Doddridge County Sheriff Flood Plain Ordinance Fund

1021

69-217/515

DATE July 16, 2013

PAY TO THE, ORDER OF.... ANTERO RESOURCES

\$ 1,000.00

One Thousand Dollars and No/100-----

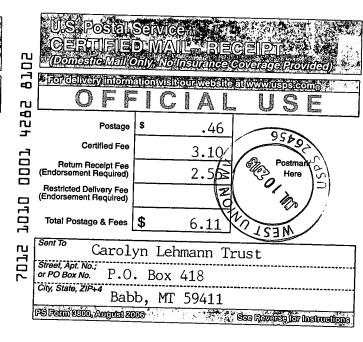
CORNERS IONIE
West Union, W 26456

MEMO Reimburse Bldg Permit #13-031 (Redican)

#001021# #051502175#

11.0964909

8 Domestic Melicenty *Fordelivery information visitour Postage Certified Fee 1010 0101 3.10 Return Receipt Fee (Endorsement Required) Restricted Delivery Fee (Endorsement Required) Total Postage & Fees \$ 6.11 Sent To 5,0 John & Melissa Cascarelli Street, Apt. No.; Rt.3, Box 55 A Salem, WV 26426 or PO Box No. City, State, ZIP+4 PS Form 3300, August 2003 See Reverse for Instructions



SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVER	rY .
 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 mailpied or on the front if space permits. 	, \	A. Signature B. Received by (Printed Name) C. I C. I D. Is delivery address different from item 1?	Agent Addressee Date of Delivery 20/20/5
1. Article Addressed to:		If YES, enter delivery address below:	□ No
Carolyn Lehmann Trust c/o Kristian Loel Rexroad Bikas P.O. Box 418 Babb, MT 59411			
,	-	3. Service Type Certified Mail	or Merchandise
		4. Restricted Delivery? (Extra Fee)	☐ Yes
Article Number (Transfer from service label) 7012	סומ	0001 4595 9705	
PS Form 3811, February 2004 Dom	estic Ret	turn Receipt	102595-02-M-1540

UNITED STATES POSTAL SERVICE

FISI-CIAS MAIL
POSTAGE & EGES PAIC
SSPS
Permitt No. G-10

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

DODDRIDGE COUNTY CLERK 118 E. COURT ST., RM 102 WEST UNION, WV 26456

BETH A. ROGERS

րոլուդիրդիկիկորորդիկիուրիությա

SENDER: COMPLETE THIS SECT	TON	COMPLETE THIS SECTION ON DELIVERY
 Complete items 1, 2, and 3. Also item 4 if Restricted Delivery is det Print your name and address on t so that we can return the card to Attach this card to the back of the or on the front if space permits. 	sired. he reverse you.	B. Received by (Printed Name) C. Date of Delivery
1. Article Addressed to: John & Melissa Cascarelli Rt. 3, Box 55 A Salem, WV 26426		D. Is delivery address different from item ?
		3. Service Type
Article Number (Transfer from service label)	7015 1010	3POB 4282 4096
PS Form 3811, February 2004	Domestic Re	eturn Receipt 102595-02-M-1540

UNITED-STATES POSTAL SERVICEN Fees Paid SPP

12 301 2013 PM 41 Parmit No. 9-40

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

BETH A. ROGERS DODDRIDGE COUNTY CLERK 118 E. COURT ST., RM 102 WEST UNION, WV 26456

<u> հեհհետնիկակվան Ունդինի ՈՒՈՒՈՒՈՒՈՒՈՒՈՒՈՒՈՒՈ</u>

By: BH - MEH - AML

Asst. Chief Tax Deputy

W. C. Underwood Jr.

Sheriff of Doddridge County

The Person paying Money into the Treasury shall forthwith file one of these Receipts with the County Clerk

Doddridge County, West Virginia

No. 7

> Date: July 9, 2013

> > ***Customer copy***

Received: #13-031 Antero

\$1,985.75

In Payment For:

Building Permits (LP)

For:

12-Flood Plain Ordinance #20 Fund

By: BH - MEH - AML

Aset Chi Tax Deputy

W. C .Underwood Jr.

Sheriff of Doddridge County

By: BH - MEH - AML

Asst. Chief Tax Deputy

Michael Headley

Sheriff of Doddridge County

The Person paying Money into the Treasury shall forthwith file one of these Receipts with the County Clerk

Doddridge County, West Virginia

No. 4859

Date: July 9, 2013

Customer copy

Received: #13-031 Antero

\$1,985.75

In Payment For:

318 Building Permits (LP)

For: 12-Flood Plain Ordinanc Fund #20 Fund

By: BH - MEH - AML

Asst. Chief Tax Deputy

Michael Headley

Sheriff of Doddridge County



ANTERO RESOURCES CORPORATION 1625 17th STREET, SUITE 300 DENVER, COLORADO 80202

Check Total Vendor No. Date Check Number Vendor Name Jul-02-2013 32831 \$1,985.75 DODDRIDGE COUNTY COMMISSION 43312

VOUCHER	VENDOR INV #	INV DATE	TOTAL AMOUNT	PRÏÔR PMTS & DISCOUNTS	NET AMOUNT	
	XSTAGINGAREA N PERMIT APP-		1,985.75	0.00	1,985.75	
TOTAL INVOI		COX STAGING	AREA		1,985.75	

Doddridge County Flood Plain Application Fee Calculator (if in Flood Plain)				
Cox Staging A	Area			
Estimated Construction Costs	\$97,150.60			
Amount over \$100,000	-\$2,849.40			
Drilling Oil and Gas Well Fee	\$1,000.00			
Deposit for additional charges	\$1,000.00			
\$5 per \$1,000 over \$100,000	-\$14.25			
Amount Due with application	\$1,985.75			

--

Legal Advertisement:

Doddridge County

Floodplain Permit Application

20 days ath July.

Please take notice that on the 09th day of July, 2013,

ANTERO RESOURCES APPALACHIAN CORP. filed an

application for a Floodplain Permit to develop land located at or

about: VICTOR & WANDA COX, Surface Owners, Greenbrier District,

Deed Book /Page: 229/313 & 65/123, Tax Map: 13 Parcel 11 & TM 14 Parcel 8

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 July 29th, 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

TRANSACTION REPORT

JUL-10-2013 WED 03:58 PM

FOR:

DODDRIDGE CO. CLERK

304 873 1840

SEND

DATE	START	RECE I VER	TX TIME	PAGES	TYPE	NOTE	M♯ DP
JUL-10	03:58 PI	1 93048731600	26"	1	FAX TX	OK	501

TOTAL:

26S PAGES:

1

Legal Advertisement:

Doddridge County

Floodplain Permit Application

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

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager



July 1, 2013

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 Appalachian Corporation (Antero) would like to submit a Doddridge County Floodplain permit application for our Cox Staging Area. Our project is located in Doddridge County, Greenbrier District. Per the enclosed HEC-RAS study prepared by The Trasher Group, Inc. on June 7, 2013, the placement of the topsoil in the floodplain will not create an increase of the flood elevation or cause significant erosion.

Attached you will find the following:

- > Doddridge County Floodplain Permit Application and permit fees
- ➤ HEC-RAS Study
- > FIRM Map
- > Copies of other required permits

If you have any questions please feel free to contact me at (303) 357-6820.

Thank you in advance for your consideration.

Sincerely,

Shauna Redican

Permit Representative

Antero Resources Appalachian Corporation

Enclosures

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT

PURPOSE FOR PERMIT: <u>STAGING AREA</u>
ISSUED TO ANTERO RESOURCES
ADDRESS: 1625 17TH STREET, DENVER CO
PROJECT ADDRESS: RT. 3 BOX 46, SALEM, WU 26426 TAX MAP 13-PARCEL 11 + TAX MAP 14 PARCEL 8
ISSUED BY: Dan Willing,
DATE: 07/31/2013

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

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	Multion
DATE July 1, 2019	,

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.

Antero Resources Appalachian Corporation - Kevin	Kilstrom, Vice	
APPLICANT'S NAME: President of Production		
ADDRESS:1625 17th Street, Denver, CO 80202		ت
TELEPHONE NUMBER: Contact Shauna Redican: 303-357-6820		Ξ
	832	نٿ
	(7)	85
	₹ ³ %% -	

1

BUILDER'S NAME:
ADDRESS:
TELEPHONE NUMBER:
ENGINEER'S NAME: The Thrasher Group - Michael Nestor
ADDRESS: 30 Columbia Boulevard, Clarksburg, WV 26301
TELEHONE NUMBER: 304 - 624 - 4108
PROJECT LOCATION:
NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Victor and Wanda Cox
M.E. Church
ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) 1 Rt. 3 , Box 46
Salen WV 26426
DISTRICT: Greenbrier
DATE/FROM WHOM PROPERTY
PURCHASED:
LAND BOOK DESCRIPTION: Tillable, Woodland
DEED BOOK REFERENCE: "DB 229; PG 313 "D8 65; PG 123
TAX MAP REFERENCE: "TM 13 : Par 11 "TM 14 : Par 8
EXISTING BUILDINGS/USES OF PROPERTY: None/None 2) Abandoned Church James
NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT
PROPERTY_Victor Cox
ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE
SUBJECT PROPERTY Rt. 3, Box 46 Salem, WV 26426

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

	ACI	IVITY				STRUCTU	RAL TYPE
0 0 0 0 0	[] Addition[] Alteration[] Relocation[] Demolition			0 0 0 0 0	Residential (1 – 4 Family) Residential (more than 4 Family) Non-residential (floodproofing) Combined Use (res. & com.) Replacement		
В.	OTHER DEV	/EOPLI	MENT ACTIV	/ITIES:			
)X 0 0 0 0 0	Watercours Drainage Im Road, Street Subdivision	e Altero provent, or Brid (includitater or	Mining for STRUCTUR ration (includin nents (includin dge Construct ng new expan Sewer System fy)	ng dredg ng culvert ion sion)	ing and ch	checked ab	
C.	STANDAR	O SITE	PLAN OR SK	KETCH			
	THE LOT. SH INDICATING	D SITE A SEPAI IOW TH	PLANS HAVE N RATE 8 ½ X 11 IE LOCATION (NOT BEE INCH SH OF THE IN SIZE & H	N PREPAR EET OF PA NTENDED (HEIGHT. IC	ED: APER THE SH CONSTRUCT	RED. APE AND LOCATION OF ION OR LAND USE STING BUILDINGS,

IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN \$ 97,150.60

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

3. SIGN AND DATE THE SKETCH.

Sent out Outo/10/13

WHO OWN PROPERTY THAT MAY B BY A FLOODPLAIN STUDY OR SURVE	
ME: John + Melissa Cascarolli	NAME: Carolyn Lehmann Trust Kristig
DRESS: Rt. 3, Box 55A	ADDRESS: P.O. Box 418 Rexis
Salem, WV 26426	ADDRESS: P.O. Box 418 Rexis Babb MT 59411
ME:	NAME:
DDRESS:	ADDRESS:
LOCATED UPON ANY ADJACENT PRO	ONE ADULT RESIDING IN EACH RESIDENCE OPERTY AT THE TIME THE FLOODPLAIN PERMIT ME AND ADDRESS OF AT LEAST ONE ADULT
1. NAME AND ADDRESS OF AT LEAST OF LOCATED UPON ANY ADJACENT PROAPPLICATION IS FILED AND THE NAME RESIDING IN ANY HOME ON ANY PROBE DEMONSTRATED BY A FLOODPLAN	PERTY AT THE TIME THE FLOODPLAIN PERMIT ME AND ADDRESS OF AT LEAST ONE ADULT OPERTY THAT MAY BE AFFECTED BY FLOODING AS IN STUDY OR SURVEY.
1. NAME AND ADDRESS OF AT LEAST OF LOCATED UPON ANY ADJACENT PROAPPLICATION IS FILED AND THE NAME RESIDING IN ANY HOME ON ANY PROBLEM ON THE NAME: Sohn Cascare 11. ADDRESS: Rt. 3, Box 55 A	PPERTY AT THE TIME THE FLOODPLAIN PERMIT ME AND ADDRESS OF AT LEAST ONE ADULT OPERTY THAT MAY BE AFFECTED BY FLOODING AS IN STUDY OR SURVEY. NAME: ADDRESS:
1. NAME AND ADDRESS OF AT LEAST OF LOCATED UPON ANY ADJACENT PROAPPLICATION IS FILED AND THE NAMESTED IN ANY HOME ON ANY PROBED BY A FLOODPLANT NAME: John Cascare 11;	PPERTY AT THE TIME THE FLOODPLAIN PERMIT ME AND ADDRESS OF AT LEAST ONE ADULT OPERTY THAT MAY BE AFFECTED BY FLOODING AS IN STUDY OR SURVEY. NAME: ADDRESS:
1. NAME AND ADDRESS OF AT LEAST OF LOCATED UPON ANY ADJACENT PROAPPLICATION IS FILED AND THE NAME RESIDING IN ANY HOME ON ANY PROBLEM ON THE NAME: Sohn Cascare 11. ADDRESS: Rt. 3, Box 55 A	PERTY AT THE TIME THE FLOODPLAIN PERMIT ME AND ADDRESS OF AT LEAST ONE ADULT OPERTY THAT MAY BE AFFECTED BY FLOODING AS IN STUDY OR SURVEY. NAME: ADDRESS:

1. NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA

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.

NAM	Kevin Kilstrom, Vice President of Production		•
SIGN	ATURE: WWw.	DATE:_	July 1, 2013
After Admi	completing SECTION 2, APPLICANT should submit form to F nistrator/Manager or his/her representative for review.		
SECT	TON 3: FLOODPLAIN DETERMINATION (to be comp	leted by	/ Floodplain
Adm	inistrator/Manager or his/her representative)		
THE	PROPOSED DEVELOPMENT:		
THE P	ROPOSED DEVELOPMENT IS LOCATED ON:		
FIRM	Panel: 235		
Dated	10/04/2011		
[] reviev	Is <u>NOT</u> located in a Specific Flood Hazard Area (Notify apply is complete and NO FLOOPLAIN DEVELOPMENT PERMIT IS	icant that	the application
rs.	Is located in Special Flood Hazard Area.		. :
	FIRM zone designationA	,	`
	FIRM zone designationA 100-Year flood elevation is:	M	NGVD (MSL)
]	Unavailable		
]	The proposed development is located in a floodway. FBFM Panel No	Daka J	
	MA TO THE RESIDENCE OF THE PARTY OF THE PART	Dated	

See section 4 for additional instructions.

[]

SIGNED Dan Wolling

DATE 07/31/2013

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.
O	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 elevationFt. 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).

		be completed by Floodpla	<u>in</u>				
Administra	ntor/Manager or his/her i	<u>representative)</u>					
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 Doddri County on May 21, 2013. The permit is issued subject to the conditions attached to a made part of this permit.							
SIGNED	DATE	:					
with the pro	lain Administrator/Manager for visions of the Doddridge Count the applicant may complete ar	ound that the above was not in ty Floodplain Ordinance and/or a appealing process below.	conform denied t				
APPEALS:	Appealed to the County Con	nmission of Doddridge County?	[] Yes {]				
		n - Approved [] Yes [] No					

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 isFT. NGVD (MSL)
2	Actual (As Built) elevation of floodproofing isFT. NGVD (MSL)
Note:	Any work performed prior to submittal of the above information is at risk of the ant.
SECT	ON 7: COMPLIANCE ACTION (To be completed by the Floodplain
<u>Admi</u>	nistrator/Manager or his/her representative).
as app	oodplain Administrator/Manager or his/her representative will complete this section licable based on inspection of the project to ensure compliance with the Doddridge y Floodplain Ordinance.
IN	SPECTIONS:
	DATE:BY:
со	MMENTS
	ON 8: CERTIFICATE OF COMPLIANCE (To be completed by Floodplain
	nistrator/Manager or his/her representative).
Certific	rate of Compliance issued: DATE: 12/06/13BY: Dan Wolfes

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

•
PERMIT NUMBER: 13-03/ PERMIT DATE: 07/3(/2013
PURPOSE
CONSTRUCTION LOCATION: Cox Staging Area
Antero Resources
OWNER'S ADDRESS: 1625 17 TH STREET
Denver, Co. 80202
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 12/06/2013

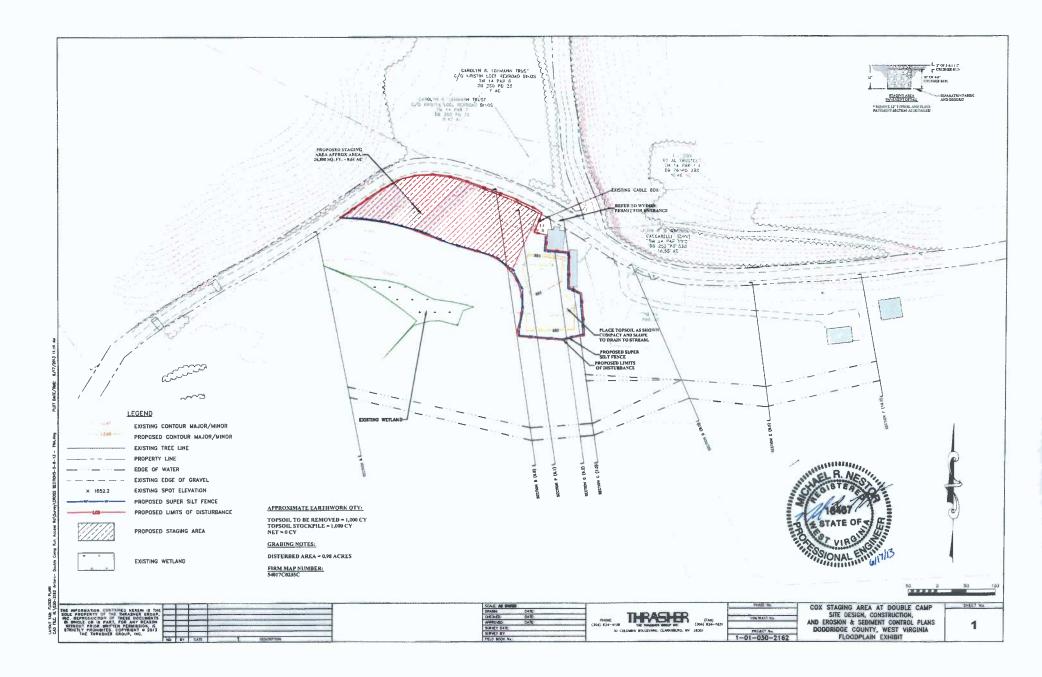
Antero

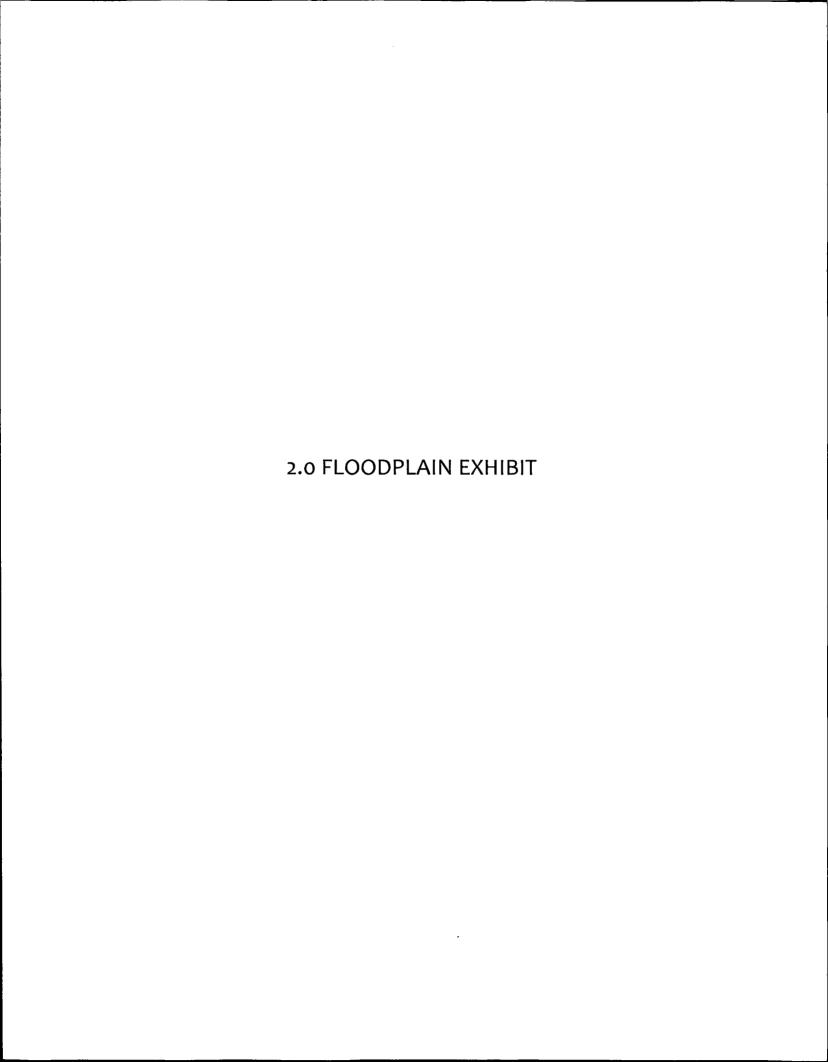


Staging Area

Meathouse Fork at mouth
of bouble Camp

12/05/2013 DJW







May 9, 2013

Mike Ash Antero Resources 175-D Elk Creek Road Mt. Clare, WV 26408

Re: Double Camp Road - Cox Staging Area

Dear Mike,

Below please find an estimated budget to construct the Cox Staging Area. I have included E&S controls, grading, and placing a stone surface over the area. If you have any questions please feel free to give me a call at 412-980-2203.

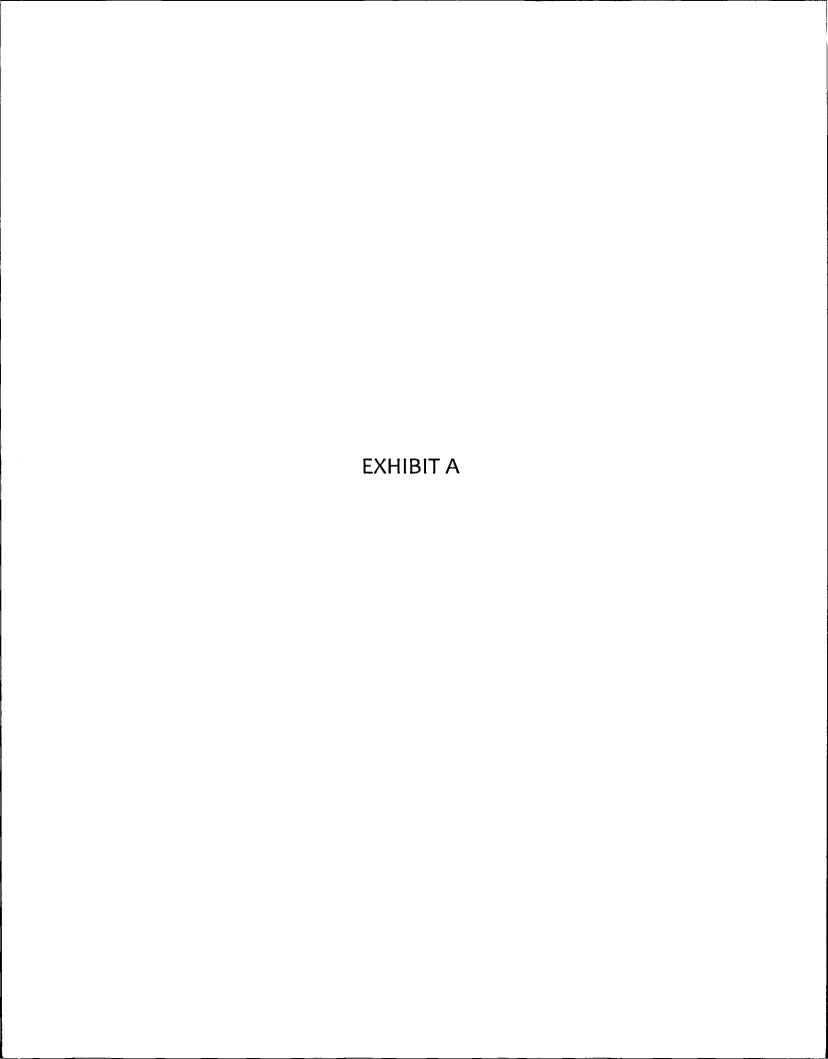
			Unit	
Description	Quantity	Unit	Cost	Total
Strip Topsoil	1,000	CY	\$5.00	\$5,000.00
Super Silt Fence	1,100	LF	\$10.00	\$11,000.00
Class 2A Geotextile	3,000	SY	\$1.50	\$4,500.00
Geogrid	3,000	SY	\$6.00	\$18,000.00
4"-6" Crusher Run	1,580	TN	\$29.17	\$46,088.60
3/4" Crusher Run	320	TN	\$28.60	\$9,152.00
Concrete Barrier	48	LF	\$10.42	\$500.00
Seed & Mulch	3,000	SY	\$0.97	\$2,910.00

\$97,150.60

Sincerely,

Richard C. Doyle

General Manager



Cox Staging Area at Double Camp New Milton, WV

Floodplain Analysis Report For Antero Resources

Doddridge County, West Virginia

June 2013

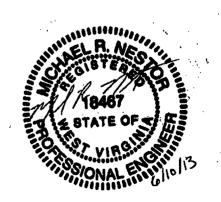


TABLE OF CONTENTS

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- 2.0 Floodplain Exhibit
- 3.0 Existing Condition HEC-RAS calculations
- 4.0 Proposed Condition HEC-RAS calculations

Appendix

Exhibit A – Landowner Exhibit

Exhibit B - WVDOT Permit and WVDEP Oil & Gas Permit

Exhibit C - FIRM Map

Exhibit D - Contacts

Exhibit E - Cost Estimate

COX STAGING AREA AT DOUBLE CAMP

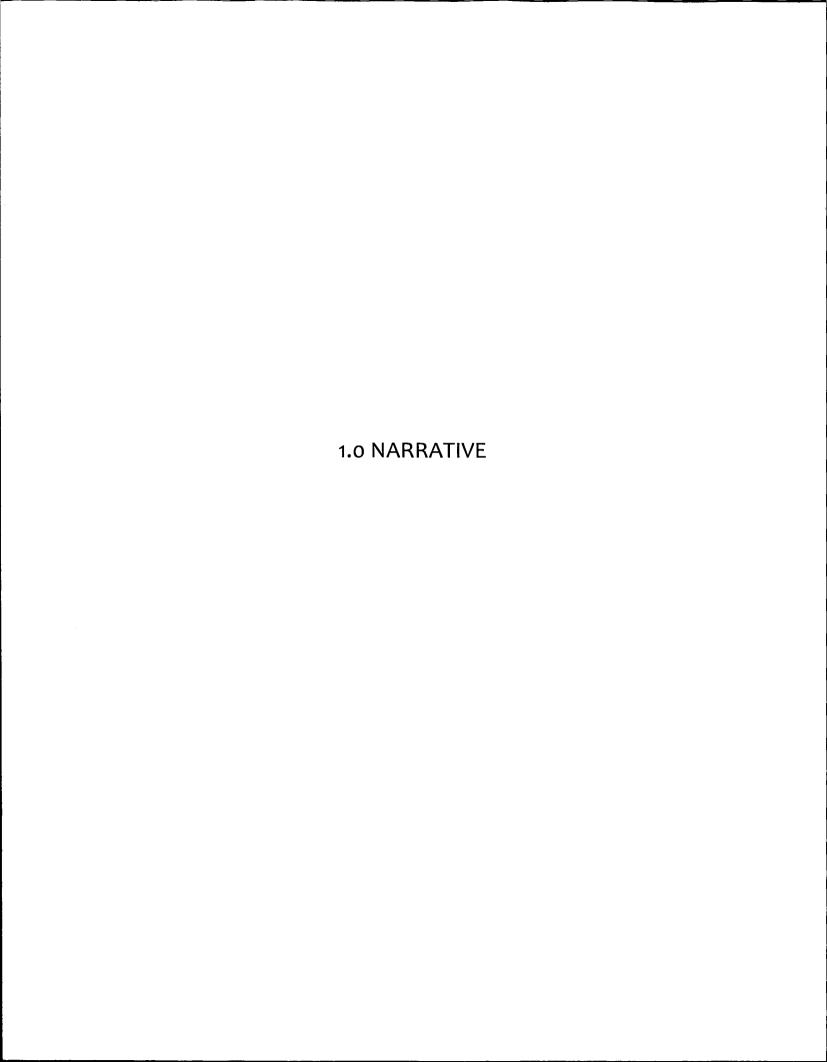
FLOODPLAIN ANALYSIS SUMMARY

The project is located approximately 250 ft west of Meatfork (CR-25) and Double Camp Road (Rt. 25/11) in Doddridge County. The flood analysis is for a section of Meathouse Fork, and the site is an existing low-lying area. Antero Resources is proposing to create a staging area along CR-25. Creation of the staging area will require removing topsoil and re-establishing existing grade with imported stone. The excess topsoil will be placed adjacent to the staging area within the floodplain zone.

The flood analysis base flow was estimated using information from the Flood Insurance Study for Doddridge County issued in the October 4, 2011 revised edition. The project is located approximately half way between the tributary connections from Laurel Run/Big Isaac Creek and Brushy Fork. The peak flows at these locations are 2,230 cfs and 6,050 cfs, respectively. A peak flow of 4,140 cfs was used for the flood analysis. An estimated flow is sufficient for this analysis as the increase/decrease in flood elevation created from the modifications being proposed is of more concern than an exact flood elevation.

A HEC-RAS model was created to compare the flood elevation for both the existing condition and proposed condition. The existing condition model was set up based on field surveyed cross sections. The existing condition HEC-RAS model was then modified to include two additional cross sections to account for placement of the topsoil in the proposed condition. The results of the models show the water elevation decreases slightly (approximately 1") with the placement of the fill within the floodplain from Section C upstream to Section F. Conversely the velocity through these sections increases approximately 0.22 cfs. This is a minor increase and will not create an erosion concern. The downstream section (Section B) shows no impact due to the placement of the topsoil within the floodplain. The detailed summary for each model is attached as part of this report.

In conclusion the placement of the topsoil in the floodplain will not create an increase of the flood elevation or cause significant erosion.



