Doddridge County Sheriff
Flood Plain Ordinance Fund

1003
69-217/515

DATE July 2, 2013

PAY TO THE ORDER OF ANTERO RESOURCES $ 4,021.29

Four Thousand Twenty-One Dollars and 29/100---------- DOLLARS

Security features included. Details on back

CORNERSTONE BANK
West Union, WV 26456

Ralph Sandora Jr.
Betty A. Rogers
MP

MEMO #13-008 R. Smith Reimbursement Permit

⑈001003⑈ ⑆051502175⑆ 11⑈9649⑈91⑈

BLUE TRADITIONAL

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

Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jun-19-2013	31830	$4,180.30

VOUCHER	VENDOR INV #	INV DATE	TOTAL AMOUNT	PRIOR PMTS & DISCOUNTS	NET AMOUNT
06-AP-8412	RJSMITHPAD	06/18/13	4,180.30	0.00	4,180.30
FLOOD PLAIN PERMIT - RJ SMITH PAD					
TOTAL INVOICES PAID					4,180.30

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. 4763

Date: June 24, 2013
Customer copy

Received: #13-008 Antero Resources $4,180.30

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

DETACH AND RETAIN FOR TAX PURPOSES

Doddridge County Flood Plain Refund Calculator (if not in Flood Plain)	
RJ Smith Pad	
Estimated Construction Costs	$536,060.00
Amount over $100,000	$436,060.00
Drilling Oil and Gas Well Fee	$1,000.00
Deposit for additional charges	$1,000.00
$5 per $1,000 over $100,000	$2,180.30
Amount Due with application	$4,180.30
95% of Application Fee minus $1,000 deposit	$3,021.29
Cost for Permit	$159.02
Total Refund (Includes 100% of 1,000 deposit)	$4,021.29

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

June 19, 2013

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

Mr. Wellings:

Antero Resources Appalachian Corporation (Antero) would like to submit a Doddridge County Floodplain permit application for our RJ Smith Drill Pad. Our project is located in Doddridge County, Grant District and per FIRM map #54017C0130C, this location is not within the floodplain.

Attached you will find the following:

- Doddridge County Floodplain Permit Application
- FIRM Map
- A detailed set of plans signed by a WV licensed professional engineer
- Copies of other required permits
- Site Safety Plan

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

Shauna Redican
Permit Representative
Antero Resources Appalachian Corporation

Enclosures

RJ Smith

PERMIT # 13-008

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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

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

APPLICANT'S SIGNATURE _____

DATE June 18, 2013

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

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

APPLICANT'S NAME: Antero Resources Appalachian Corporation - Shauna Redican, Permit Representative

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: Contact Shauna Redican: 303-357-6820

BUILDER'S NAME: Antero Resources Appalachian Corporation

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: (303) 357-7310

ENGINEER'S NAME: White Brothers Consulting, LLC - Timothy T. White

ADDRESS: 447 Call Road, Suite 216

TELEHONE NUMBER: 304-550-9484

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) See attached Exhibit A

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) See attached Exhibit A

DISTRICT: Grant

DATE/FROM WHOM PROPERTY PURCHASED: N/A

LAND BOOK DESCRIPTION:

DEED BOOK REFERENCE: DB 202 Page 227, DB 195 Page 395, DB 245 Page 324

TAX MAP REFERENCE: TM 5, Pcl 9, 10, 19 and 20

EXISTING BUILDINGS/USES OF PROPERTY: None

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY Robert J. Smith

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY RR 2 Box 289 Little Flint Rd., West Union, WV 26456

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

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVEOPLMENT ACTIVITIES:

X	Fill	[]	Mining	X	Drilling	[]	Pipelining

X Grading

[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)

[] Watercourse Altercation (including dredging and channel modification)

[] Drainage Improvements (including culvert work)

X Road, Street, or Bridge Construction *Access Road Construction as shown on page 5 of attached RJ Smith Pad Design

[] Subdivision (including new expansion)

[] Individual Water or Sewer System

[] Other (please specify)

_____

C. STANDARD SITE PLAN OR SKETCH

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

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ 536,060.00

*See attached Floodplain Calculation Fee

D. ADJACENT AND/OR AFFECTED LANDOWNER

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

NAME: N/A
ADDRESS: _____

_____

NAME: _____
ADDRESS: _____

_____

NAME: _____
ADDRESS: _____

_____

NAME: _____
ADDRESS: _____

_____

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

NAME: N/A
ADDRESS: _____

_____

NAME: _____
ADDRESS: _____

_____

NAME: _____
ADDRESS: _____

_____

NAME: _____
ADDRESS: _____

_____

E. CONFIRMATION FORM

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

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

(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.

(C) PUBLICATION.

RJ Smith Pad Doddridge County Floodplain Permit – Exhibit A

Surface Owners:

Owner: Denzil F. Pratt
Address: RR 2 Box 296
West Union, WV 26456

Owner: Robert J. Smith
Address: RR 2 Box 289 Little Flint Rd.
West Union, WV 26456

2nd Address
Address: 2725 Canton Rd.
West Union, WV 26456

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

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

NAME (PRINT): Anthony Smith

SIGNATURE: _____ **DATE:** 6/24/2013

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 130

Dated: 10/04/2011

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

[] Is located in Special Flood Hazard Area.

FIRM zone designation _____

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

[] Unavailable

[] The proposed development is located in a floodway.

FBFM Panel No. _____ Dated _____

[] See section 4 for additional instructions.

SIGNED Dan Wellings DATE 06/24/2013

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.

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

_____

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

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

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

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

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

[] Other:

_____

_____

_____

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

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

SIGNED Dan Wellings DATE 06/24/2013

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

APPEALS: Appealed to the County Commission of Doddridge County? [] Yes {} No

Hearing Date:_____

County Commission Decision - Approved [] Yes [] No

CONDITIONS:_____

_____

_____

_____

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

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

COMPLETE 1 OR 2 BELOW:

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

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

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

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

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

INSPECTIONS:

DATE:_____ **BY:**_____

DEFICIENCIES ? **Y/N**

COMMENTS_____

_____

_____

_____

_____

_____

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

Certificate of Compliance issued: DATE:_____ BY:_____

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

PERMIT NUMBER:_____
PERMIT DATE:_____

PURPOSE –

CONSTRUCTION LOCATION:_____

OWNER'S ADDRESS:_____
_____
_____

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

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

SIGNED Dan Williams **DATE** 06/24/2013

ANTERO RESOURCES APPALACHIAN CORPORATION

RJ SMITH PAD

SCHEDULE OF QUANTITIES

CLEARING & GRUBBING; EROSION & SEDIMENT CONTROLS				
	QUANTITY	UNIT		
MOBILIZATION	1.0	EA	$19,140.00	$19,140.00
CONSTRUCTION ENTRANCE	1.0	EA	$3,172.76	$3,172.76
CLEARING & GRUBBING	13.4	AC	$4,513.25	$60,432.42
TREE REMOVAL	13.4	AC	$2,953.00	$39,540.67
8" COMPOST FILTER SOCK	0.0	LF		$0.00
12" COMPOST FILTER SOCK	0.0	LF		$0.00
18" COMPOST FILTER SOCK	0.0	LF		$0.00
24" COMPOST FILTER SOCK	1,891.0	LF	$9.23	$17,453.93
SUPER SILT FENCE	1,256.0	LF	$8.48	$10,650.88
9" STRAW WATTLES	0.0	LF		$0.00
TOTAL				**$150,390.66**
SITE				
	QUANTITY	UNIT		
DRILL PAD EXCAVATION	14,542.0	CY	$3.75	$54,532.50
ACCESS ROADS EXCAVATION	26,531.0	CY	$4.16	$110,368.96
AUXILIARY PAD EXCAVATION	10,203.0	CY	$4.13	$42,138.39
TOPSOIL	5,400.0	CY	$4.09	$22,086.00
DIVERSION DITCH	735.0	LF	$4.50	$3,307.50
ROADSIDE DITCH	2,780.0	LF	$3.99	$11,092.20
TOTAL				**$243,525.55**
SUMP(S) PER ANTERO RESOURCES STANDARD DETAIL				
	QUANTITY	UNIT		
INSTALL 102" x 78" x 44" PRE CAST SUMP	4.0	EA	$844.22	$3,376.88
VALVE BOX HDPE PIPE (MINIMUM 12" DIAMETER x 48" HEIGHT)	4.0	EA	$545.50	$2,182.00
4" PVC CONNECTIVE PIPE (ANTERO SUMP DRAIN DETAIL)	50.0	LF	$9.42	$471.00
TOTAL				**$6,029.88**
AGGREGATE SURFACING - SPREADING, COMPACTION, and/or INSTALLATION				
	QUANTITY	UNIT		
DRILL PAD AASHTO #1 (8" THICK)	2,255.0	TON	$2.59	$5,840.45
DRILL PAD 1 1/2" or 3/4" CRUSHER RUN STONE (2" THICK)	565.0	TON	$2.89	$1,632.85
DRILL PAD GEOTEXTILE FABRIC (US 200)	5,565.0	SY	$1.06	$5,898.90
ACCESS ROADS 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	2,125.0	TON	$2.83	$6,013.75
ACCESS ROAD 1 1/2" OR 3/4" CRUSHER RUN STONE (2" THICK)	540.0	TON	$2.95	$1,593.00
ACCESS ROADS GEOTEXTILE FABRIC (US 200)	4,800.0	SY	$1.02	$4,896.00
*INSTALL TENSAR TX190 GEOGRID or EQUIVALENT	1.0	SY		$0.00
TANK PAD 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	1,075.0	TON	$2.43	$2,612.25
TANK PAD 1 1/2" or 3/4" CRUSHER RUN AGGREGATE (2" THICK)	270.0	TON	$2.56	$691.20
TANK PAD GEOTEXTILE FABRIC (US 200)	2,735.0	SY	$1.16	$3,172.60
*INSTALL TENSAR TX190 GEOGRID or EQUIVALENT	1.0	SY		$0.00
TOTAL				**$32,351.00**
ROAD CULVERTS				
	QUANTITY	UNIT		
15" HDPE	0.0	LF		$0.00
18" HDPE	72.0	LF	$23.33	$1,679.76
24" HDPE	0.0	LF		$0.00
30" HDPE	0.0	LF		$0.00
36" HDPE	225.0	LF	$40.00	$9,000.00
42" HDPE	0.0	LF		$0.00
48" HDPE	0.0	LF	$60.00	$0.00
60" HDPE	0.0	LF		$0.00
R4 RIP RAP (INLETS/OUTLETS)	22.0	TON	$35.69	$785.18
AASHTO #1 STONE (DITCH CHECKS)	5.0	TON	$61.10	$305.50
DITCH LINING - (ACCESS ROAD) SYNTHETIC MATTING (TRM)	741.0	SY	$3.45	$2,556.45
DITCH LINING - (ACCESS ROAD) RIP RAP	2,039.0	SY	$26.28	$53,584.92
TOTAL				**$67,911.81**

