Rate Map Panel 54017C0165C Effective 10/04/2011 on behalf of Antero Resources. The reach of interest is along Buffalo Calf Fork in Doddridge County approximately 13,000-feet above the confluence with Buckeye Creek. The reach is identified as an Approximate Zone A with no BFE or floodway established.

The proposed development is for the construction of a water line stream crossing. The proposed development will not include inhabited dwellings or permanent structures.

An analysis was performed to establish a floodway and BFE at the location of the proposed activity. The floodway was developed and the extents were mapped for the purposes of this evaluation to ensure that the activities proposed would not encroach within the established floodway. The water surface elevation (WSEL) of the 1-Percent Annual Chance Flood was established and the extents were mapped in order to minimize the proposed development in the floodplain and to insure the proposed elevation of the horizontal component at the proposed stream crossing will be above the established floodway elevation.

Considering the requirements of the local floodplain ordinance, the following design specification shall be adhered to:

- Encroachment in the established floodway boundary will be limited to the minimum access needed for construction of the stream crossing structure.
- No permanent obstruction in the floodway will occur.
- The lowest horizontal element of the proposed stream crossing will have a minimum elevation of 1-foot above the 1-Percent Annual Flood Elevation of 947.3.

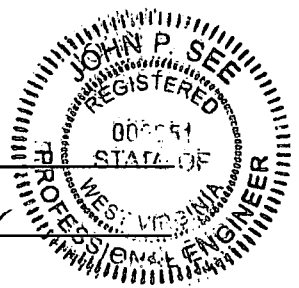
If the aforementioned specifications are implemented, the proposed development should not have a significant adverse effect on any adjacent property owners.

If you have any questions concerning the proposed development activities, please call Mr. John P. See with Kelly Surveying, PLLC at (304) 419-4296.

Date: 1/27/14

Signature: *J. Lee*

Title: ENGINEER



Buffalo Calf Fork Flood Hazard Analysis Report
(Proposed Aerial Span Crossing)
Doddridge County, WV

*Supporting Flood Hazard Documentation for Design and
Determination of Potential Adverse Effects*

PREPARED FOR:
ANTERO RESOURCES CORPORATION

PREPARED BY:
Kelly Surveying, PLLC
PO Box 254
Dailey, WV 26259
(304)338-6985

January 27, 2014

Executive Summary

The document contains information regarding the flood hazard risk of a reach of Buffalo Calf Creek in Doddridge County, West Virginia. The flood hazard risk analysis was performed to determine the Base Flood Elevation and extents of the Floodway to ensure that a proposed action would not result in significant increases in water surface elevations of the 1-Percent Annual Chance Flood in the area of the proposed action.

The study reach of Buffalo Calf Fork is approximately located 13,000-feet above the confluence of Buffalo Calf Fork and Buckeye Creek. The study reach is identified as an Approximate Zone A with no Base Flood Elevation (BFE) or Floodway established. The contributing drainage area of this reach is approximately 1.0-square miles.

Proposed Development

The proposed development within the regulatory floodplain (Approximate Zone A with no BFE or Floodway established) consists of the site preparation and construction of a support structure and crossing of a 12-inch High-Density Polyethylene Pipe (HDPE).

Hydrology

The contributing drainage area of the study reach was determined using a 3-meter Digital Elevation Model (DEM) published by the US Geological Survey (USGS) and the Geographical Information System (GIS) enabled software HEC-GeoHMS. HEC-GeoHMS was used to convert the DEM into a flow accumulation grid file used to delineate contributing drainage area. The contributing drainage area of the study reach is approximately 1.0 square miles at the downstream extent of the reach. Procedures outlined in *USGS Scientific Investigations Report 2010-5033 Estimating Magnitude and Frequency of Peak Discharge for Rural, Unregulated, Streams in West Virginia* were used to determine peak discharges for flood events having various exceedance probabilities. A 1-Percent Annual Chance Exceedance discharge of 299-cfs was determined and used for the entire study reach, which varied in drainage area by less than 10-percent.

Hydraulics

The HEC-RAS (version 4.1) steady-flow hydraulic model was chosen for hydraulic analysis due to its ability to perform backwater computations. A geometry file was developed using the GIS enabled HEC-GeoRAS software. Hydraulic cross sections, stream centerline, flow paths, culvert crossing, and bank stations were laid out using a combination of 2011 NAIP aerial photography, a detailed Triangular Irregular Network (TIN) developed based on LiDAR topographic data collected 04/21/2013, and topographic data collected during a land survey conducted 01/23/2014.

The USACE HEC-GeoRAS software was then used to extract this data into a HEC-RAS geometry file. Channel geometry was estimated using site topographic data, aerial photography, and cross sections taken during the land survey. Channel Manning's "n" values were estimated based on the USGS

Publication *Roughness Characteristics of Natural Channels* and best professional judgment; and determined to be 0.04. Over bank roughness values were estimated using aerial photography and photographs taken during the land survey and were assigned a values ranging from 0.06 to 0.08. Expansion and contraction values were assigned a value of 0.1 and 0.3; respectively for all cross sections except for the cross-section immediately upstream and downstream of the culvert crossing. The cross sections upstream and downstream were assigned a expansion and contraction value of 0.3 and 0.5; respectively, to account for additional energy losses due to the culvert crossing. A downstream boundary condition was assumed to be Normal Depth using a friction slope of 0.008 ft/ft based on local bed slope. A steady-flow subcritical flow regime was used for this analysis

A floodway was developed using the procedures outlined in in the FEMA publication *Guidelines and Specifications for Flood Hazard Mapping Partners*. A floodway was developed based on the aforementioned 1-Percent Annual Chance Flood peak discharge determined using the USGS Regression Equations. An encroachment analysis within the HEC-RAS program with equal conveyance to achieve a surcharge between 0.1 and 1.0 feet.

Mapping

The results from the HEC-RAS hydraulic analysis was then imported into a Geospatial Information System (GIS) environment using the USACE HEC-GeoRAS software extension. The inundation and floodway extents were mapped based on the TIN derived from the LiDAR topographic survey. Due to limitations in the software's representation of the floodway extents, the floodway was hand smoothed between cross sections. Also, minor edits were made in the floodplain extents to correct for suspected errors in the TIN based on contour interpolation.

There were difficulties with the encroachment analysis at the cross sections immediately upstream and downstream of the culvert. The analysis suggested a very large expansion of the floodway at these locations, the mapped extent of the floodway were adjusted based on professional judgment to correct for this occurrence. The floodway extent modifications from the analysis do not affect the floodway width and extents at the location of the proposed activity.

Results

The analysis suggests that the BFE would be approximately elevation 947.3 feet-NAVD and the computed floodway was found to be approximately 20-feet in width at the location of the proposed crossing. Considering that the proposed activity is out of the regulatory floodway and that the proposed activity would not result in significant obstructions below the base flood elevation, it is not anticipated that the proposed activity would have appreciable effects on Water Surface Elevations resulting from a 1-Percent Annual Chance Flood in the vicinity of the project. The results of the analysis are illustrated on attached figures.

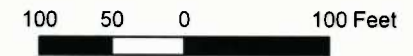
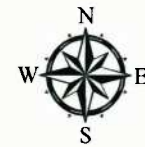
The data contained within this document was developed to address design and floodplain management considerations at the specific location for the proposed for development defined in this document. The

assumptions and limitations of the analysis should be considered and engineering judgment should be applied to any other uses.

References

- Chow, V.T. (1964) Handbook of Applied Hydrology. MCGraw-Hill. New York, NY.
- Federal Emergency Management Agency (2011). *Flood Insurance Study, Doddridge County, West Virginia and Incorporated Areas*. Washington, D. C.
- Federal Emergency Management Agency (2003). *Guidelines and Specifications for Flood Hazard Mapping Partner.*, Washington, DC.
- Federal Emergency Management Agency (2001). *Technical Bulletin 10-01 – Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe From Flooding*. Washington, D.C.
- Federal Emergency Management Agency (1995). *Managing Floodplain Development in Approximate Zone A Areas – A Guide for Obtaining and Developing Base (100-year) Flood Elevations*. FEMA 265 Washington, DC.
- Federal Emergency Management Agency (2005). *National Flood Insurance Program (NFIP) Floodplain Management Requirements – A Study Guide and Desk Reference for Local Officials*. FEMA 480. Washington, DC.
- Limerinos, J. T. (1970). *Determination of the Manning coefficient from measured bed roughness in natural channel*. Water Supply Paper, 1898B, U.S. Geological Survey, Washington, DC.
- US Geological Survey (2009). *Regional Curves for Bankfull Channel Characteristics in the Appalachian Plateaus, West Virginia*. Scientific Investigations Report 2009-5242. Reston, Virginia.
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Buffalo Calf Fork Flood Hazard Identification



Legend

- HEC-RAS Cross Section (sta)
- ▭ Detailed Study 1-Percent Chance Flood Boundary
- ▭ Detailed Study Floodway
- ▭ FEMA Approximate Zone A

Plaughter.nss

National Streamflow Statistics Program
Version 5

Based on Techniques and Methods Book 4-A6

Equations from database C:\Program Files (x86)\NSS\data\NSS_v6_2013-08-28.mdb
Updated by tkoenig 8/28/2013 at 04:10:29 PM Add 2 new params for AR 2008-5065

Site: Plaughter, West_Virginia

User:

Date: Tuesday, January 21, 2014 10:27 PM

Equations for West_Virginia developed using English units

Rural Estimate: Buffalo Calf Fork

Basin Drainage Area: 1.01 square miles

1 Region

Region: Peak_Flow_Central_Mountains_Region_2010_5033

Drainage_Area = 1.01 square miles

Crippen & Bue Region 4

Results for: Buffalo Calf Fork

Equations used:

PK1_5 = $53.8 * DRNAREA^{0.887}$

PK2 = $69.4 * DRNAREA^{0.873}$

PK5 = $116 * DRNAREA^{0.845}$

PK10 = $153 * DRNAREA^{0.831}$

PK25 = $206 * DRNAREA^{0.816}$

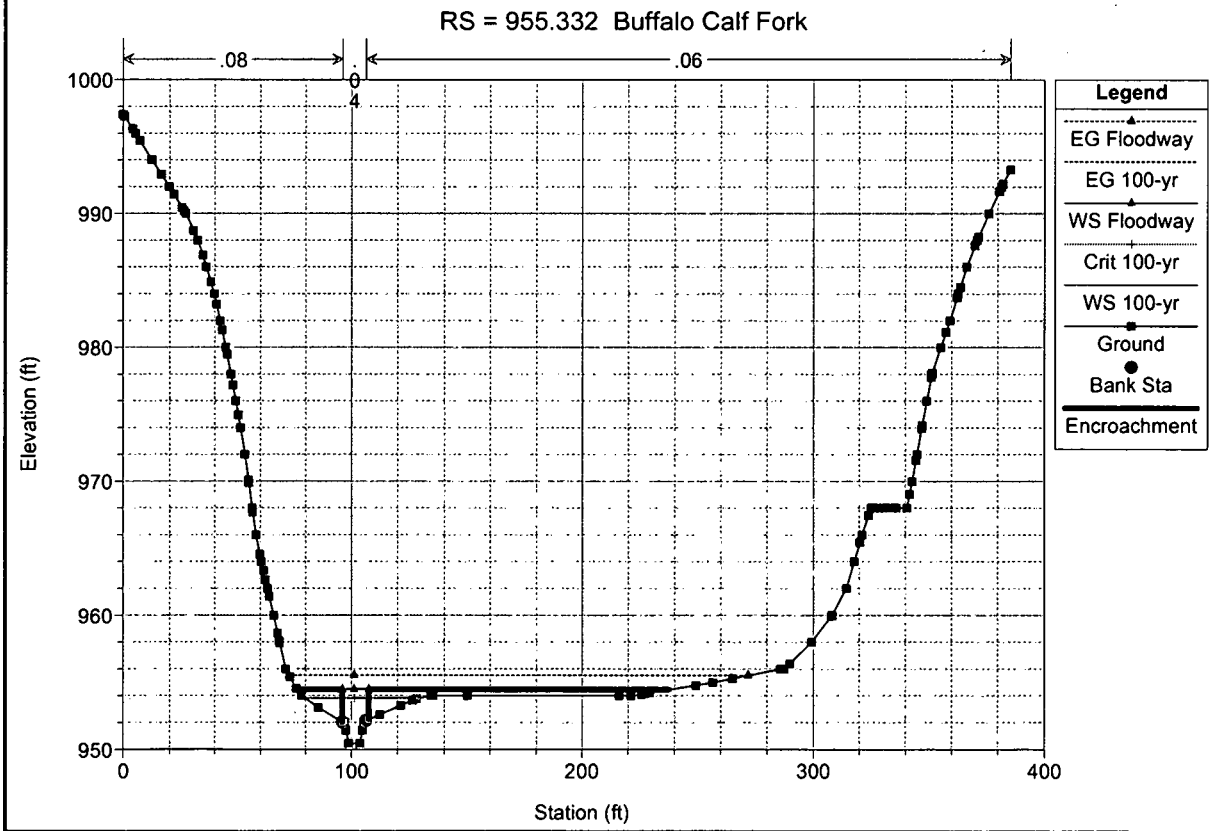
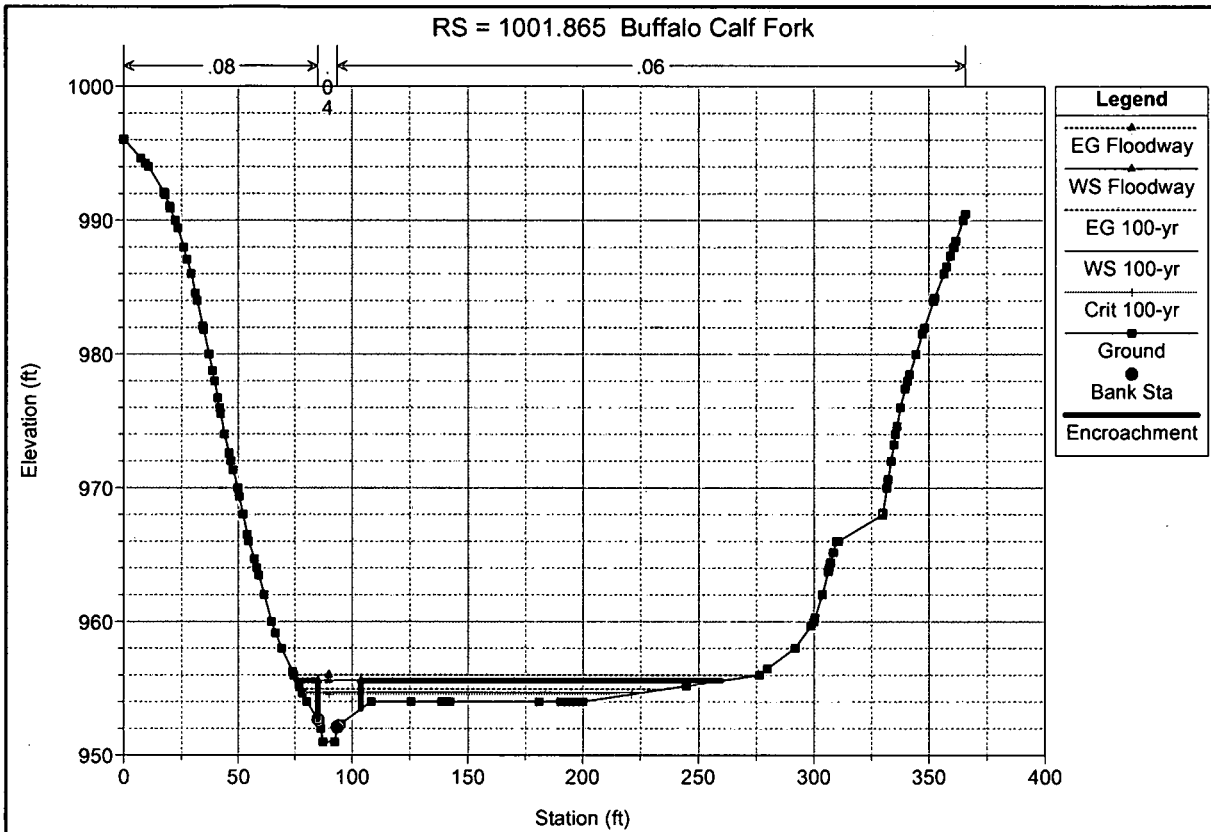
PK50 = $250 * DRNAREA^{0.807}$

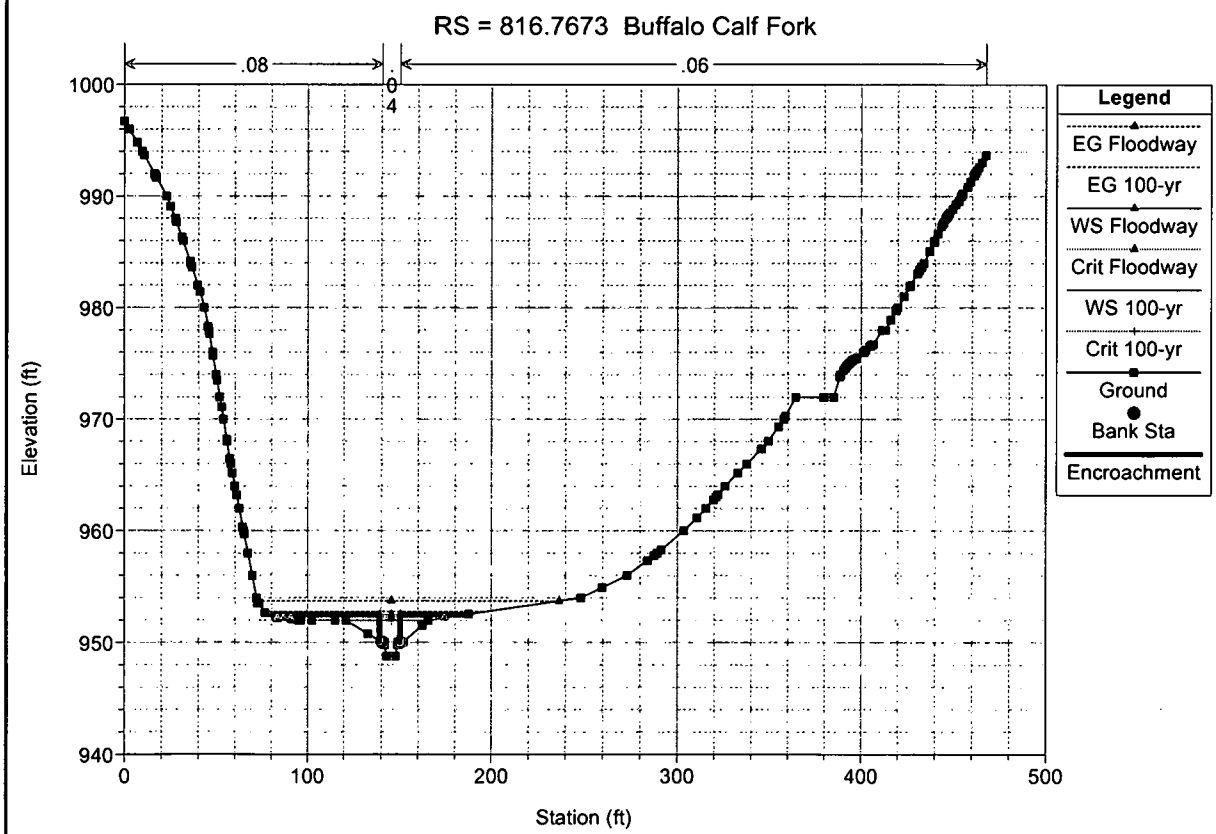
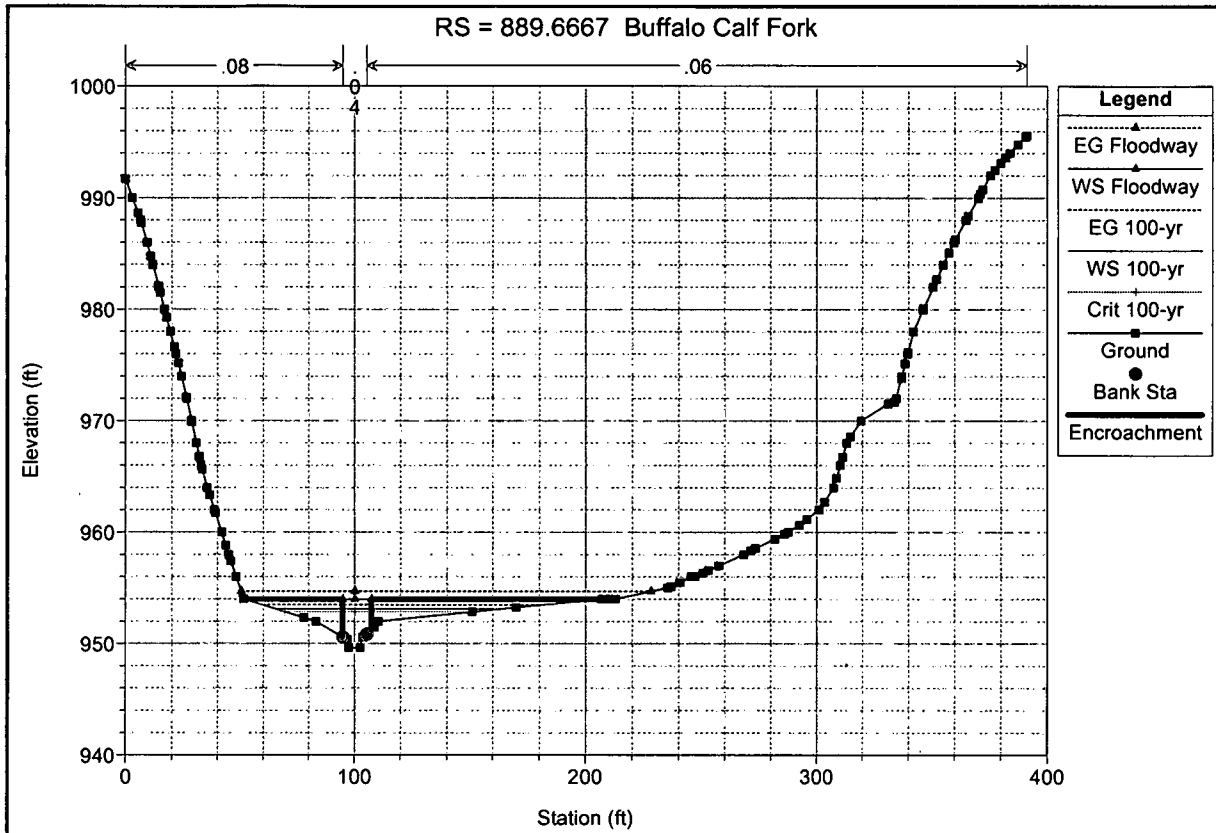
PK100 = $297 * DRNAREA^{0.800}$