3.0 EXISTING CONDITION HEC-RAS CALCULATIONS

HEC-RAS Plan: EX SITE River: STREAM 1 Reach: F TO A Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
FTOA	10.0	PF 1	4140.00	871.87	881.79	879.75	882.30	0.001771	6.88	784.35	160.95	0.40
FTOA	9.0	PF 1	4140.00	869.42	881.69		881.99	0.000958	5.44	1040.45	210.19	0.30
F TO A	8.0	PF 1	4140.00	869.42	881.54		881.84	0.001067	5.54	1045.08	233.38	0.31
FTOA	7.0	PF 1	4140.00	870.81	881.34		881.64	0.001333	6.16	1076.67	292.29	0.35
F TO A	6.0	PF 1	4140.00	870.97	880.11	880.11	881.17	0.005060	10.84	639.93	253.33	0.66

DoubleCampRun.rep

HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

X	X	xxxxxx	XX	XX		XX	XX	X	X	XXXX
Х	X	X	Х	X		X	X	X	Х	X
X	Х	X	Х			Х	Х	X	Х	X
XXX	XXXX	XXXX	Х		XXX	XX	XX	XXX	XXX	XXXX
X	X	X	X			Χ	X	X	Х	X
Х	Х	X	Х	Х		Χ	Χ	X	Х	X
Х	Х	XXXXXX	XX	XX		Х	Х	X	Х	XXXXX

PROJECT DATA

Project Title: Double Camp Run Project File: DoubleCampRun.prj

Run Date and Time: 6/7/2013 2:27:29 PM

Project in English units

Project Description:

Analysis of Adding Topsoil within Floodplain for Antero - EXISTING CONDITION

PLAN DATA

Plan Title: Double Camp Existing
Plan File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.p01

Geometry Title: Double Camp Existing

Geometry File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.g01

Flow Title : Double Camp Flow

: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC Flow File

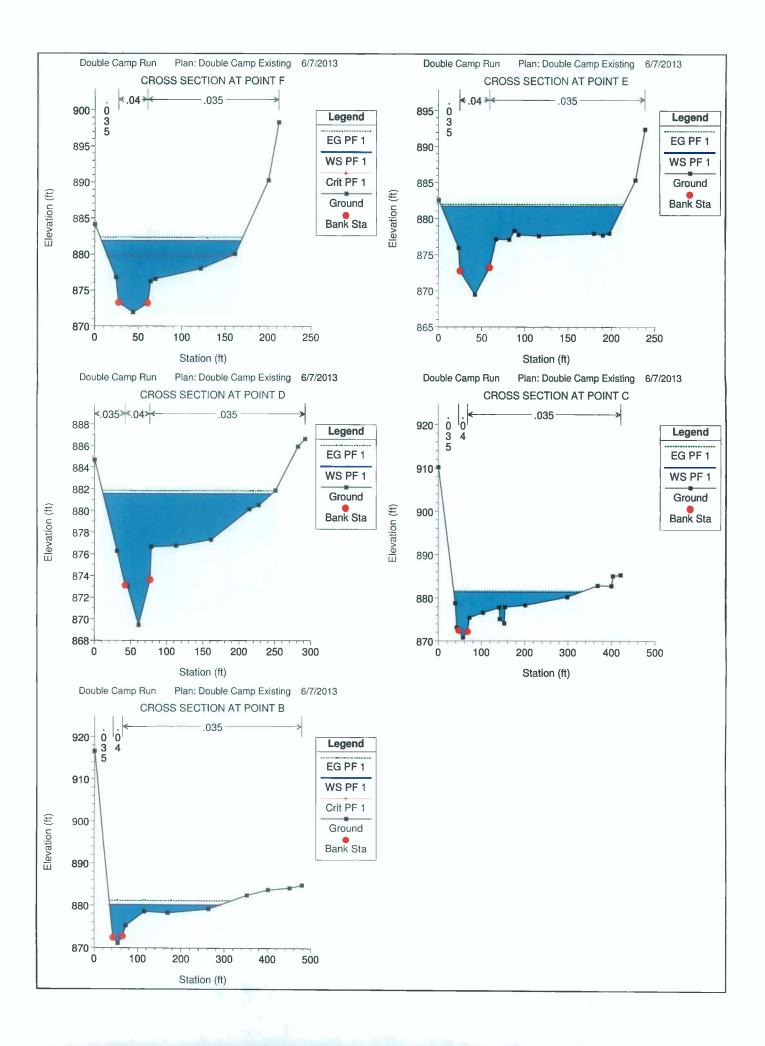
RAS\DoubleCampRun.f01

Plan Description:

Floodplain analysis of existing conditions where Cox Staging area will be placed.

Plan Summary Information: Number of: Cross Sections = 5 Multiple Openings = 0 Culverts 0 Inline Structures = = 0 Lateral Structures = Bridges =

Computational Information
Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 0.01 20 Maximum number of iterations Maximum difference tolerance 0.3 = Flow tolerance factor 0.001



DoubleCampRun.rep

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Friction Slope Method:

Average Conveyance

Computational Flow Regime:

Mixed Flow

FLOW DATA

Flow Title: Double Camp Flow

Flow File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.f01

Flow Data (cfs)

River STREAM 1 Reach F TO A RS 10.0 PF 1 4140

Boundary Conditions

River

Reach

Profile

Upstream

Downstream

STREAM 1

F TO A

PF 1

Critical

Critical

GEOMETRY DATA

Geometry Title: Double Camp Existing

Geometry File: r:\030-2162 Antero-Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.g01

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A

RS: 10.0

INPUT

Description: CROSS SECTION AT POINT F

Station Elevation Data num= 11

Sta 27.35 Sta Elev Sta Elev Elev Sta Elev Sta 24.3 873.2 44.11 871.87 60.88 0 884.08 876.73 873.14 876.18 121.92 64.26 69.69 876.5 877.94 161.72 879.99 200.59 890.24

212.77 898.27

Manning's n Values

3 num= n Val Sta n Val

Sta n Val Sta 27.35 .035 60.88 .04 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 60.88 27.35 200 197 194 .1 . 3

CROSS SECTION OUTPUT Profile #PF 1

Page 2

E.G. Elev (ft)	882.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.035	0.040	Ŏ.035
W.S. Elev (ft)	881.79	Reach Len. (ft)	200.00	197.00	194.00
Crit W.S. (ft)	879.75	Flow Area (sq ft)	63.07	310.70	410.58
<pre>E.G. Slope (ft/ft)</pre>	0.001771	Area (sq ft)	63.07	310.70	410.58
Q Total (cfs)	4140.00	Flow (cfs)	226.53	2138.84	1774.63
Top Width (ft)	160.95	Top Width (ft)	19.77	33.53	107.65
Vel Total (ft/s)	5.28	Avg. Vel. (ft/s)	3.59	6.88	4.32
Max Chl Dpth (ft)	9.92	Hydr. Depth (ft)	3.19	9.27	3.81
Conv. Total (cfs)	98365.7	Conv. (cfs)	5382.4	50818.5	42164.8
Length Wtd. (ft)	195.79	Wetted Per. (ft)	22.13	33.63	109.13
Min Ch El (ft)	871.87	Shear (lb/sq ft)	0.32	1.02	0.42
Alpha	1.19	Stream Power (lb/ft s)	212.77	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1.17	4.48	9.30
C & E Loss (ft)	0.06	Cum SA (acres)	0.30	0.45	2.88

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A RS: 9.0

INPUT

Description: CROSS SECTION AT POINT E Station Elevation Data num= Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 24.82 0 882.54 23.16 875.91 24.82 872.67 66.73 877.1 81.79 877.06 87.98 878.27 179.79 877.88 190.01 877.67 197.63 877.91 42.06 869.42 92.71 877.71 228.1 885.31 59.3 873.16 116.18 877.55 239.14 892.37

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .035 24.82 .04 59.3 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 24.82 59.3 133 140 145 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

881.99	Element	Left OB	Channel	Right OB
0.30	Wt. n-Val.	0.035	0.040	Ŏ.O35
881.69	Reach Len. (ft)	133.00	140.00	145.00
	Flow Area (sq ft)	70.55	362.67	607.23
0.000958	Area (sq ft)	70.55	362.67	607.23
4140.00	Flow (cfs)	186.93	1974.57	1978.50
210.19	Top Width (ft)	21.84	34.48	153.88
3.98	Avg. Vel. (ft/s)	2.65	5.44	3.26
12.27	Hydr. Depth (ft)	3.23	10.52	3.95
133789.0	Conv. (cfs)	6040.8	63810.6	63937.7
141.73		24.63	35.18	155.47
	Shear (lb/sq ft)	0.17	0.62	0.23
1.23	Stream Power (lb/ft s)	239.14	0.00	0.00
0.14	Cum Volume (acre-ft)	0.87	2.96	7.03
0.00	Cum SA (acres)	0.20	0.30	2.30
	0.30 881.69 0.000958 4140.00 210.19 3.98 12.27 133789.0 141.73 869.42 1.23 0.14	0.30 Wt. n-Val. 881.69 Reach Len. (ft) Flow Area (sq ft) 0.000958 Area (sq ft) 4140.00 Flow (cfs) 210.19 Top Width (ft) 3.98 Avg. Vel. (ft/s) 12.27 Hydr. Depth (ft) 133789.0 Conv. (cfs) 141.73 Wetted Per. (ft) 869.42 Shear (lb/sq ft) 1.23 Stream Power (lb/ft s) 0.14 Cum Volume (acre-ft)	0.30 Wt. n-Val. 0.035 881.69 Reach Len. (ft) 133.00 Flow Area (sq ft) 70.55 0.000958 Area (sq ft) 70.55 4140.00 Flow (cfs) 186.93 210.19 Top width (ft) 21.84 3.98 Avg. Vel. (ft/s) 2.65 12.27 Hydr. Depth (ft) 3.23 133789.0 Conv. (cfs) 6040.8 141.73 Wetted Per. (ft) 24.63 869.42 Shear (lb/sq ft) 0.17 1.23 Stream Power (lb/ft s) 239.14 0.14 Cum Volume (acre-ft) 0.87	0.30 Wt. n-Val. 0.035 0.040 881.69 Reach Len. (ft) 133.00 140.00 Flow Area (sq ft) 70.55 362.67 0.000958 Area (sq ft) 70.55 362.67 4140.00 Flow (cfs) 186.93 1974.57 210.19 Top Width (ft) 21.84 34.48 3.98 Avg. Vel. (ft/s) 2.65 5.44 12.27 Hydr. Depth (ft) 3.23 10.52 133789.0 Conv. (cfs) 6040.8 63810.6 141.73 Wetted Per. (ft) 24.63 35.18 869.42 Shear (lb/sq ft) 0.17 0.62 1.23 Stream Power (lb/ft s) 239.14 0.00 0.14 Cum Volume (acre-ft) 0.87 2.96

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A RS: 8.0

76.58 873.6 78.19	num= 14 Elev Sta Elev Sta 876.26 42.31 873.09 45.38 876.65 112.61 876.74 160.97		Elev 869.42 880.12	
Bank Sta: Left Right 42.31 76.58	Lengths: Left Channel Right 175 171 168	Coeff Contr. .1	Expan.	
CROSS SECTION OUTPUT Pro	file #PF 1			
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft) E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	881.84 Element 0.31 Wt. n-Val. 881.54 Reach Len. (ft) Flow Area (sq ft) 0.001067 Area (sq ft) 4140.00 Flow (cfs) 233.38 Top Width (ft) 3.96 Avg. Vel. (ft/s) 12.12 Hydr. Depth (ft) 126726.1 Conv. (cfs) 169.72 Wetted Per. (ft) 869.42 Shear (lb/sq ft) 1.25 Stream Power (lb/ft 0.20 Cum Volume (acre-ft) 0.00 Cum SA (acres)	129.32 455.88 30.77 3.53 4.20 13954.6 31.91 0.27 s) 292.00	Channel 0.040 171.00 343.69 343.69 1904.39 34.27 5.54 10.03 58293.8 35.23 0.65 0.00 1.82 0.19	Right OB 0.035 168.00 572.08 572.08 1779.73 168.34 3.11 3.40 54477.8 170.29 0.22 0.00 5.07 1.76
CROSS SECTION				
RIVER: STREAM 1 REACH: F TO A	RS: 7.0			
INPUT Description: CROSS SECTIO Station Elevation Data Sta Elev Sta 0 910.2 39.17 67.64 872.19 72.06 152.77 874.11 154.44 400.78 882.79 403.66	num= 18 Elev Sta Elev Sta 878.77 42.76 873.17 47.1 875.45 103.46 876.57 140.93	Elev Sta 872.43 57.37 877.76 142.02 880.22 368.67	875.12	
Manning's n Values Sta n Val Sta 0 .035 47.1	num= 3 n Val Sta n Val .04 67.64 .035			
Bank Sta: Left Right 47.1 67.64	Lengths: Left Channel Right 175 171 168	Coeff Contr. .1	Expan.	
CROSS SECTION OUTPUT Pro	file #PF 1			
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft)	881.64 Element 0.30 Wt. n-Val. 881.34 Reach Len. (ft) Flow Area (sq ft) Page 4	Left OB 0.035 175.00 60.50	Channel 0.040 171.00 200.96	Right OB 0.035 168.00 815.21

		DoubleCampRun.rep			
<pre>E.G. Slope (ft/ft)</pre>	0.001333	Area (sq ft)	60.50	200.96	815.21
Q Total (cfs)	4140.00	Flow (cfs)	235.89	1238.10	2666.01
Top Width (ft)	292.29	Top Width (ft)	11.14	20.54	260.61
Vel Total (ft/s)	3.85	Avg. Vel. (ft/s)	3.90	6.16	3.27
Max Chl Dpth (ft)	10.53	Hydr. Depth (ft)	5.43	9.78	3.13
Conv. Total (cfs)	113387.5	Conv. (cfs)	6460.5	33909.5	73017.5
Length Wtd. (ft)	169.51	Wetted Per. (ft)	15.17	20.76	266.02
Min Ch El (ft)	870.81	Shear (lb/sq ft)	0.33	0.81	0.26
Alpha	1.29	Stream Power (lb/ft s)	421.54	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.18	0.75	2.40
C & E Loss (ft)	0.08	Cum SA (acres)	0.04	0.08	0.93

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

CROSS SECTION

RIVER:	STREAM	1
DEACH.	- TO A	

REACH: F TO A RS: 6.0

INPUT

Description: CROSS SECTION AT POINT B										
Station Elevation Data num= 12										
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
. 0	916.62	43.26	872.32	54.14	870.97	65.03	872.62	72.94	875.2	
115.51	878.55	169.35	878.2	262.91	879.15	351.97	882.44	400.5	883.75	
450.77	884.18	479.55	884.83							

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .035 43.26 .04 65.03 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 43.26 65.03 314 315 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	881.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.	0.035	0.040	Ŏ.O35
W.S. Elev (ft)	880.11	Reach Len. (ft)			
Crit W.S. (ft)	880.11	Flow Area (sq ft)	29.65	182.71	427.56
<pre>E.G. Slope (ft/ft)</pre>	0.005060	Area (sq ft)	29.65	182.71	427.56
Q Total (cfs)	4140.00	Flow (cfs)	174.60	1981.48	1983.92
Top Width (ft)	253.33	Top Width (ft)	7.61	21.77	223.95
<pre>Vel Total (ft/s)</pre>	6.47	Avg. Vel. (ft/s)	5.89	10.84	4.64
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)	3.90	8.39	1.91
Conv. Total (cfs)	58198.6	Conv. (cfs)	2454.4	27854.9	27889.2
Length Wtd. (ft)		Wetted Per. (ft)	10.89	21.98	224.51
Min Ch El (ft)	870.97	Shear (lb/sq ft)	0.86	2.63	0.60
Alpha	1.63	Stream_Power (lb/ft s)	479.55	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

River:STREAM 1

Reach	River Sta.	n1	n2	n3
F TO A	10.0	.035	.04	.035
F TO A	9.0	.035	.04	.035
F TO A	8.0	.035	.04	.035
F TO A	7.0	.035	.04	.035
F TO A	6.0	.035	.04	.035

SUMMARY OF REACH LENGTHS

River: STREAM 1

Reach	River Sta.	Left	Channel	Right
F TO A F TO A F TO A	10.0 9.0 8.0 7.0	200 133 175 175	197 140 171 171	194 145 168 168
F TO A	6.0	314	314	315

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: STREAM 1

Reach	River Sta.	Contr.	Expan.
F TO A	10.0	.1	.3
F TO A	9.0	.1	.3
F TO A	8.0	.1	.3
F TO A	7.0	.1	.3
F TO A	6.0	. 1	. 3

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : EX SITE

River: STREAM 1 Reach: F TO A RS: 7.0 Profile: PF 1 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

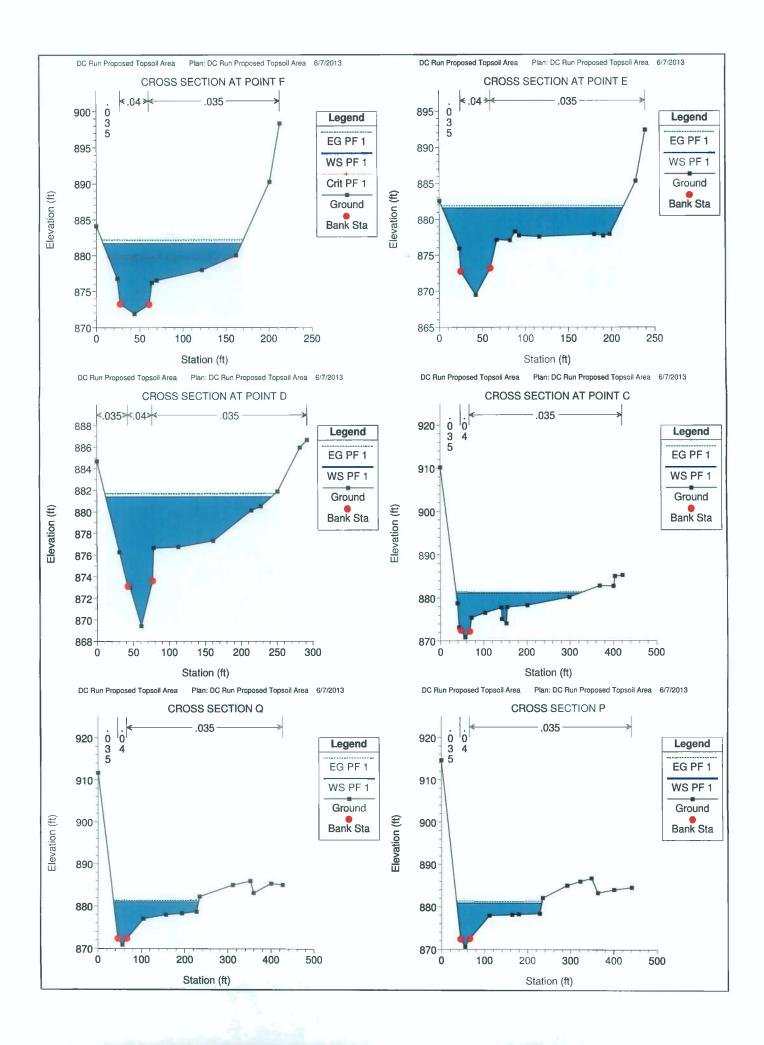
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

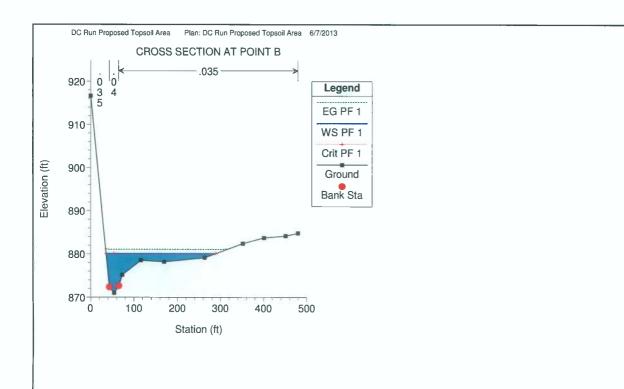
This may indicate the need for additional cross sections.



HEC-RAS Plan: Proposed Site River: STREAM 1 Reach: F TO A Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
.885 1 1946.51	- 844 1.5 2. 第		(cfs)	(ft) :	(ft)	(ft)	्(ft)	(ft/ft)	∉(ft/s) -	(sq ft)	(ft)	
F TO A	10.0	PF 1	4140.00	871.87	881.65	879.75	882.20	0.001923	7.10	762.05	159.96	0.41
F TO A	9.0	PF1	4140.00	869.42	881.53		881.86	0.001047	5.64	1008.29	209.03	0.31
F TO A	8.0	PF1	4140.00	869.42	881.37		881.70	0.001183	5.77	1004.99	229.83	0.32
F TO A	7.0	PF 1	4140.00	870.81	881.13		881.47	0.001565	6.58	1014.18	286.30	0.37
F TO A	6.2	PF1	4140.00	870.84	881.01		881.42	0.001679	6.75	867.45	196.24	0.39
F TO A	6.1	PF1	4140.00	870.59	880.84		881.33	0.002030	7.35	815.56	197.45	0.42
F TO A	6.0	PF 1	4140.00	870.97	880.11	880.11	881.17	0.005060	10.84	639.93	253.33	0.66





HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

X	Х	xxxxxx	XX	XX		XX	XX	Х	X	XXXX
X	Х	X	Х	X		Χ	Х	X	Х	X
Х	Х	X	Х			Χ	Χ	Х	Х	X
XXXX	XXXX	XXXX	Х		XXX	XX	XX	XXX	XXX	XXXX
Х	Х	X	Х			Χ	Χ	Х	Х	X
X	Х	X	X	X		X	X	X	X	X
X	Х	XXXXXX	XX	XX		Х	Х	Х	X	XXXXX

PROJECT DATA

Project Title: DC Run Proposed Topsoil Area

Project File : DoubleCampRunPro.prj Run Date and Time: 6/10/2013 7:12:01 AM

Project in English units

Project Description:

Analysis of Adding Topsoil within Floodplain for Antero - PROPOSED CONDITION

PLAN DATA

Plan Title: DC Run Proposed Topsoil Area Plan File : r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC RAS\DoubleCampRunPro.p02

Geometry Title: DC Run Proposed Topsoil Area

Geometry File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.g02

: DC Run Proposed Topsoil Area Flow Title

Flow File : r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.f02

Plan Description:

Floodplain analysis of proposed conditions after Cox Staging area is established and topsoil stockpile is in place.

Plan Summary Information:

Number of: Cross Sections = 7 Multiple Openings = 0 Culverts = 0 Inline Structures =

Bridges 0 Lateral Structures =

Computational Information
Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 0.01 Maximum number of iterations = 20 Maximum difference tolerance 0.3 = Flow tolerance factor 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Friction Slope Method:

Average Conveyance

Computational Flow Regime:

Mixed Flow

FLOW DATA

Flow Title: DC Run Proposed Topsoil Area

Flow File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.f02

Flow Data (cfs)

River STREAM 1 Reach F TO A RS 10.0 PF 1 4140

Boundary Conditions

River

Reach

Profile

Upstream

Downstream

STREAM 1 Critical

F TO A

PF 1

Critical

GEOMETRY DATA

Geometry Title: DC Run Proposed Topsoil Area

Geometry File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.g02

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A

RS: 10.0

INPUT

Description: CROSS SECTION AT POINT F

Station Elevation Data 11 num=

Sta 24.3 Sta Elev Sta 27.35 Elev Elev Sta Elev Sta 884.08 876.73 876.5 44.11 871.87 60.88 0 873.2 873.14 64.26 876.18 121.92 877.94 69.69 161.72 879.99 200.59 890.24

212.77 898.27

Manning's n Values

num= n Val Sta n Val Sta

n Val 27.35 60.88 .035 .04 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 27.35 60.88200 197 194 .1 . 3

CROSS SECTION OUTPUT Profile #PF 1

Page 2

E.G. Elev (ft)	882.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.035	0.040	Ŏ.O35
W.S. Elev (ft)	881.65	Reach Len. (ft)	200.00	197.00	194.00
Crit W.S. (ft)	879.75	Flow Area (sq ft)	60.36	306.04	395.65
<pre>E.G. Slope (ft/ft)</pre>	0.001923	Area (sq ft)	60.36	306.04	395.65
Q Total (cfs)	4140.00	Flow (cfs)	222.58	2173.17	1744.25
Top Width (ft)	159.96	Top Width (ft)	19.31	33.53	107.13
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)	3.69	7.10	4.41
Max Chl Dpth (ft)	9.78	Hydr. Depth (ft)	3.13	9.13	3.69
Conv. Total (cfs)	94403.9	Conv. (cfs)	5075.4	49554.6	39773.9
Length Wtd. (ft)	195.81	Wetted Per. (ft)	21.65	33.63	108.59
Min Ch El (ft)	871.87	Shear (lb/sq ft)	0.33	1.09	0.44
Alpha	1.20	Stream Power (lb/ft s)	212.77	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	1.05	4.13	7.99
C & E Loss (ft)	0.07	Cum SA (acres)	0.28	0.42	2.37

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A

RS: 9.0

INPUT

Description: CROSS SECTION AT POINT E
Station Elevation Data num= 15

Sta Elev Sta Elev Sta Elev Sta Elev Elev Sta 23.16 81.79 0 882.54 66.73 877.1 179.79 877.88 875.91 877.06 877.67 872.67 878.27 24.82 873.16 877.55 42.06 59.3 869.42 87.98 197.63 92.71 877.71 116.18 190.01 877.91 228.1 885.31 239.14 892.37

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .035 24.82 .04 59.3 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 24.82 59.3 133 140 145 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	881.86	Element	Left OB	Channel	Right OB
vel Head (ft)	0.33	Wt. n-Val.	0.035	0.040	0.035
W.S. Elev (ft)	881.53	Reach Len. (ft)	133.00	140.00	145.00
Crit W.S. (ft)		Flow Area (sq ft)	67.24	357.38	583.67
E.G. Slope (ft/ft)	0.001047	Area (sq ft)	67.24	357.38	583.67
Q Total (cfs)	4140.00	Flow (cfs)	183.19	2014.69	1942.12
Top Width (ft)	209.03	Top Width (ft)	21.30	34.48	153.25
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)	2.72	5.64	3.33
Max Chl Dpth (ft)	12.11	Hydr. Depth (ft)	3.16	10.36	3.81
Conv. Total (cfs)	127952.2	Conv. (cfs)	5661.7	62266.7	60023.8
Length Wtd. (ft)	141.68	Wetted Per. (ft)	24.07	35.18	154.82
Min Ch El (ft)	869.42	Shear (lb/sq ft)	0.18	0.66	0.25
Alpha	1.24	Stream_Power (lb/ft s)	239.14	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.75	2.63	5.81
C & E Loss (ft)	0.00	Cum SA (acres)	0.18	0.27	1.79

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A

RS: 8.0

INPUT Description: CROSS SECTION Station Elevation Data Sta Elev Sta 0 884.68 30.93 76.58 873.6 78.19 227.38 880.5 250.49	num= 14 Elev Sta Elev Sta 876.26 42.31 873.09 45.38 876.65 112.61 876.74 160.97	Elev Sta 873 60.98 877.3 214.49 86.64	Elev 869.42 880.12
Manning's n Values Sta n Val Sta 0 .035 42.31	num= 3 n Val Sta n Val .04 76.58 .035		
Bank Sta: Left Right 42.31 76.58	Lengths: Left Channel Right 175 171 168	Coeff Contr. .1	Expan. .3
CROSS SECTION OUTPUT Pro	file #PF 1		
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft) E.G. Slope (ft/ft) Q Total (cfs) Top width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	881.70 Element 0.33 Wt. n-Val. 881.37 Reach Len. (ft) Flow Area (sq ft) 0.001183 Area (sq ft) 4140.00 Flow (cfs) 229.83 Top Width (ft) 4.12 Avg. Vel. (ft/s) 11.95 Hydr. Depth (ft) 120379.6 Conv. (cfs) 169.76 Wetted Per. (ft) 869.42 Shear (lb/sq ft) 1.26 Stream Power (lb/ft s 0.23 Cum Volume (acre-ft) 0.00 Cum SA (acres)	Left OB 0.035 175.00 124.05 124.05 454.02 30.14 3.66 4.12 13201.7 31.25 0.29 292.00 0.46 0.10	Channel 0.040 0.035 171.00 168.00 337.75 543.19 1947.45 1738.52 34.27 165.42 5.77 3.20 9.86 3.28 56626.5 50551.3 35.23 167.37 0.71 0.24 0.00 0.00 1.52 3.93 0.16 1.26
CROSS SECTION			
RIVER: STREAM 1 REACH: F TO A	RS: 7.0		
67.64 872.19 72.06	num= 18 Elev Sta Elev Sta 878.77 42.76 873.17 47.1 8 875.45 103.46 876.57 140.93 8 877.87 201.3 878.31 298.48 8	77.76 142.02	Elev 870.81 875.12 882.87
Manning's n Values Sta n Val Sta 0 .035 47.1	num= 3 n Val Sta n Val .04 67.64 .035		
Bank Sta: Left Right 47.1 67.64	Lengths: Left Channel Right 21 22 23	Coeff Contr.	Expan. .3
CROSS SECTION OUTPUT Pro	file #PF 1		
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft)	881.47 Element 0.34 Wt. n-Val. 881.13 Reach Len. (ft) Flow Area (sq ft) Page 4	Left OB 0.035 21.00 58.13	Channel Right OB 0.040 0.035 22.00 23.00 196.53 759.53

E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	DoubleCampRunPro.rep 0.001565 Area (sq ft) 58.13 196.53 4140.00 Flow (cfs) 242.76 1292.45 286.30 Top Width (ft) 10.87 20.54 4.08 Avg. Vel. (ft/s) 4.18 6.58 10.32 Hydr. Depth (ft) 5.35 9.57 104652.6 Conv. (cfs) 6136.6 32671.0 22.58 Wetted Per. (ft) 14.82 20.76 870.81 Shear (lb/sq ft) 0.38 0.92 1.32 Stream Power (lb/ft s) 421.54 0.00 0.04 Cum Volume (acre-ft) 0.10 0.47 0.01 Cum SA (acres) 0.02 0.05	759.53 2604.79 254.89 3.43 2.98 65845.0 260.30 0.29 0.00 1.42 0.45
CROSS SECTION		
RIVER: STREAM 1 REACH: F TO A	RS: 6.2	
0 911.63 45.87 157.14 877.94 193.88 352.31 885.94 359.61	num= 14 Elev Sta Elev Sta Elev Sta Elev 872.32 56.27 870.84 66.69 872.28 105.55 877 878.29 227.42 878.68 234.48 882.3 311.6 885 883.13 400.14 885.38 427.17 885.06	
Manning's n Values Sta n Val Sta 0 .035 45.87	num= 3 n Val Sta n Val .04 66.69 .035	
Bank Sta: Left Right 45.87 66.69	Lengths: Left Channel Right Coeff Contr. Expan. 48 48 48 .1 .3	
CROSS SECTION OUTPUT Pro	file #PF 1	
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft) E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	881.42 Element Left OB Channe 0.41 Wt. n-Val. 0.035 0.040 881.01 Reach Len. (ft) 48.00 48.00 Flow Area (sq ft) 44.08 196.58 0.001679 Area (sq ft) 44.08 196.58 4140.00 Flow (cfs) 169.93 1327.87 196.24 Top Width (ft) 10.14 20.82 4.77 Avg. Vel. (ft/s) 3.86 6.75 10.17 Hydr. Depth (ft) 4.35 9.44 101047.4 Conv. (cfs) 4147.6 32410.1 48.00 Wetted Per. (ft) 13.36 21.02 870.84 Shear (lb/sq ft) 0.35 0.98 1.17 Stream Power (lb/ft s) 427.17 0.00 0.09 Cum Volume (acre-ft) 0.07 0.37 0.01 Cum SA (acres) 0.02 0.04	0.035 48.00 626.80 626.80
CROSS SECTION		
RIVER: STREAM 1 REACH: F TO A	RS: 6.1	

15

INPUT
Description: CROSS SECTION P
Station Elevation Data num=
Sta Elev Sta Elev Elev Sta Elev Page 5 Sta Sta Elev

DoubleCampRunPro.rep 65.69 872.48 54.98 870.59 0 914.59 44.28 872.36 111.32 877.92 164.25 228.11 878.37 235.14 878.09 179.2 878.23 882.05 291.7 885 441.08 884.54 322.3 886 348.36 886.7 362.81 883.28 400.23 884 Manning's n Values num= n Val n Val n Val Sta Sta Sta 65.69 .035 44.28 .04 .035 Lengths: Left Channel Right Coeff Contr. Expan. Bank Sta: Left Right 44.28 65.69 34 34 34 . 3 CROSS SECTION OUTPUT Profile #PF 1 E.G. Elev (ft) Vel Head (ft) Left OB Channel Right OB 881.33 Element Wt. n-Val.
Reach Len. (ft)
Flow Area (sq ft)
Area (sq ft)
Flow (cfs) 0.49 0.035 0.040 Ō.035 34.00 577.93 W.S. Elev (ft) Crit W.S. (ft) 880.84 34.00 34.00 37.72 199.91 E.G. Slope (ft/ft) Q Total (cfs) 0.002030 199.91 577.93 37.72 152.38 4140.00 1469.38 2518.25 Top Width (ft) Avg. Vel. (ft/s) Hydr. Depth (ft) Top Width (ft) Vel Total (ft/s) 167.14 4.36 197.45 8.89 21.41 7.35 4.04 5.08 Max Chl Dpth (ft) 9.34 10.25 4.24 3.46 Conv. (cfs)
Wetted Per. (ft) Conv. Total (cfs) Length Wtd. (ft) 91893.0 3382.2 32614.9 55896.0 12.29 168.08 34.00 21.72 Shear (lb/sq ft) Stream Power (lb/ft s) Cum Volume (acre-ft) Min Ch El (ft) 870.59 0.39 1.17 0.44

warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections. Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Cum SA (acres)

441.08

0.03

0.01

0.035

29.65

0.00

0.39

0.15

Right OB

427.56

0.035

0.040

182.71

0.00

0.15

0.02

CROSS SECTION

vel Head (ft)

W.S. Elev (ft) Crit W.S. (ft)

Alpha

Frctn Loss (ft)

C & E Loss (ft)

RIVER: STREAM 1 REACH: F TO A	RS: 6.0			
115.51 878.55 169.35	num= 12 Elev Sta Elev 872.32 54.14 870.97	Sta 65.03 351.97	Elev Sta 872.62 72.94 882.44 400.5	Elev 875.2 883.75
Manning's n Values Sta n Val Sta 0 .035 43.26	num= 3 n Val Sta n Val .04 65.03 .035			
Bank Sta: Left Right 43.26 65.03	Lengths: Left Channel 314 314	Right 315	Coeff Contr. .1	Expan.
CROSS SECTION OUTPUT Pro	ofile #PF 1			
E.G. Elev (ft)	881.17 Element		Left OB	Channe

Wt. n-Val.