ANTERO RESOURCES APPALACHIAN CORPORATION

RJ SMITH PAD

SCHEDULE OF QUANTITIES

FENCING/GATES				
	QUANTITY	**UNIT**		
4 FT WOVEN WIRE FARM FENCE w/MINIMUM 10 FT POST SPACING (WOODEN and/or "T" POST	0.0	LF		$0.00
16 FT DOUBLE GATE	0.0	EA		$0.00
TOTAL				**$0.00**
SEEDING				
	QUANTITY	**UNIT**		
SITE SEEDING (LIME, FERTILIZER, SEEDING, AND HYDRO-MULCH w/TACK (HYC-2 OR EQUAL))	10.9	AC	$3,301.25	$35,851.58
TOTAL				**$35,851.58**
UNFORESEEN SITE CONDITIONS				
	QUANTITY	**UNIT**		
*ROCK CLAUSE - BLASTING	1.0	CY		$0.00
*ROCK CLAUSE - HOE RAMMING	1.0	CY		$0.00
*FRENCH DRAINS	1.0	FT		$0.00
*PHASE 1 FENCING - STEEL CORRUGATED PANELS w/"T" POST (10 FT CENTERS) - WETLAND PROTECTION	1.0	LF		$0.00
*PHASE 2 FENCING - SILT FENCE AND OR FILTER SOCK OUTSIDE OF PHASE 3 FENCING - WETLAND PROTECTION	1.0	LF		$0.00
*PHASE 3 FENCING - ORANGE SAFETY FENCE w/"T" POST (10FT CENTERS) - WETLAND PROTECTION	1.0	LF		$0.00
*SILT FENCE	1.0	LF		$0.00
*TEMPORARY SEEDING	1.0	AC		$0.00
*CONSTRUCTION STAKEOUT	1.0	HOUR		$0.00
* JUTE MATTING - SLOPE MATTING	1.0	SY		$0.00
TOTAL				**$0.00**
	GRAND TOTAL			**$536,060.47**
ANTERO RESOURCES WILL SUPPLY THE FOLLOWING:				
102"X 78" X 44" PRE CAST SUMP				
VALVE FOR THE VALVE BOX HDPE PIPE				
AGGREGATE				
GEOTEXTILE FABRIC (US 200) OR EQUIVALENT				
TENSAR TX190 GEOGRID OR EQUIVALENT				
15" HDPE ROAD CULVERT				

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

MAY 09 2013

Regulatory Division
Energy Resource Branch
LRH-2013-00402-OHR-UnTrib Little Flint Run

Mr. Brett F. Fletcher
Antero Resources
1625 17th Street
Denver, Colorado 80202

Dear Mr. Fletcher:

I refer to the information submitted on your behalf by AllStar Ecology, LLC regarding the proposed RJ Smith Drill Pad Site. You have requested authorization for the discharge of fill material into two streams for the construction of an access road. Implementation of the proposal would include the discharge of fill material into intermittent Stream 1 for the installation of two culverts at two locations referred to as Impact 1 and Impact 2. Fill material would be discharged into 146 linear feet (lf) of Stream 1 at Impact 1 and 117 lf of Stream 1 at Impact 2. An additional 8 lf of Stream 1 at Impact 2 would be temporarily affected by the discharge of fill material necessary to complete the culvert installation. The proposed project would also result in the discharge of fill material into 21 lf of ephemeral Stream 3 for the installation of the culverted crossing at Impact 2. The proposed RJ Smith Drill Pad Site access road would be located east of CR 14 (Little Flint Road), near Canton, in Doddridge County, West Virginia (39.3628N, 80.7299W).

The Corps of Engineers authority to regulate waters of the United States is based, in part, on the definitions and limits of jurisdiction contained in 33 CFR 328 and 33 CFR 329. Section 404 of the Clean Water Act requires that a Department of the Army permit be obtained prior to the discharge of dredged or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act of 1899 requires that a Department of the Army permit be obtained for any work in, on, over or under a navigable water.

You have requested we provide a preliminary jurisdictional determination (PJD) for the aquatic resources that would be affected by the proposed project. Based on a review of the information provided and other information available to us, this office has determined Stream 1 and Stream 3 **may** be jurisdictional waters of the United States. This determination has been made in accordance with the Regulatory Guidance Letter for Jurisdictional Determinations issued by the U.S. Army Corps of Engineers on June 26, 2008 (RGL No. 08-02). As indicated in the guidance, this PJD is non-binding and cannot be appealed (33 C.F.R. 331.2) and only provides a written indication that waters of the U.S, including wetlands, may be present on-site.

You have declined to exercise the option to obtain an approved JD in this instance and at this time. For the purposes of the determination of impacts, compensatory mitigation, and other resource protection measures for activities that require authorization from this office, the streams described in the attached PJD will be evaluated as if they are waters of the United States.

Attached please find two copies of the PJD. If you agree with the findings of this PJD and understand your options regarding the same, please sign and date one copy of the form and return it to this office within 30 days of receipt of this letter. You should submit the signed copy to the following address:

Ms. Susan Fields (LRH-2013-00402-OHR-UnTrib Little Flint Run)
U.S. Army Corps of Engineers, Huntington District
502 8th Street
Huntington, West Virginia 25701

I also refer to the pre-construction notification you have submitted for the proposed project. You have requested authorization from the Department of the Army to discharge fill material into 271 linear feet of Stream 1, 146 linear feet at Impact 1 and 125 lf at Impact 2, and into 21 linear feet of Stream 3 for the construction of an access road. Based on the submitted information, it has been determined the proposed discharge of fill material meets the criteria for authorization under Nationwide Permit Number (NWP) #14 (attached) under the February 21, 2012 Federal Register, Notice of Reissuance of Nationwide Permits (77 FR 10184) provided you comply with all terms and conditions of the enclosed material. A copy of this NWP can be found on our website at http://www.lrh.usace.army.mil/Missions/Regulatory.aspx.

Please be aware this nationwide permit authorization does not obviate the requirement to obtain other Federal, state or local authorizations required by law. A copy of this NWP and verification letter must be supplied to your project engineer responsible for construction activities. A copy of the verification letter must be kept at the site during construction. Upon completion of the work, the attached certification must be signed and returned to this office.

If you have any questions concerning the above, please contact Ms. Susan A. Porter at (304) 399-5610 or by email at Susan.A.Porter@usace.army.mil.