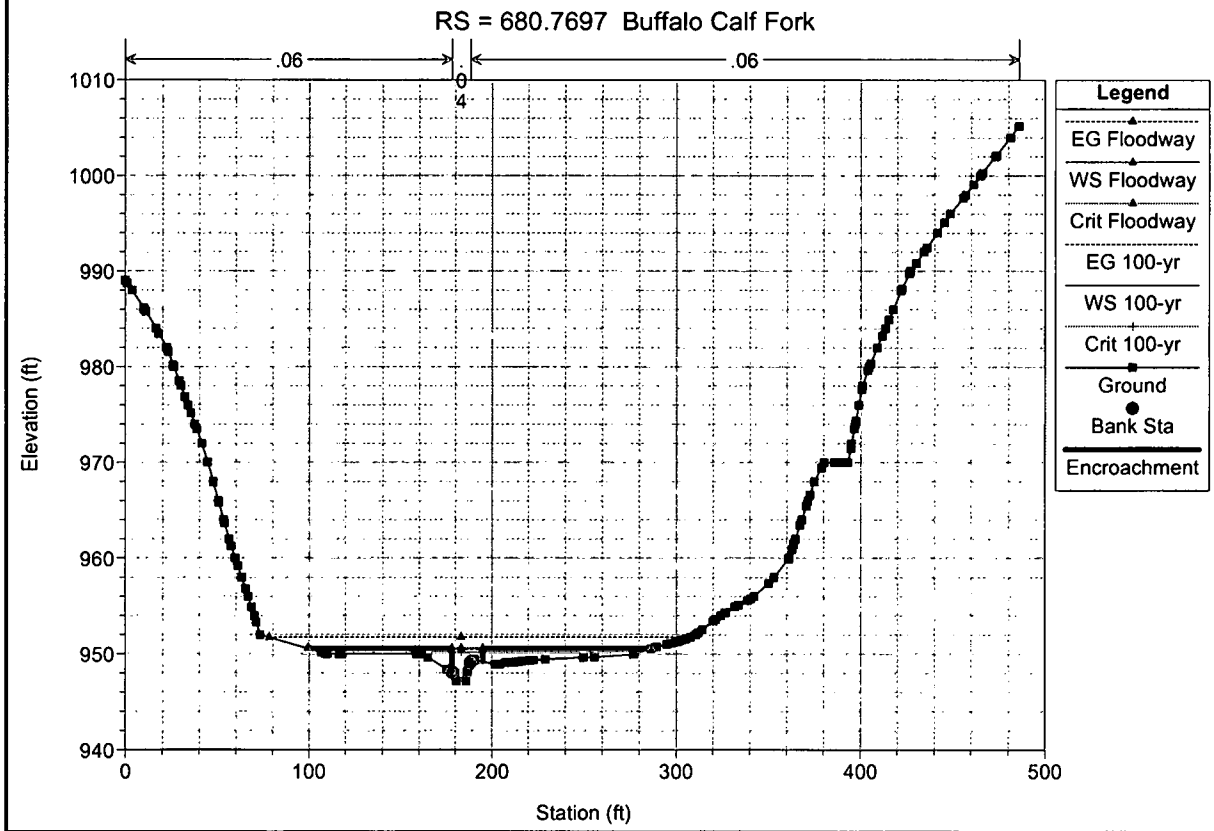
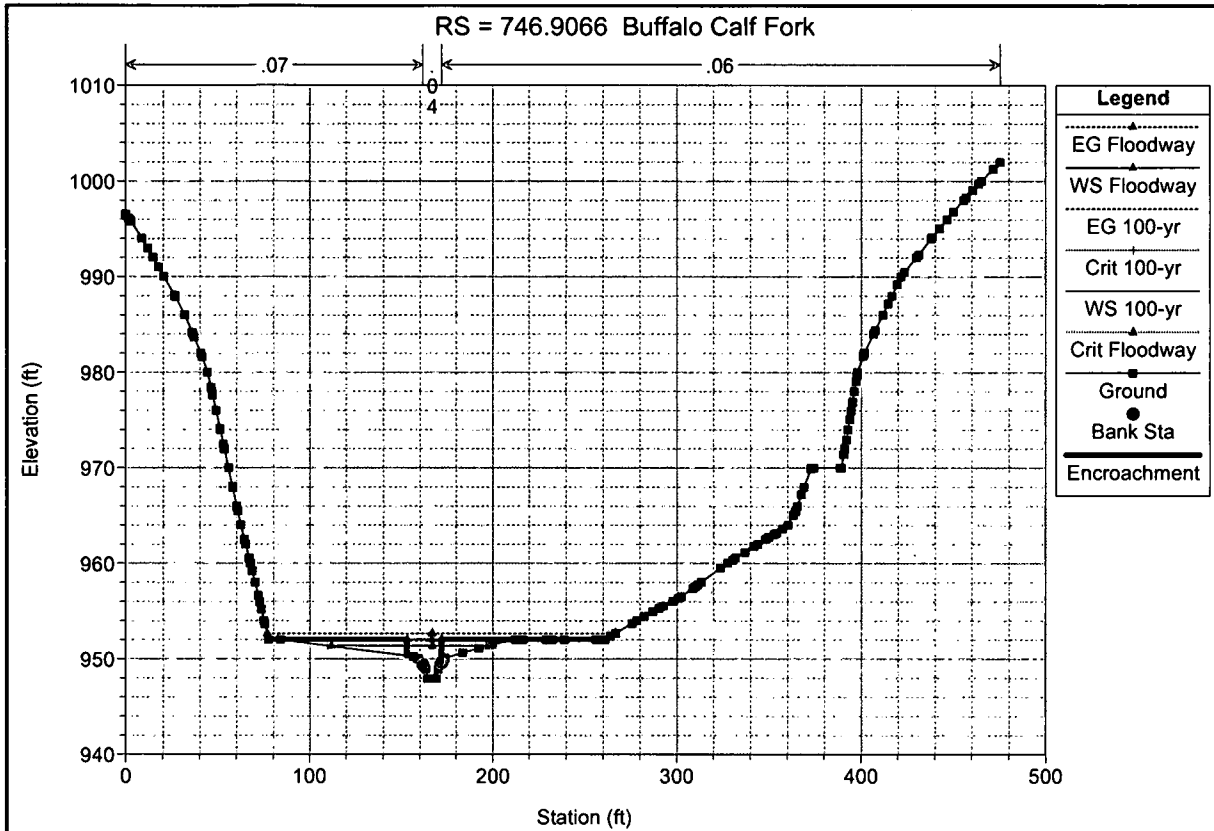
PK200 = $347 * DRNAREA^{0.793}$

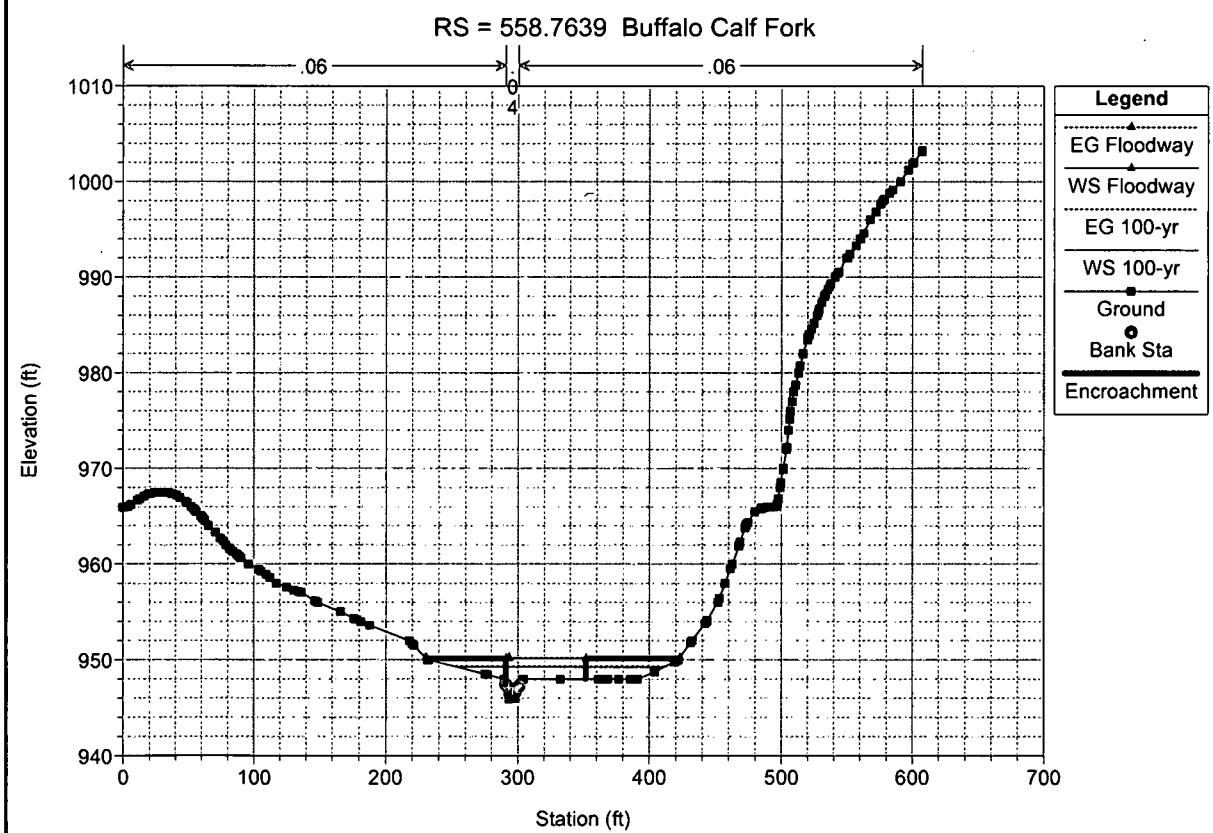
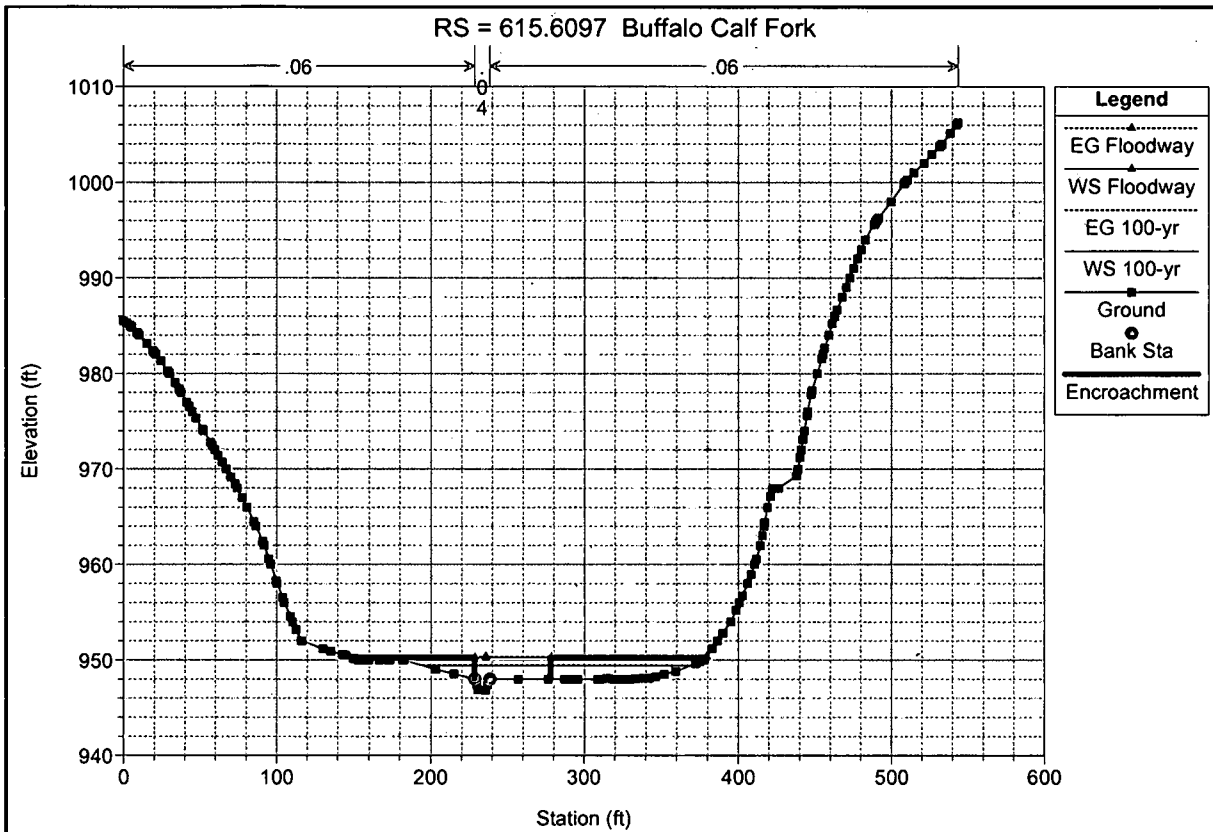
PK500 = $420 * DRNAREA^{0.785}$