Reach Len. (ft) Flow Area (sq ft)

Page 6

1.22

0.10

0.06

1.06

880.11

880.11

		DoubleCampRunPro.rep			
E.G. Slope (ft/ft)	0.005060	Area (sq ft)	29.65	182.71	427.56
Q Total (cfs)	4140.00	Flow (cfs)	174.60	1981.48	1983.92
Top Width (ft)	253.33	Top width (ft)	7.61	21.77	223.95
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)	5.89	10.84	4.64
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)	3.90	8.39	1.91
Conv. Total (cfs)	58198.6	Conv. (cfs)	2454.4	27854.9	27889.2
Length Wtd. (ft)		Wetted Per. (ft)	10.89	21.98	224.51
Min Ch El (ft)	870.97	Shear (lb/sq ft)	0.86	2.63	0.60
Alpha	1.63	Stream Power (lb/ft s)	479.55	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:STREAM 1

Reach	River Sta.	n1	n2	n3
F TO A F TO A F TO A F TO A	10.0 9.0 8.0 7.0 6.2 6.1	.035 .035 .035 .035 .035	.04 .04 .04 .04	.035 .035 .035 .035 .035
F TO A	6.0	.035	.04	.035

SUMMARY OF REACH LENGTHS

River: STREAM 1

Reach	River Sta.	Left	Channel	Right
F TO A	10.0	200	197	194
F TO A	9.0	133	140	. 145
F TO A	8.0	175	171	168
F TO A	7.0	21	22	23
F TO A	6.2	48	48	48
F TO A	6.1	34	34	34
F TO A	6.0	314	314	315

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: STREAM 1

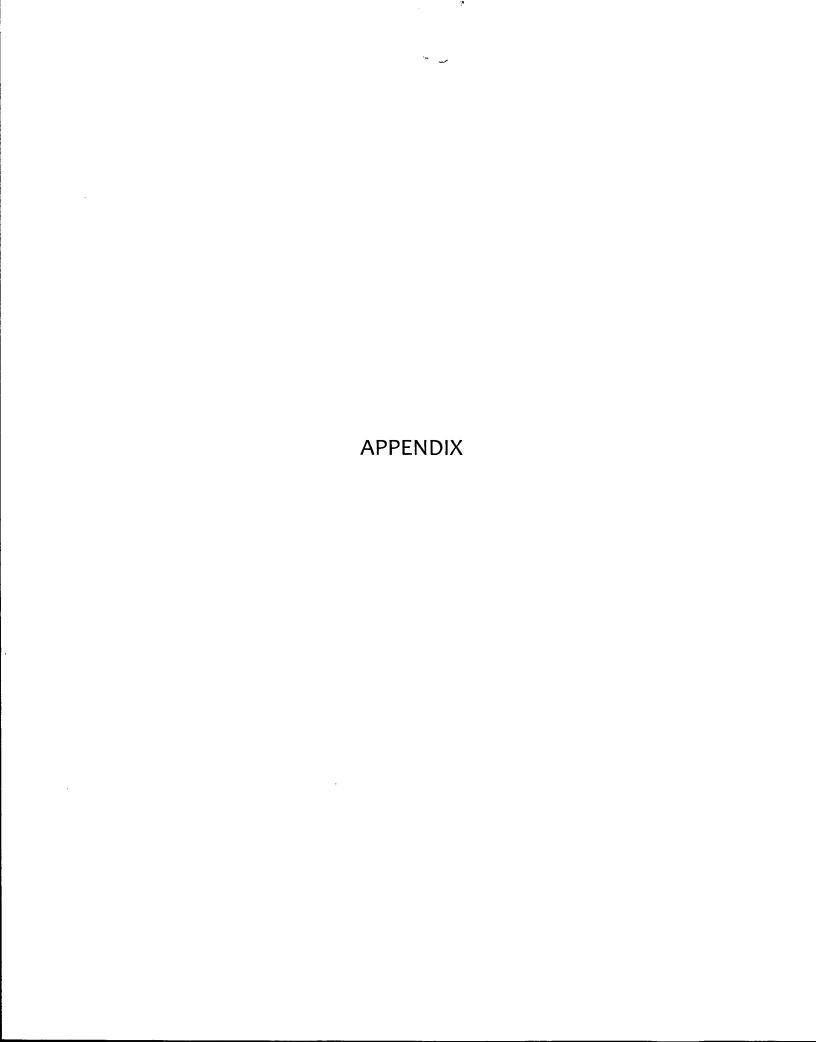
Reach	River Sta.	Contr.	Expan.
F TO A F TO A	10.0 9.0	:1 :1	.3
F TO A	8.0	.1	.3
F TO A F TO A	7.0 6.2	.1	.3
F TO A	6.1	.1 .1	.3
F TO A	6.0	.1	. 3

ERRORS WARNINGS AND NOTES Errors Warnings and Notes for Plan: Proposed Site

River: STREAM 1 Reach: F TO A RS: 6.1 Profile: PF 1 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.



13 JUL 19 AM L: L

Cox Staging Area at Double Camp

New Milton, WV

Floodplain Analysis Report For Antero Resources

Doddridge County, West Virginia

June 2013 (Revised July 2013)



TABLE OF CONTENTS

- 1.0 Narrative
- 2.0 Floodplain Exhibit
 - 11" x 17" Exhibit
 - 22" x 34" Exhibit
- 3.0 Existing Condition HEC-RAS calculations
- **4.0** Proposed Condition HEC-RAS calculations

Appendix

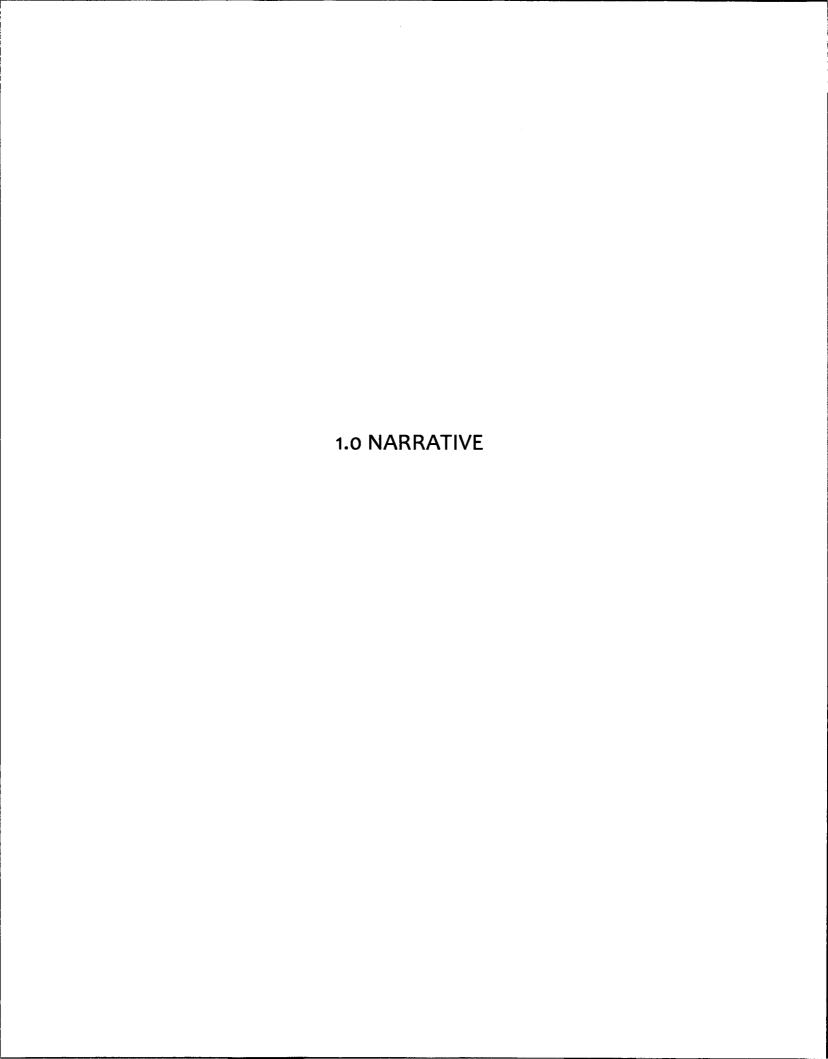
Exhibit A - Landowner Exhibit

Exhibit B - WVDOT Permit and WVDEP Oil & Gas Permit

Exhibit C – FIRM Map

Exhibit D - Contacts

Exhibit E - Cost Estimate



COX STAGING AREA AT DOUBLE CAMP

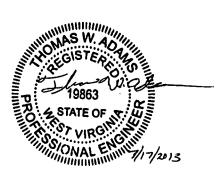
FLOODPLAIN ANALYSIS SUMMARY

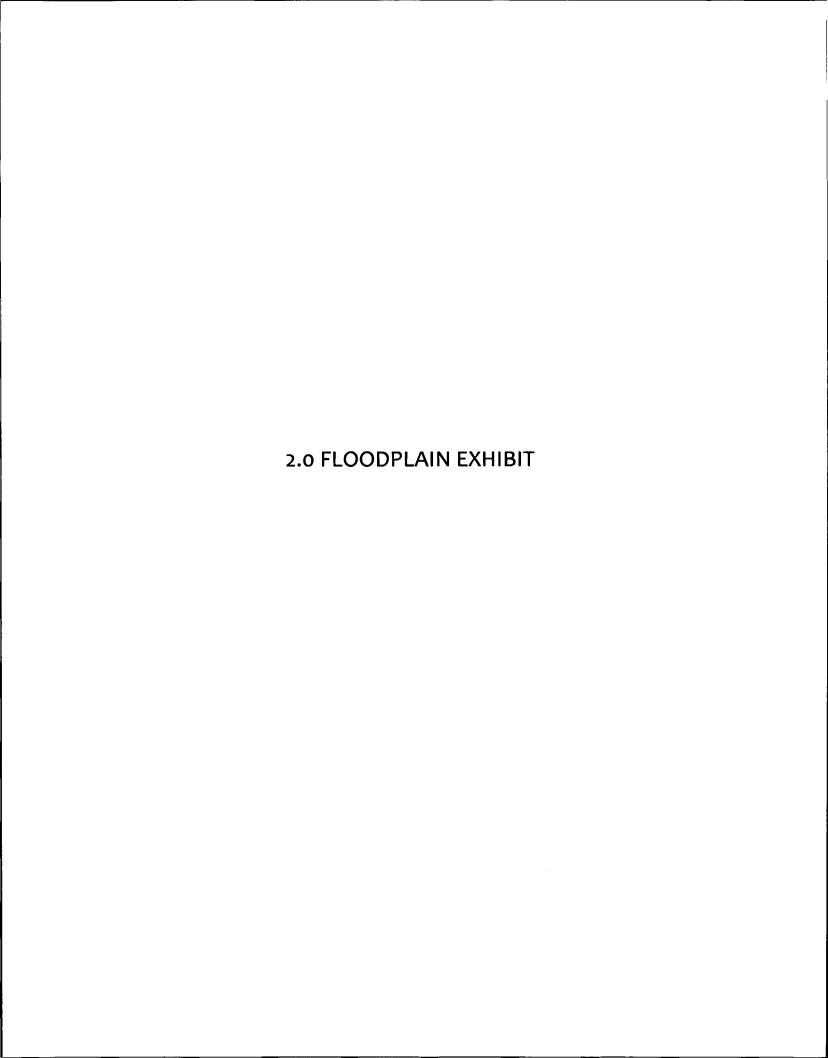
The project is located approximately 250 ft west of Meatfork (CR-25) and Double Camp Road (Rt. 25/11) in Doddridge County. The flood analysis is for a section of Meathouse Fork, and the site is an existing low-lying area. Antero Resources is proposing to create a staging area along CR-25. Creation of the staging area will require removing topsoil and re-establishing existing grade with imported stone. The excess topsoil will be placed adjacent to the staging area within the floodplain zone.

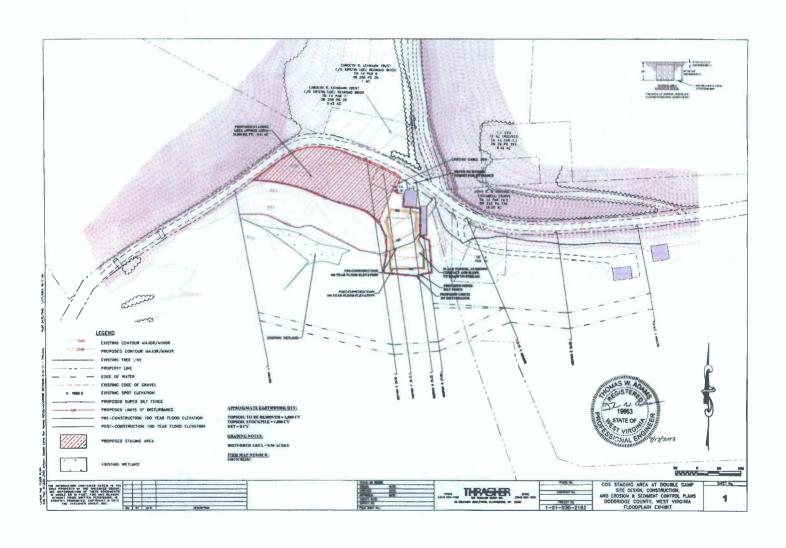
The flood analysis base flow was estimated using information from the Flood Insurance Study for Doddridge County issued in the October 4, 2011 revised edition. The project is located approximately half way between the tributary connections from Laurel Run/Big Isaac Creek and Brushy Fork. The peak flows at these locations are 2,230 cfs and 6,050 cfs, respectively. A peak flow of 4,140 cfs was used for the flood analysis. An estimated flow is sufficient for this analysis as the increase/decrease in flood elevation created from the modifications being proposed is of more concern than an exact flood elevation.

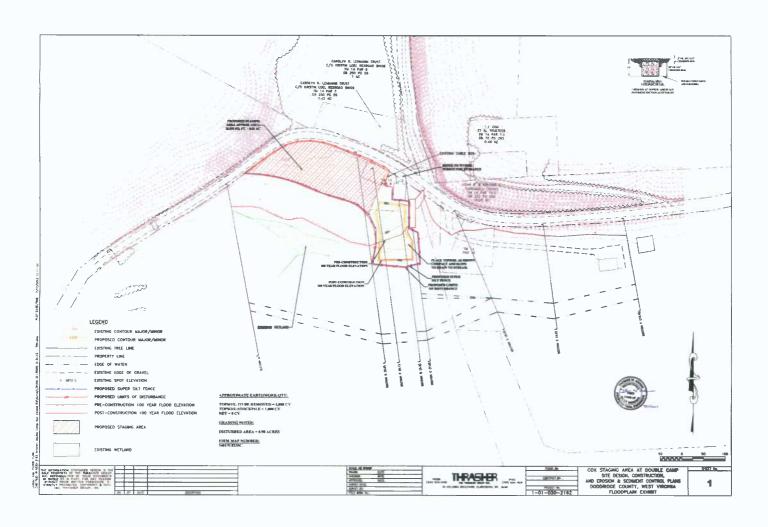
A HEC-RAS model was created to compare the flood elevation for both the existing condition and proposed condition. The existing condition model was set up based on field surveyed cross sections. The existing condition HEC-RAS model was then modified to include two additional cross sections to account for placement of the topsoil in the proposed condition. The results of the models show the water elevation decreases slightly (approximately 1") with the placement of the fill within the floodplain from Section C upstream to Section F. Conversely the velocity through these sections increases approximately 0.22 cfs. This is a minor increase and will not create an erosion concern. The downstream section (Section B) shows no impact due to the placement of the topsoil within the floodplain. The detailed summary for each model is attached as part of this report.

In conclusion the placement of the topsoil in the floodplain will not create an increase of the flood elevation or cause significant erosion.





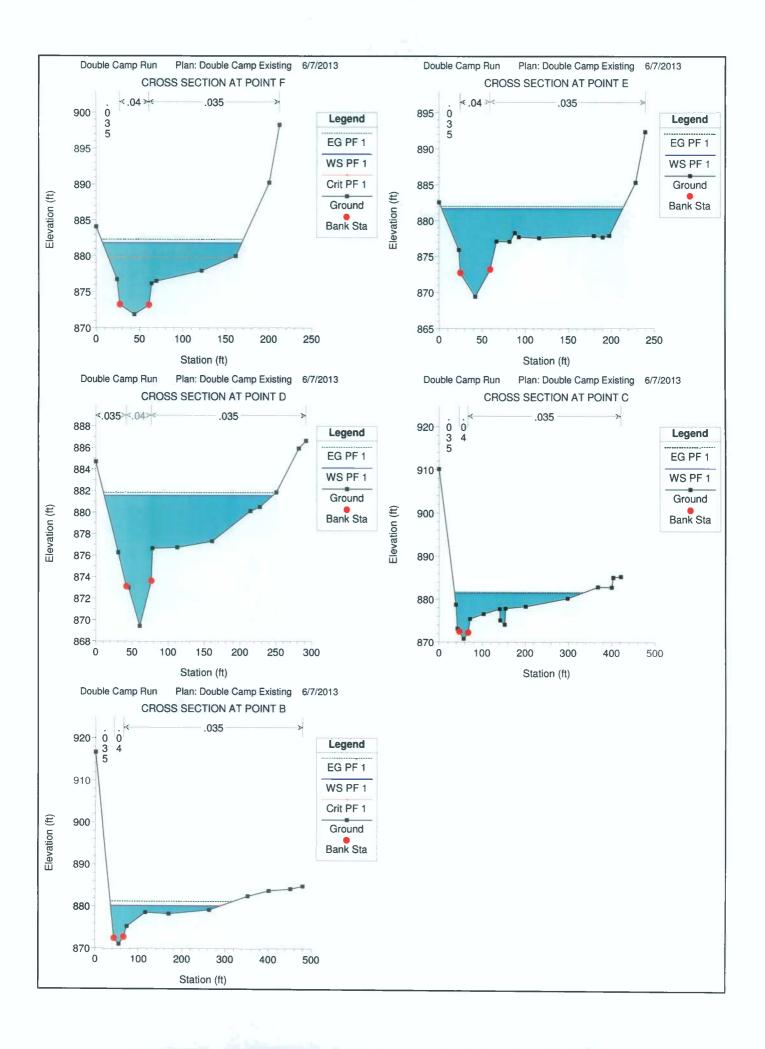




3.0 EXISTING CONDITION HEC-RAS CALCULATIONS

HEC-RAS Plan: EX SITE River: STREAM 1 Reach: F TO A Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
F TO A	10.0	PF 1	4140.00	871.87	881.79	879.75	882.30	0.001771	6.88	784.35	160.95	0.40
F TO A	9.0	PF 1	4140.00	869.42	881.69		881.99	0.000958	5.44	1040.45	210.19	0.30
FTOA	8.0	PF 1	4140.00	869.42	881.54		881.84	0.001067	5.54	1045.08	233.38	0.31
FTOA	7.0	PF 1	4140.00	870.81	881.34		881.64	0.001333	6.16	1076.67	292.29	0.35
F TO A	6.0	PF 1	4140.00	870.97	880.11	880.11	881.17	0.005060	10.84	639.93	253.33	0.66



HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

, X	Х	XXXXXX	(XXXX XXXX XXXX		XX	XX		XXXX		
X	Х	X	Х	Х		Χ	Х	Х	Х	X
Х	X	X	Х			Х	Х	X	Х	X
XXXXXXX		XXXX	Х		XXX	XX	XX	XXX	XXX	XXXX
X	X	X	Х			Х	Χ	Х	Х	X
Х	X	X	Х	X		Χ	Х	X	Х	X
Х	Х	XXXXXX	XX	XX		Χ	X	X	X	XXXXX

PROJECT DATA

Project Title: Double Camp Run Project File : DoubleCampRun.prj

Run Date and Time: 6/7/2013 2:27:29 PM

Project in English units

Project Description:

Analysis of Adding Topsoil within Floodplain for Antero - EXISTING CONDITION

PLAN DATA

Plan Title: Double Camp Existing

Plan File : r:\030-2162 Antero-Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.p01

Geometry Title: Double Camp Existing

Geometry File: r:\030-2162 Antero-Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.g01

Flow Title : Double Camp Flow

Flow File : r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.f01

Plan Description:

Floodplain analysis of existing conditions where Cox Staging area will be placed.

Plan Summary Information:

Number of: Cross Sections = 5 Multiple Openings = 0

Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 0.01 Maximum number of iterations = 20 Maximum difference tolerance = 0.3 Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Friction Slope Method:

Average Conveyance

Computational Flow Regime:

Mixed Flow

FLOW DATA

Flow Title: Double Camp Flow

Flow File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.f01

Flow Data (cfs)

River Reach STREAM 1 F TO A RS 10.0 PF 1 4140

Boundary Conditions

River Reach Profile Upstream

Downstream

STREAM 1

F TO A

PF 1

Critical

Critical

GEOMETRY DATA

Geometry Title: Double Camp Existing

Geometry_File : r:\030-2162 Antero-Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRun.g01

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A RS: 10.0

INPUT

Description: CROSS SECTION AT POINT F Station Elevation Data num= 1:

11 Elev Sta Sta Elev Sta Elev Sta Elev Elev Sta 884.08 27.35 0 24.3 876.73 873.2 44.11 871.87 60.88 873.14 64.26 121.92 876.18 69.69 876.5 877.94 161.72 879.99 200.59 890.24

212.77 898.27

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val 0 .035 27.35 .04 60.88 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 27.35 60.88 200 197 194 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

Page 2

E.G. Elev (ft)	882.30	Element	Left OB	Channel	Right OB
vel Head (ft)	0.52	Wt. n-Val.	0.035	0.040	Ŏ.O35
W.S. Elev (ft)	881.79	Reach Len. (ft)	200.00	197.00	194.00
Crit W.S. (ft)	879.75	Flow Area (sq ft)	63.07	310.70	410.58
<pre>E.G. Slope (ft/ft)</pre>	0.001771	Area (sq ft)	63.07	310.70	410.58
Q Total (cfs)	4140.00	Flow (cfs)	226.53	2138.84	1774.63
Top Width (ft)	160.95	Top Width (ft)	19.77	33.53	107.65
Vel Total (ft/s)	5.28	Avg. Vel. (ft/s)	3.59	6.88	4.32
Max Chl Dpth (ft)	9.92	Hydr. Depth (ft)	3.19	9.27	3.81
Conv. Total (cfs)	98365.7	Conv. (cfs)	5382.4	50818.5	42164.8
Length Wtd. (ft)	195.79	Wetted Per. (ft)	22.13	33.63	109.13
Min Ch El (ft)	871.87	Shear (lb/sq ft)	0.32	1.02	0.42
Alpha	1.19	Stream Power (lb/ft s)	212.77	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1.17	4.48	9.30
C & E Loss (ft)	0.06	Cum SA (acres)	0.30	0.45	2.88

CROSS SECTION

RIVER: STREAM 1 REACH: F TO A

REACH: F TO A RS: 9.0

INPUT

Description: CROSS SECTION AT POINT E 15 Station Elevation Data num= Sta Elev 23.16 875.91 81.79 877.06 Sta 42.06 Elev Elev Sta Sta Elev Sta Elev 882.54 877.1 875.91 24.82 872.67 877.06 87.98 878.27 877.67 197.63 877.91 0 869.42 59.3 873.16 877.71 116.18 877.55 66.73 92.71 179.79 877.88 190.01 228.1 885.31 239.14 892.37

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .035 24.82 .04 59.3 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 24.82 59.3 133 140 145 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	881.99	Element	Left OB	Channel	Right OB
vel Head (ft)	0.30	Wt. n-Val.	0.035	0.040	0.035
W.S. Elev (ft)	881.69	Reach Len. (ft)	133.00	140.00	145.00
Crit W.S. (ft)		Flow Area (sq ft)	70.55	362.67	607.23
<pre>E.G. Slope (ft/ft)</pre>	0.000958	Area (sq ft)	70.55	362.67	607.23
Q Total (cfs)	4140.00	Flow (cfs)	186.93	1974.57	1978.50
Top Width (ft)	210.19	Top Width (ft)	21.84	34.48	153.88
vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	2.65	5.44	3.26
Max Chl Dpth (ft)	12.27	Hydr. Depth (ft)	3.23	10.52	3.95
Conv. Total (cfs)	133789.0	Conv. (cfs)	6040.8	63810.6	63937.7
Length Wtd. (ft)	141.73	Wetted Per. (ft)	24.63	35.18	155.47
Min Ch El (ft)	869.42	Shear (1b/sq ft)	0.17	0.62	0.23
Alpha	1.23	Stream Power (lb/ft s)	239.14	0.00	0.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.87	2.96	7.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	0.30	2.30

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A RS: 8.0

INPUT Description: CROSS SECTIO Station Elevation Data Sta Elev Sta 0 884.68 30.93 76.58 873.6 78.19 227.38 880.5 250.49 Manning's n Values	num= 14 Elev Sta Elev Sta	Elev Sta 873 60.98 877.3 214.49 886.64	Elev 869.42 880.12
Sta n Val Sta 0 .035 42.31	n Val Sta n Val .04 76.58 .035		
Bank Sta: Left Right 42.31 76.58	Lengths: Left Channel Right 175 171 168	Coeff Contr. .1	Expan. .3
CROSS SECTION OUTPUT Pro	file #PF 1		
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft) E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	881.84 Element 0.31 Wt. n-Val. 881.54 Reach Len. (ft) Flow Area (sq ft) 4140.00 Flow (cfs) 233.38 Top Width (ft) 3.96 Avg. Vel. (ft/s) 12.12 Hydr. Depth (ft) 126726.1 Conv. (cfs) 169.72 Wetted Per. (ft) 869.42 Shear (lb/sq ft) 1.25 Stream Power (lb/ft 0.20 Cum Volume (acre-ft 0.00 Cum SA (acres)	129.32 455.88 30.77 3.53 4.20 13954.6 31.91 0.27 s) 292.00	Channel 0.040 0.035 171.00 168.00 343.69 572.08 343.69 572.08 1904.39 1779.73 34.27 168.34 5.54 3.11 10.03 3.40 58293.8 54477.8 35.23 170.29 0.65 0.22 0.00 0.00 1.82 5.07 0.19 1.76
CROSS SECTION			
RIVER: STREAM 1 REACH: F TO A	RS: 7.0		
INPUT Description: CROSS SECTIO Station Elevation Data Sta Elev Sta 0 910.2 39.17 67.64 872.19 72.06 152.77 874.11 154.44 400.78 882.79 403.66	num= 18 Elev Sta Elev Sta 878.77 42.76 873.17 47.1 875.45 103.46 876.57 140.93 877.87 201.3 878.31 298.48	Elev Sta 872.43 57.37 877.76 142.02 880.22 368.67	Elev 870.81 875.12 882.87
Manning's n Values Sta n Val Sta 0 .035 47.1	num= 3 n Val Sta n Val .04 67.64 .035		
Bank Sta: Left Right 47.1 67.64	Lengths: Left Channel Right 175 171 168	Coeff Contr. .1	Expan. .3
CROSS SECTION OUTPUT Pro	file #PF 1		
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft)	881.64 Element 0.30 Wt. n-Val. 881.34 Reach Len. (ft) Flow Area (sq ft) Page 4	Left OB 0.035 175.00 60.50	Channel Right OB 0.040 0.035 171.00 168.00 200.96 815.21

		DoubleCampRun.rep			
<pre>E.G. Slope (ft/ft)</pre>	0.001333	Area (sq ft)	60.50	200.96	815.21
Q Total (cfs)	4140.00	Flow (cfs)	235.89	1238.10	2666.01
Top Width (ft)	292.29	Top Width (ft)	11.14	20.54	260.61
Vel Total (ft/s)	3.85	Avg. Vel. (ft/s)	3.90	6.16	3.27
Max Chl Dpth (ft)	10.53	Hydr. Depth (ft)	5.43	9.78	3.13
Conv. Total (cfs)	113387.5	Conv. (cfs)	6460.5	33909.5	73017.5
Length Wtd. (ft)	169.51	Wetted Per. (ft)	15.17	20.76	266.02
Min Ch El (ft)	870.81	Shear (lb/sq ft)	0.33	0.81	0.26
Alpha	1.29	Stream Power (lb/ft s)	421.54	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.18	0.75	2.40
C & E Loss (ft)	0.08	Cum SA (acres)	0.04	0.08	0.93

Warning: The velocity head has changed by more than $0.5~{\rm ft}~(0.15~{\rm m})$. This may indicate the need for additional cross sections. Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

CROSS SECTION

RIVER:	STREAM	1

RS: 6.0 REACH: F TO A

INPUT

Descript	tion:	CROSS	SECT	TON AT	POINT	В
Station	Eleva	ition	Data	num	=	12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	916.62	43.26	872.32	54.14	870.97	65.03	872.62	72.94	875.2
115.51	878.55	169.35	878.2	262.91	879.15	351.97	882.44	400.5	883.75
450.77	884.18	479.55	884 83						

Right 65.03 Lengths: Left Channel Right 315 Coeff Contr. Bank Sta: Left Expan. 43.26 314 314 .1

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	881.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.	0.035	0.040	Ō.035
W.S. Elev (ft)	880.11	Reach Len. (ft)			
Crit W.S. (ft)	880.11	Flow Area (sq ft)	29.65	182.71	427.56
E.G. Slope (ft/ft)	0.005060	Area (sq ft)	29.65	182.71	427.56
Q Total (cfs)	4140.00	Flow (cfs)	174.60	1981.48	1983.92
Top Width (ft)	253.33	Top Width (ft)	7.61	21.77	223.95
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)	5.89	10.84	4.64
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)	3.90	8.39	1.91
Conv. Total (cfs)	58198.6	Conv. (cfs)	2454.4	27854.9	27889.2
Length Wtd. (ft)		Wetted Per. (ft)	10.89	21.98	224.51
Min Ch El (ft)	870.97	Shear (lb/sq ft)	0.86	2.63	0.60
Alpha	1.63	Stream_Power (lb/ft s)	479.55	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

River:STREAM 1

Reach	River Sta.	n1	n2	n3
F TO A	10.0	.035	.04	.035
F TO A	9.0	.035	.04	.035
F TO A	8.0	.035	.04	.035
F TO A	7.0	.035	.04	.035
F TO A	6.0	.035	.04	.035

SUMMARY OF REACH LENGTHS

River: STREAM 1

Reach	River Sta.	Left	Channel	Right
F TO A	10.0	200	197	194
	9.0	133	140	145
	8.0	175	171	168
	7.0	175	171	168
	6.0	314	314	315

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: STREAM 1

Reach	River Sta.	Contr.	Expan.
F TO A	10.0	.1	.3
F TO A	9.0	$.ar{1}$.3
F TO A	8.0	.1	.3
F TO A	7.0	.1	.3
F TO A	6.0	. 1	. 3

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : EX SITE

RS: 7.0

River: STREAM 1 Reach: F TO A RS: 7.0 Profile: PF 1 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

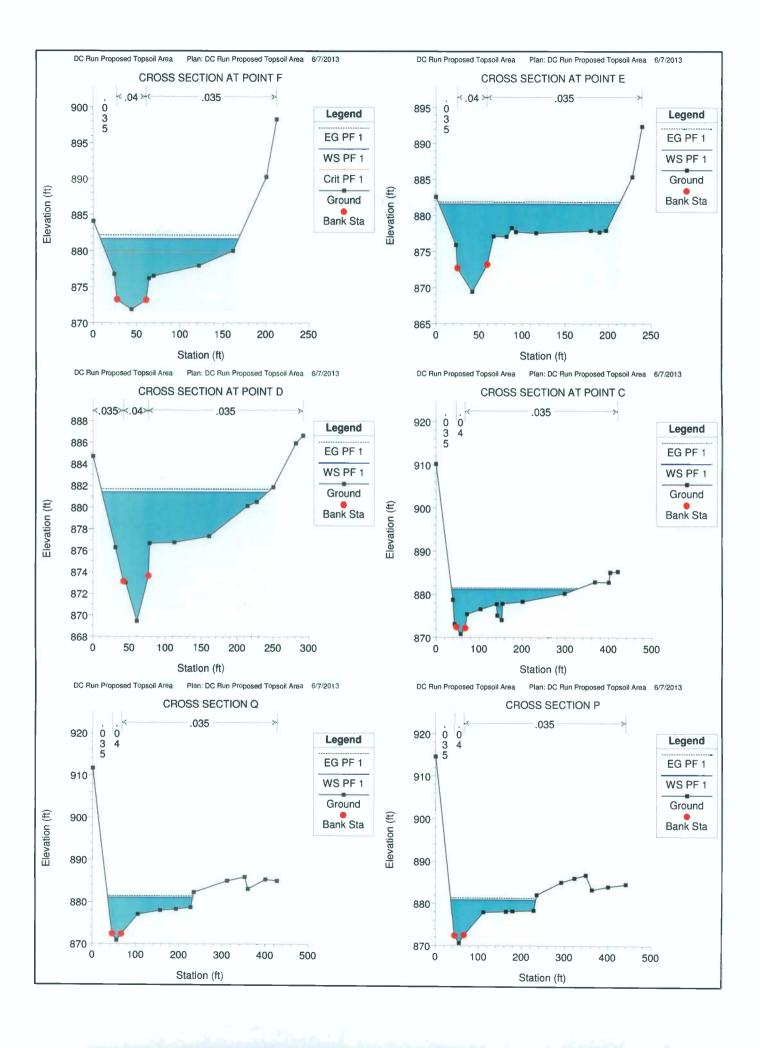
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

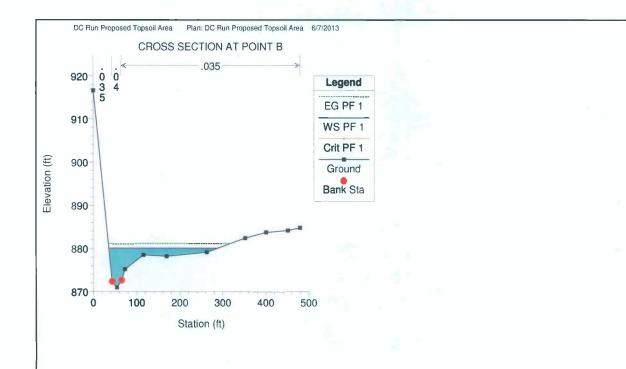
This may indicate the need for additional cross sections.