Sincerely,

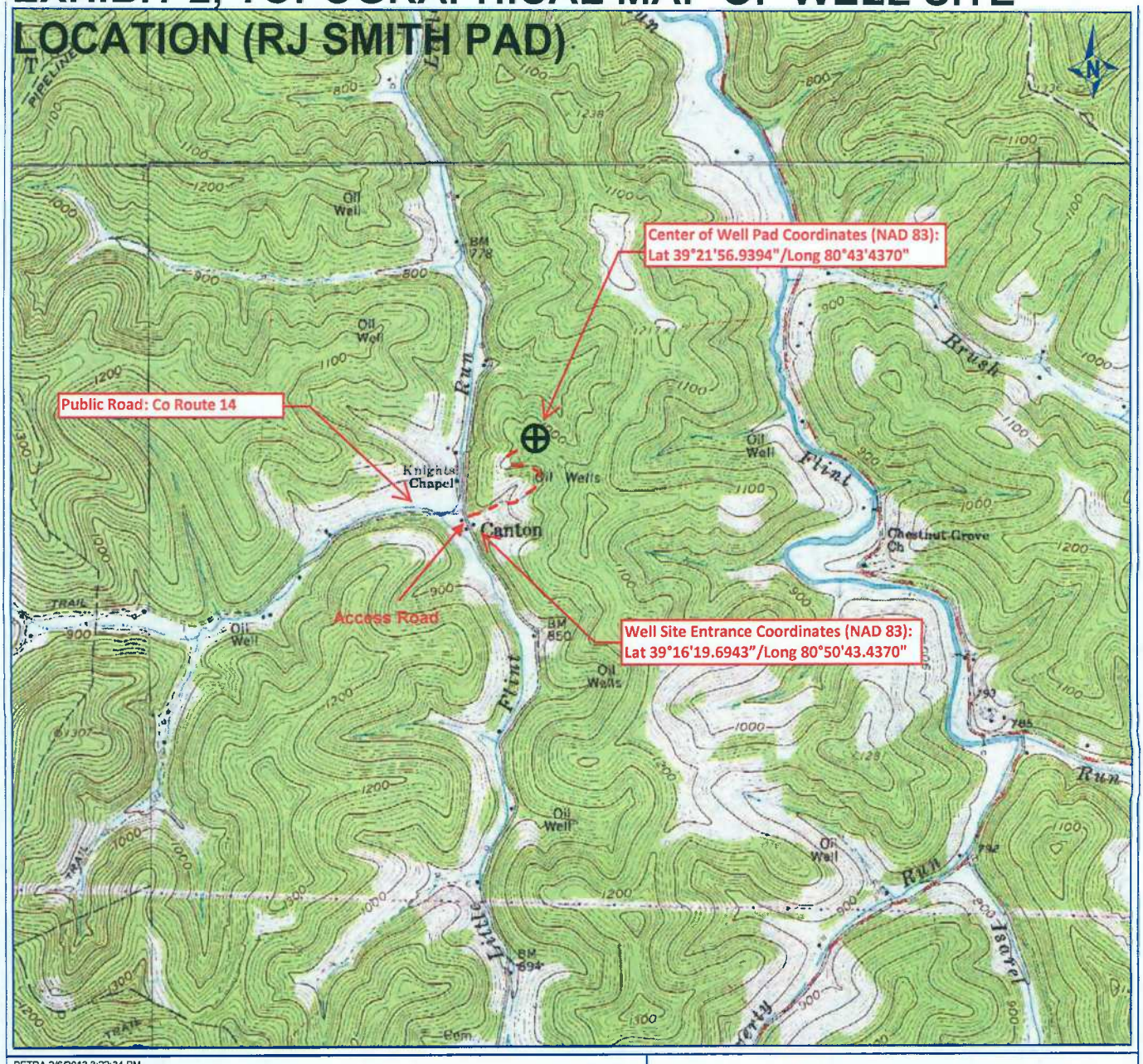
Kimberly D. Courts-Brown
Regulatory Project Manager
Energy Resource Branch

Enclosures

CF: (w/out encls)
AllStar Ecology, LLC
1582 Meadowdale Road
Fairmont, WV 26554

Ms. Carrie Traver
U.S. Environmental Protection Agency - Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103

EXHIBIT 2, TOPOGRAPHICAL MAP OF WELL SITE LOCATION (RJ SMITH PAD)



PETRA 2/6/2013 3:22:34 PM

Antero Resources Corporation

Appalachian Basin

RJ SMITH PAD

Doddridge County

0 2,000 4,000

FEET

REMARKS

QUADRANGLE: SMITHBURG
WATERSHED: LITTLE FLINT RUN
DISTRICT: GRANT

February 6, 2013

RJ Smith Pad - EXHIBIT 3
LIST OF ALL SCHOOLS & PUBLIC FACILITIES WITHIN A ONE- MILE RADIUS OF PROPOSED WELL SITE

Facility Name	Telephone Number
None identified within a 1-mile radius	

WW - 6B
(3/13)

EXHIBIT 4.a to SSP- WW-6B FORM

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Appalachian Corporation | 494488557 (Operator ID) | 017- Doddridge (County) | Grant (District) | Smithburg 7.5' (Quadrangle)

2) Operator's Well Number: Gibson Unit 1H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____ Underground Storage _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 7000' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7000' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 18000' MD

10) Approximate Fresh Water Strata Depths: 73', 370'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 1,300', 2,185'

13) Approximate Coal Seam Depths: 185', 1,003'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

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(3/13)

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	430'	430' *See above	CTS, 597 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2495'	2495'	CTS, 1016 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18000'	18000'	4541 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	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			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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 and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

WW - 6B
(1/12)

EXHIBIT 4.b to SSP- WW-6B FORM

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

1) Well Operator: Antero Resources Appalachian Corporation | 494488557 (Operator ID) | 017- Doddridge (County) | Grant (District) | Smithburg 7.5' (Quadrangle)

2) Operator's Well Number: Gibson Unit 2H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 7200' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7200' TVD
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: 17100' MD
10) Approximate Fresh Water Strata Depths: 73', 370'
11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.
12) Approximate Saltwater Depths: 1,300', 2,185'
13) Approximate Coal Seam Depths: 185', 1,003'
14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	425'	425' *See above	CTS, 590 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#	17100'	17100'	4295 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	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			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string. Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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 and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

EXHIBIT 4.c to SSP- WW-6B FORM

WW - 6B
(3/13)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator:	Antero Resources Appalachian Corporation	494488557	017- Doddridge	Grant	Smithburg 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Mishka Unit 1H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____ Underground Storage _____

Other _____

(b) If Gas: Shallow ■ Deep _____

Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Marcellus Shale: 7200' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7200' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 19000' MD

10) Approximate Fresh Water Strata Depths: 73', 370'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 1,300', 2,185'

13) Approximate Coal Seam Depths: 185', 1,003'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

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(3/13)

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	430'	430' *See above	CTS, 597 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2565'	2565'	CTS, 1044 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	19000'	19000'	4794 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	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			
Sizes:	N/A			
Depths Set:	N/A			

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21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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 and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

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EXHIBIT 4.d to SSP- WW-6B FORM

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

1) Well Operator:	Antero Resources Appalachian Corporation	494488557	017- Doddridge	Grant	Smithburg 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Duff Unit 1H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 7200' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7200' TVD
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: 18800' MD
10) Approximate Fresh Water Strata Depths: 73', 370'
11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.
12) Approximate Saltwater Depths: 1,300', 2,185'
13) Approximate Coal Seam Depths: 185', 1,003'
14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

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20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	420'	420' *See above	CTS, 583 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2555'	2555'	CTS, 1040 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18800'	18800'	4743 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	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			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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 and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

WW - 6B
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EXHIBIT 4.e to SSP- WW-6B FORM

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

1) Well Operator: Antero Resources Appalachian Corporation | 494488557 (Operator ID) | 017- Doddridge (County) | Grant (District) | Smithburg 7.5' (Quadrangle)

2) Operator's Well Number: Duff Unit 2H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 7200' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7200' TVD
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: 18700' MD
10) Approximate Fresh Water Strata Depths: 73', 370'
11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.
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13) Approximate Coal Seam Depths: 185', 1,003'
14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

WW - 6B
(1/12)

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
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Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	425'	425' *See above	CTS, 590 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2560'	2560'	CTS, 1042 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18700'	18700'	4713 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.438"	1530	Class A	1.18
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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			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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 and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

WW - 6B
(1/12)

EXHIBIT 4.f to SSP- WW-6B FORM

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

1) Well Operator:	Antero Resources Appalachian Corporation	494488557	017- Doddridge	Grant	Smithburg 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Costlow Unit 2H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 7400' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7400' TVD
8) Formation at Total Vertical Depth: Marcellus
9) Proposed Total Measured Depth: 18600' MD
10) Approximate Fresh Water Strata Depths: 73', 370'
11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.
12) Approximate Saltwater Depths: 1,300', 2,185'
13) Approximate Coal Seam Depths: 185', 1,003'
14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

WW - 6B
(1/12)

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	425'	425' *See above	CTS, 590 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2590'	2590'	CTS, 1055 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18600'	18600'	4674 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		6800'	
Liners							

TYPE	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			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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 and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

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

May 31, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706220, 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 completion of permitted well work, 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 me at (304) 926-0499 ext. 1654.