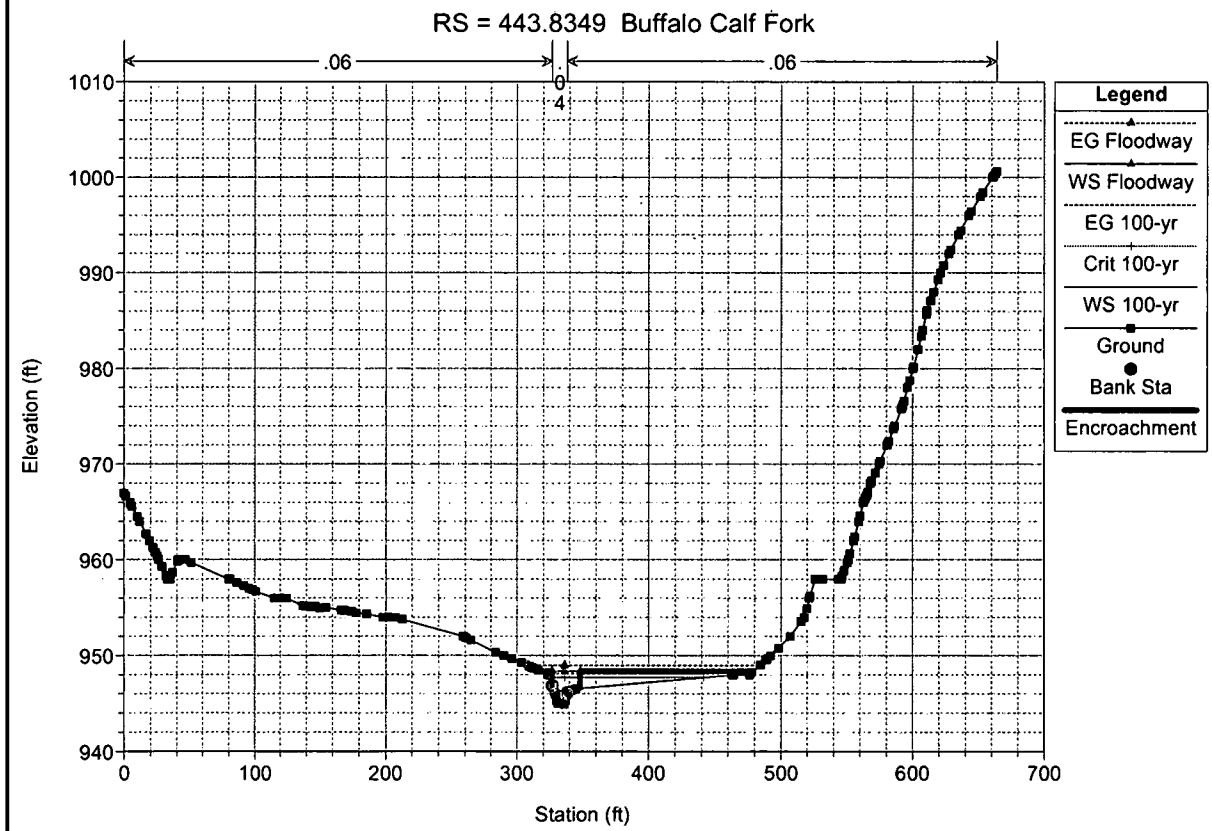
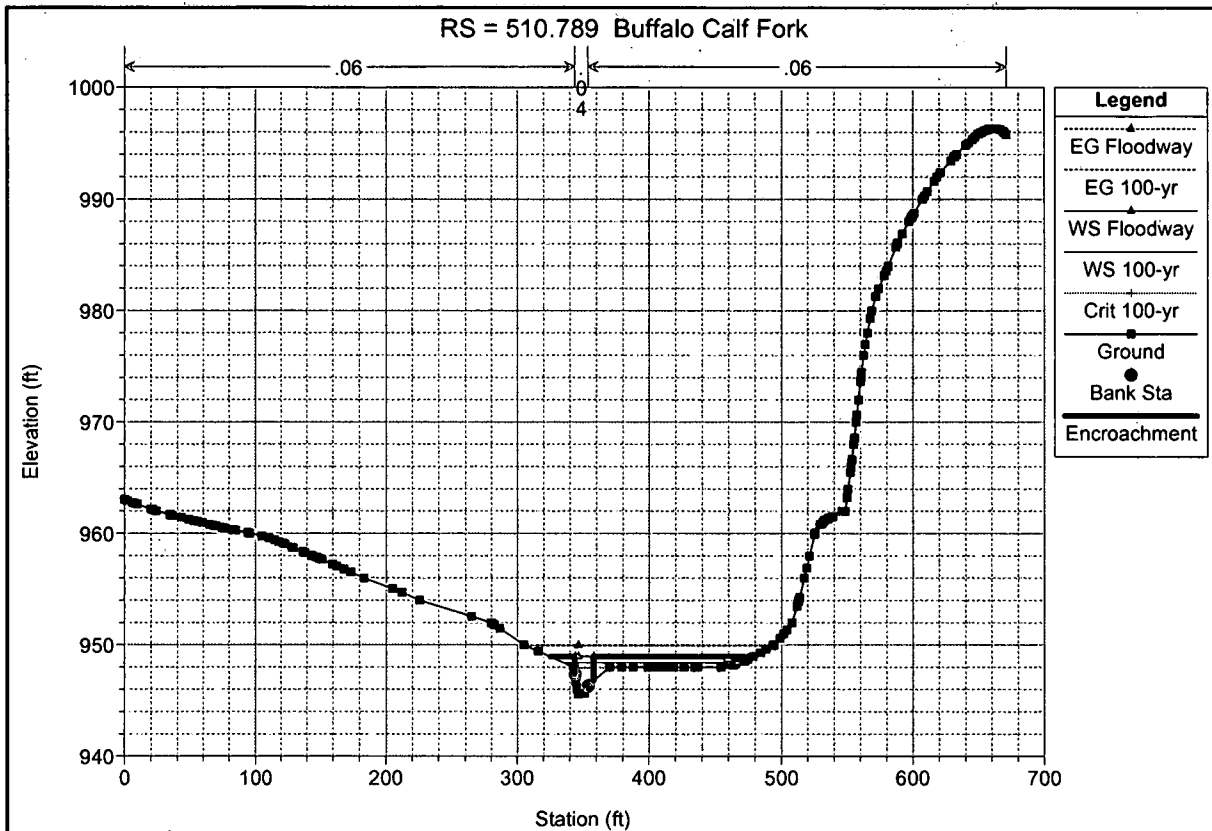
Statistic	Value, cfs	Standard Error, %	Equivalent Years
PK1_5	54.3	35	2
PK2	70	34	2.1
PK5	117	35	3.2
PK10	154	37	4
PK25	208	41	4.8
PK50	252	44	5.3
PK100	299	48	5.6
PK200	350	52	5.9
PK500	423	56	6.1
maximum: 3980 (for C&B region 4)			