HEC-RAS Plan: Proposed Site River: STREAM 1 Reach: F TO A Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chril	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
F TO A	10.0	PF 1	4140.00	871.87	881.65	879.75	882.20	0.001923	7.10	762.05	159.96	0.41
F TO A	9.0	PF 1	4140.00	869.42	881.53		881.86	0.001047	5.64	1008.29	209.03	0.31
F TO A	8.0	PF 1	4140.00	869.42	881.37		881.70	0.001183	5.77	1004.99	229.83	0.32
F TO A	7.0	PF 1	4140.00	870.81	881.13		881.47	0.001565	6.58	1014.18	286.30	0.37
F TO A	6.2	PF t	4140.00	870.84	881.01		881.42	0.001679	6.75	867.45	196.24	0.39
F TO A	6.1	PF 1	4140.00	870.59	880.84		881.33	0.002030	7.35	815.56	197.45	0.42
F TO A	6.0	PF 1.	4140.00	870.97	880.11	880.11	881.17	0.005060	10.84	639.93	253.33	0.66





HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

X	Х	XXXXXX	XX	XX		XX	XX	×	X	XXXX
Х	Х	X	Х	X		Х	Х	Х	X	X
Х	Х	X	X			Х	Х	Х	X	X
XXX	XXXX	XXXX	X		XXX	XX	XX	XXX	XXX	XXXX
Х	Х	X	Х			Х	Χ	Х	X	X
Х	Х	X	X	Х		Х	Х	Х	X	X
X	X	XXXXXX	XX	XX		Х	Х	X	X	XXXXX

PROJECT DATA

Project Title: DC Run Proposed Topsoil Area

Project File: DoubleCampRunPro.prj Run Date and Time: 6/10/2013 7:12:01 AM

Project in English units

Project Description:

Analysis of Adding Topsoil within Floodplain for Antero - PROPOSED CONDITION

PLAN DATA

Plan Title: DC Run Proposed Topsoil Area

Plan File : $r:\030-2162$ Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.p02

Geometry Title: DC Run Proposed Topsoil Area

Geometry File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.g02

Flow Title : DC Run Proposed Topsoil Area

Flow File : r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.f02

Plan Description:

Floodplain analysis of proposed conditions after Cox Staging area is

established and topsoil stockpile is in place.

Plan Summary Information:

Number of: Cross Sections = Multiple Openings = 0

0 Culverts = Inline Structures = 0 Bridges 0 Lateral Structures =

Computational Information
Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 0.01 Maximum number of iterations = 20 Maximum difference tolerance = 0.3Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Friction Slope Method:

Average Conveyance

Computational Flow Regime:

Mixed Flow

FLOW DATA

Flow Title: DC Run Proposed Topsoil Area

Flow File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.f02

Flow Data (cfs)

River Reach STREAM 1 F TO A RS 10.0 PF 1 4140

Boundary Conditions

River Reach

keach Profile

Upstream

Downstream

STREAM 1

PF 1

Critical

Critical

GEOMETRY DATA

Geometry Title: DC Run Proposed Topsoil Area

F TO A

Geometry File: r:\030-2162 Antero- Double Camp Run Access Rd\Documents\Design\HEC

RAS\DoubleCampRunPro.g02

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A RS: 10.0

TNDIIT

Description: CROSS SECTION AT POINT F

Station Elevation Data num= 11

Sta Elev Sta 27.35 Elev Elev Elev Sta Sta Sta Elev 873.2 871.87 873.14 884.08 24.3 876.73 44.11 60.88 0 64.26 121.92 877.94 161.72 876.18 69.69 876.5 879.99 200.59 890.24

212.77 898.27

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val 0 .035 27.35 .04 60.88 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 27.35 60.88 200 197 194 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

Page 2

E.G. Elev (ft)	882.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.035	0.040	Ŏ.035
W.S. Elev (ft)	881.65	Reach Len. (ft)	200.00	197.00	194.00
Crit W.S. (ft)	879.75	Flow Area (sq ft)	60.36	306.04	395.65
E.G. Slope (ft/ft)	0.001923	Area (sq ft)	60.36	306.04	395.65
Q Total (cfs)	4140.00	Flow (cfs)	222.58	2173.17	1744.25
Top Width (ft)	159.96	Top Width (ft)	19.31	33.53	107.13
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)	3.69	7.10	4.41
Max Chl Dpth (ft)	9.78	Hydr. Depth (ft)	3.13	9.13	3.69
Conv. Total (cfs)	94403.9	Conv. (cfs)	5075.4	49554.6	39773.9
Length Wtd. (ft)	195.81	Wetted Per. (ft)	21.65	33.63	108.59
Min Ch El (ft)	871.87	Shear (lb/sq ft)	0.33	1.09	0.44
Alpha	1.20	Stream Power (lb/ft s)	212.77	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	1.05	4.13	7.99
C & E Loss (ft)	0.07	Cum SA (acres)	0.28	0.42	2.37

CROSS SECTION

RIVER: STREAM 1

REACH: F TO A RS: 9.0

INPUT

Description: CROSS SECTION AT POINT E Station Elevation Data num= Sta Sta Sta Elev Elev Sta Elev Sta Elev Elev 23.16 875.91 24.82 81.79 877.06 87.98 190.01 877.67 197.63 24.82 872.67 87.98 878.27 197.63 877.91 42.06 869.42 59.3 873.16 92.71 877.71 116.18 877.55 228 1 885 21 220.14 2002 0 882.54 23.16 66.73 877.1 81.79 179.79 877.88 190.01

Manning's n Values num=
n val Sta n Val Sta n Val Sta 0 .035 24.82 Sta n Val 59.3 .035 .04

Bank Sta: Left Right 24.82 59.3 Lengths: Left Channel Coeff Contr. Right Expan. 145 133 140 . 1 . 3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	881.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.035	0.040	Ŏ.035
W.S. Elev (ft)	881.53	Reach Len. (ft)	133.00	140.00	145.00
Crit W.S. (ft)		Flow Area (sq ft)	67.24	357.38	583.67
E.G. Slope (ft/ft)	0.001047	Area (sq ft)	67.24	357.38	583.67
Q Total (cfs)	4140.00	Flow (cfs)	183.19	2014.69	1942.12
Top Width (ft)	209.03	Top Width (ft)	21.30	34.48	153.25
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)	2.72	5.64	3.33
Max Chl Dpth (ft)	12.11	Hydr. Depth (ft)	3.16	10.36	3.81
Conv. Total (cfs)	127952.2	Conv. (cfs)	5661.7	62266.7	60023.8
Length Wtd. (ft)	141.68	Wetted Per. (ft)	24.07	35.18	154.82
Min Ch El (ft)	869.42	Shear (lb/sq ft)	0.18	0.66	0.25
Alpha	1.24	Stream Power (1b/ft s)	239.14	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.75	2.63	5.81
C & E Loss (ft)	0.00	Cum SA (acres)	0.18	0.27	1.79

228.1

885.31 239.14

892.37

CROSS SECTION

RIVER: STREAM 1

RS: 8.0 REACH: F TO A

	num= 14 Elev Sta Elev Sta 876.26 42.31 873.09 45.38 876.65 112.61 876.74 160.97 881.87 281.86 885.93 292 num= 3	Elev Sta 873 60.98 877.3 214.49 886.64	Elev 869.42 880.12	
Bank Sta: Left Right 42.31 76.58	Lengths: Left Channel Right 175 171 168	Coeff Contr.	Expan.	
CROSS SECTION OUTPUT Pro	file #PF 1			
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft) E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	881.70 Element 0.33 Wt. n-Val. 881.37 Reach Len. (ft) Flow Area (sq ft) 0.001183 Area (sq ft) 4140.00 Flow (cfs) 229.83 Top Width (ft) 4.12 Avg. Vel. (ft/s) 11.95 Hydr. Depth (ft) 120379.6 Conv. (cfs) 169.76 Wetted Per. (ft) 869.42 Shear (lb/sq ft) 1.26 Stream Power (lb/ft 0.23 Cum Volume (acre-ft) 0.00 Cum SA (acres)	124.05 454.02 30.14 3.66 4.12 13201.7 31.25 0.29 s) 292.00) 0.46	Channel 0.040 171.00 337.75 337.75 1947.45 34.27 5.77 9.86 56626.5 35.23 0.71 0.00 1.52 0.16	Right OB 0.035 168.00 543.19 543.19 1738.52 165.42 3.20 3.28 50551.3 167.37 0.24 0.00 3.93 1.26
CROSS SECTION				
RIVER: STREAM 1 REACH: F TO A	RS: 7.0			
INPUT Description: CROSS SECTION Station Elevation Data Sta Elev Sta 0 910.2 39.17 67.64 872.19 72.06 152.77 874.11 154.44 400.78 882.79 403.66	num= 18 Elev Sta Elev Sta 878.77 42.76 873.17 47.1 875.45 103.46 876.57 140.93 877.87 201.3 878.31 298.48	Elev Sta 872.43 57.37 877.76 142.02 880.22 368.67	Elev 870.81 875.12 882.87	
Manning's n Values Sta n Val Sta 0 .035 47.1	num= 3 n Val Sta n Val .04 67.64 .035			
Bank Sta: Left Right 47.1 67.64	Lengths: Left Channel Right 21 22 23	Coeff Contr. .1	Expan.	
CROSS SECTION OUTPUT Pro	file #PF 1			
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft)	881.47 Element 0.34 Wt. n-Val. 881.13 Reach Len. (ft) Flow Area (sq ft) Page 4	Left OB 0.035 21.00 58.13	Channel 0.040 22.00 196.53	Right OB 0.035 23.00 759.53

```
DoubleCampRunPro.rep
                                                          65.69
235.14
           914.59
                      44.28
                              872.36
                                         54.98 870.59
                                                                   872.48
                                                                             111.32
                                                                                      877.92
  164.25
                      179.2
                              878.23
           878.09
                                       228.11 878.37
                                                                   882.05
                                                                                         885
                                                                              291.7
   322.3
               886
                     348.36
                               886.7
                                       362.81 883.28
                                                          400.23
                                                                       884
                                                                             441.08
                                                                                      884.54
Manning's n Values
                              num=
                        Sta
                               n Val
     Sta
            n Val
                                           Sta
                                                  n Val
                      44.28
             .035
                                 .04
                                         65.69
        0
                                                  .035
                              Lengths: Left Channel
                                                          Right
Bank Sta: Left
                                                                      Coeff Contr.
                    Right
                                                                                       Expan.
          44.28
                    65.69
                                           34
                                                    34
                                                             34
                                                                               .1
                                                                                          . 3
CROSS SECTION OUTPUT Profile #PF 1
  E.G. Elev (ft)
                                881.33
                                            Element
                                                                          Left OB
                                                                                       Channel 1
                                                                                                   Right OB
  Vel Head (ft)
                                  0.49
                                            Wt. n-Val.
                                                                           0.035
                                                                                                     Õ.035
                                                                                        0.040
                                            Reach Len. (ft)
Flow Area (sq ft)
Area (sq ft)
Flow (cfs)
  W.S. Elev (ft)
Crit W.S. (ft)
                                                                                                    34.00
577.93
                                880.84
                                                                           34.00
                                                                                        34.00
                                                                                       199.91
                                                                            37.72
  E.G. Slope (ft/ft)
                              0.002030
                                                                                       199.91
                                                                                                    577.93
                                                                            37.72
  Q Total (cfs)
                                4140.00
                                                                          152.38
                                                                                      1469.38
                                                                                                   2518.25
                                            Top Width (ft)
Avg. Vel. (ft/s)
Hydr. Depth (ft)
Conv. (cfs)
Wetted Per. (ft)
  Top Width (ft)
Vel Total (ft/s)
                                197.45
                                                                            8.89
                                                                                        21.41
                                                                                                    167.14
                                   5.08
                                                                            4.04
                                                                                          7.35
                                                                                                      4.36
  Max Chl Dpth (ft)
                                 10.25
                                                                                          9.34
                                                                                                      3.46
                                                                            4.24
  Conv. Total (cfs)
Length Wtd. (ft)
                                                                          3382.2
                               91893.0
                                                                                      32614.9
                                                                                                   55896.0
                                 34.00
                                                                           12.29
                                                                                        21.72
                                                                                                    168.08
                                            Shear (lb/sq ft)
Stream_Power (lb/ft s)
  Min Ch El (ft)
                                870.59
                                                                            0.39
                                                                                          1.17
                                                                                                      0.44
                                  1.22
  Alpha
                                                                           441.08
                                                                                          0.00
                                                                                                      0.00
  Frctn Loss (ft)
                                   0.10
                                            Cum Volume (acre-ft)
                                                                            0.03
                                                                                          0.15
                                                                                                      0.39
  C & E Loss (ft)
                                   0.06
                                            Cum SA (acres)
                                                                                                      0.15
                                                                             0.01
                                                                                          0.02
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
CROSS SECTION
RIVER: STREAM 1
REACH: F TO A
                              RS: 6.0
TNPIIT
Description: CROSS SECTION AT POINT B
                                          12
Station Elevation Data
                              num=
                               Elev
                                                           Sta
65.03
             Elev
                        Sta
                                                  Elev
     Sta
                                          Sta
                                                                     Elev
                                                                                        Elev
                                                                                Sta
                                        54.14
       0
           916.62
                      43.26
                              872.32
                                                870.97
                                                                   872.62
                                                                              72.94
                                                                                       875.2
                     169.35
                               878.2
  115.51
           878.55
                                       262.91
                                                879.15
                                                          351.97
                                                                   882.44
                                                                              400.5
                                                                                      883.75
  450.77
           884.18
                     479.55
                              884.83
Manning's n Values
                                           3
                              num=
     Sta
           n Val
                        Sta
                               n Val
                                           Sta
                                                  n Val
                      43.26
              .035
                                         65.03
                                 .04
                                                   .035
Bank Sta: Left
                                                          Right
                   Right
                              Lengths: Left Channel
                                                                     Coeff Contr.
                                                                                       Expan.
          43.26
                   65.03
                                          314
                                                   314
                                                            315
                                                                               . 1
                                                                                          . 3
CROSS SECTION OUTPUT Profile #PF 1
```

E.G. Elev (ft)

Vel Head (ft)

W.S. Elev (ft) Crit W.S. (ft) 881.17

880.11

880.11

1.06

Element

Wt. n-Val.

Reach Len. (ft)

Flow Area (sq ft)

Page 6

Left OB

0.035

29.65

Channel

0.040

182.71

Right OB

427.56

0.035

E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	DoubleCampRunPro.rep 0.001565	1292.45 26 20.54 2 6.58 9.57 32671.0 65	759.53 604.79 254.89 3.43 2.98 5845.0 260.30 0.29 0.00 1.42 0.45
CROSS SECTION			
RIVER: STREAM 1 REACH: F TO A	RS: 6.2		
INPUT Description: CROSS SECTION Station Elevation Data Sta Elev Sta 0 911.63 45.87 157.14 877.94 193.88 352.31 885.94 359.61	num= 14 Elev Sta Elev Sta Elev Sta 872.32 56.27 870.84 66.69 872.28 105.55 878.29 227.42 878.68 234.48 882.3 311.6	Elev 877 885	
Manning's n Values Sta n Val Sta 0 .035 45.87	num= 3 n Val Sta n Val .04 66.69 .035		
Bank Sta: Left Right 45.87 66.69	Lengths: Left Channel Right Coeff Contr. 48 48 48 .1	Expan. .3	
CROSS SECTION OUTPUT Pro	file #PF 1		
E.G. Elev (ft) Vel Head (ft) W.S. Elev (ft) Crit W.S. (ft) E.G. Slope (ft/ft) Q Total (cfs) Top Width (ft) Vel Total (ft/s) Max Chl Dpth (ft) Conv. Total (cfs) Length Wtd. (ft) Min Ch El (ft) Alpha Frctn Loss (ft) C & E Loss (ft)	881.42 Element Left OB 0.41 Wt. n-Val. 0.035 881.01 Reach Len. (ft) 48.00 Flow Area (sq ft) 44.08 0.001679 Area (sq ft) 44.08 4140.00 Flow (cfs) 169.93 196.24 Top Width (ft) 10.14 4.77 Avg. Vel. (ft/s) 3.86 10.17 Hydr. Depth (ft) 4.35 101047.4 Conv. (cfs) 4147.6 48.00 Wetted Per. (ft) 13.36 870.84 Shear (lb/sq ft) 0.35 1.17 Stream Power (lb/ft s) 427.17 0.09 Cum Volume (acre-ft) 0.07 0.01 Cum SA (acres) 0.02	0.040 48.00 196.58 196.58 6.75 9.44 32410.1	ight OB 0.035 48.00 626.80 626.80 642.20 165.28 4.22 3.79 4489.7 166.14 0.40 0.00 1.06 0.34
CROSS SECTION			
RIVER: STREAM 1 REACH: F TO A	RS: 6.1		

INPUT
Description: CROSS SECTION P
Station Elevation Data num= 15
Sta Elev Sta Elev Sta Elev Sta Elev Sta Page 5 Elev

		DoubleCampRunPro.rep			
E.G. Slope (ft/ft)	0.005060	Area (sq ft)	29.65	182.71	427.56
Q Total (cfs)	4140.00	Flow (cfs)	174.60	1981.48	1983.92
Top Width (ft)	253.33	Top Width (ft)	7.61	21.77	223.95
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)	5.89	10.84	4.64
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)	3.90	8.39	1.91
Conv. Total (cfs)	58198.6	Conv. (cfs)	2454.4	27854.9	27889.2
Length Wtd. (ft)		Wetted Per. (ft)	10.89	21.98	224.51
Min Ch El (ft)	870.97	Shear (1b/sq ft)	0.86	2.63	0.60
Alpha	1.63	Stream Power (lb/ft s)	479.55	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:STREAM 1

Reach	River Sta.	n1	n2	n3
F TO A F TO A F TO A F TO A	10.0 9.0 8.0 7.0 6.2 6.1	.035 .035 .035 .035 .035	.04 .04 .04 .04	.035 .035 .035 .035
F TO A	6.0	.035	.04	.035

SUMMARY OF REACH LENGTHS

River: STREAM 1

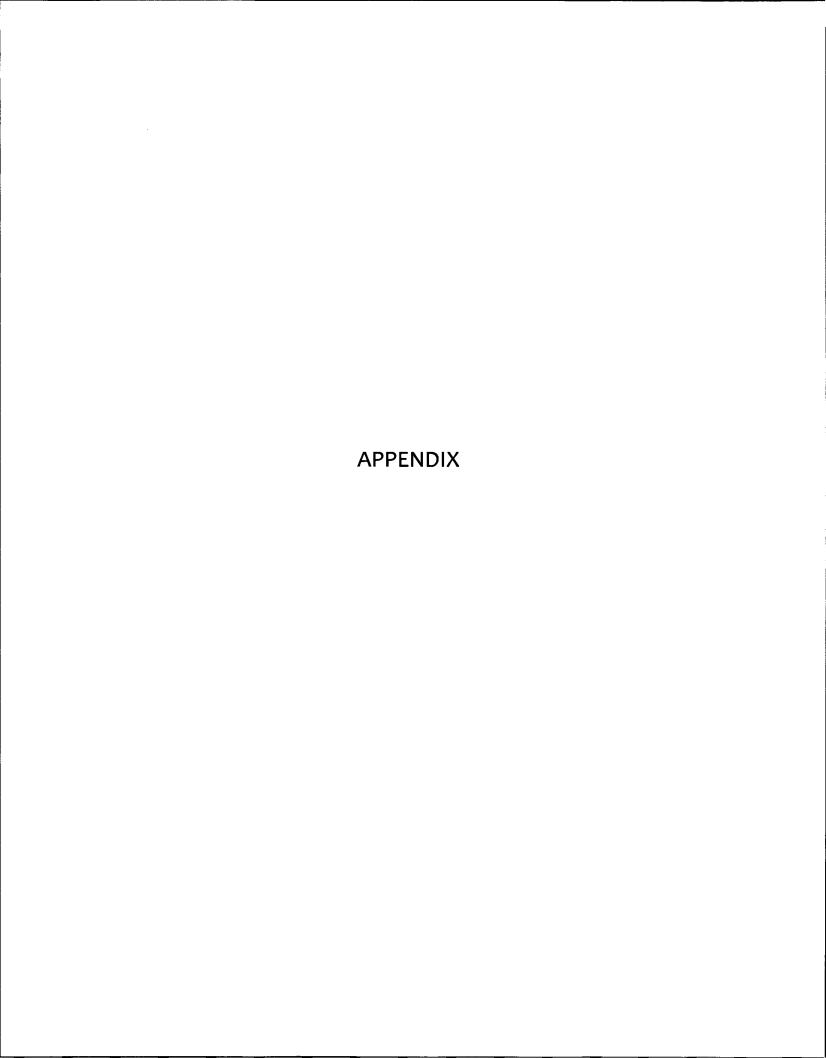
Reach	River Sta.	Left	Channel	Right
F TO A F TO A F TO A F TO A	10.0 9.0 8.0 7.0 6.2	200 133 175 21 48	197 140 171 22 48	194 145 168 23 48
F TO A F TO A	6.1 6.0	34 314	34 314	34 315

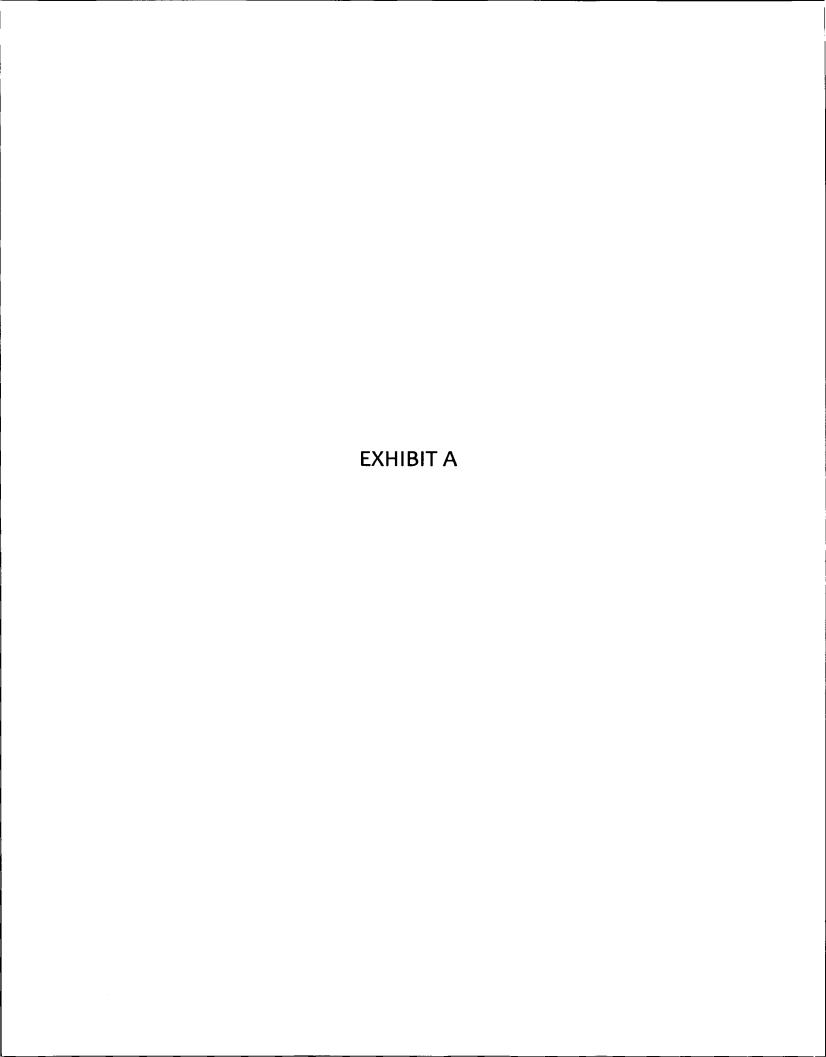
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: STREAM $\boldsymbol{1}$

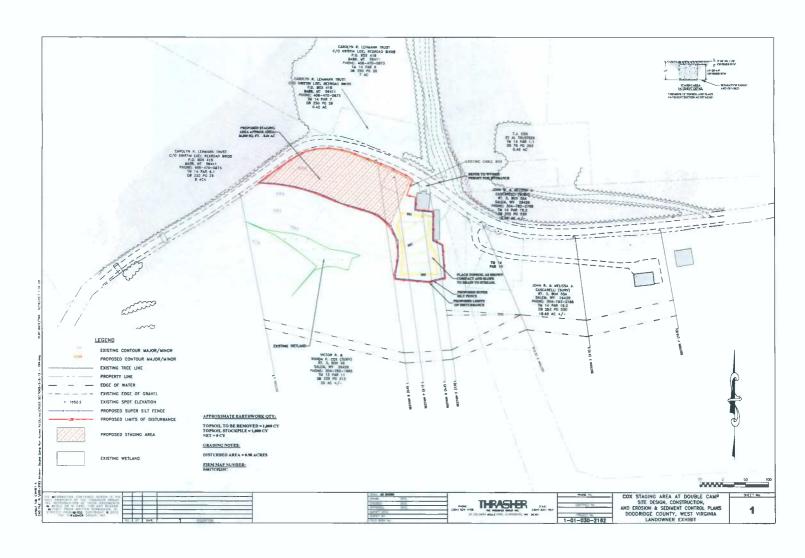
		Reach	River Sta.	Contr.	Expan
F	T0 T0 T0	A	10.0 9.0 8.0	.1 .1	.3
	ТО		7.0	$.\bar{1}$. 3
F	TO	Α	6.2	.1	. 3
F	TO	Α	6.1	.1	.3
F	то	Α	6.0	.1	. 3

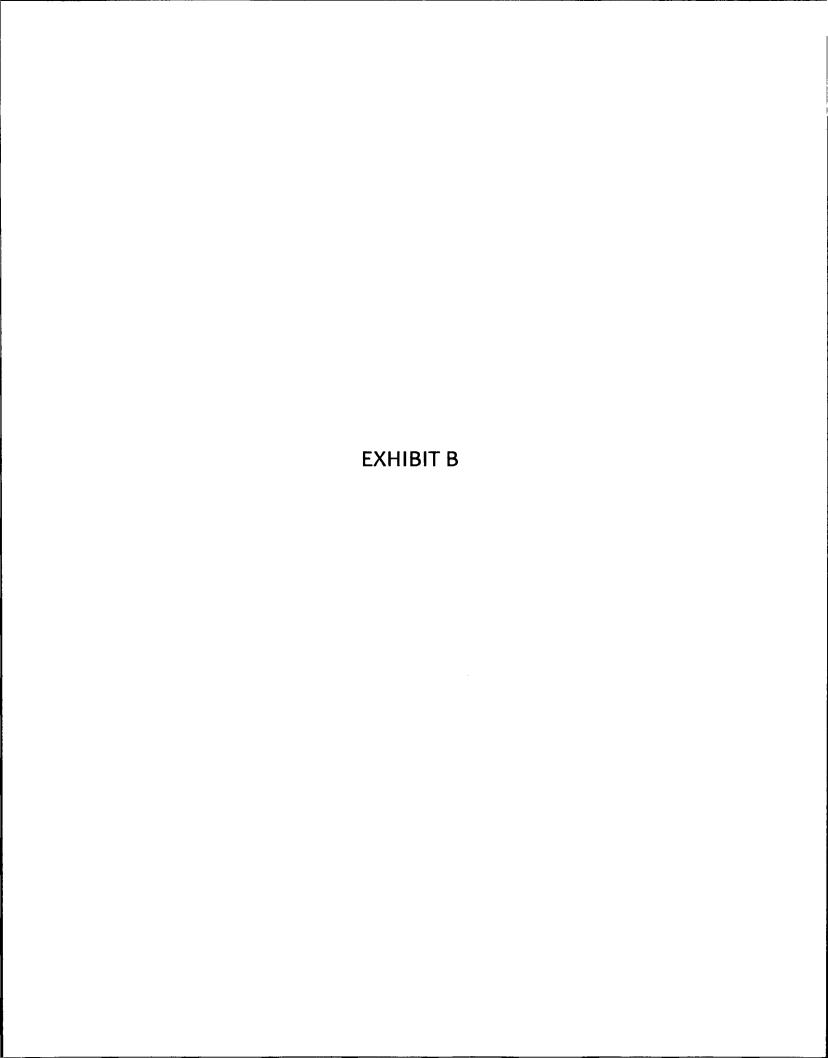
ERRORS WARNINGS AND NOTES Errors Warnings and Notes for Plan : Proposed Site

River: STREAM 1 Reach: F TO A RS: 6.1 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.











WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

Earl Ray Tomblin Governor

Office of the District Engineer/Manager
District Four
PO Box 4220 (EXIT 121, 1-79) * Clarksburg, WV 26302 * 304-842-1550

**Total A. Mattox, Jr., P. E. Secretary of Transportation / Commissioner of Highways Office of the District Engineer/Manager

May 16, 2013

ANTERO RESOURCES APPALACHIAN CORPORATION 175 D ELK CREEK ROAD **MOUNT CLARE, WV 26408**

Dear Applicant:	
Your approved copy of Permit Number04-2013- permit type is enclosed. A description of the work is	
Please contact the District Four office:	
Denise Ronce	ne 304-842-1575
at least 48 hours in advance of the date you plan to begin we by the permit.	ork so arrangements can be made to inspect the work authorized
Failure to comply will result in cancellation of you	permit.
A copy of this permit is to be available on the job at a West Virginia Division of Highways' personnel.	ll times while the work is in progress for inspection by the
	Sincerely,
	District Engineer / District Manager
Initials: TC Attachments: Yes Enclosure: No cc:0409 Charleston Permits	Permit Supervisor

E.E.O./AFFIRMATIVE ACTION EMPLOYER

7. The work authorized under this permit shall be completed on or before (Date): 05-10-2013

RECOMMENDED:

Title PERMIT SUPERVISOR Signature and Title of Applicant

BOND REQUIREMENT:

BOND NO. | PM 9 | 289 | DATE 2-21-12 |

Attached On File ST

INSPECTION: Owner/Consultant | Title DISTRICT MANAGER

West Virginia Division of Highways

Periodic ST Reimbursable No Cost ST

PERMIT NO:

0420130401

AUTHORIZATION NO:

CHAPTER 17 WEST VIRGINIA CODE, 1931

§17-4-8. Use of roadbed by railroad, telephone company, etc.

No railroad or electric or other railway shall be constructed upon the roadbed of any state road, except to cross the same, nor shall any person, firm or corporation enter upon or construct any works in or upon such road, or lay or maintain thereon or thereunder any drainage, sewer or water pipes, gas pipes, electric conduits or other pipes, nor shall any telephone, telegraph or electric line or power pole, or any other structure whatsoever, be erected upon, in or over any portion of a state road, except under such restrictions, conditions and regulations as may be prescribed by the state road commissioner. Whenever any railroad or electric or other railway, heretofore or hereafter constructed, shall cross any state road, it shall be required to keep its own roadbed, and the bed of the road or highway at such crossing, in proper repair, or else to construct and maintain an overhead or undergrade crossing, subject to the approval of the state road commissioner; and the tracks of such railroad or railway at grade crossings shall be so constructed as to give a safe and easy approach to and across the same, and when the construction of such approaches is made necessary by a change in the railroad grade at the grade crossing, the cost shall be upon the railway company.

§17-16-6. Permit by commission or county court for openings in or structures on public roads; franchises and easements of oil, etc., transportation companies.

No opening shall be made in any state or county-district road or highway, nor shall any structure be placed therein or thereover, nor shall any structure, which has been so placed, be changed or removed, except in accordance with a permit from the state road commission or county court, as the case may be. No road or highway shall be dug up for laying or placing pipes, sewers, poles or wires, or for other purposes, and no trees shall be planted or removed or obstructions placed thereon, without the written permit of the commission or county court, or its duly authorized agent, and then only in accordance with the regulations of the commission or court. The work shall be done under the supervision and to the satisfaction of the commission or court; and the entire expense of replacing the highway in as good condition as before shall be paid by the persons to whom the permit was given, or by whom the work was done: Provided, however, That nothing herein contained shall be so construed as to prevent any oil or gas company or person having a proper permit or franchise from transporting oil or gasoline along any of the public highways of this State, nor to give such company a franchise without paying to the landowners through whose lands such road passes the usual and customary compensation paid or to be paid to the landowners for such right of way. Any grant or franchise when made shall be construed to give to such company or person only the right to use the easement in such public road.

A violation of any provision of this section shall be a misdemeanor, and the person or corporation violating the same shall, upon conviction thereof, be fined not less than twenty-five nor more than one hundred dollars for each offense.

§17-16-9. Private driveways or approaches to roads; obstruction of ditches.

The owner or tenant of land fronting on any state road shall construct and keep in repair all approaches or driveways to and from the same, under the direction of the state road commission, and, likewise, the owner or tenant of land fronting on any county-district road shall construct and keep in repair approaches or driveways to and from the same, under the direction of the county road engineer, and it shall be unlawful for such owner or tenant to fill up any ditch, or place any material of any kind or character in any ditch, so as in any manner to obstruct or interfere with the purposes for which it

SUPPLEMENTARY CONDITIONS

- 1. The person, firm or corporation to whom a permit is issued agrees to hold the State of West Virginia and DIVISION harmless on account of any damages to persons or property which may arise during the process of the work
- 2. Applications for permission to perform work within highway rights of way shall be made on DIVISION'S standard permit form and shall be signed by the authorized representative of the person, firm or corporation applying.
- The APPLICANT shall give detailed information concerning the work to be performed and the application must include a sketch sufficient to show the nature of the work performed.
- APPLICANT, his agents, successor, heirs or assigns, contractors or any other person, firm or corporation working under APPLICANT'S real or apparent authority, shall perform the work in a manner satisfactory to DIVISION. Damage to the road resulting at any time from work authorized under this permit shall be repaired by APPLICANT. Unsatisfactory repairs may be a corrected by DIVISION or its authorized agent and the cost thereof paid by
- 5. DIVISION assumes no liability for damage to the proposed work by reason of construction or maintenance work on
- 6. This permit is granted subject to removal of the authorized installation by APPLICANT at no cost to DIVISION when required for improvement of the road, and subject to all regulations now or hereafter adopted by DIVISION.
- Utility installation shall be in accordance with the current manual, "Accommodation of Utilities on Highway Right of
- Driveways shall be in accordance with the current manual, "Rules and Regulations for Constructing Driveways on State Highway Rights-of-Way."
- DIVISION reserves the right to cancel this permit at any time, should APPLICANT fail to comply with the terms and conditions under which it is granted. 10. This permit is granted only insofar as the DIVISION has a right to do so.

Addendum to Permit 04-2013-0481

This addendum, made this 13th day of May 2013, between the West Virginia Department of Transportation, Division of Highways, a statutory company hereinafter called the Division and

auu

Antero Resources

Address:

1625 17th Street, Denver, CO 80202

Phone: 303 357-7310

hereinafter called APPLICANT.

The Applicant has filed with the DIVISION a written application for the following named route and location:

Doddridge County Route SLS 25, Meathouse Fork@ MP7.384 to construct a truck staging area for the Trent, Wagner and Hughs Well Pad sites.

- All Equipment, Machinery, and Materials (including but not limited to Jersey Barriers, etc) must be stored off of the Division's right-of-way. No Parking will be permitted on the Division's Right-of-Way.
- 2. Equipment, Machinery, or Materials, even if placed off of the Division's Right-of-Way, must not cause sight
- Entrance and Exit must clearly marked in the field and follow the Division's Manual on Rules and Regulations for Constructing Driveways on State Highway Rights-of-Way.
- After completion of the project, a joint review of roads will be filmed and evaluated to assure roads have been repaired to
 existing condition or better.
- No travel on School Bus Routes during their traversing operational hours on above mentioned route on bi-directional roadways where the lane widths are less than 10 ft.
- Pilot Vehicle required for all Oversized Loads on covered roads.
- Ditch lines to be maintained by applicant. FDR or equivalent required to stabilize road to uphold increased traffic and heavy and excess amount of loads. Centerline of roadway cannot be relocated without an agreement between WV DOH and Antero Resources.
- Repairs that will include "Hot Mix Asphalt" will have the following testing requirement: The supplier will be responsible for testing at the plant; Compaction testing will be as per WV DOH specifications.
- The Division of Highways shall have the right at all times to inspect the work, and if such inspections should reveal that the
 work is not done according to specifications, upon being so advised by the Division, ANTERO Resources agrees to take

Applicant shall properly repair and maintain any and all damages that may result to said bridges, highways, shoulders and ditches from hauling activities of Applicant, its agents, contractors and employees, to as good

a condition prior to commencement of Applicant's operation or as when the permit was issued, as determined by the District Engineer/Manager of the DIVISON having jurisdiction over the work permitted, or pay damages therefore in the amount to sufficiently restore such bridges, roads, highways, shoulders and ditches to original condition; and shall reimburse the DIVISON for all inspection costs incurred by it in connection with said work and repairs of such damages and faithfully comply with all terms and conditions of said permits and save harmless the DIVISION and the State of West Virginia from all losses resulting from the conduct of said work and repairs; provided that all projects covered by this blanket bond have been restored to original or better condition; then this Bond shall be released; or otherwise will remain in full force and effect.

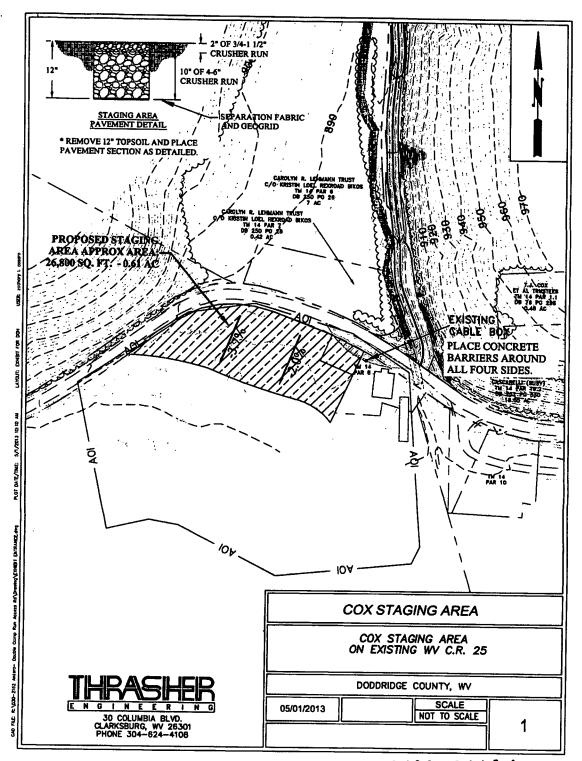
Bond Amount: \$1,000,000.00

Bond Number: LPM9062891 Date: 2/21/2012

BOND Number LPM 9062891

OIL and GAS DATA INFORMATION SHEET

<u>APPLICANT</u>					
Company Name	ANTERO RI	ESOURCES A	APPALCHIAN CO	DRPORATION	
Address		STREET			
City	DENVER	ST_ <u>CO</u>	Zip <u>80202</u>		
Contact Person Per	mit <u>Burt Simo</u>	ox	Telephone	(304) 282-9372	
24/7 Road Maintena	ance Contact	Aaron Kunzlei	Telephone	Cell (405) 227-834	4
24/7 Backup Contac	at <u>Du</u>	sty Wood	_Telephone	Cell (817) 771-143	
Drilling/Fracking will	require	Less than 50	00 Barrels of fluid	ds <u> </u>	
Site Location					
Site Name Cox S	<u>taging area</u> R	oad Local Na	me <u>Meathous</u>	se Fork Rte.# SLS 25	
Approach location WGS 83	Decimal Format (GPS <u>√39.1</u>	168 W-80.	62721 County Doddride	<u>16</u>
Location Description	on				
On Route.# SLS 25	being 250 fee	NSEW of	Jct. of Rte.# <u>SLS</u>	S 25 and Rte.# <u>SLS25/11</u>	
DOH USE ONLY HA	AULING ROUTE	From US or	WV Route (Atta	ch Map)	
Name & Rte.#	Beg MP	End MP	Surface Type	Condition	
— — Wag.		; ; ;			
Well location WGS 83 Dec		S N:		W:	
	STATE	COUNTY	PERMIT NUI	MBER	





west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax

Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

January 29, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706167, issued to ANTERO RESOURCES APPALACHIAN CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, well operators report of well work, is to be submitted to this office within 90 days of completion of drilling, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please fee, from the issue date unless permitted well work is commenced. If there are any questions, please fee, from the issue date unless permitted well work is commenced. If there are any questions, please fee, from the issue date unless permitted well work is commenced. If there are any questions, please fee, from the issue date unless permitted well work is commenced. If there are any questions, please fee, from the issue date unless permitted well work is commenced.

Operator's Well No: BOWEN UNIT 2H

Farm Name: CLARENCE TRENT JR ET AL

James Martin

API Well Number: 47-1706167

Permit Type: Horizontal 6A Well

Date Issued: 01/29/2013

Promoting a healthy environment.

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PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

- 1. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 2. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 3. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 4. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled Water Well Regulations, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 5. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS W.VA. CODE \$22-6A - WELL WORK PERMIT APPLICATION

					17	ت ۲	511
1) Well Operator:	Antero Resource	s Appalachian Corpo	ration	494488567	017- Doddridge	Greenbrier	New Milton 7.5'
				Operator ID	County	District	Quadrangle
2) Operator's Well N	Jumber	Bowen Unit 2H		_	•		Anadrangie
	•	BOWER UNIT 2H		W	ell Pad Nam/	e: Trent Pad	 _
3 Elevation, current	_	~1422'	Ele	vation, proposed p	ost-construct	tion:	1410
4) Well Type: (a) G	as <u>E</u> ther	Oil _					
(b) If	Gas: Sha	llow		Deep			
	Ho	rizontal		Bup			
5) Existing Pad? Yes 6) Proposed Target F Marcellus Shale: 7,600' TVI	ormation(s)	, Depth(s), An unesa: 80', Associated	ticipate	d Thicknesses and	Associated F	Pressure(s):	
7) Proposed Total Ve	rtical Denth	: 7,600 TVD					
8) Formation at Total	Vertical De	enth: Marrell	us Shala	_			
9) Proposed Total Me	easured Den	th: 14,300'					
10) Approximate Fre	sh Water Str	ata Denths:	97, 2	14.41			
11) Method to Determ	nine Fresh V	Vater Denth					
12) Approximate Salt	water Dentl	15: 1795	<u> </u>	et well records. Depths hav	e been adjusted ac	cording to surface e	levations.
13) Approximate Coa	l Seam Den	ths: 352', 1		-ac ite			
14) Approximate Der	th to Possib	le Void (coal t	mine k	aret other).			
15) Does land contain	coal seams	tributary or ac	liacent	to active mine?	None antidipated		
16) Describe propose	d well work				No		
		Orini, portura	iie, iieoture	a new hortzontal shallow v	veil and complete M	arcellus Shale	
						·	
17) Describe fracturin Antero plans to pump Slickwe water and sand, with less tha	rter into the Marcel	lus Shale formation in	order to rea	dy the well for production. To attached "List of Anticipate	he fluid will be comp d Additives Used for	rised of approximate	ating Well *
18) Total area to be 4:		- 				,	
18) Total area to be di	sturbea, inc	uding roads, s	tockpile	e area, pits, etc, (ac	res):	13.97 acres	<u> 40 </u>
19) Area to be disturbe	ed for well p	ad only, less a	ccess re	oad (acres):	6.81 acres		

20)

CASING AND TUBING PROGRAM

TYPE	Size	New ot Used	Grade	Weight per	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	90'	90'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300'	300'	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2490'	2490'	CTS, 1014 Cu. Ft.
Intermediate							310, 1011 00.11.
Production	5-1/2"	New	P-110	20#	14,300'	14,300	3537 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7200'	
Liners							

TYPE	<u>Size</u>	Welfbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Coment Yield
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730		1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate]					1.10
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		777 677 770
Liners						

PACKERS

	N/A	
Sizes:	N/A	2 9 F
Depths Set:	N/A	NOT THE STATE OF T

21) Describe centralizer placement for each casing string.	Conductor: no centralizers
Surface Casing: one centralizer 10' above the float shoe, or spaced up the hole to surface	
spaced up the hole to surface.	ne on the insert float collar and one every 4th joint
Intermediate Casing: one centralizer above float joint, one c	controlling El change
to surface.	cition and one every 4th collar
Production Casing: one centralizer at shoe joint and are	
Production Casing: one centralizer at shoe joint and one evo	
2) Describe all cement additives associated with each cem	ent tyne
Conductor: no additives, Class A cement.	
Surface: Class A cement with 2% calcium and 1/4 lb flake,	5 gollong of alou-to
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons	of clay treet
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C	CAS + O SW C 40- + O SW C 40-
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0	3 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51
Substitution of the substi	7% FL-16U + U.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20
) Proposed borehole conditioning procedures.	ductor: blowhole clean with air, run casing, 10 bbls fresh water.
Surface: blowhole clean with air, trip to conductor shoe, trip to	bottom, blowbole clean with air trip out
circulate pipe capacity + 40 bbls fresh water followed by 25 b	bls bantonite mud. 10 bbls fresh water
Intermediate: blowhole clean with air, trip to surface casing shoe,	trip to bottom, bloubele clean with the state of
circulate 40 bbls brine water followed by 10 bbls fresh water a	and 25 bble besterits much array to the casing.
Production: circulate with 14 lb/gal NaCl mud, trip to middle of latera	al circulate nump bish viscosity
pump high viscosity sweep, trip to top of curve, trip to bottom, c	imulate, pump high viscosity sweep, trip to base of curve,
circulate 10 bbls fresh water nump 48 bbls berits nill nump 48 bbls	arounder, pullip night viscosity sweep, trip out, run casing,

circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.
*Note: Attach additional sheets as needed.

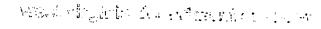
STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE

Operator 1	Vame_A	intero Resources Appalachian Corporation	OP Code 494488557
Watershed	Standin	gstone Run of Meathouse Fork	Quadrangle New Mitton 7.5'
Elevation	1410'	County Doddridge	District Greenbrier
Descriptio	n of ant	icipated Pit Waste: Orilling and Flowback Fluid	is and Cuttings
Do you an	ticipate	using more than 5,000 bbls of water to com	plete the proposed well work? Yes X No
Will a synt	thetic li	ner be used in the pit? Yes	If so what mil 2 60 mll
Proposed I	Disposa	Method For Treated Pit Wastes: Land Application	n so, what mil. / so that
		Underground Injection (UIC Perm	nit Number
		Reuse (at API Number Future perm	nitted well locations when applicable. API# will be crowided on Form WP 34
	-	Off Site Disposal (Meadowfill Land Other (Explain	ill Pennit #SWF-1032-98)
Drilling me	edium a	nticipated for this well? Air, freshwater, oil	based, etc. Surface - AhrFrashwater, Intermediate - Dust/Sdff Foam, Production - Water Based Must
Additives t	o he usa	ed, what type? Synthetic, petroleum, etc. Ned? Please See Attachment	<i>VA</i>
		ystem be used ? Yes	
Drill cutting	gs dispo	osal method? Leave in pit, landfill, removes	offsite, etc. Removed offsite and taken to landfill
-Ií	left in	pit and plan to solidify what medium will be	e used? Cement lime N/A
-L	andfill (or offsite name/permit number? Meadowfill L	andfill (Permit #SWF-1032-98)
provisions of regulation I of application the information submitting of Company Comp	of the point can be certify to form an attion, I false infofficial (ermit are enforceable by law. Violations of each to enforcement action. under penalty of law that I have personal ad all attachments thereto and that, based of believe that the information is true, accurrice formation, including the possibility of fine of	d conditions of the GENERAL WATER POLLUTION PERMIT issued Virginia Department of Environmental Protection. I understand that the fany term or condition of the general permit and/or other applicable law by examined and am familiar with the information submitted on this is my inquiry of those individuals immediately responsible for obtaining attended to the prisonment.
Subscribed :	and swo	om before me this 18 day of (
My commis	sion exp	Oulitea 1/18/2014	Notary Public NHIT
			A COLORDA POR COLO

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	Property Boundary	^ _		
	Road	========	Directors	
	Existing Fence		Spring	Ç
	Planned Fonce	xx	Wat Spot	O
	Streem		Denin Pipe w/ star in inches	-(12)
	Open Ditch		Waterwey —	
	Rock	ප්ප්රිත	Cross Drain Transfer	
		**************************************	Artificial Filter Strip Zappaceza	
	North	T N	Pit Cui Watte	ATTIME.
	Bulletings		PR: Compacted Fill Walks	mental and
	Water Walls	®	Area for Land Application	Mary Mary Mary Mary Mary Mary Mary Mary
Mari Wali Bad	Orll Siles	⊕	of PR Waste	
NOW WELLING	O.B.I.) + New Fran Pit (3.	22) + New Access Roads (2.05) + Topsoi		o (1.03) + Timber Stockpile (0.23) = 13.97 Acres
Propos	ed Revegetation Treat	ment Acres Disturbed 13.97	Prevegetation p	H <u>60</u>
	Lime 2-3	Tons/acre or to correct to pH 6.	5 pre	escel of mulos all cut ones liss the 2 mm per acce
	Pertilizer (10-20-20	or popivalent) 500 Below	o (500 lbs minimum)	less the 24 or per acre
	Mulch 2-3		(SAA 199 (HINDING)	
	PATRICE	Tons/acre		
		Seed M	Ebetures	
	An	ea I (Temporary)	Δ.	rea II (Perminent)
	Seed Type	Ibs/sore	Seed Type	That/acre
Oats		168	Tall Fescue	50
Rye		120		
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Attach:				* Marie
		rit and proposed area for land applicati	on.	
				
PHOROCC	obies section of myork	ed 7.5' topographic sheet.		
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Plan Ap	proved by:	and so lun	_	
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Wester Manager ed. Ther. Primary Water Sources



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Antero Resources

Bowen Unit 2H

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- «Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- •Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- •Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

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west virginia department of environmental protection

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De Monda and C 047-017-06167 Antero Resources Bowen Unit 2H الله المنافقة المستقير المقا المستداني المراجعة المستوانية المستقيل المستوانية المستواني ______ Stream/River West Fork River @ JCP Withdrawal James & Brenda Raines 13.42 5/31/2013 5/31/2014 6,010,000 39.320913 -80.337572 Stonewall Jackson Dam . 3061000 WEST FORK RIVER AT ENTERPRISE, WV 1,900 170.54 146.25 West Fork River @ McDonald Withdrawa! David Shrleves 5/31/2013 5/31/2014 6,010,000 39.16761 -80.45069 ☑ pagedireau Drief (27) Stonewall Jackson Dam (1.25) Stonewall 3061000 WEST FORK RIVER AT ENTERPRISE, WV 3,000 270.54 106.30 %. .7C* Serios West Fork River @ GAL Withdrawal □ F.C.: David Shrieves

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5/31/2013	5/31/2014	6,010,000 1,000	3114500 71.96	39.39675 MIDDLE ISLAND CREEK A	-80.73819? TLITTLE, WV 13.10
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	5/31/2014	70 to 70 mage + 6,010,000	ver minimation •	unala untita e. 39.26054	-80.720998
District Color	e brañ.	े ए कान्द्र	l⊋: 3114500	MIDDLE ISLAND CREEK AT	
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	in Colombia.	.:			

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	Tom's Fork @	Erwin Withdraesal				John F. E	rwin and Sandra E. Erwin
5/31/2013	5/31/2014		<u>.</u>		·;"	******	
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		1,000	Þ		69.73		0.59
Semis /	Arnold Creek (Davis Withdrawal					Jonathon Davis
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Digital reports	1000		de yek	3155220	OUTH FORK	HUGHES RIVER BELO	
		3,000	<u>-</u>	3	9.80		1.9
erras N	orth Fork of t	lughes River	· @ Davis Withdrawal			····: Lewis P.	
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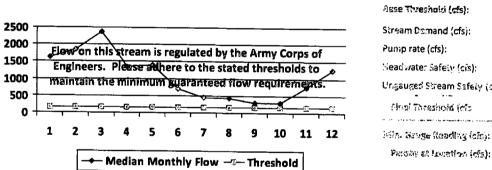
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Antero Resources

Bowen Unit 2H

iource I	D: 8945 Coss	5 Cource Mattre West Fork River @ JCP Withdrawal James & Brenda Raines			Fource Latitude: 39.320913 Source Longitude: -80.337572			
☐ Tro	MUC-8 Code: Prainage Area dangered Species out Stream? gulated Stream? oximate PSD? ruged Stream?	o ☑ _{Mus} □ Tier	532.2 County:	Harrison	Anticipated withdrawal start date: Anticipated viltndrawal and date: Total Volume from Source (gal): Main Pump rate (gpm): Main Pump rate (gpm):			
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444 <u>4</u>	<u>Předlan</u> <u>Etorobly řove</u> icist 1,630.82	sisepunate	"VEDWO COLU		**************************************	- -		
2	1,836.14 2,365.03	• •. •	• •					
5 6	1,352.59 1,388.37 695.67	•	• •					
7 8 9	450.73 430.37 299.45	- -	•					
10 11 12	293.59 736.74 1,257.84		•					

Water Availability Profile



Meter Availability Assessment of Location

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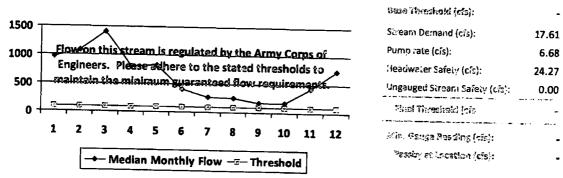
"Threshold", as depicted in the chart above is meant only to Indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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_					B	lowen Unit 2H		
Source			e Name	David Sh		Donald Withdrawal	Source Latitude: 39. Source Latitude: -80	
□ ''' ② % □ PI	HUG9 C Drainage noangered S out Stream? syllated Stre codinate PSI streed Stream	e Area (si pecies? earn?	c. mi.): ☑ M □ Tie	314.91 314.91 Ussel Strea er 97 ewall Jacks		Harrison	Anticipased witherawar start date: Anticipated withdrawar end date: Total stolurne from Source (gal): Afax. Puring rate (gam): Alax Short axes and Total proper	•
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	Drainage A		rd.)	759.00	ind at typh uttraggicted;	and the second seco	Gouge Threshold (cis):	234
1 2 3 4 5 6 7 8 9 10 11 12	964.92 1,086.47 1,399.42 800.34 821.52 411.64 266.70 254.66 177.19 173.72 435.94 744.28		Thresher	ie	Estimated Analysis orange fore;			
		Wa	ter Av	/ailabili	ity Profile	1	Vistar Apollobility Assessme	ed of Location

Water Availability Profile



"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

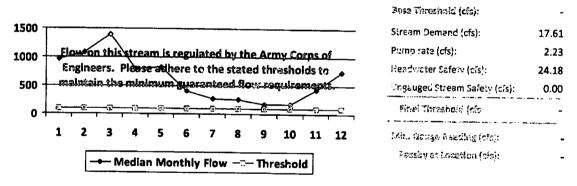
veest virginia department of environmental protection

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Bowen Unit 2H

	i			_			
Sui/cal	e PD: 8947 Source Name West Fork River @ GAL Withdrawal David Shrieves				Source Latitude: 39.16422 Cource Congitude: -80.45173		
☐ Ym ☑ Re ☐ Pri	NUC-3 Code: Oralnage Are dengered Specie out Stream? gulated Stream? oximate PSD? luged Stream?	e (sq. mi.): esÿ	313.67 313.67 Ussel Streeth er 3? ewall Jackson		Harrison	indisipated withdrawal start data: Antidipated withdrawal and onta: Total Volume from Source (gol): Most. Fump rate (gom): Pos. South with	_
	Reference Saug	30610	000 WE	ST FORK RIV	ER AT ENTERPRIS	E. WV	
	Drainage Area (sq. mi.)	759.00			Gauge Threshoki (cis):	234
1 2 3 4 5 6 7	<u>Madien</u> <u>morting Rew</u> icfe) 961.18 1,082.19 1,393.91 797.19 818.28 410.02 265.65	Thresho	w	Estimação Availeda Soter (els)			

Water Availability Profile



"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water applicability of anoth.