James Martin
Chief

Operator's Well No: COSTLOW UNIT 2H
Farm Name: SMITH, ROBERT J.
API Well Number: 47-1706220
Permit Type: Horizontal 6A Well
Date Issued: 05/31/2013

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. No discharge shall be allowed from the well pad during drilling activities.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

17-06220

WW - 6B
(1/12)

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

03 611

1) Well Operator:	Antero Resources Appalachian Corporation	494488557	017- Doddridge	Grant	Smithburg 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: Costlow Unit 2H Well Pad Name: RJ Smith Pad

3 Elevation, current ground: ~1002' Elevation, proposed post-construction: 996'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 7400' TVD, Anticipated Thickness- 55 Feet, Associated Pressure- 2950#

7) Proposed Total Vertical Depth: 7400' TVD
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13) Approximate Coal Seam Depths: 185', 1,003'
14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

RECEIVED
Office of Oil and Gas
FEB 28 2013
WV Department of
Environmental Protection

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 13.39 acres

19) Area to be disturbed for well pad only, less access road (acres): 2.70 acres

17-06220

WW - 6B
(1/12)

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	425'	425' *See above	CTS, 590 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2590'	2590'	CTS, 1055 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18600'	18600'	4674 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		6800'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
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Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

Received
Office of Oil & Gas

APR 23 2013

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

DCW
4-18-13

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17-06220

WW - 6B
(1/12)

21) Describe centralizer placement for each casing string. Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons 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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) 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 bbls bentonite mud, 10 bbls fresh water spacer.

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Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high 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.

WW-9
Rev. 1/12

API No. 47 - 017 - 06220
Operator's Well No. Costlow Unit 2H

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 Appalachian Corporation OP Code 494488557

Watershed Little Flint Run Quadrangle Smithburg 7.5'

Elevation 996' County Doddridge District Grant

Description of anticipated Pit Waste: No pit will be used at this site (Drilling and Flowback Fluids will be stored in tanks. Cuttings will be tanked and hauled off site.

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes X No ____

Will a synthetic liner be used in the pit? N/A . If so, what mil.? N/A

Proposed Disposal Method For Treated Pit Wastes:

____ Land Application
____ Underground Injection (UIC Permit Number ____)
■ Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34)
■ Off Site Disposal (Meadowfill Landfill Permit #SWF-1032-98)
____ Other (Explain ____

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Surface - Air/Freshwater, Intermediate - Dust/Stiff Foam, Production - Water Based Mud
-If oil based, what type? Synthetic, petroleum, etc. N/A
Additives to be used? Please See Attachment
Will closed loop system be used ? Yes
Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Removed offsite and taken to landfill
-If left in pit and plan to solidify what medium will be used? Cement, lime, N/A
-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-98)

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature ____

Company Official (Typed Name) Gerard G. Alberts

Company Official Title Environmental & Regulatory Manager

Subscribed and sworn before me this 7th day of February, 2013

RECEIVED
Office of Oil and Gas
FEB 28 2013
WV Department of
Environmental Protection

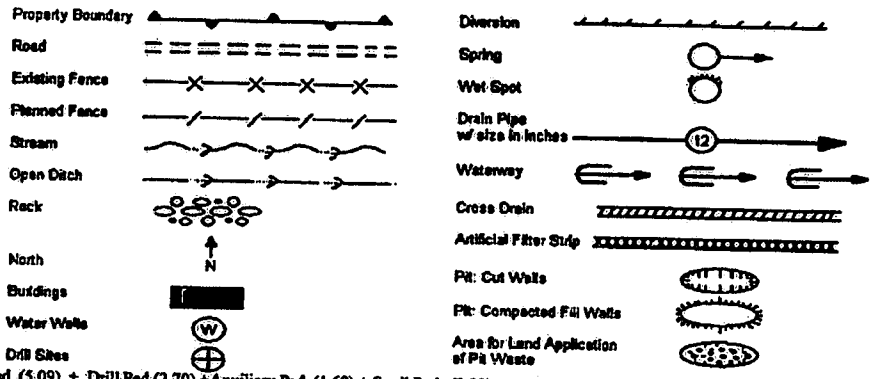
Notary Public

My commission expires 5/18/15

SHAUNA REDICAN
Notary Public
State of Colorado

WW-9
Rev. 1/12

API No. 47 - 017 - 06220
Operator's Well No. Costlow Unit 2H



Access Road (5.09) + Drill Pad (2.70) + Auxiliary Pad (1.68) + Spoil Pads (3.92) = 13.39 Acres

Proposed Revegetation Treatment: Acres Disturbed 13.39 Prevegetation pH _____

Lime 2-4 Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500 lbs minimum)

Mulch 2-3 Tons/acre Hay or straw or Wood Fiber (will be used where needed)

Seed Mixtures

Area I (Temporary) Seed Type	lbs/acre
Tall Fescue	45
Perennial Rye Grass	20
*or type of grass seed requested by surface owner	

Area II (Permanent) Seed Type	lbs/acre
Tall Fescue	45
Perennial Rye Grass	20
*or type of grass seed requested by surface owner	

Received
Office of Oil & Gas

APR 23 2013

Attach:
Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Douglas Newlon

Comments: Pressed & mulch install E+S to Dep regulations

Title: Oil & Gas inspector Date: 4-18-2013

Field Reviewed? (✓) Yes ( ) No

Water Management Plan:
Primary Water Sources

WMP-01117	API/ID Number:	047-017-06220	Operator:	Antero Resources
		Costlow 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.

APPROVED MAY 2 4 2013

Source Summary

WMP-01117	API Number:	047-017-06220	Operator:	Antero Resources
		Costlow Unit 2H		

Stream/River

o Source **West Fork River @ JCP Withdrawal** Owner: **James & Brenda Raines**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.320913	-80.337572

☑ Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: **3061000** **WEST FORK RIVER AT ENTERPRISE, WV**

Max. Pump rate (gpm): 2,000 **Min. Gauge Reading (cfs): 175.00** **Min. Passby (cfs) 146.25**

DEP Comments:

o Source **West Fork River @ McDonald Withdrawal** Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.16761	-80.45069

☑ Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: **3061000** **WEST FORK RIVER AT ENTERPRISE, WV**

Max. Pump rate (gpm): 3,000 **Min. Gauge Reading (cfs): 175.00** **Min. Passby (cfs) 106.30**

DEP Comments:

o Source **West Fork River @ GAL Withdrawal** Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.16422	-80.45173

☑ Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: **3061000** **WEST FORK RIVER AT ENTERPRISE, WV**

Max. Pump rate (gpm): 2,000 **Min. Gauge Reading (cfs): 175.00** **Min. Passby (cfs) 106.30**

DEP Comments:

o Source **Middle Island Creek @ Dawson Withdrawal** Owner: **Gary D. and Rella A. Dawson**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.379292	-80.867803

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 3,000 **Min. Gauge Reading (cfs): 76.03** **Min. Passby (cfs) 28.83**

DEP Comments:

o Source **McElroy Creek @ Forest Withdrawal** Owner: **Forest C. & Brenda L. Moore**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.39675	-80.738197

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 74.77** **Min. Passby (cfs) 13.10**

DEP Comments:

o Source **McElroy Creek @ Sweeney Withdrawal** Owner: **Bill Sweeney**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.398123	-80.656808

☐ Regulated Stream? Ref. Gauge ID: **3114500** **MIDDLE ISLAND CREEK AT LITTLE, WV**

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 6.66**

DEP Comments:

o Source **Meathouse Fork @ Gagnon Withdrawal** Owner: **George L. Gagnon and Susan C. Gagnon**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.26054	-80.720998

☐ Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 71.96** **Min. Passby (cfs) 13.10**

DEP Comments:

o Source **Meathouse Fork @ Whitehair Withdrawal** Owner: **Elton Whitehair**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.211317	-80.679592

☐ Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 7.28**

DEP Comments:

o Source **Tom's Fork @ Erwin Withdrawal** Owner: **John F. Erwin and Sandra E. Erwin**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.174306	-80.702992

☐ Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 0.59**

DEP Comments:

o Source **Arnold Creek @ Davis Withdrawal** Owner: **Jonathon Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.302006	-80.824561

☐ Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 3.08**

DEP Comments:

o Source **Buckeye Creek @ Powell Withdrawal** Owner: **Dennis Powell**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.277142	-80.690386

☐ Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 69.73** **Min. Passby (cfs) 4.59**

DEP Comments:

o Source **South Fork of Hughes River @ Knight Withdrawal** Owner: **Tracy C. Knight & Stephanie C. Knight**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.198369	-80.870969

☐ Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm): 3,000 **Min. Gauge Reading (cfs): 39.80** **Min. Passby (cfs) 1.95**

DEP Comments:

o Source **North Fork of Hughes River @ Davis Withdrawal** Owner: **Lewis P. Davis and Norma J. Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000		39.322363	-80.936771

☐ Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm): 1,000 **Min. Gauge Reading (cfs): 35.23** **Min. Passby (cfs) 2.19**

DEP Comments:

Source Summary

WMP-**01117** API Number: **047-017-06220** Operator: **Antero Resources**

Costlow Unit 2H

Purchased Water

o Source **Middle Island Creek @ Solo Construction** Owner: **Solo Construction, LLC**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000	1,000,000	39.399094	-81.185548