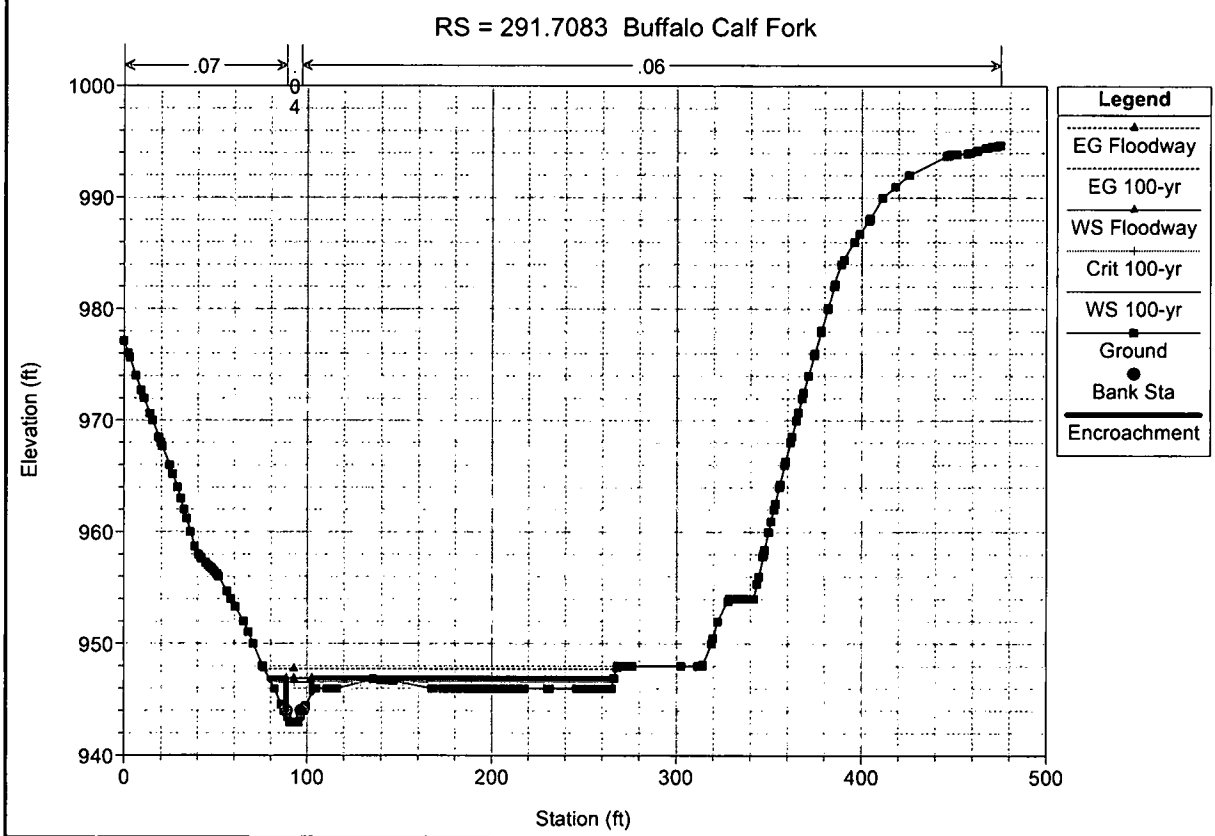
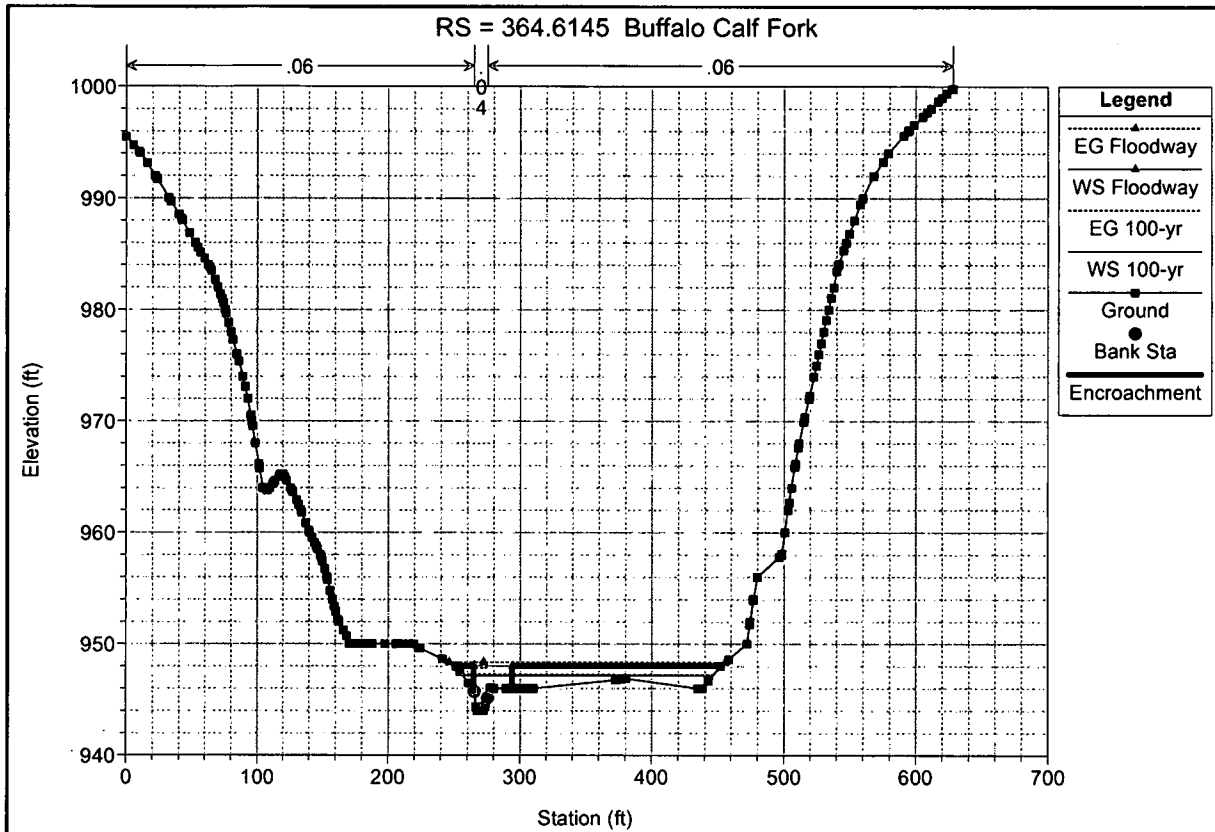


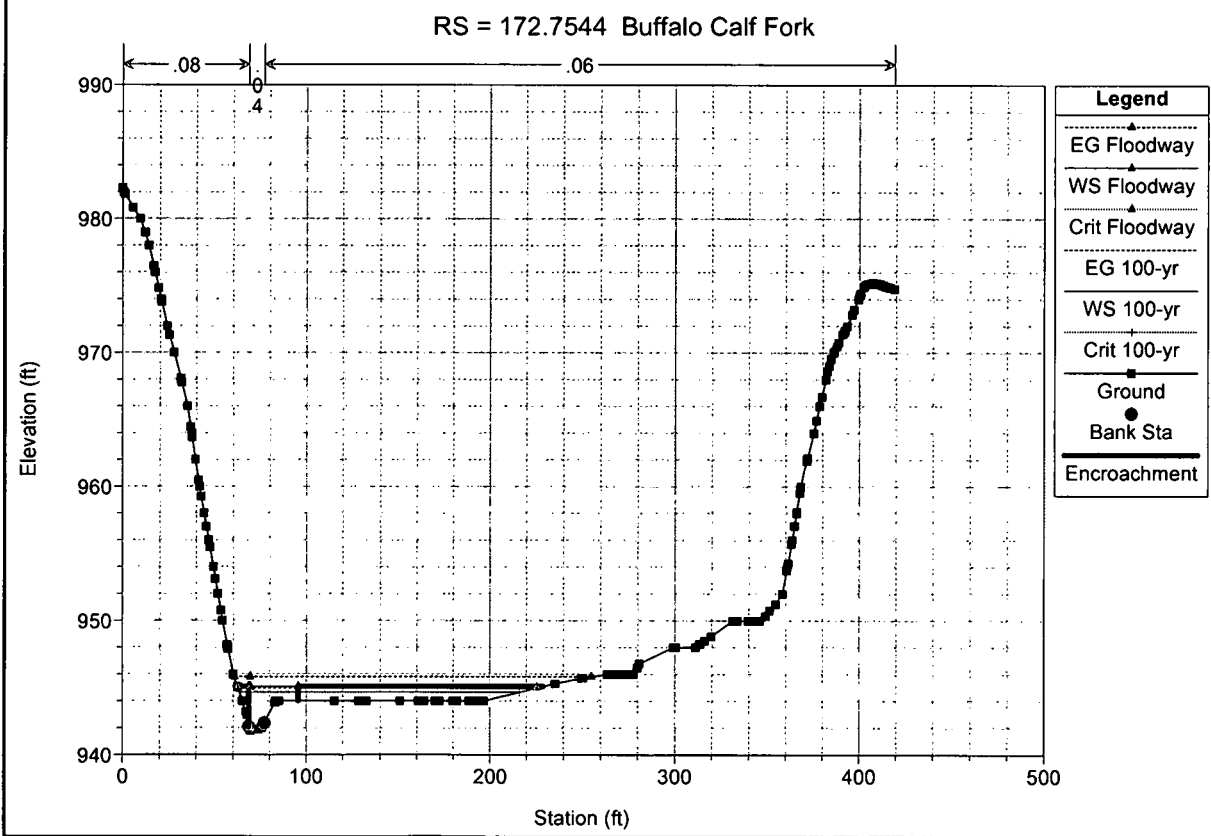
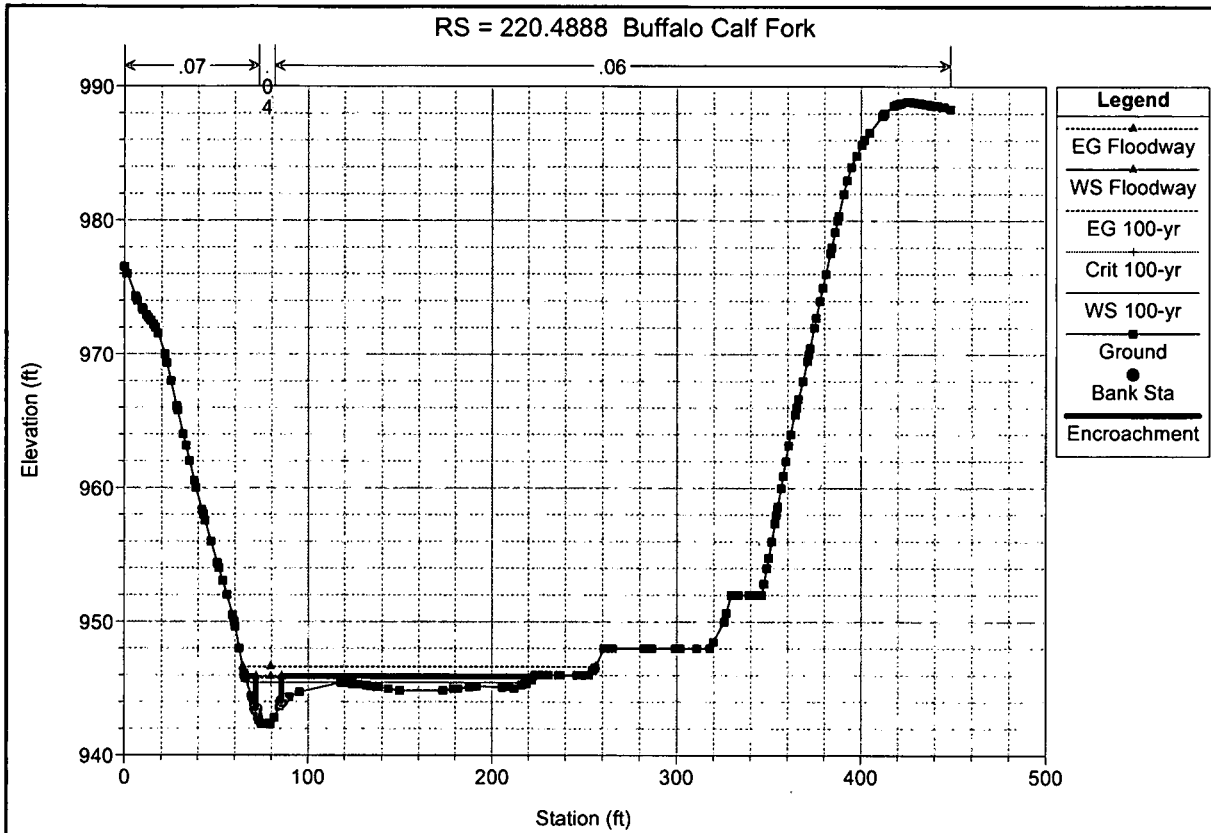