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Antero Resources

water the carrier towns of Source (D): 8948 Source Name McElroy Creek @ Forest Withdrawal Source Latitude: 39.39675 Forest C. & Brenda L. Moore Cource Longitude: -80.738197 HUC-8 Code: 5030201 Avultipoted withdrawal start date: Drainage Area (sq. nd.): 88.85 5/31/2013 County: anticipated within and enduate: ☐ Endangered Species? ☐ Wussel Stream? 5/31/2014 ☐ Trout Stream? Total Volume from Source (gal): ☐ Tier 5? 6,010,000 ☐ Regulated Stream? Max. Pump rate (gpm): 1,000 ☐ Preximate PSi0? Mick. Stabilization is Treated ☐ Gauged Stream? Max. Thrisk gump roles (spin) Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV Drainage Area (sq. mi.) 458.00 Gauge Threshold (cfs): 45 Median <u>อัสใหกอร์สตร์</u> well vidincen f. unitsbia 7.162017 · Treesisons ೇದರ್ weter in 95.28 17.55 77.91 119.86 17.55 102.48 134.11

48.26 Water Availability Profile

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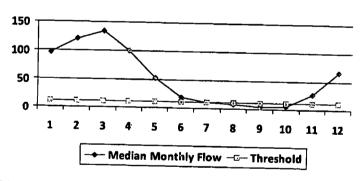
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Water Avallability Assessment of Location						
Base Threshold (cla):	8.73					
Stream Demanri (cis):	2.23					
Pump rate (cfs):	2.23					
Head water Safety (crs):	2.18					
Ungauged Stream Safety (cfs):	2.18					
Gosi Threshold (cis	17.55					
Alfo, Gauge Roading (cfs):	71.96					
possing at Location (cis):	13.09					

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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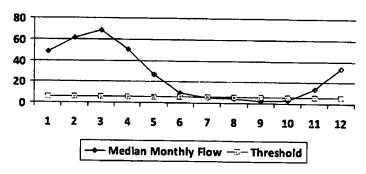
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Antero Resources

	_		'	bowen Unit 2H		
Source (5): 8949	: 8949 ବିଅନ୍ତର ମିଶ୍ରୀକ McElr Bill Sv			eney Withdrawal	Source Ladicade: 39.398123 Source Longitude: -80.656808	
Drainage Drainage Andangered Sp Trout Stream?	: Area (sq. mi.): pecies? 🏿 🗗 M	45.16 ussel Strea er 3?	Country 54?	Doddridge	Anticipated withdrawal start date: Anticipated withdrawal and dute: Total Volume from Source (gal):	5/31/2013 5/31/2014 6,010,000
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Reference (Gaug 3114	500 N	MIDDLE ISLANI	D CREEK AT LITTLE, W	4	

Urainage Area (sq. mi.) 458.00				টিauge ∀hreshold (cis):	45
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1	48.43	8.88	39.93		
2	60.92	8.88	52.42		
3	68.17	8.88	5 9.67		
4	50.62	8.88	42.12		
5	26.70	8.88	18.21		
6	9.32	8.88	0.83		
7	5.28	8.88	-3.22		•
8	4.34	8.88	-4.15		
9	2.23	8.88	-6.27		
10	2.80	8.88	-5.70		
11	13.65	8.88	5.16		
12	33.36	8.88	24.86		

Water Availability Profile



Water Ava	llability A	ssessatatil	ci	Lucation

STOREST PROGRAMMENT OF ROCKERS						
Base Threshold (cfs):	4.44					
Stream Demand (cfs):	0.00					
Pump rate (cfs):	2.23					
Headwater Safety (cfs):	1.11					
Ungauged Stream Safety (cfs):	1.11					
Final Threshold (cfo	8.88					
Mir. George Arading (cos):	69.73					
Passay of Location (efc):	6.66					

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

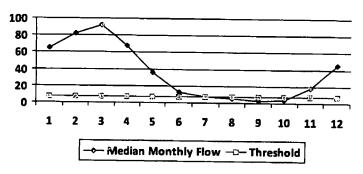
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Course ID: 8950 Source Name MUC-8 Code: 5030		thouse Fork @ Gagnon Withdrawal rge L. Gagnon and Susan C. Gagnon	Source Letitude: 39.26054 Source Lengtoude: -80.720998	
Drainage Area (so ☑ Endangered Species? ☐ Trout Stream? ☐ Regulated Stream?		o conny: Doddridge	Arcialposed with trewal start date: Anticipated with drawal end date: Total Volume from Source (gai):	5/31/2013 5/31/2014 6,010,000
□ Preximate PSD? □ Gauged Stream? Reference Gaug	3114500	MIDDLE ISLAND CREEK AT LITTLE, WV	Max. Purno rate (gom): Jan. Simular son Jan. Simular son	

Byalnage Area (sq. mi.)			458.00	Gauge Threshold (cis):	45
<u>iršana s</u>	<u>Predian</u> Prenthis flora (cfs)	'Sir eshak'	<u>Estimures</u> <u>ProBable</u> water (efc)		
1	64.99	13.39	51.70		
2	81.75	13.39	58.46		
3	91.47	13.39	78.19		
4	67.93	13.39	54.64		
5	35.83	13.39	22.55		
6	12.51	13.39	-0.77		
7	7.08	13.39	-6.20		
8	5.83	13.39	-7.45		
9	2.99	13.39	-10.30		
10	3.75	13.39	-9.53		
11	18.32	13.39	5.04		
12	44.76	13.39	31.48		

Water Availability Profile



Motes Aveilability Assessment of Laustion					
Suse Threshold (cfs):	5.95				
Stream Demand (cfs):	2.23				
Pump rate (cis):	2.23				
risadwater Sofety (cfs):	1.49				
Ungauged Scream Safety (cis):	1.49				
Pinal Threshold (als	13.39				
न्त्रीतः Gauge Reading (cfs):	71.96				
Passby of Lecation (cis):	11.74				

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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Antero Resources

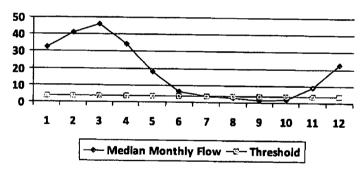
Bowen Unit 2H

Source IPt 8951 Sydrico		Meathouse Fork @ Whitehair	nitehair Withdrawal	Pource Legiside: 39.2 Dource Legiside: -80.	
HUC-8 Code: Drainage Area (sq Ø Endangered Speries) Trout Stream? □ Regulated Scream?		30.37 Chuntyt sel Stream?	Doddridge	Anticlps test with drower start date: Anticlps test with drawal end date: Total Volume from Source (gal); Men. Pump rate (gam);	5/31/2013 5/31/2014 6,010,000
Frontimate PSD? Gauged Stream? Reference Gaug	3114500	O MIDDLE ISLANI	O CREEK AT LITTLE, W	e a Sharita ezone eksan Trush yang ras	i molsi 0

	oramoge wiles (24	. ca.)	438.00	
<u>(4):</u>	Median monthly fices		Estimated Available	-
•••	idist	Threshold	कारण है जर निविद्य है	
	32.57	6.70	26.15	
	40.97	6.70	24.55	

istener.	inomble fices laist	Threshold	<u>Reallebic</u> webs/fals)
1	32.57	6.70	26.15
2	40.97	6.70	34.55
3	45.84	6.70	39.42
4	34.04	6.70	27.62
5	17.96	6.70	11.54
6	6.27	6.70	-0.15
7	3.55	6.70	-2.87
8	2.92	6.70	-3.50
9	1.50	6.70	-4.92
10	1.88	6.70	-4.54
11	9.18	6.70	2.76
12	22.43	6.70	16.01

Water Availability Profile



Meter Arallability Assessment of Legation

Gauge Threshold (cfs):

Weter Arellability Ascessment of	Lecation
base Threshold (cis):	2.98
Stream Demand (cis):	0.00
Pump rate (cfs):	2.23
Neadwater Safety (cfs):	0.75
ingauged Stream Safety (cfc):	0.75
Shall threshold (cfr	6.70
ंगीतः विकासन् विकासीकाः (जाए)	69.73
Passity of Incation (cia):	7.29

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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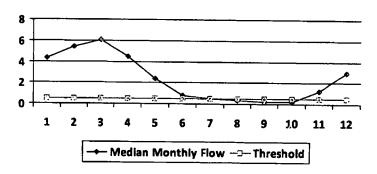
west virginia department of environmental protection

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00887 047-017-06167 Antero Pesources Bowen Unit 2H Source ID: 8952 Tom's Fork @ Erwin Withdrawal Source Marke Source Latitude: 39.174306 John F. Erwin and Sandra E. Erwin Source Longitude: -80.702992 HUC-8 Code: 5030201 antidipated withdrawal start date: 5/31/2013 Drainage Area (sq. mi.): 4.01 County: Doddridge Anticipated withdrawal and date: 5/31/2014 ☐ Endangered Species? ✓ Nussel Stream? Total Volume from Source (gal): 6,010,000 ☐ Trout Stream? □ Mar 97 ☐ Regulated Stream? Max. authorate (gpm): 1,000 Proximate FSD? area. Simplifensious lituates. ☐ Gauged Stream? Mary Truck primalate (1938) MIDDLE ISLAND CREEK AT LITTLE, WV 3114500 Drainage Area (sq. mi.) 458.00 Gauge Threshold (c/s): Madian Estinuate i northly flow <u>Avelleiche</u> 10000 Threshold fefzl weter (cfs) 4.30 2.82 1.88 5.41 2.82 2.98 3 6.05 2.82 3.63 4.49 2.82 2.07 2.37 2.82 -0.05 0.83 2.82 -1.60 0.47 2.82 -1.96 8 0.39 2.82 -2.04 9 0.20 2.82 -2.23 10 0.25 2.82 -2.18 11 1.21 2.82 -1.21 12 2.96 2.82

Water Availability Profile

0.54



What we Armillohilly denough and a small of

acaret Mediamira Mercestysti on	(United to the second
Base Threshold (cis):	0.39
Stream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (nfs):	0.10
Ungauged Stream Safety (ភន):	0.10
Phul Threshold (cit	2.82
Mo. Gauge Residing (class	69.73
Passby at Lucation (ofs):	0.59

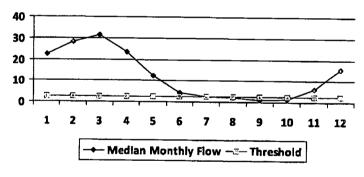
"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection.

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					OWEN OIN 2H		
Seurse	10: 8953	Source Name	Jonathon	reek @ Davis \ Davis	Nithdrawal	Source Letitude: 39.0 Source Longitude: -80	
	ndangered Sp rou? Stream? egulated Stre rodmate PSD	Area (sq. mi.): recies?	0201 20.83 ussal Strea er 37	County:	Doddridge	Antiducted withdrawel start date: Articipated withdrawal and date: Fotal Volume from Source (gal): MCCC, Jump rata (gam):	5/31/2013 5/31/2014 6,010,000 1,000
☐ G	auged Stream						in (1911) 0
1 2 3	Heference G Drainage Ar Inharding Archeloly (1 (272) 22.34 28.10 31.44	530 (sq. rai.) 1.	458.00	<u>Exterior of the North Colors</u> 17.29 23.05 26.39	CREEK AT LITTLE,	t මෙලුම ("aras) old (cis);	45
4 5 6 7 8 9 10 11	23.35 12.32 4.30 2.43 2.00 1.03 1.29 6.30 15.39	5.30 5.30 5.30 5.30 5.30 5.30 5.30 5.30		18.30 7.26 -c.75 -2.62 -3.05 -4.03 -3.76 1.25 10.34			

Water Availability Profile



Water Appliability Aspessment o	Location.
Sasa Threithold (cfa):	2.05
Stream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Cardwater Safety (cfs):	0.51
Ungauged Stream Safety (cis):	0.51
Anal Threshold (clic	5.30
Min. Tauga desding (cis):	69.73
resolve of facetion (cists	3.07

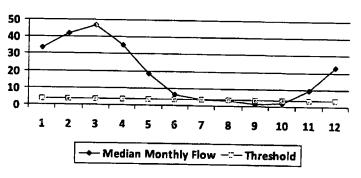
"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

sect virginia department of environmental protection

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122. 2					sowen unit 2H		
Source	ib: 8954	Scrince Nov	Buckey Dennis	e Creek @ Pow Powell	ell Withdrawal	Scurce latitude: 39. Scurce Longitude: -80	
	HUC-Sic	ncis: !	5030201				
_	Dreinagd ndangered S rout Stream?): 31.15 wirssal Stre Tier 57	Onuscije ខណៈវ៉	Doddridge	Anticlia to Parthdrawol oten, date: Antidipater, vichoraval and pate: Total Induste from Sounce (gal):	5/31/2013 5/31/2014 6,010,000
	egulated Stre	ខាលិ				wax. hump rate (gpm):	1,000
	roximate PSE	?7				. Naw. Sizur dzanienie	
ئن 🗆	auged Strear	n?				en drade prima es	
	Reference (Saug 31	114500	MIDDLE ISLANI	D CREEK AT LITTLE,	A Part of the Control	
******		rea (sq. r.i.)	458.0			Gruge Threshold (c's):	45
58: C.T.	<u>Media</u> monthib (foful	<u></u>	হক্তিক	<u>Estimated</u> <u>Available</u> water (ch)			***********
1	33.41	6	.82	26.95			
2	42.02		.82	35.56			
3 4	47.02 34.92		.82	40.56			
5	18.42		.82 .82	28.46			
6	6.43		.82	11.96 -0.03			
7	3.64		.82	-0.03 -2.82			•
8	3.00		.82	-3.46			
9	1.53	6	.82	-4.92			
10	1.93	6.	82	-4.53			
11	9.42	6.	82	2.96			
12	23.01	6.	82	16.55			

Water Availability Profile



 The Stauge Reading (ris): Fusing at Location (size): 	69.73 4.59
Chal Threshold (cfs	6.82
Ingauged Stream Safety (c's):	0.77
Headwater Safety (cls):	0.77
Pump rate (cfs):	2.23
Stream Demand (cfs):	0.00
Gase Threshold (ofs):	3.06
Water Availability Accessment o	f kozado:

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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59.55

65.21

36.87

25.86

13.90

6.89

3.98

4.79

5.20

15.54

32.06

10

11

12

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Antero Resources

.:					В	lowen Unit 2H			
Source I	D: 8955 200-8 C	Sources	Vame So	acy C.		River @ Knight Wi	thdrawal	Source Laditude: 39. Source Longitude: -80	
_		e Area (sq. pecies [:]	mi.): 1	. 6.26 el Strea	County: m?	Ritchie	and spet	દે જોઇલેલ્ટરની start date: જે ઓઇલેલ્ટરનાથી end date: દેવાંગમાં ઉભા Journe (gal):	5/31/2013 5/31/2014 6,010,000
□ ar	gulated Str oximate PSI luged Stream	57						Friend Fund rate (gpm): Fried Streets von Fried Tuck sumpra	
	Reference Drainage A		3155220 i.)	S 229.00		UGHES RIVER BEL	OW MACFARLA		
istonfi.	<u> </u>	<u>n</u> Îwr	'brus': ' '		Colination Artificial Jan 1763 31,44	•		Gauge Throshold (cfs):	22

Water Availability Profile

45.31

50.97

22.63

11.63

-0.33

-7.34

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-9.04

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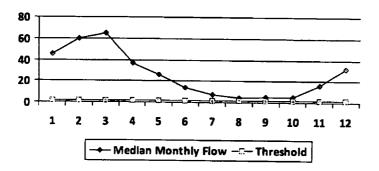
14.26

14.26

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14.26

14.26



Waver Availability Assessment of Location

Buse Threshold (ds):	1.56
Stream Damand (cfs):	5.62
Parno rato (cls):	6.68
Duadwater Sufcay (cis):	0.39
Ungauged Stream Solety (cla):	0.00
Clical Throchold (cit	14.26
Mir. Sauge Receing (ds):	39.80
Panalny at Lonatten Jefah	1.95

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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Antero Resources

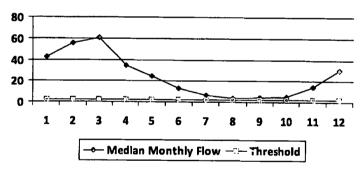
Bowen Unit 2H

erce ID: 8956 Source Ma		Fork of Hughes F P. Davis and Nori	River @ Davis Witi mal J. Davis	_	ource Lastude: 39.3 sce Longitude: -80	
HUC-3 Code: Drainage Area (sq. n	5030203 :(.): 15.18	Countr	Ritchie	anticipened with	nawal stavi: date:	5/31/201
	🗷 Mussai Sto			v attolpated with Untal Malas a S	රු awa! පොල් date: ලාක ම්ලාගල් (gal):	5/31/201
니 Trouc Stream? [] Regulated Stream?	□ Tier27				umo rate (gan):	6,010,000 1.000
Proximate PSD7					esta Sharisaason	,
☐ Gauged Stream?					ed on Truck receives	5 (ga) 4

	Drainage Arca (sq. :	ni.) 229.00	Gauge Threshold (cis): 2	2
	ให้ อย่ โลก		Estimates	
7131	<u>menthly flow</u> (cfe)	Transfersia	<u>amallable</u> waten (afa)	

	101613-711		Construences.	
<u>660mia)</u>	<u>menthly flow</u> (cfe)	Taresiyah	<u>Armillaisie</u> we te n ioini	
1	42.64	4.42	38.36	
2	55.59	4.42	51.32	
3	60.88	4.42	56.60	
4	34.42	4.42	30.14	
5	24.15	4.42	19.87	
6	12.98	4.42	8.70	
7	6.44	4.42	2.16	
8	3.72	4.42	-0.56	
9	4.47	4.42	0.19	
10	4.85	4.42	0.57	
11	14.50	4.42	10.23	
12	29.93	4.42	25.65	

Water Availability Profile



Weter Applicability Assessment of Locating

96in. Opuga kapding (cis): Pozsby at Lougina (cis):	35.23 2.19
Final Vicennaki (cfs	4.42
Ungauged Stream Safety (cls):	0.36
Hondwater Safety (cis):	0.36
eump rate (cfs):	2.23
Stream Demand (cfs):	0.00
Dase Threshold (cis):	1.46
TOTAL PROBUSTIONS PROPERTY OF	Pecamina.

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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Antero Resources

Bowen Unit 2H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsultable water supplies. Please review the following notes:

•For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.

•For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Lake/Reservior

Source ID: 8957

Source Herns City of Salem Reservior (Lower Dog Run)

Source start date:

5/31/2013

Source endidate:

5/31/2014

Mex. Daily Purchase (ga!) 1,000,000

Control of the section of the sectio

Total Volume from Source (gal):

6,010,000

- ...DELS:

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west virginia department of environmental protection

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Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

•For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.

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Source (Dt. 8958 Source Mame Pennsboro Lake

For dense with face of the properties of a state of the s

Source start date:

5/31/2013

Matt. Drift; Processes (gall)

Source end date: rosel (Sittline from Scriete (gel):

5/31/2014 6,010,000

Source ID: 8959 Source Name Powers Lake (Wilderness Water Park Dam)

Source start date:

5/31/2013

Source end date:

5/31/2014

Max. Dally Purchase (ga!)

Total Volume from Source (gal):

6,010,000

west virginia department of environmental protection

important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 8960 Source Planne Powers Lake Two

Man. Dally Purchase (423)

Source start date:

5/31/2013

Course and date:

5/31/2014

Total Voirma from Source (gal):

6,010,000

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Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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•For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

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KLJ/I	C	uН	æ	11

Source for 8961 Source Name Poth Lake (Landowner Pond)

Wax. Daily Purchase (gal)

Max. Daily Purchase (gal)

Louise shart deven Tource endicate:

5/31/2013

color Malume from Source (gal):

5/31/2014 6,010,000

Source No. 8962 Source Name Williamson Pond (Landowner Pond)

Source start date:

Source end date:

5/31/2013 5/31/2014

Total Volume from Source (gai):

6,010,000

west virginia department of environmental protection

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

eFor groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.

•For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 8963 Source Name Eddy Pond (Landowner Pond)

Source start date:

5/31/2013

Max. Dally Purchase (gal)

and any of the designation of the second control of the second con

Source and date: Total Volume from Jaurue (gal):

5/31/2014 6,010,000

Source ID: 8964 Source Name Hog Lick Quarry

Source start date:

5/31/2013

Max. Daily Furchase (gal)

1,000,000

Source and date: Yotal Volume from Source (gal): 5/31/2014 6,010,000

Eleko

west virginia department of environmental protection

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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 For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 8965 Source Name Glade Fork Mine

Bource start data:

5/31/2013

Source and date:

5/31/2014

rifetti Daily Purchase (gal)

1,000,000

Total Volume from Source (gal):

6,010,000

Recycled Frac Water

Source ID: 8966 Source Name Belton Unit 1H

Max. Daily Purchase (gal)

Source start date:

5/31/2013

Source end date:

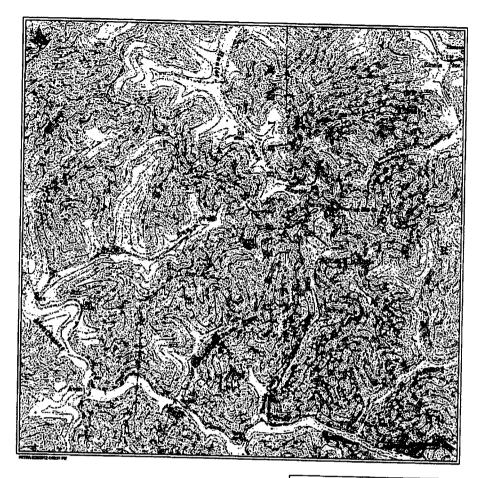
5/31/2014

Total Volume from Source (gal):

6,010,000

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Antero Resources Corporation

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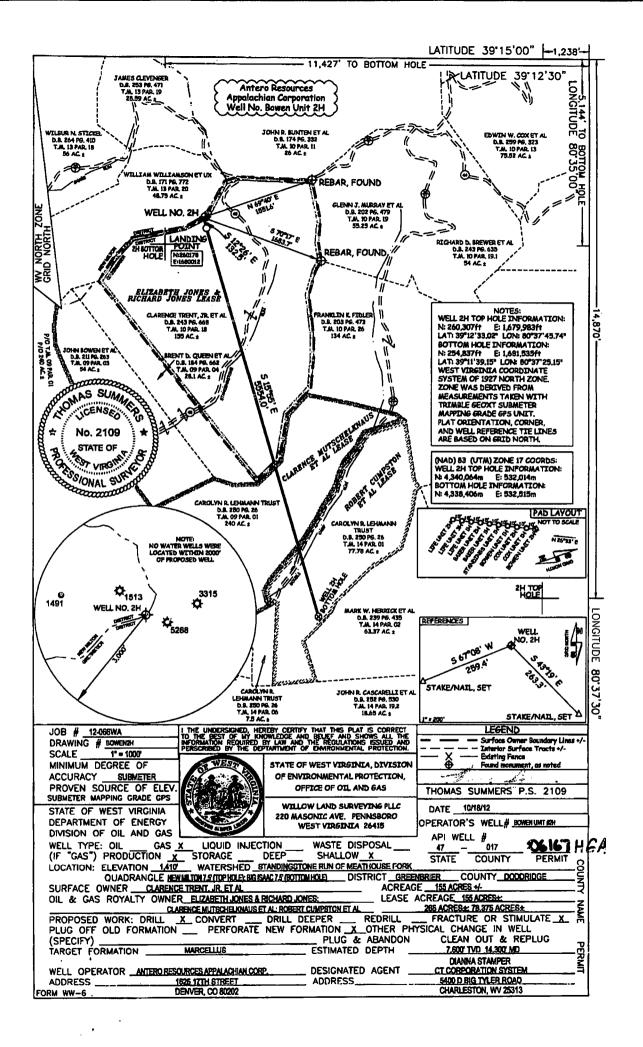
Bowen Unit 2H County Doddridge

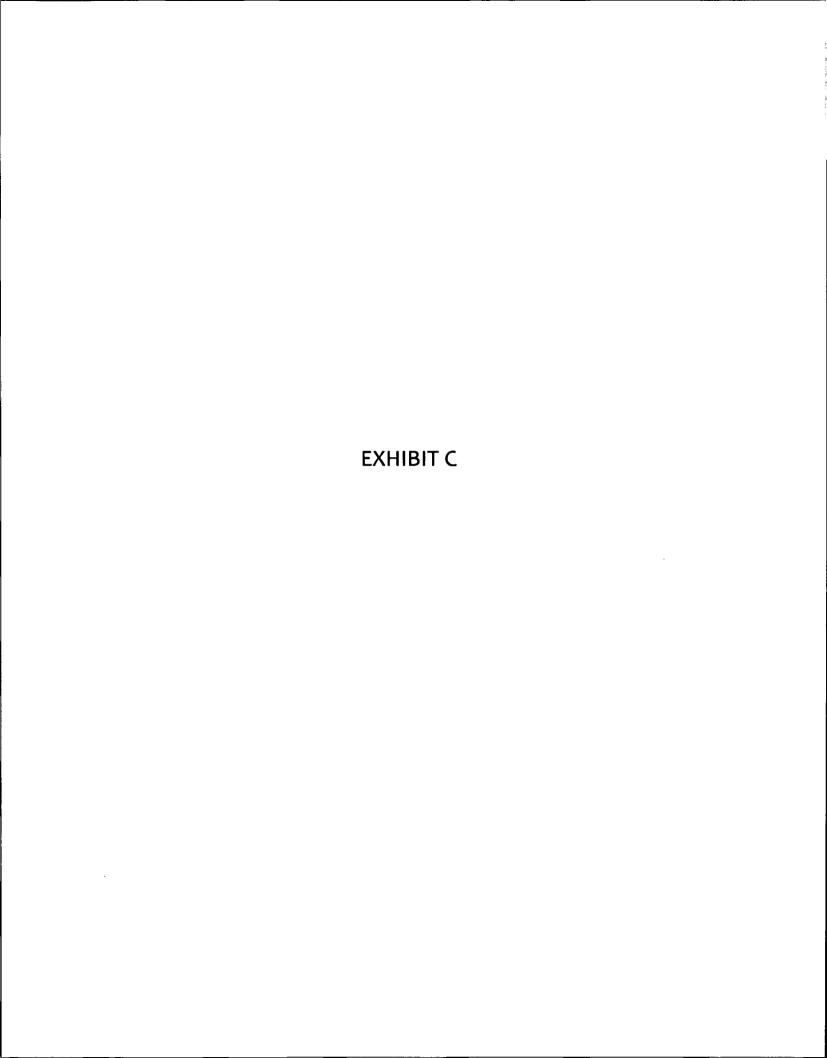


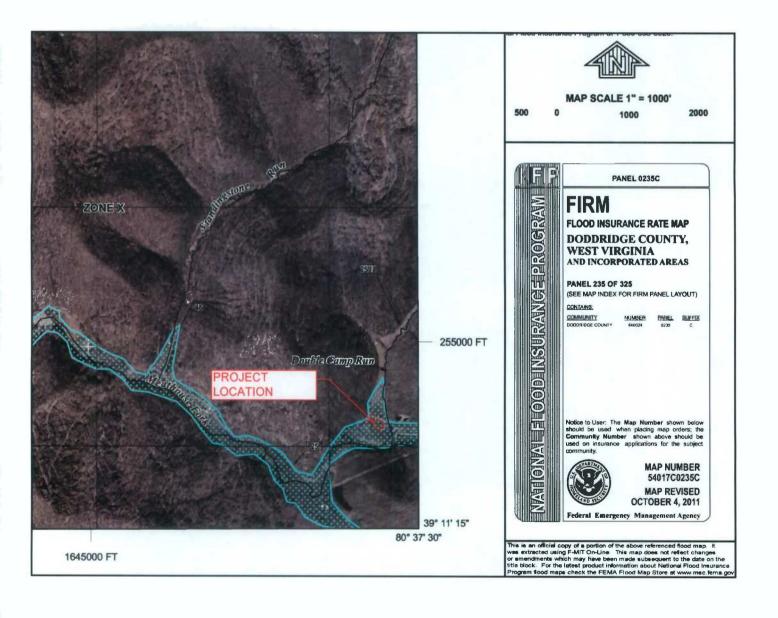
REMARKS

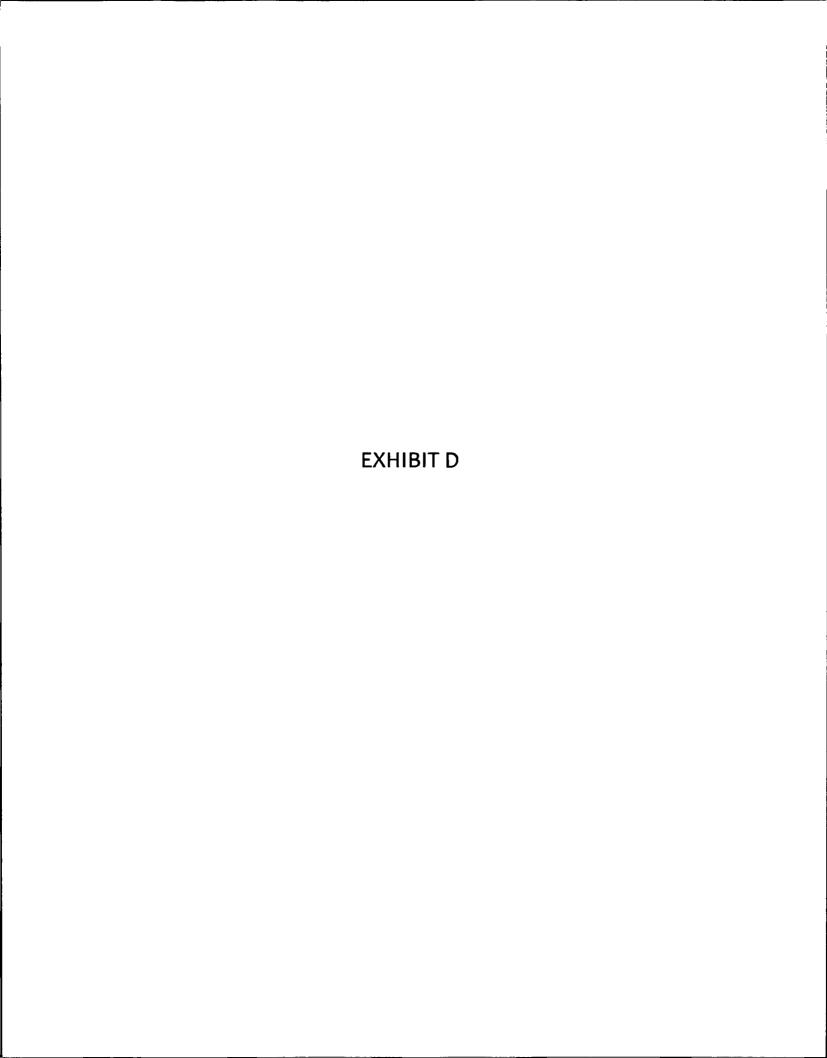
QUADRANGLE: NEW MILTON & BIG ISAAC
WATERSHED: STANDINGS RUN
DISTRICT: GREENBRIER

Date: 9/12/2012









CONTACTS

Project Engineer

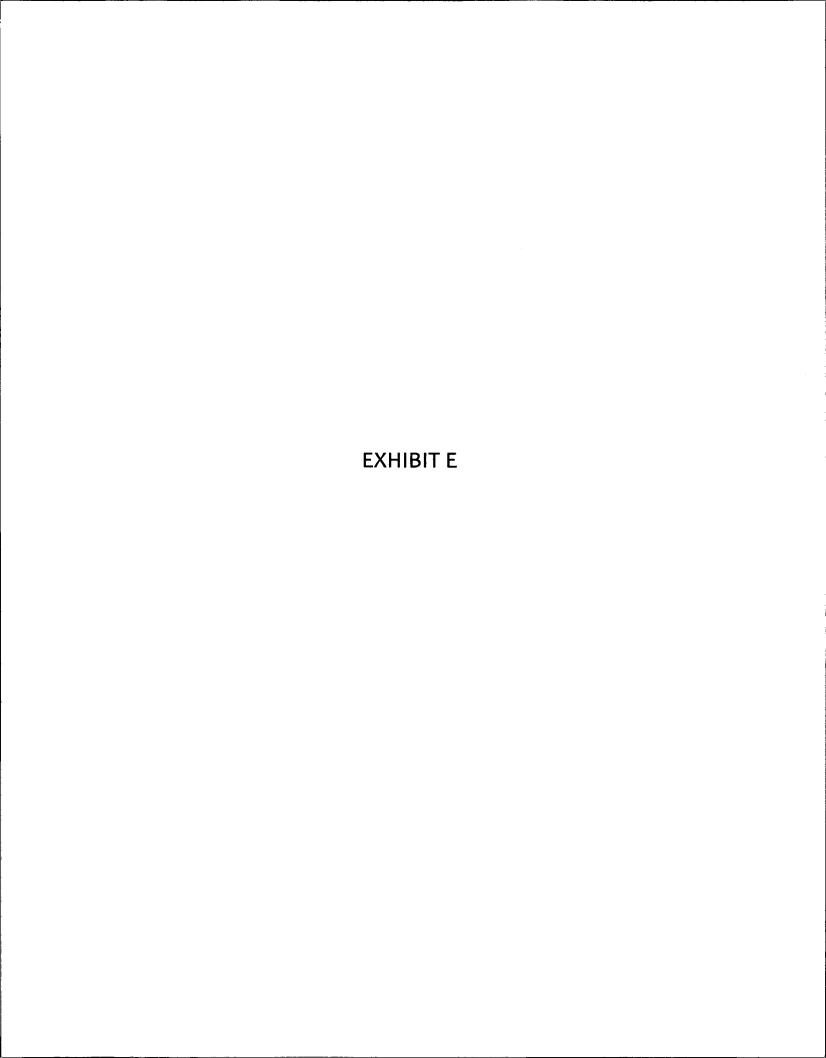
Michael R. Nestor, P.E., C.F.M. The Thrasher Group 30 Columbia Boulevard Clarksburg, WV 26301

Phone: 304-624-4108 Cell: 304-677-8981 Fax: 304-624-7831

Applicant/Developer Contact

Michael W. Ash, P.S. Survey Coordinator Antero Resources 175-D Elk Creek Road Mt. Clare, WV 26408 Phone: 304-622-3842

Cell: 304-380-6181





May 9, 2013

Mike Ash Antero Resources 175-D Elk Creek Road Mt. Clare, WV 26408

Re: Double Camp Road - Cox Staging Area

Dear Mike,

Below please find an estimated budget to construct the Cox Staging Area. I have included E&S controls, grading, and placing a stone surface over the area. If you have any questions please feel free to give me a call at 412-980-2203.