☑ Regulated Stream? **Ohio River Min. Flow** Ref. Gauge ID: 9999999 **Ohio River Station: Willow Island Lock & Dam**

Max. Pump rate (gpm): **Min. Gauge Reading (cfs): 6,468.00** **Min. Passby (cfs)**

DEP Comments: **Elevation analysis indicates that this location has the same elevation as Middle Island Creek's pour point into the Ohio River. As such, it is deemed that water flow at this location is heavily influenced by the Ohio River.**

o Source **Sun Valley Public Service District** Owner: **Sun Valley PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/28/2013	8/28/2014	7,790,000	200,000	-	-

☑ Regulated Stream? **Stonewall Jackson Dam** Ref. Gauge ID: 3061000 **WEST FORK RIVER AT ENTERPRISE, WV**

Max. Pump rate (gpm): **Min. Gauge Reading (cfs): 171.48** **Min. Passby (cfs)**

DEP Comments:

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14347 | Source Name: Middle Island Creek @ Solo Construction
Solo Construction, LLC

Source Latitude: 39.399094
Source Longitude: -81.185548

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 | County: Pleasants

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm):
Max. Simultaneous Trucks:
Max. Truck pump rate (gpm) 0

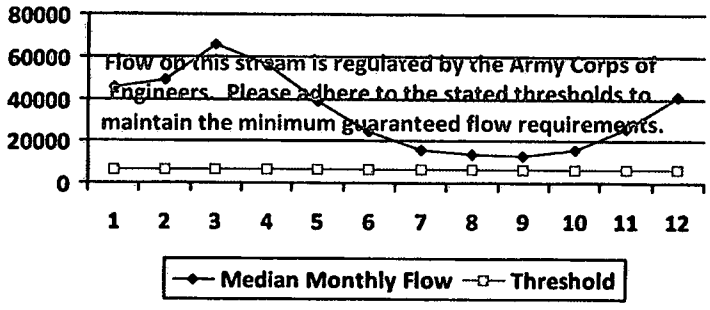
- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☑ Regulated Stream? Ohio River Min. Flow
- ☑ Proximate PSD? City of St. Marys
- ☑ Gauged Stream?

Reference Gaug 9999999 | Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00 | Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby 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.

Source Detail

WMP-01117	API/ID Number: 047-017-06220	Operator: Antero Resources
Costlow Unit 2H		

Source ID: 14348 Source Name: Sun Valley Public Service District / Sun Valley PSD

Source Latitude:

Source Longitude:

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 391.85 County: Harrison

Anticipated withdrawal start date: 8/28/2013

Anticipated withdrawal end date: 8/28/2014

Total Volume from Source (gal): 7,790,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

- ☐ Endangered Species?
- ☐ Trout Stream?
- ☑ Regulated Stream?
- ☐ Proximate PSD?
- ☑ Gauged Stream?
- ☑ Mussel Stream?
- ☐ Tier 3?

Stonewall Jackson Dam

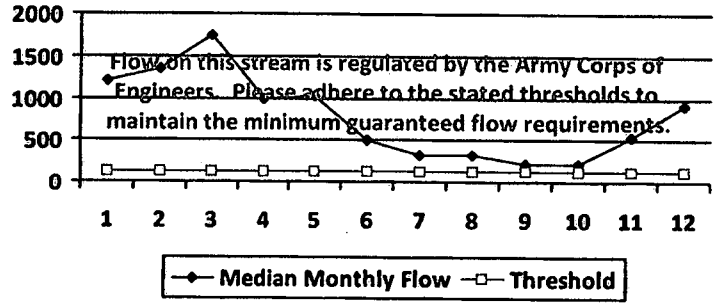
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	1,200.75	-	-
2	1,351.92	-	-
3	1,741.33	-	-
4	995.89	-	-
5	1,022.23	-	-
6	512.21	-	-
7	331.86	-	-
8	316.87	-	-
9	220.48	-	-
10	216.17	-	-
11	542.45	-	-
12	926.12	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	
Downstream Demand (cfs):	
Pump rate (cfs):	
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby 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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14334 | Source Name: West Fork River @ JCP Withdrawal
James & Brenda Raines

Source Latitude: 39.320913
Source Longitude: -80.337572

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 532.2 | County: Harrison

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 2,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☐ Trout Stream?
- ☑ Regulated Stream?
- ☐ Proximate PSD?
- ☑ Gauged Stream?
- ☑ Mussel Stream?
- ☐ Tier 3?

Stonewall Jackson Dam

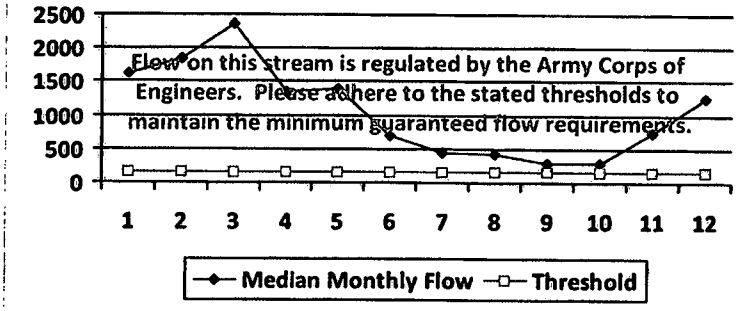
Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.) 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	1,630.82	-	-
2	1,836.14	-	-
3	2,365.03	-	-
4	1,352.59	-	-
5	1,388.37	-	-
6	695.67	-	-
7	450.73	-	-
8	430.37	-	-
9	299.45	-	-
10	293.59	-	-
11	736.74	-	-
12	1,257.84	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.29
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.46
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby 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.

Source Detail

WMP-01117	API/ID Number: 047-017-06220	Operator: Antero Resources
	Costlow Unit 2H	

Source ID: 14335 Source Name: West Fork River @ McDonald Withdrawal
David Shrieves

Source Latitude: 39.16761
Source Longitude: -80.45069

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 314.91 County: Harrison

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 3,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☐ Trout Stream?
- ☑ Regulated Stream?
- ☐ Proximate PSD?
- ☑ Gauged Stream?
- ☑ Mussel Stream?
- ☐ Tier 3?

Stonewall Jackson Dam

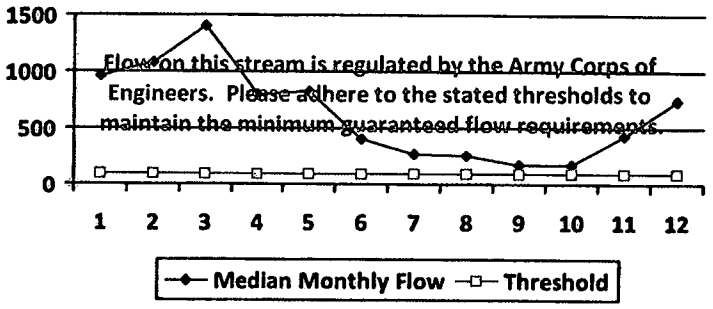
Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.) 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	964.98	-	-
2	1,086.47	-	-
3	1,399.42	-	-
4	800.34	-	-
5	821.52	-	-
6	411.64	-	-
7	266.70	-	-
8	254.66	-	-
9	177.19	-	-
10	173.72	-	-
11	435.94	-	-
12	744.28	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.29
Downstream Demand (cfs):	0.00
Pump rate (cfs):	6.68
Headwater Safety (cfs):	24.27
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby 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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14336 | Source Name: West Fork River @ GAL Withdrawal
David Shrieves

Source Latitude: 39.16422
Source Longitude: -80.45173

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 313.67 | County: Harrison

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 2,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☐ Trout Stream?
- ☑ Regulated Stream? — Stonewall Jackson Dam
- ☐ Proximate PSD?
- ☑ Gauged Stream?
- ☑ Mussel Stream?
- ☐ Tier 3?

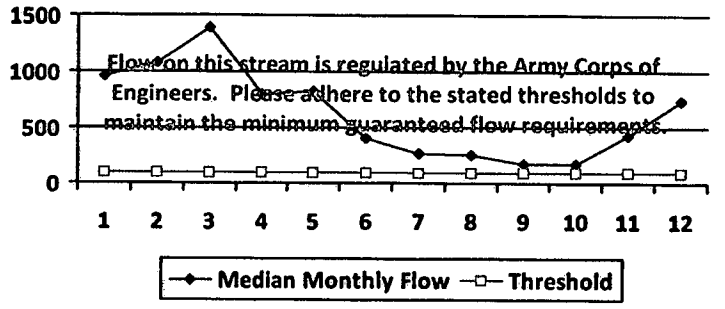
Reference Gaug: 3061000 | WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	961.18	-	-
2	1,082.19	-	-
3	1,393.91	-	-
4	797.19	-	-
5	818.28	-	-
6	410.02	-	-
7	265.65	-	-
8	253.65	-	-
9	176.49	-	-
10	173.04	-	-
11	434.22	-	-
12	741.35	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.29
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.46
Headwater Safety (cfs):	24.18
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby 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.