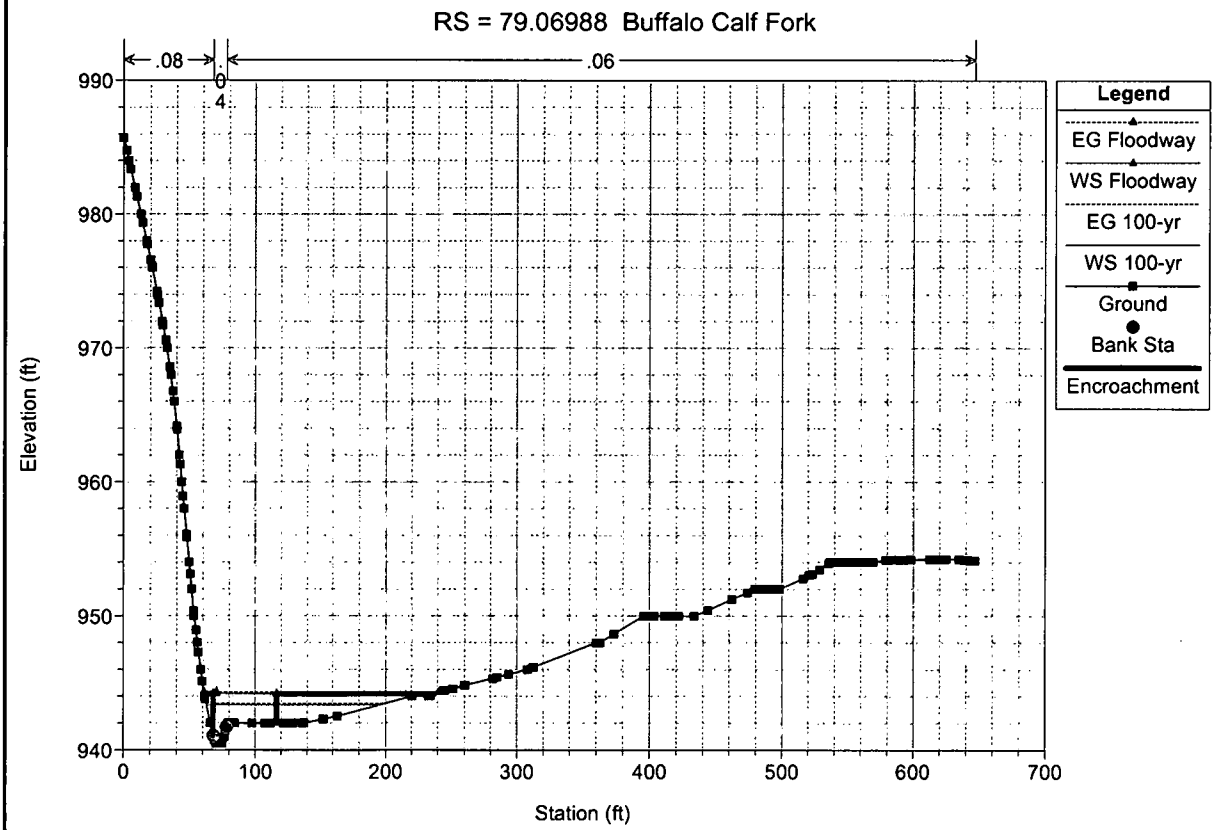
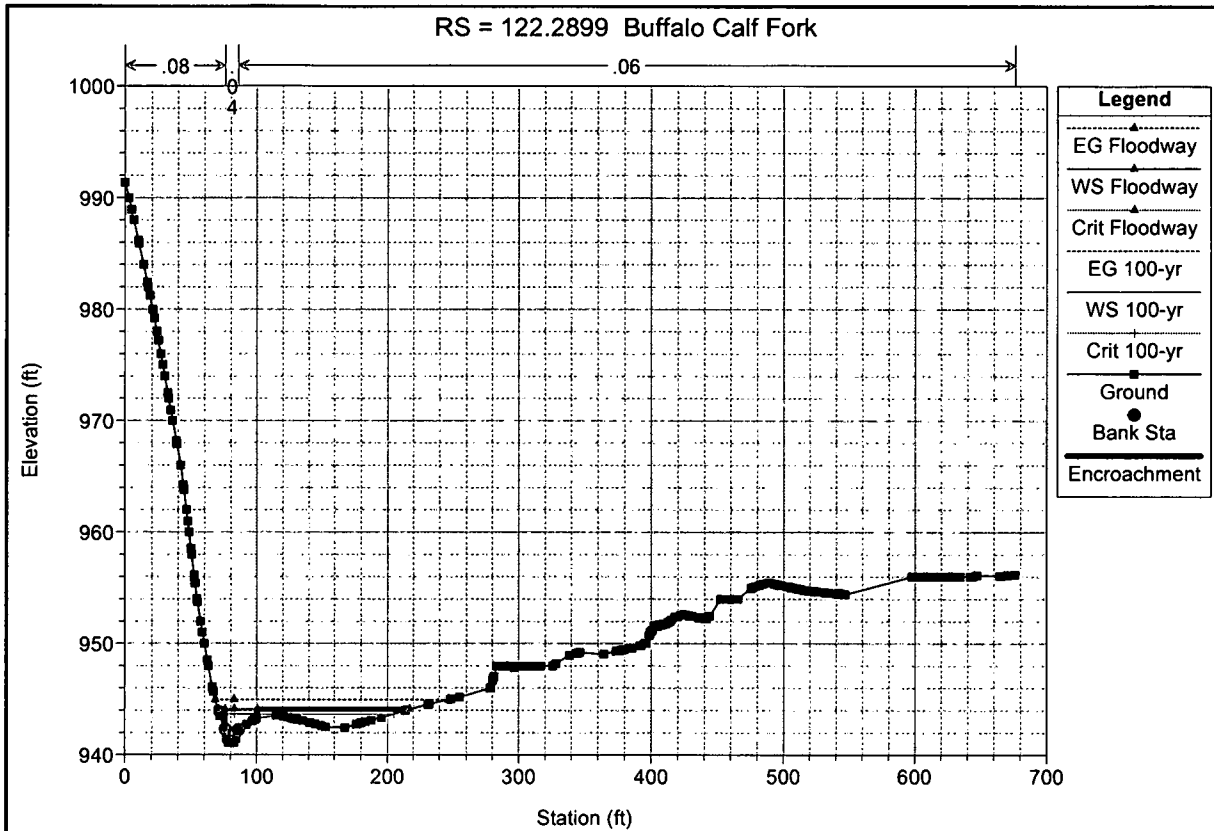




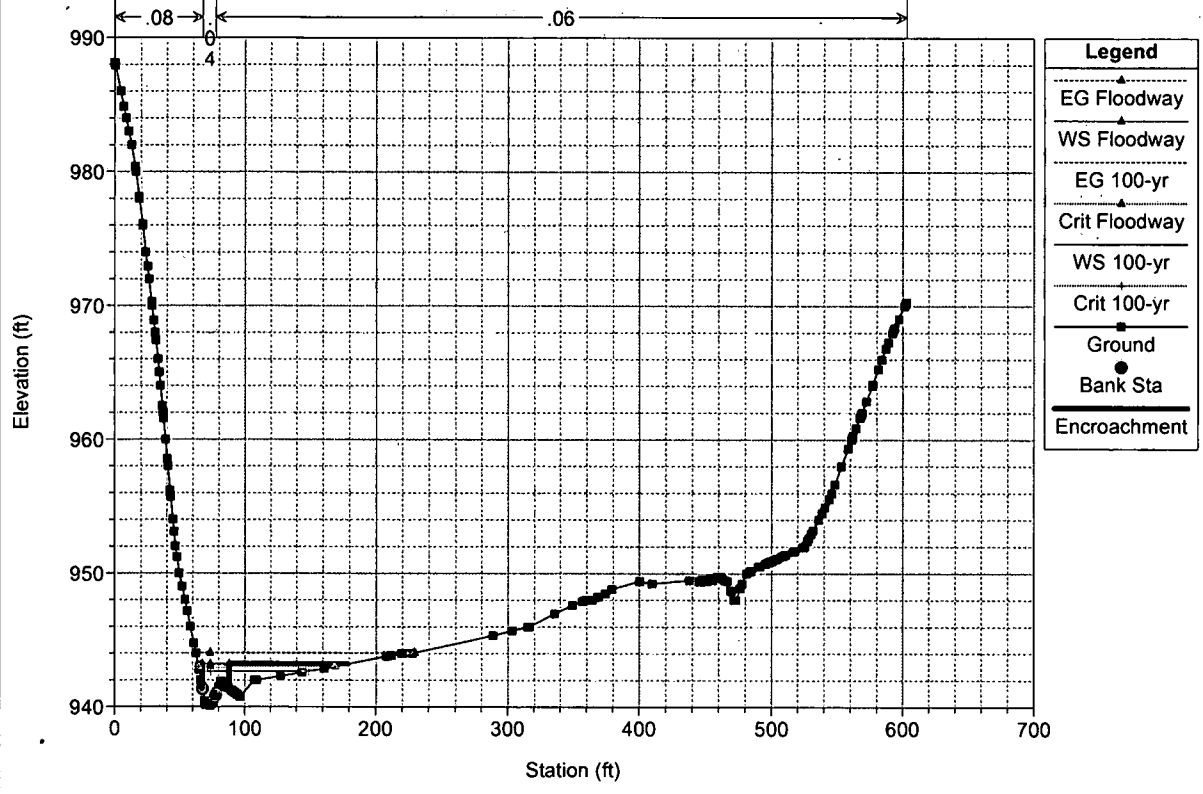








RS = 43.11598 Buffalo Calf Fork



STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO WIT

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

Floodplain Permit
14-122
Waterline

was published in said paper for ... *2* ...
successive weeks beginning with the issue
of ... *February 11th* ... 2014 and
ending with the issue of

... *February 18th* ... 2014 and
that said notice contains ... *189* ...
WORD SPACE at ... *115* ... cents a word
amounts to the sum of \$... *21.73* ...