			Unit	
Description	Quantity	Unit	Cost	Total
Strip Topsoil	1,000	CY	\$5.00	\$5,000.00
Super Silt Fence	1,100	LF	\$10.00	\$11,000.00
Class 2A Geotextile	3,000	SY	\$1.50	\$4,500.00
Geogrid	3,000	SY	\$6.00	\$18,000.00
4"-6" Crusher Run	1,580	TN	\$29.17	\$46,088.60
3/4" Crusher Run	320	TN	\$28.60	\$9,152.00
Concrete Barrier	48	LF	\$10.42	\$500.00
Seed & Mulch	3,000	SY	\$0.97	\$2,910.00

\$97,150.60

Sincerely,

Richard C. Doyle, General Manager



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

Earl Ray Tomblin Governor

Office of the District Engineer/Manager Office of the District Engineer/Manager

District Four

PO Box 4220 (EXIT 121, I-79) * Clarksburg, WV 26302 * 304-842-1550

Paul A. Mattox, Jr., P. E. Secretary of Transportation / Commissioner of Highways May 16, 2013

ANTERO RESOURCES APPALACHIAN CORPORATION 175 D ELK CREEK ROAD **MOUNT CLARE, WV 26408**

cc:0409 Charleston Permits

Dear Applicant:	
Your approved copy of Permit Number 04-201 permit type is enclosed. A description of the work	
Please contact the District Four office:	
Denise Ro	ncone 304-842-1575
at least 48 hours in advance of the date you plan to beg by the permit.	in work so arrangements can be made to inspect the work authorized
Failure to comply will result in cancellation of y	our permit.
A copy of this permit is to be available on the job west Virginia Division of Highways' personnel.	at all times while the work is in progress for inspection by the
	Sincerely,
	District Engineer / District Manager
Initials: TC	Do accio
Attachments: Yes	Permit Supervisor
Enclosure: No	- come amparticus

E.E.O./AFFIRMATIVE ACTION EMPLOYER

Form MM-109 Rev. 05-19-05	PERMIT NO.	042018	0481
PERMIT TO ENTER UPON, UNDER, OVER CONTROL VIRGINIA, AS PROVIDED FOR IN STARTICLE 16, CHAPTER 17: SECTION 8 APTIC	PR ACROSS THE ST	ATE ROADS C E 16, CHAPTE	OF THE STATE OF R 17; SECTION 9,
ARTICLE 16, CHAPTER 17; SECTION 8, ARTICAMENDED.	LLE 4, CHAPTER 17,	WEST VIRGIN	IA CODE, 1931, AS
THIS PERMIT, Made this 1 day of DEPARTMENT OF TRANSPORTATION DAYS	MAY 20 1	3, between th	e WEST VIRGINIA
or House Original On Divis	OON OF HIGHWAYS	a statutomi com	poration hereinafter
ANI	ERO RESOURCES	•	Formula indicating
Address: 175-D Elk Creek Road Mt. Clar	e, WV. 26408		304-622-3842
hereinafter called APPLICANT.			
In consideration of the hereinafter set out consideration	NESSETH		
In consideration of the hereinafter set out coven 17; or Section 9, Article 16, Chapter 17; or Section Virginia, 1931, as amended, and the rules and regulapply to enter	ants and in accordance on 8, Article 4, Chapte lations promulgated the	e with Section 6, or 17, of the Of ereunder, APPL	Article 16, Chapter ficial Code of West ICANT does hereby
•	DOH Project		
Route Type & No. CR 25	No.	NA	(if applicable);
at 250 ft. west of Jct. Meathouse Fork (CR	SLS 25/11	Mile	uppricable),
in DODDRIDGE County for	25) & Double Camp	Rd. Post	7384
in DODDRIDGE County, for to plans and specifications which are attached because on	ne purposes nereinafte	r set forth and in	accordance with
plans and specifications which are attached hereto and proposed staging area. After removed plans	u made a part hereof:	Remove 12" of to	opsoil from
proposed staging area. After removal place separation separation fabric followed by 2° of 3/2° = 1.1/2° emissions	on fabric down. Place 1	0" of 4-6" crushe	r run on top of the
separation fabric followed by 2" of 3/4" - 1 1/2" crusher	run on top of that. Cox	Staging Aro	2
		_	
APPLICANT further agrees to accept the condition	ns hereinafter set forth	:	
1. APPLICANT shall deposit with DIVISION the certified or cashier's check, or executed bond wand inspection costs DIVISION may sustain	sum of \$ 0	in the for	m of an official,
and inspection costs DIVISION may sustain expense incurred in restoring said highway to	by reason of the gran	ting of this man	cover any damage
expense incurred in restoring said highway to damages that may result within one (1) year from	its original condition	or the proper rer	nit, including any
(1) your 11,01	m the date of the comp	letion of said wor	k.
2. APPLICANT agrees to reimburse DIVISION for	zinomentie	llav	
	this manner is	nows.	
B. At \$ per linear foot for C. At \$ per linear foot for	feet of w	ater line installe	d under this permit
por inical 100t 10	rect of se	wer line installed	lunder this
 APPLICANT shall notify DIVISION at least Failure to comply will be cause for cancellation 	48 hours in advance of this permit	of the date the	work will begin.
4. APPLICANT agrees to protect its and less			
 APPLICANT agrees to protect its employees, accordance with the current Division of Highy Construction and Maintenance Operations". 	equipment and users vays manual "Traffic	of the highway Control For Stre	y at all times in ect and Highway
APPLICANT agrees to comply with all applications under this permit.	ble state and federal	aws in the perfe	ormance of work
Supplementary conditions cited on the reverse si hereof.	de of this permit are u	nderstood and so	reed to be a west
	•		recuito de a part
7. The work authorized under this permit shall be co	mpleted on or before (Date):05	i-10-2013
denise former			
Title PERMIT SUPERVISOR	Euge	Sé.	حب
BOND REQUIREMENT:		and Title of Applic	ant
BOND NO. 19M9() 2891 DATE 2-21-12	APPROVED:	00	
Attached On File	Tur	July	-
INSPECTION: Owner/Consultant	Title DISTR	ICT MANAGER	
Full Time Part Time No Cost No C		irginia Division of Highw	
AUTHORIZATION NO:		A 4 0 4 : -	
	PERMIT NO:	042013	0401

CHAPTER 17 WEST VIRGINIA CODE, 1931

§17-4-8. Use of roadbed by railroad, telephone company, etc.

No railroad or electric or other railway shall be constructed upon the roadbed of any state road, except to cross the same, nor shall any person, firm or corporation enter upon or construct any works in or upon such road, or lay or maintain thereon or thereunder any drainage, sewer or water pipes, gas pipes, electric conduits or other pipes, nor shall any telephone, telegraph or electric line or power pole, or any other structure whatsoever, be erected upon, in or over any portion of a state road, except under such restrictions, conditions and regulations as may be prescribed by the state road commissioner. Whenever any railroad or electric or other railway, heretofore or hereafter constructed, shall cross any state road, it shall be required to keep its own roadbed, and the bed of the road or highway at such crossing, in proper repair, or else to construct and maintain an overhead or undergrade crossing, subject to the approval of the state road commissioner; and the tracks of such railroad or railway at grade crossings shall be so constructed as to give a safe and easy approach to and across the same, and when the construction of such approaches is made necessary by a change in the railroad grade at the grade crossing, the cost shall be upon the railway company.

§17-16-6. Permit by commission or county court for openings in or structures on public roads; franchises and easements of oil, etc., transportation companies.

No opening shall be made in any state or county-district road or highway, nor shall any structure be placed therein or thereover, nor shall any structure, which has been so placed, be changed or removed, except in accordance with a permit from the state road commission or county court, as the case may be. No road or highway shall be dug up for laying or placing pipes, sewers, poles or wires, or for other purposes, and no trees shall be planted or removed or obstructions placed thereon, without the written permit of the commission or county court, or its duly authorized agent, and then only in accordance with the regulations of the commission or court. The work shall be done under the supervision and to the satisfaction of the commission or court; and the entire expense of replacing the highway in as good condition as before shall be paid by the persons to whom the permit was given, or by whom the work was done: Provided, however, That nothing herein contained shall be so construed as to prevent any oil or gas company or person having a proper permit or franchise from transporting oil or gasoline along any of the public highways of this State, nor to give such company a franchise without paying to the landowners through whose lands such road passes the usual and customary compensation paid or to be paid to the landowners for such right of way. Any grant or franchise when made shall be construed to give to such company or person only the right to use the easement in such public road.

A violation of any provision of this section shall be a misdemeanor, and the person or corporation violating the same shall, upon conviction thereof, be fined not less than twenty-five nor more than one hundred dollars for each offense.

§17-16-9. Private driveways or approaches to roads; obstruction of ditches.

The owner or tenant of land fronting on any state road shall construct and keep in repair all approaches or driveways to and from the same, under the direction of the state road commission, and, likewise, the owner or tenant of land fronting on any county-district road shall construct and keep in repair approaches or driveways to and from the same, under the direction of the county road engineer, and it shall be unlawful for such owner or tenant to fill up any ditch, or place any material of any kind or character in any ditch, so as in any manner to obstruct or interfere with the purposes for which it

SUPPLEMENTARY CONDITIONS

- 1. The person, firm or corporation to whom a permit is issued agrees to hold the State of West Virginia and DIVISION harmless on account of any damages to persons or property which may arise during the process of the work
- 2. Applications for permission to perform work within highway rights of way shall be made on DIVISION'S standard permit form and shall be signed by the authorized representative of the person, firm or corporation applying.
- 3. The APPLICANT shall give detailed information concerning the work to be performed and the application must include a sketch sufficient to show the nature of the work performed.
- APPLICANT, his agents, successor, heirs or assigns, contractors or any other person, firm or corporation working under APPLICANT'S real or apparent authority, shall perform the work in a manner satisfactory to DIVISION. Damage to the road resulting at any time from work authorized under this permit shall be repaired by APPLICANT. Unsatisfactory repairs may be a corrected by DIVISION or its authorized agent and the cost thereof paid by
- 5. DIVISION assumes no liability for damage to the proposed work by reason of construction or maintenance work on
- This permit is granted subject to removal of the authorized installation by APPLICANT at no cost to DIVISION when required for improvement of the road, and subject to all regulations now or hereafter adopted by DIVISION.
- Utility installation shall be in accordance with the current manual, "Accommodation of Utilities on Highway Right of
- Driveways shall be in accordance with the current manual, "Rules and Regulations for Constructing Driveways on State Highway Rights-of-Way."
- 9. DIVISION reserves the right to cancel this permit at any time, should APPLICANT fail to comply with the terms and conditions under which it is granted. 10. This permit is granted only insofar as the DIVISION has a right to do so.

Addendum to Permit 04-2013-0481

This addendum, made this 13th day of May 2013, between the West Virginia Department of Transportation, Division of Highways, a statutory company hereinafter called the Division

and

Antero Resources

Address:

1625 17th Street, Denver, CO 80202

Phone: 303 357-7310

hereinafter called APPLICANT.

The Applicant has filed with the DIVISION a written application for the following named route and location:

Doddridge County Route SLS 25, Meathouse Fork@ MP7.384 to construct a truck staging area for the Trent, Wagner and Hughs Well Pad sites.

- 1. All Equipment, Machinery, and Materials (including but not limited to Jersey Barriers, etc) must be stored off of the Division's right-of-way. No Parking will be permitted on the Division's Right-of-Way.
- 2. Equipment, Machinery, or Materials, even if placed off of the Division's Right-of-Way, must not cause sight distance problems.
- 3. Entrance and Exit must clearly marked in the field and follow the Division's Manual on Rules and Regulations for Constructing Driveways on State Highway Rights-of-Way.
- After completion of the project, a joint review of roads will be filmed and evaluated to assure roads have been repaired to existing condition or better.
- No travel on School Bus Routes during their traversing operational hours on above mentioned route on bi-directional roadways where the lane widths are less than 10 ft.
- Pilot Vehicle required for all Oversized Loads on covered roads.
- Ditch lines to be meintained by applicant. FDR or equivalent required to stabilize road to uphoid increased traffic and heavy and excess amount of loads. Centerline of roadway cannot be relocated without an agreement between WV DOH and Antero Resources.
- Repairs that will include "Hot Mix Asphalt" will have the following testing requirement: The supplier will be responsible for testing at the plant; Compaction testing will be as per WV DOH specifications.
- The Division of Highways shall have the right at all times to inspect the work, and if such inspections should reveal that the
 work is not done according to specifications, upon being so advised by the Division, ANTERO Resources agrees to take
 immediate corrective actions.

Applicant shall properly repair and maintain any and all damages that may result to said bridges, highways, shoulders and ditches from hauling activities of Applicant, its agents, contractors and employees, to as good

a condition prior to commencement of Applicant's operation or as when the permit was issued, as determined by the District Engineer/Manager of the DIVISON having jurisdiction over the work permitted, or pay damages therefore in the amount to sufficiently restore such bridges, roads, highways, shoulders and ditches to original condition; and shall reimburse the DIVISON for all inspection costs incurred by it in connection with said work and repairs of such damages and faithfully comply with all terms and conditions of said permits and save harmless the DIVISION and the State of West Virginia from all losses resulting from the conduct of said work and repairs; provided that all projects covered by this blanket bond have been restored to original or better condition; then this Bond shall be released; or otherwise will remain in full force and effect.

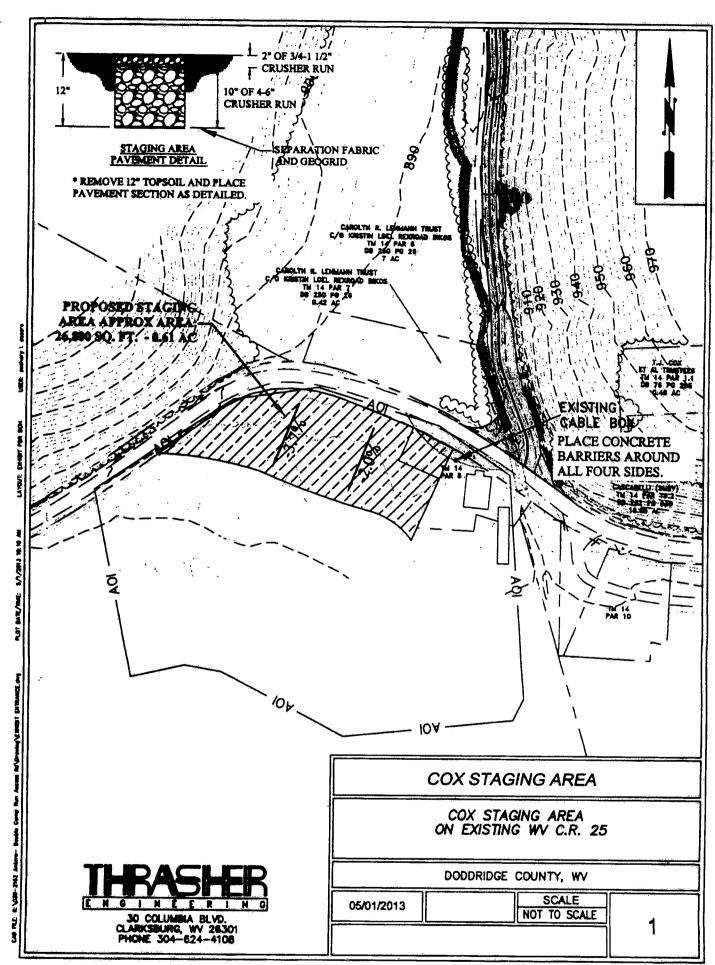
Bend Amount: \$1,000,000.00

Bond Number: LPM9062891 Date: 2/21/2012

BOND Number <u>LPM 9062891</u>

OIL and GAS DATA INFORMATION SHEET

APPLICANT				
Company Name	ANTERO R	ESOURCES /	APPALCHIAN CORF	PORATION
Address		H STREET		
City	DENVER	ST_ <u>CO</u>	Zip <u>80202</u>	
Contact Person Permit				04) 282-9372
24/7 Road Maintenand	e Contact _	Aaron Kunzle	<u>r</u> Telephone	Cell (405) 227-8344
24/7 Backup Contact	<u>Du</u>	sty Wood	Telephone	Cell (817) 771-1436
Drilling/Fracking will re	quire	Less than 50	00 Barrels of fluids	<u>></u> 5000/+
Site Location				
Site Name Cox Stag	<u>ing area</u> R	load Local Na	ame <u>Meathouse F</u>	Fork Rte.# SLS 25
				721 County Doddridge
Location Description				
On Route.#_SLS 25_b	eing <u>250 fee</u>	t NSEW of	Jct. of Rte.# SLS 25	5_ and Rte.# SLS25/11
DOH USE ONLY HAU				
			·	
Name & Rte.#	seg MP	End MP	Surface Type	Condition
	- 11.11			
STAGING AND	2a W111			
Service	:			
				
- Trent	PAD 04-13	g-1065 ;		-
— — Wagner Hughes	PAD			
	DAN			
— Hughes	7714			
				· · · · · · · · · · · · · · · · · · ·
				
				
Well location WGS 83 Decim	al Format GP	S N:	w	/:
WV DEP Permit Number	47 -		•	
			PERMIT NUMBI	- =D
	VIAIL	COUNT	FERMIL DUME	r R





west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax

Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

January 29, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706167, issued to ANTERO RESOURCES APPALACHIAN CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, well operators report of well work, is to be submitted to this office within 90 days of completion of drilling, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact the at (304) 926-0499 ext. 1654.

Operator's Well No: BOWEN UNIT 2H

Farm Name: CLARENCE TRENT JR ET AL

James Martin

Chief

API Well Number: 47-1706167

Permit Type: Horizontal 6A Well

Date Issued: 01/29/2013

Promoting a healthy environment.

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

- 1. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 2. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95% compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 3. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 4. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 5. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

			17	~ · ·	511
1) Well Operator: Antero Re	sources Appalachian Corporation	494488557	017- Doddridge	Greenbrier	New Milton 7.5'
		Operator ID	County	District	Quadrangle
2) Operator's Well Number	Bowen Unit 2H		Vell Pad Nam	e: Trent Pad	
3 Elevation, current ground	: ~1422' E	levation, proposed	post-construct	tion:	1410
4) Well Type: (a) Gas Other	Oil			-	
(b) If Gas:	Shallow	Deep			
	Horizontal Z	Всер			
5) Existing Pad? Yes or No: 6) Proposed Target Formation Marcellus Shale: 7,600' TVD, Anticipate	on(s), Depth(s), Anticipa	ted Thicknesses and	Associated F	ressure(s):	
7) Proposed Total Vertical D 8) Formation at Total Vertica 9) Proposed Total Measured 10) Approximate Fresh Wate 11) Method to Determine Fre 12) Approximate Saltwater D 13) Approximate Coal Seam 14) Approximate Depth to Po 15) Does land contain coal se 16) Describe proposed well v	Depth: Marcellus Shale Depth: 14,300' MD or Strata Depths: 37 or Strata Depths: 01 or Strata Depths: 352', 1058' Depths: 352', 1058' ossible Void (coal mine, 12 cams tributary or adjacen	7, 214' ffset well records. Depths have the control of the control	None anticipated		elevations.
17) Describe fracturing/stimu Antero plans to pump Slickwater Into the water and sand, with less than 1 percent	Marcellus Shale formation in order to n special-purpose additives as shown in	eady the well for production. The attached "List of Anticipate	d Additives Used for	ised of approximate	ely 99 percent lating Well."
18) Total area to be disturbed.19) Area to be disturbed for w			6.81 acres	13.97 acres	

20)

CASING AND TUBING PROGRAM

TYPE	Size	New Of Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	90'	90'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8*	ivew	J-55	54.5#	300'	300'	CTS, 417 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2490'	2490'	CTS, 1014 Cu. Ft.
Intermediate							
Production	5-1/2*	New	P-110	20#	14,300'	14,300	3537 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7200'	
Liners							

ТҮРЕ	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200	-	
Liners						

PACKERS

Kind:	N/A	0
Sizes:	N/A	\$ 7
Depths Set:	N/A	₹ ਜੋੜ

GAS

Describe centralizer placement for each casing st	ring. Conductor: no centralizers
Surface Casing: one centralizer 10' above the float sh	oe, one on the insert float collar and one every 4th joint
spaced up the hole to surface.	be, one on the insert float collar and one every 4th joint
Intermediate Casing: one centralizer above float joint	one centralizer 5' above float collar and one every 4th collar
to surface.	one centralizer 5 above float collar and one every 4th collar
Production Casing: one centralizer at shoe joint and or	ne every 3 joints to top of cement in intermediate casing.
) Describe all cement additives associated with each	h cement type.
Conductor: no additives, Class A cement.	
Surface: Class A cement with 2% calcium and 1/4 lb fl	ake, 5 gallons of clay treat
Intermediate: Class A cement with 1/4 lb of flake, 5 ga	llons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt +	- 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-5
Production: Tail cement- Class H + 45 PPS Calcium Carbonate	e + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-2
	2.00% NOON-31 V 0.2 % NOR-20
Proposed borehole conditioning procedures.	Conductor: blowhole clean with air, run casing, 10 bbls fresh water
Surface: blowhole clean with air, trip to conductor shoe.	trip to bottom, blowhole clean with air, trip out, run casing,
circulate pipe capacity + 40 bbls fresh water followed by	/ 25 bb/s bentonite mud. 10 bb/s feest waters.
Intermediate: blowhole clean with air, trip to surface casing	shoe, trip to bottom, blowhole clean with air, trip out, run casing
circulate 40 bbls brine water followed by 10 bbls fresh water	vater and 25 bbls bentonite mud, pump 10 bbls fresh water.
Production: circulate with 14 lb/gal NaCl mud, trip to middle of	flateral, circulate, pump high viscosity sweep, trip to base of curve,
pump high viscosity sweep, trip to top of curve, trip to both	tom, circulate, pump high viscosity sweep, trip to base of curve,
circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10	This fresh water followed by 40 by

*Note: Attach additional sheets as needed.

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE

Operator Name Antero Resources Ap	opalachian Corporation	OP Code 49448855	7
Watershed Standingstone Run of Mea	thouse Fork Quad	Irangle New Milton 7.5'	
Elevation 1410	County_Doddridge	District Greenbrie	r
Description of anticipated Pit Was	te: Drilling and Flowback Fluids and Cuttin	gs	
Do you anticipate using more than	5,000 bbls of water to complete the p	roposed well work? Yes X	No
Will a synthetic liner be used in the	e pit? Yes If so, wh	at mil 260 mil	
Proposed Disposal Method For Tre	eated Pit Wastes:		
Land A	opucation ound Injection (UIC Permit Number		
	at API Number Future permitted well loo		
	Disposal (Meadowfill Landfill Permit #		provided on Form WR-34)
	Explain	S W1 -1(32-78)	
Drilling medium anticipated for thi	s well? Air, freshwater, oil based, etc	Surface - Air/Freshwater, Intermediate - Dust/Stit	f Foam, Production - Water Sesed Mud
-If oil based, what type?	Synthetic, petroleum, etc. N/A		
Additives to be used? Please See A	Attachment		
Will closed loop system be used?			
Drill cuttings disposal method? Le	ave in pit, landfill, removed offsite, e	c. Removed offsite and taken to lan	dfill
-if left in pit and plan to so	olidify what medium will be used? Co	ement, lime, N/A	
-Landfill or offsite name/p	ermit number? Meadowfill Landfill (Pem	it #SWF-1032-98)	
or regulation can lead to enforceme I certify under penalty of application form and all attachment the information, I believe that the	f law that I have personally examinated that, based on my inquisinformation is true, accurate and colling the possibility of fine or imprison the possibility of fine or impri	ed and am familiar with the i	nit and/or other applicable law
Subscribed and sworn before me thi	s 18 day of Octo	bek , 20/2	
My commission expires //	18/2014	Notary Public	THE WHITE
			NOTANY PUBLIC POOLOGIANTINIAN SEPTIMENTAL

	<u> !)(:</u>	16)
Operator's Well No. Bossen	Unit 2H		

		2	Diversion
	Rosd		Spring —————
	Existing Fence		Wet Spot
	Plenned Fence		Omin Pipe
	Stream	~~~~~	w/ stze in inchos
	Open Ditch		
	Rock	්දුර් දුර	Cross Dram
		4	Addicial Filter Strip Zanasas Construction
	North	Ř	Pit Cut Walls
	Bulldingo		Pit: Compacted Fill Walts
	Water Wells	®	Area for Land Application
all Ded (Ord Sites	—	of Pt Waste
Burner		221 + NEW ACCESS KOODS (2.08) + Topso	I Stockpile (0.59) + Weste Stockpile (1.03) + Timber Stockpile (0.23) = 13.97 Acre
Fropos	ser veseRemion ries	iment: Acres Disturbed 13.97	Prevegetation pH 6-0
	Lime 2-3	Tons/acre or to correct to pH 6	5 present on both all cut a no less the 24 or per a
	Pertilizer (10-20-20	or equivalent) 500 lbs/ac	to (500 lbs minimum)
			•
	Mulch 2-3	Tons/acre	
		Seed 1	Aixtures
	Ar	ea I (Temporary)	A W
	Seed Type	lbs/acre	Area II (<u>Parmanent)</u> Seed Type Ibs/scre
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			Tall Pescue 50
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Rye		120	
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Bowen Unit 2H

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- *Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- •Quantification of known existing demands on the water supply (Large Quantity Users);
- •Minimum flows required by the Army Corps of Engineers; and

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Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

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Stream/River

West Fork River @ JCP Withdrawal

James & Brenda Raines

5/31/2013 5/31/2014

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6,010,000

39.320913

-80.337572

Stonewall Jackson Dam

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30610C0 WEST FORK RIVER AT ENTERPRISE, WV

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West Fork River @ McDonald Withdrawal

David Shrieves

5/31/2013 5/31/2014

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Serios West Fork River @ GAL Withdrawal

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David Shrieves

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☑ Nay state State of Stonewall Jackson Dam (1997) (1998) 3061000 WEST FORK RIVER AT ENTERPRISE, WV

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		1,000	71.96		13.10
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orac (Meathouse Fo	rk @ Gagnon Withdrawal		Geo	orge L. Gagnon and Susan C. Gagnon
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□ tregion Live	2 BR 13.	ି ହେଲ୍∵ି	3114500	MIDDLE ISLAND CREEK AT	LITTLE, WV
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	Tom's Fork @	Erwin Withdrawal				John F. Er	win and Sandra E. Erwin
r /24 /2042			i.	•	157	ualte.	
	5/31/2014	6,010),000			39.174306	-80.702992
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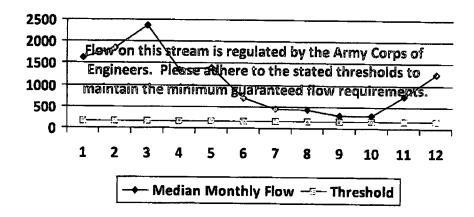
5/31/2013 5/31/2014 6,010,000 39.277142 -80.690336 □ v storiv 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV 1,000 69.73 4.59 South Fork of Hughes River @ Knight Withdrawal Tracy C. Knight & Stephanie C. Knight ย์เลท เมาาฮ -5.2% onta ett om helikulargindu. 5/31/2013 5/31/2014 6,010,000 39.198369 -80.870969 Disturbinens Later 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WI 3,000 39.80 1.95 North Fork of Hughes River @ Davis Withdrawal Lewis P. Davis and Normal J. Davis Start Sata - Early aut This is the straight of the state of the sta seka tarifa ordin seka yin dine 5/31/2013 5/31/2014 6,010,000 39.322363 -80.936771 🗆 sajak indama 1970 USA CONYSID. 3155220 BOUTH FORK HUGHES RIVER BELOW MACFARLAN, WI 1,000 As a second of the second of t 35.23 2.19

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West Fork River @ JCP Withdrawal Cource Maine Fource Lathade: 39.320913 James & Brenda Raines Pource Longitude: -80.337572 5020002 HUC-8 Godet Anticipated withdrawal start date: 5/31/2013 Prainage Area (sq. mi.): 532.2 County: Harrison setticipated withdrawal and data: 5/31/2014 ☐ Enclangared Species? ☑ :dussol Stream? Total Volume from Source (gal): 6,010,000 ☐ Trout Stream? ☐ 17ier 3? ☑ Regulated Stream? Stonewall Jackson Dam More Pump rate (gpm): 1,000 Proximate PSD? official Standard sons the Jose ☑ Gauged Stream? Displayed princy recoggo.c.) Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV Drainage Area (stj. ml.) 759.00 Gauge Threshold (cfs): 234

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1	1,630.82	*	,
2	1,836.14	•	<u> </u>
3	2,365.03	-	
4	1,352.59	•	-
5	1,388.37	•	
6	695.67	•	
7	450.73	ż	•
8	430.37	•	-
9	299.45	∓	-
10	293.59	-	•
11	736.74	-	
12	1,257.84	- ,	*

Water Availability Profile



Meter Avellability Assessment of Lucado.

Sase Threshold (cfs):	
Stream Domand (cfs):	17.6
Pump rate (cfs):	2.2
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Ungauged Stream Safety (cfs):	0.0
elesi Thesshold (ets	
Mile. Gauge Steading Sciops	
Percay at location (cfs):	

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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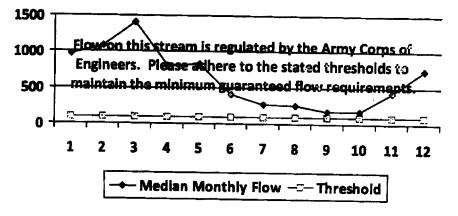
Antero Resources

Bowen Unit 2H

والمتاريخ للأراب والمعاشف كالمصابين والرمائة متعالم فالمستوانية والمرافية المناف والمنافر والمالية والمستقد والم West Fork River @ McDonald Withdrawal Souther 17: 8946 Souther Martia Source Latheda: 39.16761 David Shrieves Inurce Langiaude: -80.45069 HUC-8 Code: 5020002 Antidipated หลือให้คลพลเรเลกะ date: 5/31/2013 Drainage Area (sc. mi.): 314.91 Councy: Harrison will cinated with arrayal end date: 5/31/2014 ☐ andangered Species? ☑ Noussel Stream? helal Joiurna from Source (gal): 6,010,000 Trou Stream? ☐ Titer 59 ☑ Regulated Stream? Stonewall Jackson Dam Max. Punin rate (gam): 3,000 Proximate PSD? or was Shamfer and the audies ☑ Ganged Stream? and Timbly supplied (gom) Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV 759.00 Drainage Area (cq. mi.) Gauga Threshold (cis): 234

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1	964.92	-	*
2	1,086.47	*	•
3	1,399.42	-	er.
4	800.34		-
5	821.52		
6	411.64	*	-
7	266.70	•	-
8	254.66	-	41.
9	177.19	±	~
10	173.72		••
11	435.94		-
12	744.28	•	-

Water Availability Profile



Yester Sublinicilly Assessment of Last day

2. Jone State Clary - Dags States	M PASSAGAI
issue Threshold (cls):	-
Stream Demand (cfs):	17.61
Pump rate (cis):	6.68
Headwater Safety (cfs):	24.27
Ungauged Stream Safety (cfs):	0.00
Sual Threchold fols	and the second s
Min. Veryge Posding (elej:	elle e emuje
Pessby et Location (cis):	u'

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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	· · ·		Bowen Unit 2H	Anteiones	
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☐ 1000 ☑ Re. ☐ Pro	MUC-3 Code: Distinage Area (sidengered apenies) out Stream? gulated Stream? oximate PSD? ouged Stream?		renta?		
	Reference Gaug Drainage Area (sq.	3061000 mi.) 759	WEST FORK RIVER AT ENTERPR	©augo Threshoki (cís):	234
1 2 3 4 5 6 7 8 9 10 11 12	961.18 1,082.19 1,393.91 797.19 818.28 410.02 265.65 253.65 176.49 173.04 434.22 741.35	**************************************	Signature Signature August (+f5)		Market Street Street Street
	Wa	ater Availal	pility Profile	Wester Livellability Assertiment	of tecetion
1500 1000 500	Engineers.	Pl ease a dhere	ulated by the Army Corps of to the stated thresholds to aranteed flow requirement	Headwater Safety (cfs):	17.61 2.23 24.18 0.00

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability for month.