Source Detail

WMP-01117	API/ID Number: 047-017-06220	Operator: Antero Resources
	Costlow Unit 2H	

Source ID: 14337 Source Name: Middle Island Creek @ Dawson Withdrawal
Gary D. and Rella A. Dawson

Source Latitude: 39.379292
Source Longitude: -80.867803

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 181.34 County: Tyler

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 3,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

☐ Endangered Species? ☑ Mussel Stream?
☐ Trout Stream? ☐ Tier 3?
☐ Regulated Stream?
☐ Proximate PSD?
☑ Gauged Stream?

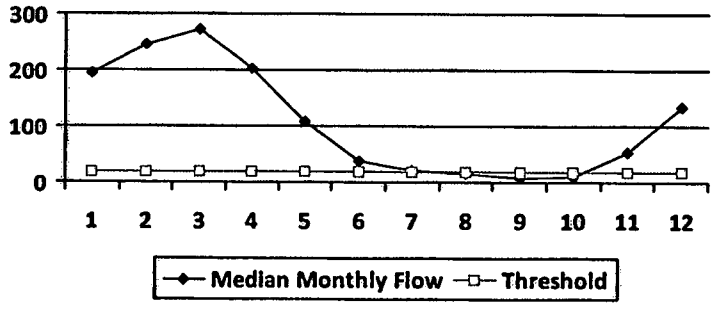
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	194.47	42.06	152.68
2	244.62	42.06	202.83
3	273.72	42.06	231.93
4	203.26	42.06	161.47
5	107.22	42.06	65.43
6	37.44	42.06	-4.35
7	21.19	42.06	-20.60
8	17.45	42.06	-24.34
9	8.94	42.06	-32.85
10	11.23	42.06	-30.56
11	54.82	42.06	13.04
12	133.96	42.06	92.17

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	17.82
Upstream Demand (cfs):	13.10
Downstream Demand (cfs):	6.55
Pump rate (cfs):	6.68
Headwater Safety (cfs):	4.45
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	**76.03**
Passby at Location (cfs):	**28.82**

"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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14338 | Source Name: McElroy Creek @ Forest Withdrawal
Forest C. & Brenda L. Moore

Source Latitude: 39.39675
Source Longitude: -80.738197

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 88.85 | County: Tyler

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

☐ Endangered Species? ☐ Mussel Stream?
☐ Trout Stream? ☐ Tier 3?
☐ Regulated Stream?
☐ Proximate PSD?
☐ Gauged Stream?

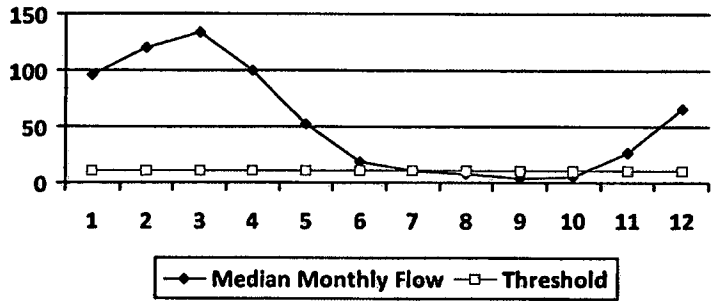
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	95.28	19.78	75.68
2	119.86	19.78	100.25
3	134.11	19.78	114.51
4	99.59	19.78	79.99
5	52.54	19.78	32.93
6	18.35	19.78	-1.26
7	10.38	19.78	-9.22
8	8.55	19.78	-11.05
9	4.38	19.78	-15.23
10	5.50	19.78	-14.10
11	26.86	19.78	7.26
12	65.63	19.78	46.03

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	8.73
Upstream Demand (cfs):	4.46
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	2.18
Ungauged Stream Safety (cfs):	2.18
Min. Gauge Reading (cfs):	**74.19**
Passby at Location (cfs):	**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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14339 | Source Name: McElroy Creek @ Sweeney Withdrawal
Bill Sweeney

Source Latitude: 39.398123
Source Longitude: -80.656808

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 45.16 | County: Doddridge

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

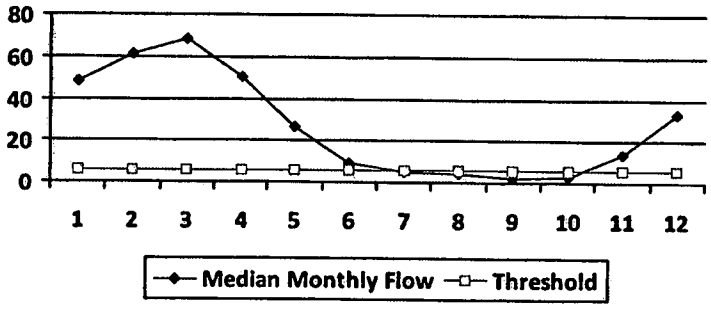
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
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
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 Availability Assessment of Location

Base Threshold (cfs):	4.44
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	1.11
Ungauged Stream Safety (cfs):	1.11
Min. Gauge Reading (cfs):	**69.73**
Passby at Location (cfs):	**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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14340 | Source Name: Meathouse Fork @ Gagnon Withdrawal
George L. Gagnon and Susan C. Gagnon

Source Latitude: 39.26054
Source Longitude: -80.720998

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 60.6 | County: Doddridge

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

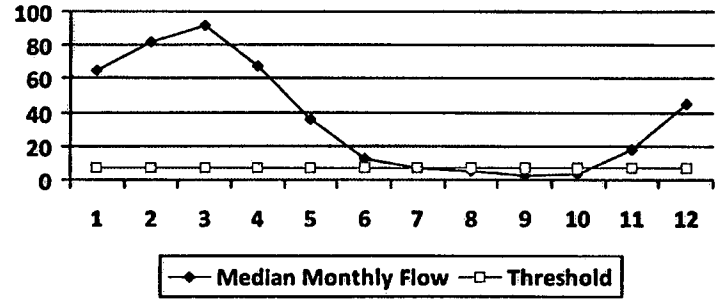
Reference Gaug: 3114500 | MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
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



Water Availability Assessment of Location

Base Threshold (cfs):	5.95
Upstream Demand (cfs):	2.23
Downstream Demand (cfs):	2.81
Pump rate (cfs):	2.23
Headwater Safety (cfs):	1.49
Ungauged Stream Safety (cfs):	1.49
Min. Gauge Reading (cfs):	**71.96**
Passby at Location (cfs):	**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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14341 | Source Name: Meathouse Fork @ Whitehair Withdrawal
Elton Whitehair

Source Latitude: 39.211317
Source Longitude: -80.679592

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 30.37 | County: Doddridge

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

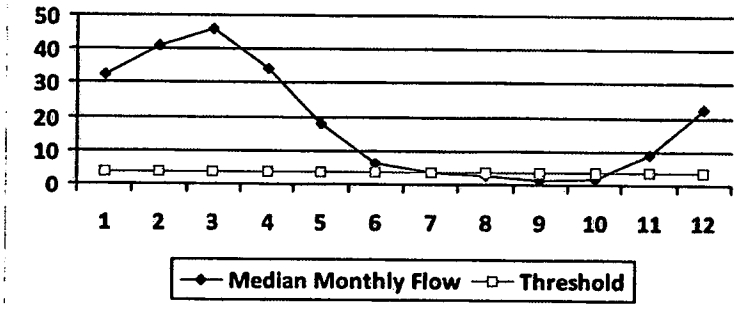
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
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



Water Availability Assessment of Location

Base Threshold (cfs):	2.98
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	2.81
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.75
Ungauged Stream Safety (cfs):	0.75
Min. Gauge Reading (cfs):	**69.73**
Passby at Location (cfs):	**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.

Source Detail

WMP-01117	API/ID Number: 047-017-06220	Operator: Antero Resources
	Costlow Unit 2H	

Source ID: 14342 Source Name: Tom's Fork @ Erwin Withdrawal
John F. Erwin and Sandra E. Erwin

Source Latitude: 39.174306
Source Longitude: -80.702992

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 4.01 County: Doddridge

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☐ Regulated Stream?
- ☐ Proximate PSD?
- ☐ Gauged Stream?

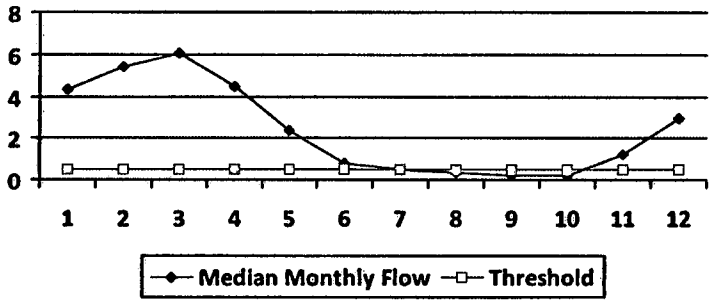
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
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



Water Availability Assessment of Location

Base Threshold (cfs):	0.39
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.10
Ungauged Stream Safety (cfs):	0.10
Min. Gauge Reading (cfs):	69.73
Passby at Location (cfs):	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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14343 | Source Name: Arnold Creek @ Davis Withdrawal
Jonathon Davis

Source Latitude: 39.302006
Source Longitude: -80.824561

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 20.83 | County: Doddridge

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- ☐ Endangered Species?
- ☐ Trout Stream?
- ☐ Regulated Stream?
- ☐ Proximate PSD?
- ☐ Gauged Stream?
- ☑ Mussel Stream?
- ☐ Tier 3?