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

\$... *16.29* ...
and each publication thereafter
\$... *38.02* ... TOTAL

EDITOR

Virginia Nicholson

SWORN TO AND SUBSCRIBED

BEFORE ME THIS THE ... *20th* ... DAY
OF ... *February* ... 2014

NOTARY PUBLIC

Laura J Adams

LEGAL ADVERTISEMENT
Doddridge County
Floodplain Permit Application

Please take notice that on the 5th February, 2014 ANTERO RESOURCES CORPORATION, MARSDEN FW1 TO PLAUGHER NORTH WATERLINE PERMIT #14-122 filed an application for a Floodplain Permit to develop land located at or about SURFACE OWNERS CAROLYN N. AND RANDY PLAUGHER GREENBRIER DISTRICT, D/B 45/151, AND TAX MAP 4 PARCEL 6.

The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by February 25, 2014.

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

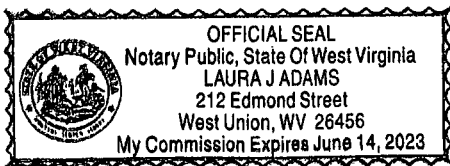
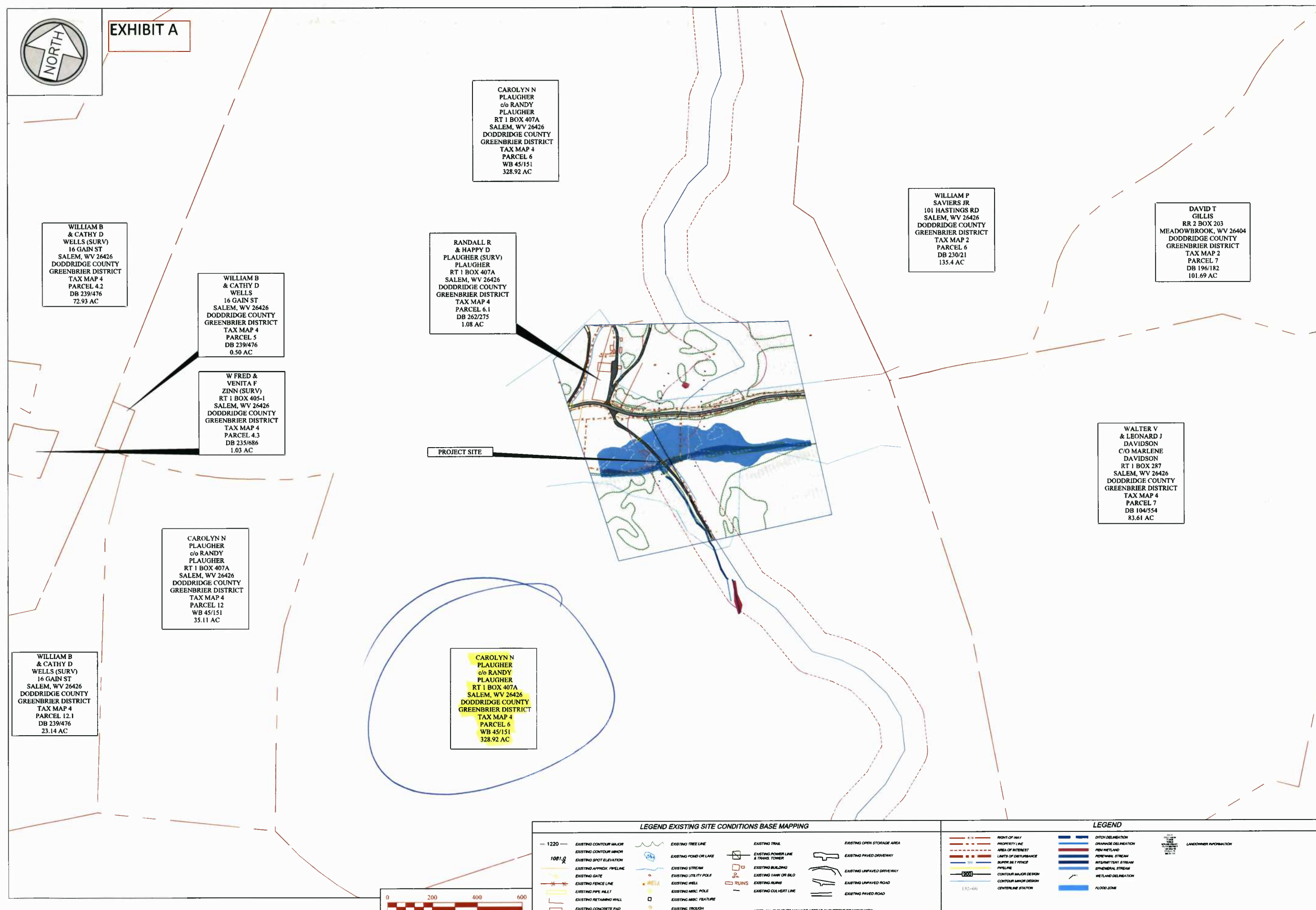




EXHIBIT A



WILLIAM B & CATHY D WELLS (SURV) 16 GAIN ST SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 4.2 DB 239/476 72.93 AC

WILLIAM B & CATHY D WELLS 16 GAIN ST SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 5 DB 239/476 0.50 AC

W FRED & VENITA F ZINN (SURV) RT 1 BOX 405-1 SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 4.3 DB 235/686 1.03 AC

CAROLYN N PLAUGHER c/o RANDY PLAUGHER RT 1 BOX 407A SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 12 WB 45/151 35.11 AC

WILLIAM B & CATHY D WELLS (SURV) 16 GAIN ST SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 12.1 DB 239/476 23.14 AC

CAROLYN N PLAUGHER c/o RANDY PLAUGHER RT 1 BOX 407A SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 6 WB 45/151 328.92 AC

RANDALL R & HAPPY D PLAUGHER (SURV) PLAUGHER RT 1 BOX 407A SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 6.1 DB 262/275 1.08 AC

WILLIAM P SAVIERS JR 101 HASTINGS RD SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 2 PARCEL 6 DB 230/21 135.4 AC

DAVID T GILLIS RR 2 BOX 203 MEADOWBROOK, WV 26404 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 2 PARCEL 7 DB 196/182 101.69 AC

WALTER V & LEONARD J DAVIDSON C/O MARLENE DAVIDSON RT 1 BOX 287 SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 7 DB 104/554 83.61 AC

CAROLYN N PLAUGHER c/o RANDY PLAUGHER RT 1 BOX 407A SALEM, WV 26426 DODDRIDGE COUNTY GREENBRIER DISTRICT TAX MAP 4 PARCEL 6 WB 45/151 328.92 AC



LEGEND EXISTING SITE CONDITIONS BASE MAPPING

1220	EXISTING CONTOUR MAJOR	EXISTING TREE LINE	EXISTING TRAIL	EXISTING OPEN STORAGE AREA
1081g	EXISTING CONTOUR MINOR	EXISTING POND OR LAKE	EXISTING POWER LINE & TRAVEL TOWER	EXISTING PAVED DRIVEWAY
	EXISTING SPOT ELEVATION	EXISTING STREAM	EXISTING BUILDING	EXISTING UNPAVED DRIVEWAY
	EXISTING APPROX. PIPELINE	EXISTING UTILITY POLE	EXISTING FARM OR BLD	EXISTING UNPAVED ROAD
	EXISTING GATE	EXISTING WELL	EXISTING RUINS	EXISTING PAVED ROAD
	EXISTING FENCE LINE	EXISTING MISC. POLE	EXISTING CULVERT LINE	
	EXISTING PIPE HOLE	EXISTING MISC. FEATURE		
	EXISTING RETAINING WALL	EXISTING TROUGH		
	EXISTING CONCRETE PAD			

NOTE: ALL ELEMENTS MAY NOT APPEAR IN CURRENT DRAWING VIEW

LEGEND

110-499	FRONT-OF-YARD	DITCH DELINEATION	LANDOWNER INFORMATION
	PROPERTY LINE	ORANGE DELINEATION	
	AREA OF INTEREST	PURPLE DELINEATION	
	LIMITS OF DISTURBANCE	PERMANENT STREAM	
	SURFACE FENCE	INTERMITTENT STREAM	
	PIPELINE	PERMANENT STREAM	
	CONTOUR MAJOR DESIGN	WETLAND DELINEATION	
	CONTOUR MINOR DESIGN	FLOOD ZONE	
	CENTERLINE STATION		

Kelly Surveying
P.O. Box 254
Dailey, WV 26259
(304)338-6985

REVISIONS	DATE



THIS DOCUMENT PREPARED FOR ANTERO RESOURCES CORPORATION

PROPERTY OWNER REFERENCE MAP
PROPOSED AERIAL SPAN 12" HDPE
BUFFALO CREEK FORK TO COUNTY ROUTE 42
PLAUGHER NORTH DRILL PAD
GREENBRIER DISTRICT, DODDRIDGE COUNTY
WEST VIRGINIA

Date: 01/27/14
Scale: 1" = 200'
Designed by: KK, JK
File No: PLAUGHER NORTH BORE
Page: 4 of 4