→ Median Monthly Flow → Threshold

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Bowen Unit 2H

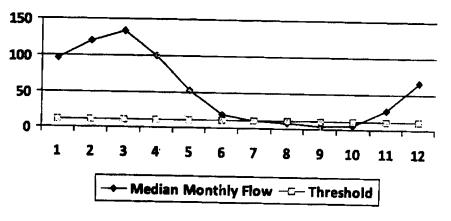
Summa (D): 8948 McElroy Creek @ Forest Withdrawal Source Marke Source Laddude: 39.39675 Forest C. & Brenda L. Moore Comes Longitude: -80.738197 HUC-8 Code: 5030201 publicipated while aval start date: 5/31/2013 Drainage Area (sq. md.): 88.85 County: Tyler antidipated with brawal end date: 5/31/2014 ☐ Endangered Species? ☐ Wussel Stream? ☐ Trout Stream? Total Volume from Source (gal): 6,010,000 ☐ Tier 3? ☐ Regulated Stream? idax. Pump rate (gran): 1,000 Preximate PSD? Max. Sund anen's Trople: 6 ☐ Gauged Stream?

3114500 MIDDLE ISLAND CREEK AT LITTLE, WV Reference Gaus

Drainage Area (sq. mi.) 458.00 ਰੇਬuge Th. oshold (c.s):

disper.	<u>Median</u> <u>samish: Sew</u> (do)	Waterland	<u>Collegacy (</u> Collegacy (collegacy) Collegacy (collegacy)
1	95.28	17.55	77.91
2	119.86	17.55	102.48
3	134.11	17.55	116.74
4	99.59	17.55	82.22
5	52. 54	17.55	35.16
6	18.35	17.55	0.97
7	10.38	17.55	-6.99
8	8.55	17.55	-8.82
9	4.38	17.55	-13.00
10	5.50	17.55	-11.87
11	26.86	17.55	9.49
12	65.63	17.55	48.26

Water Availability Profile



Stream Demanni (cís):	2.23
Pump rate (cfs):	2.23
Het divator Cafety (cis): Ungauged Stream Safety (cis):	2.18 2.18
Shall Toreshold (cits	17.55
nga. Gauge Reading (cis):	71.96
Perfor at Location (cisi:	13.09

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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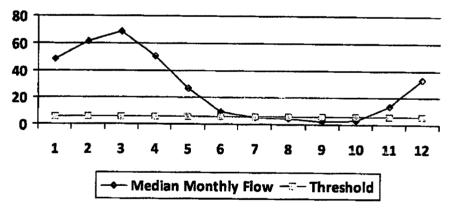
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	Bowen Unit 2H	
Source ID: 8949 Source Name McElroy Creek @ Sweeney Withdrawal Bill Sweeney HSC-8 Code: 5030201 Drainage Area (sq. mi.): 45.16 Councy: Doddridge Endangered Species? Muscel Screen? Trout Stream? Tier 8? Regulated Stream? Proximate PSD? Gauged Stream?		Source Codeace: 39.398123 Source Langitude: -80.656808
		Authorited withdrawal stand date: 5/31/20 Authorited withdrawal and dute: 5/31/20 Total Molume from Charge (gol): 6,010,0 Authorite Fump rate (gom): 1,000 Authorite Standard authorite Total Charge (gol): 2,000 Total Charge (gol): 2,000 Total Charge (gol): 2,000 Total Charge (gol): 3,000
Reference Gaug 3114	500 MIDDLE ISLAND CREEK AT LITTLE, WV	ويشهيمون المستقديم الرازي والماسيسية بالمتاه المتاهدات

	Drainage Area (sq	. mi.)	458.00
<u> Month</u>	<u>Modlan</u> <u>meritik Rem</u> fefst	Threshold	<u>Hetingacud</u> Avalletis water relai
1	48.43	8.88	39.93
2	60.92	8.88	52.42
3	68.17	8.88	59.67
4	50.62	8.88	42.12

1	48.43	8.88	39.93
2	60.92	8.88	52.42
3	68.17	8.88	5 9.67
4	50.62	8.88	42.12
5	26.70	8.88	18.21
6	9.32	8.88	0.83
7	5.28	8.88	-3.22
8	4.34	8.88	-4.15
9	2.23	8.88	-6.27
10	2.80	8.88	-5.70
11	13.65	8.88	5.16
12	33.36	2 22	24 95

Water Availability Profile



Water Availability Assessment of Lucation					
Base Threshold (cfs):	4.44				
Stream Demand (cfs):	0.00				
nump rate (cfs):	2.23				
Headwater Safety (cfs):	1.11				
Ungauged Stream Safety (cis):	1.11				
Masi Threshold (clo	8.88				
Affin George Scholing (city:	69.73				
Patchy of Incation (efc):	6.66				

Tauge Threshold (cis):

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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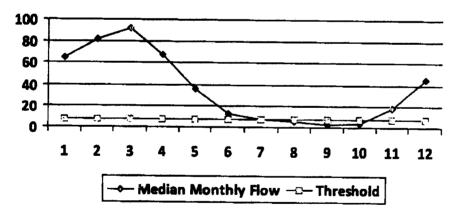
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استحدود ويتشماها Colinge ID: 8950 Springe Name Meathouse Fork @ Gagnon Withdrawal Source legicude: 39.26054 George L. Gagnon and Susan C. Gagnon Somble Langeweit: -80.720998 BUC-8 Code: 5030201 ก็สังวิที่pateน์ พริกิศรุพลโรเลาร date: 5/31/2013 Drainage Area (sq. mi.): 60.6 Country Doddridge Anticipated withdrawal endidate: 5/31/2014 ☑ Endangered Species? ☑ Muscel Streem? Total Volume from Source (gai): 6,010,000 ☐ Frout Stream? ☐ Her 3? ☐ Regulated Stream? lwaii. Pump rate (gpm): 1,000 ☐ Proximiate PSD? Brem Dimultan adus Frotaco: ☐ Gauged Stream? $(\mathcal{L}(x,\mathcal{T}_{\ell})(\mathcal{C}_{\ell})) \text{ using } r \in (gym)$ Reference Gaug MIDDLE ISLAND CREEK AT LITTLE, WV 3114500

_		,		
Brainage Area (sq. mi.)	458.00		Galge Threshold (cis):	45
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and a Mala Element	7			

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3	(ຊະວ)	िका स्थापनेष्याकीत्।	million (cife)
1	64.99	13.39	51.70
2	81.75	13.39	68.46
3	91.47	13.39	78.19
4	67.93	13.39	54.64
5	35.83	13.39	22.55
6	12.51	13.39	-0.77
7	7.08	13.39	-6.20
8	5.83	13.39	-7.45
9	2.99	13.39	-10.30
10	3.75	13.39	-9.53
11	18.32	13.39	5.04
12	44.76	13.39	31.48

Water Availability Profile



Paraby at Location (c/s):	11.74
ടത് ന. ജ്യമ ളല ജ്യമ din g (വീട്):	71.96
Pites Threshold (als	13.39
Ungauged Swearn Safety (c/s):	1.49
Headwater Safety (clis):	1.49
Pumb rvie (cis):	2.23
Stream Demand (cfs):	2.23
Suce Threshold (cfs):	5.95
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"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

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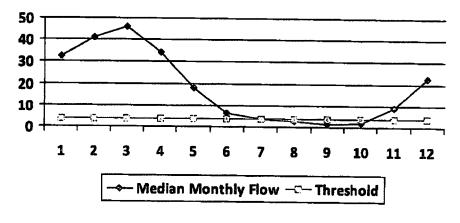
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Bouros	III: 8951 S	Compositions			itehair Withdrawal	Patrico (aduale)	39.211317
	HUC-8 Cod	e: 503 0	Elton White 201	enair		Source Langituris:	-80.679592
_	Orainage A Mangered Sper rout Stream?	rea (sg. mi.): desi - 💆 Ma - Hei	30.37 asel screami d 3?	County:	Doddridge	antidija vai viihdauvai saat data Aatidiprited vitindavai and data Total Vidunta from Source (gal)	e: 5/31/2014
F:	egulated Screar rowincate PSD? auged Stream?					Man. Dump rate (gom) Prushint Prodesin	ceons incls: 0
**************************************	Reference Gal Orainage Area	_	00 MID 458.00	DDLE ISLAND	CREEK AT LITTLE, W	Crage Witneshold (cfs	d;: 45
1 2 3 4 5 6 7 8 9	60edisn 32.57 40.97 45.84 34.04 17.96 6.27 3.55 2.92 1.50	6.70 6.70 6.70 6.70 6.70 6.70 6.70 6.70		26.15 34.55 39.42 27.62 11.54 -0.15 -2.87 -3.50 -4.92			
10 11	1.88 9.18	6.70 6.70		-4.54 2.76			

Water Availability Profile

16.01

6.70



Mater Appliability Ascessment o	Secretion :
Sase Threshold (cis):	2.98
Stream Demand (cis):	0.00
Pump rate (cfs):	2.23
Nondwater Safety (cfs):	0.75
ingauged Stream Safety (cla):	0.75
Anal three last feb	6.70
taka Kauga Kasakeg hang	69.73
Passing of Lareston (cor):	7.29

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

SPPROVED DEC 2 (22)

west virginia department of environmental protection

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22.43

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047-017-06167

Antero Pesources

Bowen Unit 2H

Source (0): 8952

Sparce Nemie

Tom's Fork @ Erwin Withdrawal

John F. Erwin and Sandra E. Erwin

Gourse Latitudo: 39.174306

المراب المراب المرابع
Source Longitude: -80.702992

HUC-8 Corie:

5030201

Drainage Area (sq. mi.):

4.01 County: Doddridge

en delipated withdrawal start date:

5/31/2013

☐ Endungered Species?

✓ Niussel Stream?

Anticipated withdrawal endidate:

☐ Trout Stream?

tictal Volume from Source (gal):

5/31/2014 6,010,000

□ #128/37

Max. runipraco (gp.n):

1,000

☐ Regulated Stream? Proximate FSD?

Oauged Streenin

Statu Simplianeous truckur

Mark Truck numbers (classin)

Reference Gaug

Drainage Area (sq. mi.)

458.00

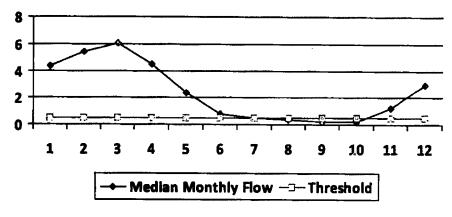
3114500 MIDDLE ISLAND CREEK AT LITTLE, \\V

Gauge Threshold (als):

45

<u> Korts:</u>	<u> Madien</u> <u>manthirfian</u> Math	Three Belle	Escintated Peallship Pates (cfc)
1	4.30	2.82	1.88
2	5.41	2.82	2.98
3	6.05	2.82	3.63
4	4.49	2.82	2.07
5	2.37	2.82	-0.05
6	0.83	2.82	-1.60
7	0.47	2.82	-1.96
8	0.39	2.82	-2.04
9	0.20	2.82	-2.23
10	0.25	2.82	-2.18
11	1.21	2.82	-1.21
12	2.96	2.82	0.54

Water Availability Profile



Wherein Liverfichtiller Bennestraare at themselves

a Contract Not 28 &
0.39
0.00
2.23
0.10
0.10
2.82
69.73
0.59

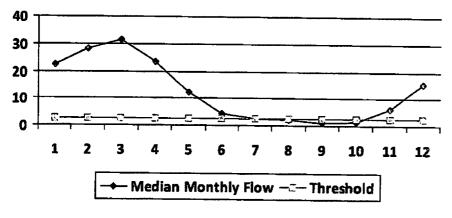
"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

12/26/2012 12:10:59 PM

Setro	ID: 8953 Scaro		Jonathon	reek @ Davis V I Davis	Vithdrawal	Source Laditude: 39.3 Source tongitude: -80.	
	Drainage Area (s ndangered Species'r roug Stream? egulated Stream?	iq. mi.):	20.83 ssel Streat	Countys s/S	Doddridge	Ar ficipated withdrawal start date: Ar ficipated withdrawal end date: Fotal Volume from Source (gal):	5/31/2013 5/31/2014 6,010,000
	roximate PSD? auged Stream?		e namentos sertes sousces e	Prop. co. source and pop.	en e	ifick. I divip note (germ): I elek Cimi i dhedid III Tuch i dhe mi	
Respects	Reference Gaug Drainage From (ng. hiterage promiting filter fold: 22.34	Mares hold 5.30	458.00	Stocker Stratistics stratistics 17.29	CREEK AT LITTLE,	WV + Euge (fares), skt fefs); 	45
2 3 4 5 6 7 8 9	28.10 31.44 23.35 12.32 4.30 2.43 2.00 1.03 1.29	5.30 5.30 5.30 5.30 5.30 5.30 5.30 5.30		23.05 26.39 18.30 7.26 -C.75 -2.62 -3.05 -4.03 -3.76			
11 12	6.30 15.39	5.30 5.30		1,25 10.34			

Water Availability Profile



edicate symplectifity in success or one of	i koradet.
Sasc Threchold (chi):	2.05
Stream Bernand (crs):	0.00
ੋਪmp rate (cfs):	2.23
Cardwater Safety (cis):	0.51
Ungauged Stream Safety (cis):	0.51
Small the entrant poin	5.30
Pin Garran Residne (ali):	
	69.73
্যাত্রতীপু গ া বিশে ত ীক্রল (ব্রকিট	3.07

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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Antero Resources

Bowen Unit 2H

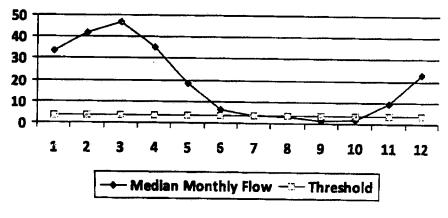
فكرابط بالمتعاب كالمستعداة فاعتبا Source (D: 8954) **Buckeye Creek @ Powell Withdrawal** Service Name: รานเตอ โลมีชาติด: **39.277142 Dennis Powell** Shuilds Longitude: -80.690386 HUC-3 Chale: 5030201 Applicated attributed our deter-5/31/2013 Dreinago Area (sq. nii.): 31.15 Doddridge transplaced with rewall and game: 5/31/2014 ☐ Endangered Specials ₩ Initiase! Stream? Total Indume from Shome (gal): 6,010,000 ☐ Trout Stream? ☐ Tion 5? ☐ Regulated Streem? with funny rate (goal): 1,000 ☐ Proximate PSD? . คือพ. Statingaments Timichsi ☐ Gauged Stream? Section Report (9,75) Reference ©aug 3114500

458.00 Brainage Area (sq. ml.) Gauge Threshold (cfs): 45 Mediar: Carriena band

MIDDLE ISLAND CREEK AT LITTLE, WV

	1-25-672016		<u> </u>
<u> </u>	<u>raunthlir Raw</u> (clb)	ীন ও হনী এনি	Ovailable Water (cfs)
1	33.41	6.82	26.95
2	42.02	6.82	35.56
3	47.02	6.82	40.56
4	34.92	6.82	28.46
5	18.42	6.82	11.96
6	6.43	6.82	-0.03
7	3.64	6.82	-2.82
8	3.00	6.82	-3.46
9	1.53	6.82	-4.92
10	1.93	6.82	-4.53
11	9.42	6.82	2.96
12	23.01	6.82	16.55
and the same of the same of the same of	Company of the Compan		

Water Availability Profile



tide for divadiability programment of boundary

The second secon	I Mary Committee
Gase Threshold (cis):	3.06
Stream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Herdwater Safety (cfs):	0.77
Ungauge Listeein Safety (ofs):	0.77
Chal Hermbold (ch	6.82
The state of the s	

69.73	The Recipe Reading (ris):
A 59	Franks at Location infer

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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65.21

36.87

25.86

13.90

6.89

3.98

4.79

5.20

15.54

32.06

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12

Bowen Unit 2H

I.:									
Source !	D: 8955	Source N				tiver @ Knight Wit Ianie C. Knight	hdrawal	Source la litude: 39.	
	NUC-8 Co	vio:	5030203			•		2 2 31 50 25 1016426. 00.	.070505
_		Area (sq. :		5. 26 Stream	County: 17	Ritchie	4ದಚಿತ್ರಿಗಳ	icd valditirawal start date: rted reicheranul ent date: r'o'une from Conrce (gal):	5/31/2013 5/31/2014 6,010,000
☐ Re	gulated Stre	amî						ਰਿਫ਼ਸ਼, ਸੰਘਾਜ਼ਨ rave (gpm):	3,000
	CRP etsmixo	?						. Had. Singlify Lov	structed to
⊻ Ga	uged Stream	17						rAss. Truck gempiral	tu (g.5/5) — u
	Reference G	Roug	3155220	so	UTH FORK H	UGHES RIVER BEL	OW MACFARI	LAN, WV	e Para Albania and Albania Albania (Albania — Albania — Albania Albania Albania Albania — Albania — Albania A
	Drainage Ar	sa (.c. mi.)) 2	29.00				Gauga Thrashold (cfs):	22
1 2	<u>Resolution</u> 1 <u>5 ความไป หรือ</u> (คริ.) 45.67 59.55	lener_	14.26 14.26		201010000 (201010000 (20101000 31.44 45.31	<u>-</u> -		The second s	

Water Availability Profile

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11.63

-0.33

-7.34

-10.25

-9.45

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1.30

17.82

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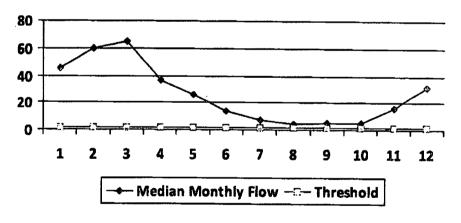
14.26

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Mater Araliabilian Assessment of	(Lecation:
wasa Virrashaid (ris):	1.56
Stream Demand (cfs):	5.62
Parap rate (cis):	6.68
Number Suffrey (575):	0.39
Ungauged Saream Salacy (cla):	0.00
Final Vicesiasis (cas	14.26
effr. Burgs handing fofsj:	39.80
Panally at hoos fem jefal:	1.95

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

APPROVED DEC 2 6 2012

wast virginia department of environmental protection

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Source (D: 8956 Source clame

werm war is the

North Fork of Hughes River @ Davis Withdrawal

Source Lasturda: 39.322363

Lewis P. Davis and Normal J. Davis

Country

Source Langitude: -80.936771

HUC-3 Code:

5030203

Drainage Area (sp. ml.): 15.18

Ritchie

sonici sessai illihdravral starti date:

5/31/2013

☑ Andangered Species? ☑ Mussar Straggraft

vintisipoted withdrawal and date:

Yotal Molacie from Source (gal):

5/31/2014

☐ @rou∉@tream?

□ Ster 37

iz ax. rumo rate (gom):

6,010,000

☐ Regulated Stream? ☐ Proximate PSD?

1,000

☐ Gauged Stream?

Alan Truck white it is (g. 1.5).

รามเมื่อใหม่เรือแบบทรางสะเสดร์ 9

Reference Gadg

3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Arca (sq. mi.)

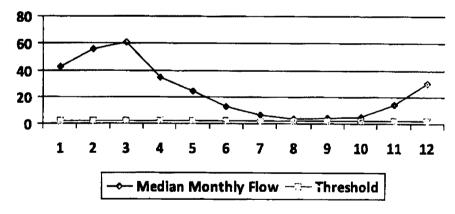
229.00

Gauge Threshold (cis):

22

	<u>Madian</u>		Balmateri
100 (100 (11) (11)	monthly flore (cla)	Tareshida	<u>chostlaidie</u>
1	42.64	4.42	38.36
2	55.59	4.42	51.32
3	60.88	4.42	56.60
4	34.42	4.42	30.14
5	24.15	4.42	19.87
6	12.98	4.42	8.70
7	6.44	4.42	2.16
8	3.72	4.42	-0.56
9	4.47	4.42	0.19
10	4.85	4.42	0.57
11	14.50	4.42	10.23
12	29.93	4.42	25.65

Water Availability Profile



Whier Availability Assessment of Location

Dase Threshold (cfs):	1.46
Stream Demand (cfs):	0.00
Fump rate (cfs):	2.23
Readwater Safety (cfs):	0.36
Ungauged St. earn Safety (cfs):	0.36
Mal This should (cis	4.42

്ട്സ. നില്യെ ക്യമന്സ്യ (നിട്ടു: Passier at Location (cfs): 35.23

2.19

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

west virginia department of environmental protection

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Antero Resources

Bowen Unit 2H

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

•For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.

•For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Lake/Reservior

Source ID: 8957

Source Marna

.. 25.61

City of Salem Reservior (Lower Dog Run)

Source stare date:

5/31/2013

Source endidate:

5/31/2014

Mex. Daily Purchase (ga!)

1,000,000

Total Volume from Source (gal):

6,010,000

. PPROTEIN

west virginia department of environmental protection

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Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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Source (Dr. 8958 Source Mame Pennsboro Lake

Sourch start date:

5/31/2013

Siturbulend date:

5/31/2014

Map. Dr By Pyrons, or (gall)

rosel (Sithma firms Strates (gel):

6,010,000

Source ID: 8959 Source Name Powers Lake (Wilderness Water Park Dam)

Source start date:

5/31/2013

Source end date:

5/31/2014

Max. Daily Purchase (ga!)

Total Volume from Source (gal):

6,010,000

and the Control designation to the second of west virginia department of environmental protection

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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•For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 8960 Source Maine Powers Lake Two

Man. Dally Purchase (52)

Source start date:

5/31/2013

Cource and Cate:

5/31/2014

Total Months from Surace (gel):

6,010,000

APPROVED DEC 2 8 2017

west virginia department of environmental protection

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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• For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Other

Source for 8961 Source Mame Poth Lake (Landowner Pond)

. Durce shart deve:

5/31/2013

Courc∈ end date:

5/31/2014

Wax. Daily Parahasa (gal)

Dist Molume from Source (gal):

6,010,000

. .::

Source No. 8962 Source Name Williamson Pond (Landowner Pond)

Source start date:

5/31/2013

Source end date:

5/31/2014

Max. Daily Purchase (gal)

Total Volume from Source (gai):

6,010,000

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west virginia department of environmental protection

important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

°For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.

oFor each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 8963 Gource Name Eddy Pond (Landowner Pond) Source start date: 5/31/2013

with Daily Purchase (gai)

Source and date: 5/31/2014

Total Volume from Source (gai): 6,010,000

Source ID: 8964 Source Name Hog Lick Quarry

Source start date: 5/31/2013 Source and date: 5/31/2014

Max. Daily Purchase (gal) 1,000,000 Total Volume from Source (gal): 6,010,000

Thirt is a

SEE NO

west virginia department of environmental protection 12/26/2012 12:11:11 PM

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

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- •For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 8965 Source Name Glade Fork Mine Source start date: 5/31/2013 Source and date: 5/31/2014

r4sit Daliv Purchose (gal) 1,000,000 Total Vidume from Source (gal): 6,010,000

Recycled Frac Water

Source ID: 8966 Source Name Belton Unit 1H

Max. Daily Purchase (gal)

Source start date:

5/31/2013

Source end date:

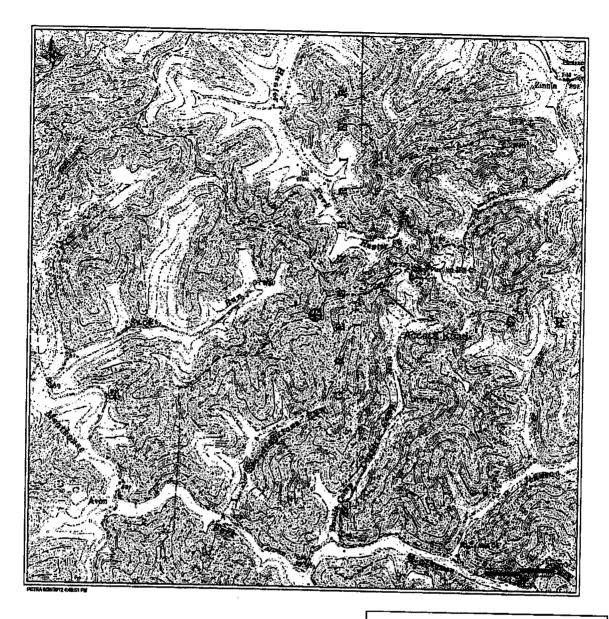
5/31/2014

Total Volume from Source (gal):

6,010,000

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Antero Resources Corporation

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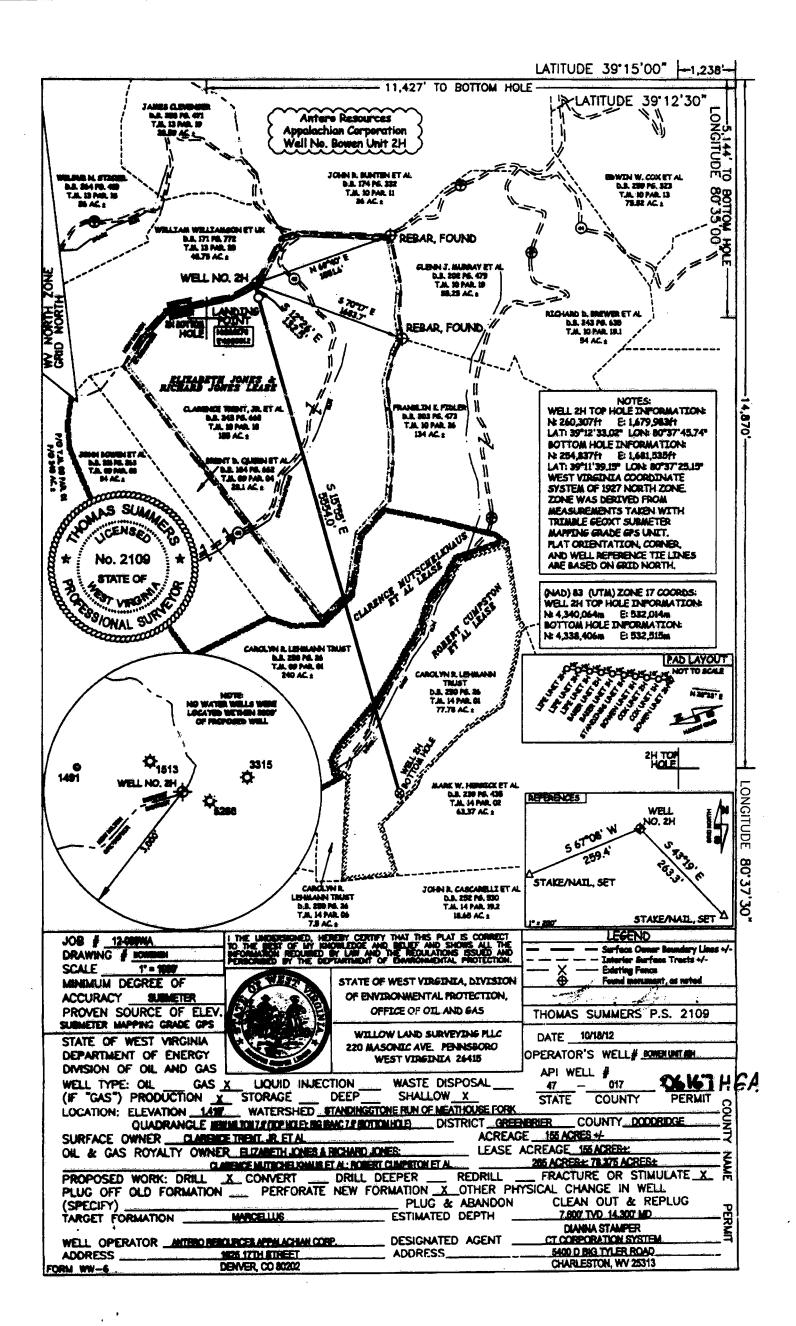
Bowen Unit 2H County Doddridge



REMARKS

QUADRANGLE: NEW MILTON & BIG ISAAC WATERSHED: STANDINGS RUN DISTRICT: GREENBRIER

Date: 9/12/2012

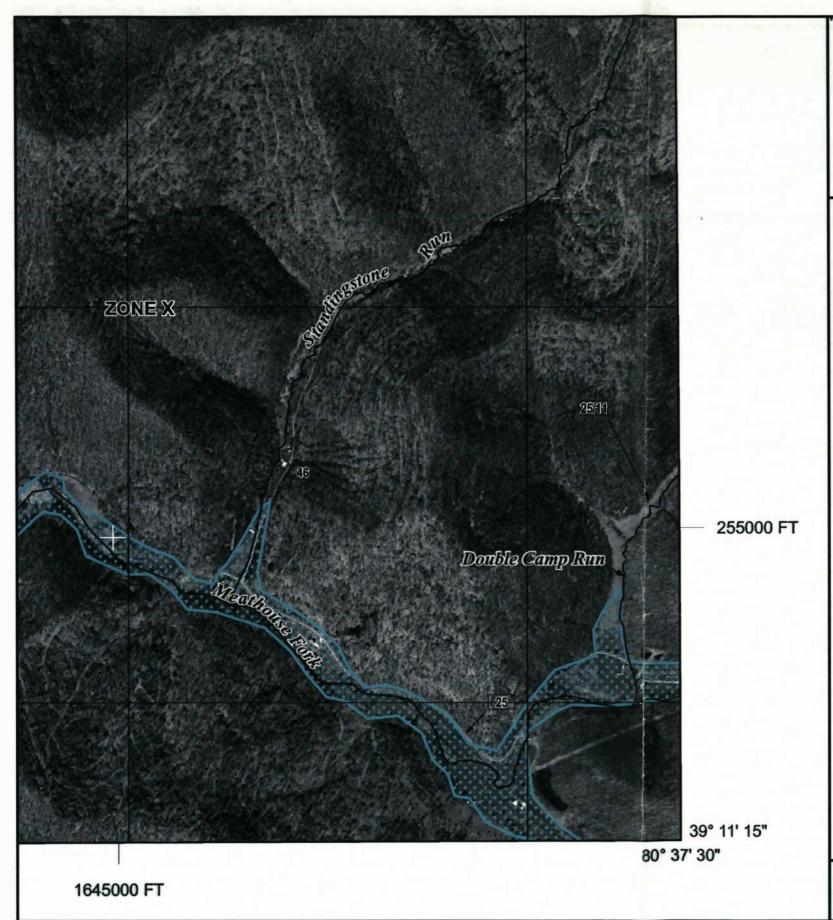


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parameters, and the original and the control of the	
	Show project on FIRM MAP
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chile schwerzenischen w. v. v. v. v. v. v. v. v. der B. Willenson	Findings
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A MAN CONTRACTOR OF A MANAGEMENT	
Annahambar (Annaha annaha	
Control of the Contro	
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and the second of the second o	
#1 12 M	

LEGAL ADVERTISEMENT Doddridge County Flease take notice that on the 100th day of July, 2013. ANTERO RESOURCES APPALACHIAN CORP. filed an application of the 100th day of July, 2013. ANTERO RESOURCES APPALACHIAN CORP. filed an application for a Flood plaint fermin to develop, land to acted at 07 about 150 department of the 100th day of the 100^t

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

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: Huodplain Permi application was published in said paper for ... 🛱 successive weeks beginning with the issue ending with the issue of July 30 2013 and that said notice contains ... 168 amounts to the sum of \$. . . FOR FIRST PUBLICATION, SECOND **PUBLICATION IS 75% OF THE FIRST PUBLICATION** and each publication thereafter **EDITOR** SWORN TO AND SUBSCRIBED BEFORE ME THIS THE ...





MAP SCALE 1" = 1000'

500

1000

2000

FIRM

FLOOD INSURANCE RATE MAP DODDRIDGE COUNTY,

PANEL 0235C

WEST VIRGINIA AND INCORPORATED AREAS

PANEL 235 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY DODDRIDGE COUNTY PANEL SUFFIX 0235

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



MAP NUMBER 54017C0235C MAP REVISED **OCTOBER 4, 2011**

Federal Emergency Management Agency

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