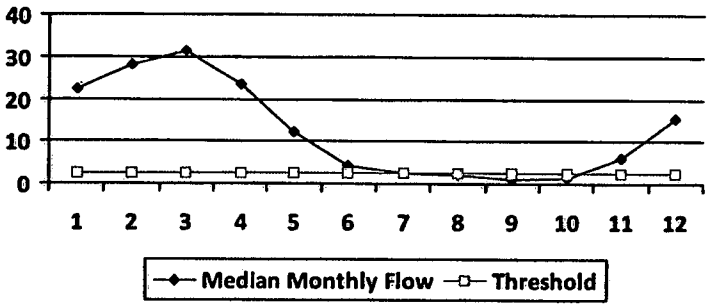
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	22.34	5.30	17.29
2	28.10	5.30	23.05
3	31.44	5.30	26.39
4	23.35	5.30	18.30
5	12.32	5.30	7.26
6	4.30	5.30	-0.75
7	2.43	5.30	-2.62
8	2.00	5.30	-3.05
9	1.03	5.30	-4.03
10	1.29	5.30	-3.76
11	6.30	5.30	1.25
12	15.39	5.30	10.34

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	2.05
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.51
Ungauged Stream Safety (cfs):	0.51
Min. Gauge Reading (cfs):	**69.73**
Passby at Location (cfs):	**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.

Source Detail

WMP-01117	API/ID Number: 047-017-06220	Operator: Antero Resources
	Costlow Unit 2H	

Source ID: 14344 Source Name: Buckeye Creek @ Powell Withdrawal
Dennis Powell

Source Latitude: 39.277142
Source Longitude: -80.690386

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 31.15 County: Doddridge

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

☐ Endangered Species? ☑ Mussel Stream?
☐ Trout Stream? ☐ Tier 3?
☐ Regulated Stream?
☐ Proximate PSD?
☐ Gauged Stream?

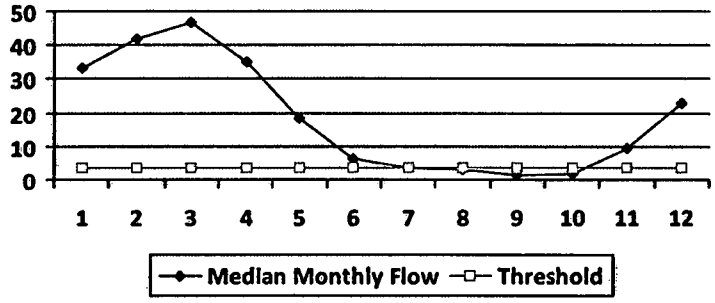
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available 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

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	3.06
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.77
Ungauged Stream Safety (cfs):	0.77
Min. Gauge Reading (cfs):	**69.73**
Passby at Location (cfs):	**4.59**

"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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14345 | Source Name: South Fork of Hughes River @ Knight Withdrawal
Tracy C. Knight & Stephanie C. Knight

Source Latitude: 39.198369
Source Longitude: -80.870969

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 16.26 | County: Ritchie

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 3,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm): 0

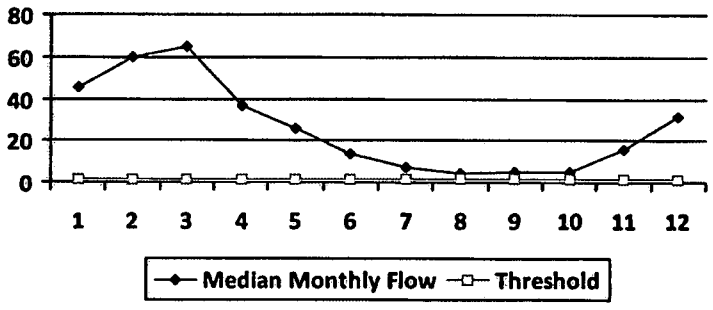
- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [x] Gauged Stream?

Reference Gaug: 3155220 | SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00 | Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45.67	14.26	31.44
2	59.55	14.26	45.31
3	65.21	14.26	50.97
4	36.87	14.26	22.63
5	25.86	14.26	11.63
6	13.90	14.26	-0.33
7	6.89	14.26	-7.34
8	3.98	14.26	-10.25
9	4.79	14.26	-9.45
10	5.20	14.26	-9.04
11	15.54	14.26	1.30
12	32.06	14.26	17.82

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	1.56
Upstream Demand (cfs):	5.62
Downstream Demand (cfs):	0.00
Pump rate (cfs):	6.68
Headwater Safety (cfs):	0.39
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	39.80
Passby at Location (cfs):	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.

Source Detail

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow Unit 2H

Source ID: 14346 | Source Name: North Fork of Hughes River @ Davis Withdrawal
Lewis P. Davis and Norma J. Davis

Source Latitude: 39.322363
Source Longitude: -80.936771

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 15.18 | County: Ritchie

Anticipated withdrawal start date: 8/28/2013
Anticipated withdrawal end date: 8/28/2014
Total Volume from Source (gal): 7,790,000
Max. Pump rate (gpm): 1,000
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

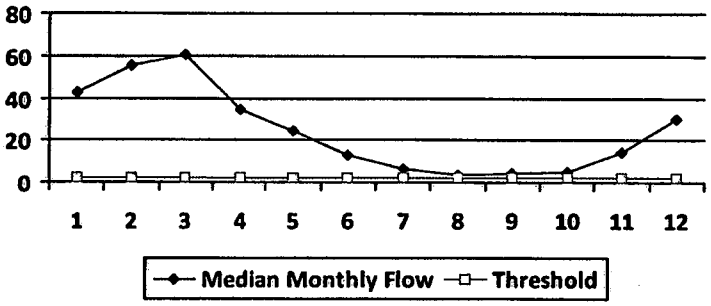
- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

Reference Gaug: 3155220 | SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00 | Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
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



Water Availability Assessment of Location

Base Threshold (cfs):	1.46
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.23
Headwater Safety (cfs):	0.36
Ungauged Stream Safety (cfs):	0.36
Min. Gauge Reading (cfs):	35.23
Passby at Location (cfs):	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

Water Management Plan:
Secondary Water Sources

WMP-01117 | API/ID Number: 047-017-06220 | Operator: Antero Resources

Costlow 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: 14349 Source Name: City of Salem Reservior (Lower Dog Run)
Public Water Provider

Source start date: 8/28/2013
Source end date: 8/28/2014

Source Lat: 39.28834 Source Long: -80.54966 County: Harrison

Max. Daily Purchase (gal): 1,000,000 Total Volume from Source (gal): 7,790,000

DEP Comments:

WMP-01117	API/ID Number:	047-017-06220	Operator:	Antero Resources
		Costlow 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.**

Source ID: 14350 Source Name: Pennsboro Lake

Source start date: 8/28/2013
Source end date: 8/28/2014

Source Lat: 39.281689 Source Long: -80.925526 County: Ritchie

Max. Daily Purchase (gal): Total Volume from Source (gal): 7,790,000

DEP Comments:

Source ID: 14351 Source Name: Powers Lake (Wilderness Water Park Dam) Private Owner

Source start date: 8/28/2013
Source end date: 8/28/2014

Source Lat: 39.255752 Source Long: -80.463262 County: Harrison

Max. Daily Purchase (gal): Total Volume from Source (gal): 7,790,000

DEP Comments:

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.

Source ID: 14352 Source Name Powers Lake Two

Source start date: 8/28/2013
Source end date: 8/28/2014

Source Lat: 39.247604 Source Long: -80.466642 County Harrison

Max. Daily Purchase (gal) Total Volume from Source (gal): 7,790,000

DEP Comments:

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.