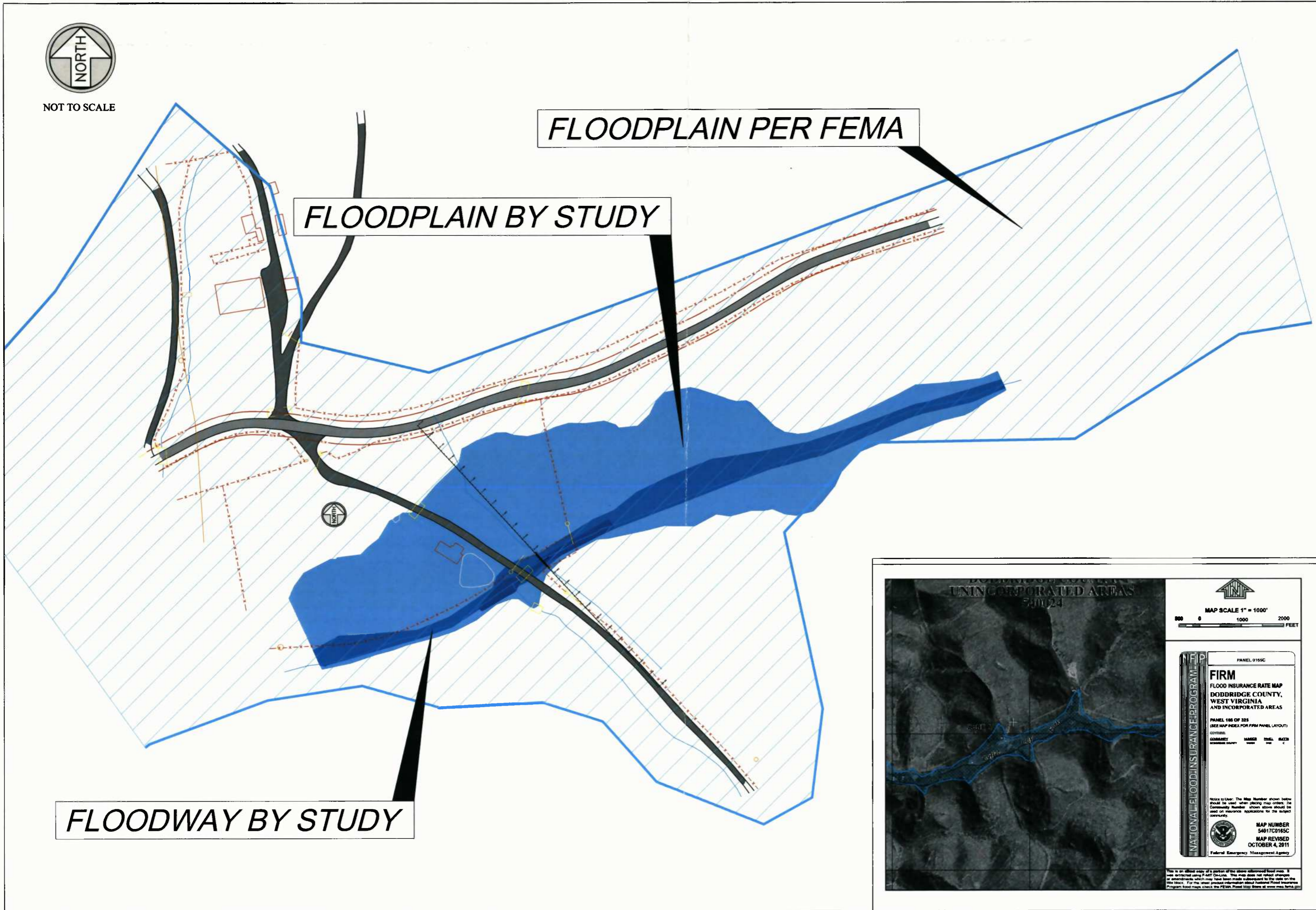


NOT TO SCALE

FLOODPLAIN PER FEMA

FLOODPLAIN BY STUDY

FLOODWAY BY STUDY



UNINCORPORATED AREAS
780024

MAP SCALE 1" = 1000'
0 1000 2000 FEET

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

PANEL 186 OF 325
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CITY/TOWNSHIP: _____
COUNTY: _____

MAP NUMBER
54817C0165C
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-Link 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 most current information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.maf.bldr.gov

Kelly S Surveying
P.O. Box 254
Dailley, WV 26259
(304)338-6985

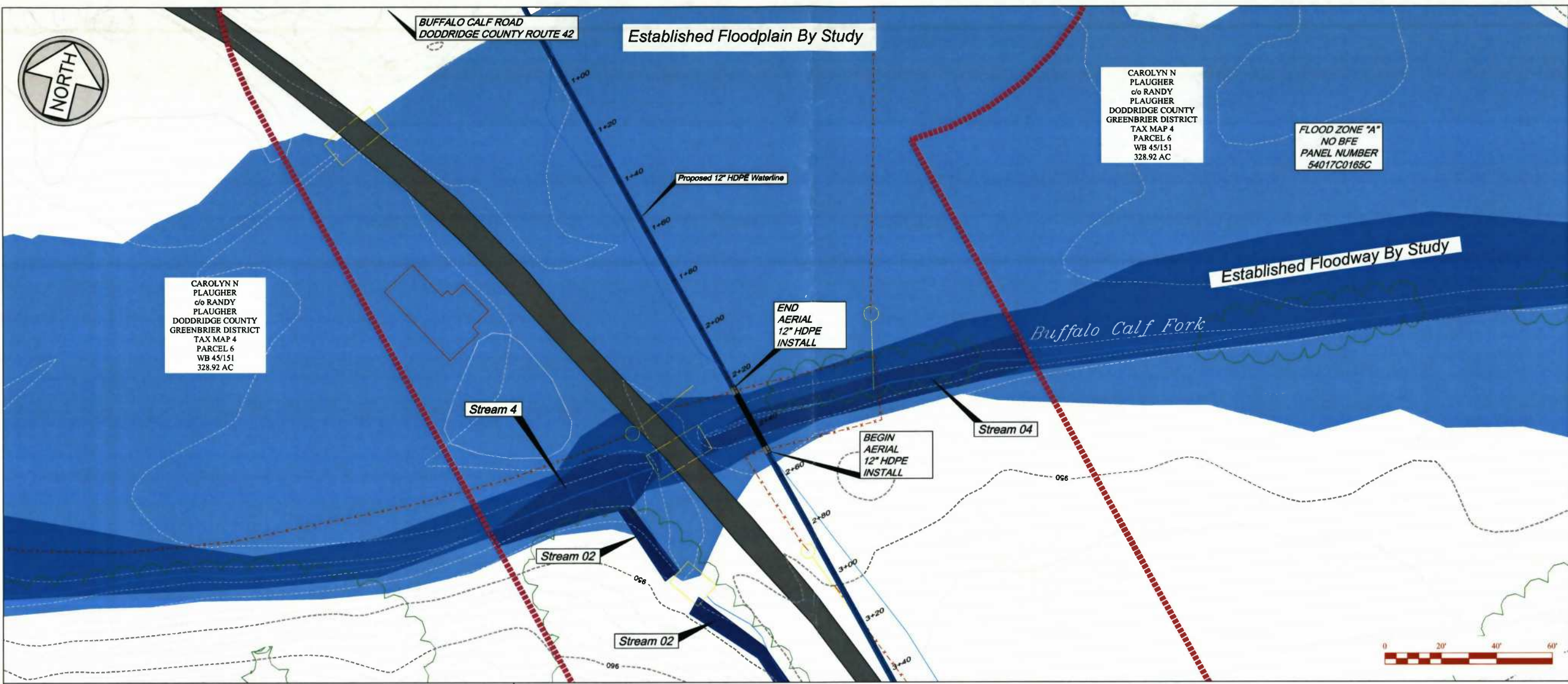
REVISIONS	DATE



THIS DOCUMENT PREPARED FOR ANTERO RESOURCES CORPORATION

FEMA FIRMETTE
PROPOSED AERIAL SPAN 12" HDPE
BUFFALO CREEK FORK TO COUNTY ROUTE 42
PLAUGHER NORTH DRILL PAD
GREENBRIER DISTRICT, DODDRIDGE COUNTY
WEST VIRGINIA

Date: 01/27/14
Scale: AS NOTED
Designed By: KK JK
File No: PLAUGHER NORTH
B01E
Page 3 of 3



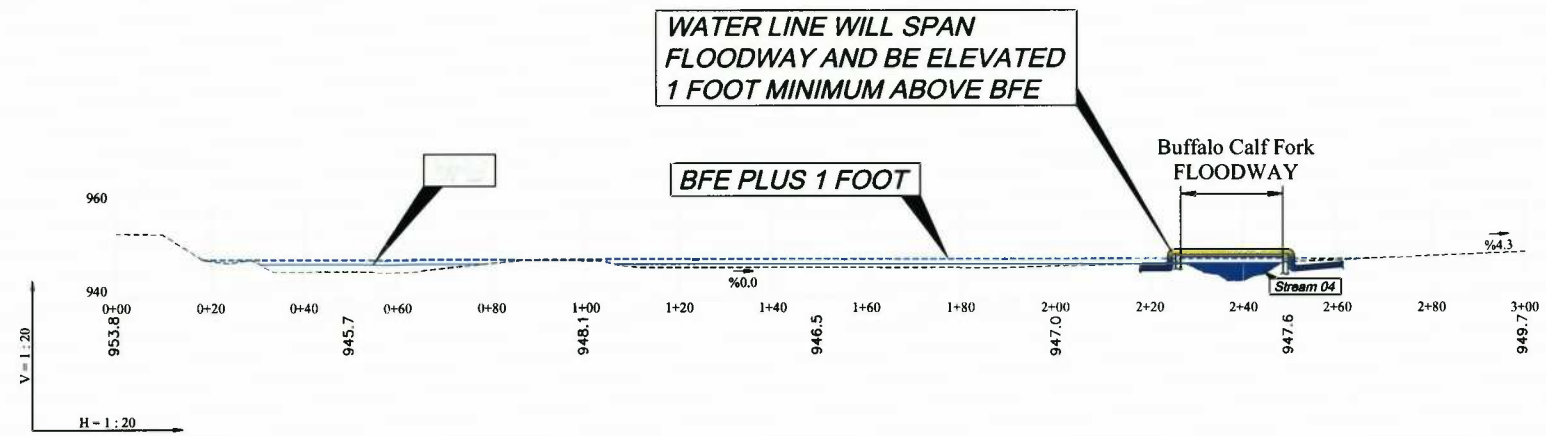
LEGEND EXISTING SITE CONDITIONS BASE MAPPING

1220	EXISTING CONTOUR MAJOR	EXISTING TREE LINE	EXISTING TRAIL	EXISTING OPEN STORAGE AREA
1061.8	EXISTING CONTOUR MINOR	EXISTING POND OR LAKE	EXISTING POWER LINE & TRANS. TOWER	EXISTING PAVED DRIVEWAY
	EXISTING SPOT ELEVATION	EXISTING STREAM	EXISTING BUILDING	EXISTING UNPAVED DRIVEWAY
	EXISTING APPROX. PIPELINE	EXISTING UTILITY POLE	EXISTING TANK OR SILO	EXISTING UNPAVED ROAD
	EXISTING GATE	EXISTING WELL	EXISTING RUNS	EXISTING PAVED ROAD
	EXISTING FENCE LINE	WELL	EXISTING CLAVERTY LINE	
	EXISTING PIPE INLET	EXISTING MISC. POLE		
	EXISTING RETAINING WALL	EXISTING MISC. FEATURE		
	EXISTING CONCRETE PAD	EXISTING TROUGH		

NOTE: ALL ELEMENTS MAY NOT APPEAR IN CURRENT DRAWING VIEW

LEGEND

---	RIGHT-OF-WAY	---	DITCH DELINEATION	---	LANDOWNER INFORMATION
---	PROPERTY LINE	---	DRAINAGE DELINEATION		
---	AREA OF INTEREST	---	PERMANENT STREAM		
---	LIMITS OF DISTURBANCE	---	INTERMITTENT STREAM		
---	SUPER SILT FENCE	---	EPHEMERAL STREAM		
---	PIPELINE	---	WETLAND DELINEATION		
---	CONTOUR MAJOR DESIGN	---			
---	CONTOUR MINOR DESIGN	---			
---	CENTRE LINE STATION	---			



**Proposed 12 inch HDPE Aerial Span
Buffalo Calf Fork Profile**

REVISIONS
DATE



THIS DOCUMENT
PREPARED FOR
ANTERO RESOURCES
CORPORATION

PLAN AND PROFILE SHEET
PROPOSED AERIAL SPAN 12" HDPE
BUFFALO CALF FORK TO COUNTY ROUTE 42
PLAUGHER NORTH DRILL PAD
GREENBRIER DISTRICT, DODDRIDGE COUNTY
WEST VIRGINIA