Other

Source ID: 14353 Source Name: Poth Lake (Landowner Pond)
Private Owner
Source start date: 8/28/2013
Source end date: 8/28/2014
Source Lat: 39.221306 Source Long: -80.463028 County: Harrison
Max. Daily Purchase (gal)
Total Volume from Source (gal): 7,790,000
DEP Comments:

Source ID: 14354 Source Name: Williamson Pond (Landowner Pond)
Source start date: 8/28/2013
Source end date: 8/28/2014
Source Lat: 39.19924 Source Long: -80.886161 County: Ritchie
Max. Daily Purchase (gal)
Total Volume from Source (gal): 7,790,000
DEP Comments:

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.**

Source ID: 14355 Source Name Eddy Pond (Landowner Pond) Source start date: 8/28/2013 Source end date: 8/28/2014

Source Lat: 39.19924 Source Long: -80.886161 County Ritchie

Max. Daily Purchase (gal) Total Volume from Source (gal): 7,790,000

DEP Comments:

Source ID: 14356 Source Name Hog Lick Quarry Industrial Facility Source start date: 8/28/2013 Source end date: 8/28/2014

Source Lat: 39.419272 Source Long: -80.217941 County Marion

Max. Daily Purchase (gal) 1,000,000 Total Volume from Source (gal): 7,790,000

DEP Comments:

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:

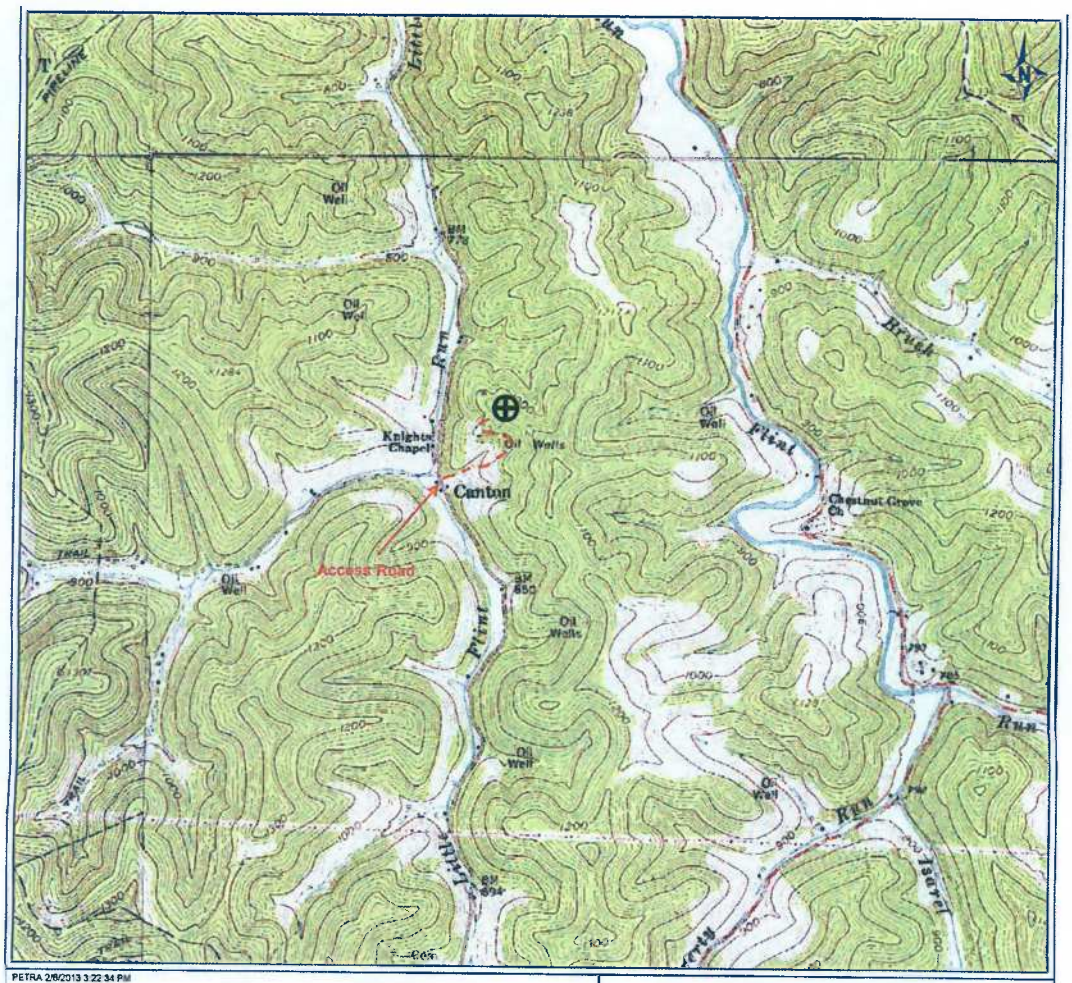
- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the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

Source ID: 14357 Source Name: Glade Fork Mine Industrial Facility
Source start date: 8/28/2013
Source end date: 8/28/2014
Source Lat: 38.965767 Source Long: -80.299313 County: Upshur
Max. Daily Purchase (gal): 1,000,000 Total Volume from Source (gal): 7,790,000
DEP Comments:

Recycled Frac Water

Source ID: 14358 Source Name: Gaskins Unit 1H
Source start date: 8/28/2013
Source end date: 8/28/2014
Source Lat: Source Long: County:
Max. Daily Purchase (gal): Total Volume from Source (gal): 7,790,000
DEP Comments:

17-06220



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Antero Resources Corporation

Appalachian Basin

Costlow **Unit 2H**

Doddridge **County**

0 2,000 4,000
FEET

REMARKS
QUADRANGLE: SMITHBURG
WATERSHED: LITTLE FLINT RUN
DISTRICT: GRANT

February 6, 2013

NORTH

PREVAILING WIND
DIRECTION NNE

ANTERO RESOURCES

EXHIBIT 1
RJ SMITH
PAD

EXHIBIT 1, PAGE 4

DRILLING LAYOUT/FLARE LINES/PREVAILING WINDS

ACCESS ROAD

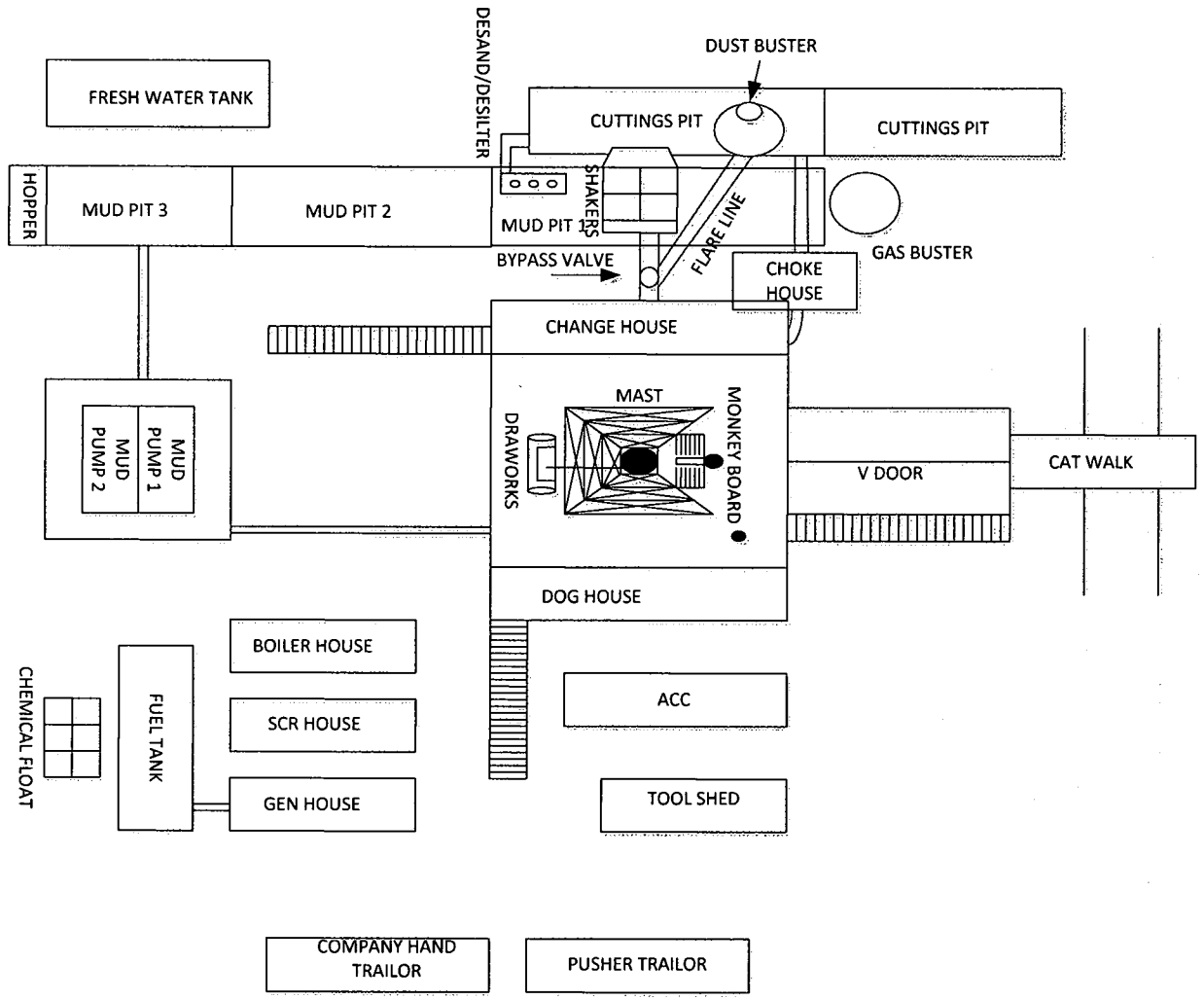
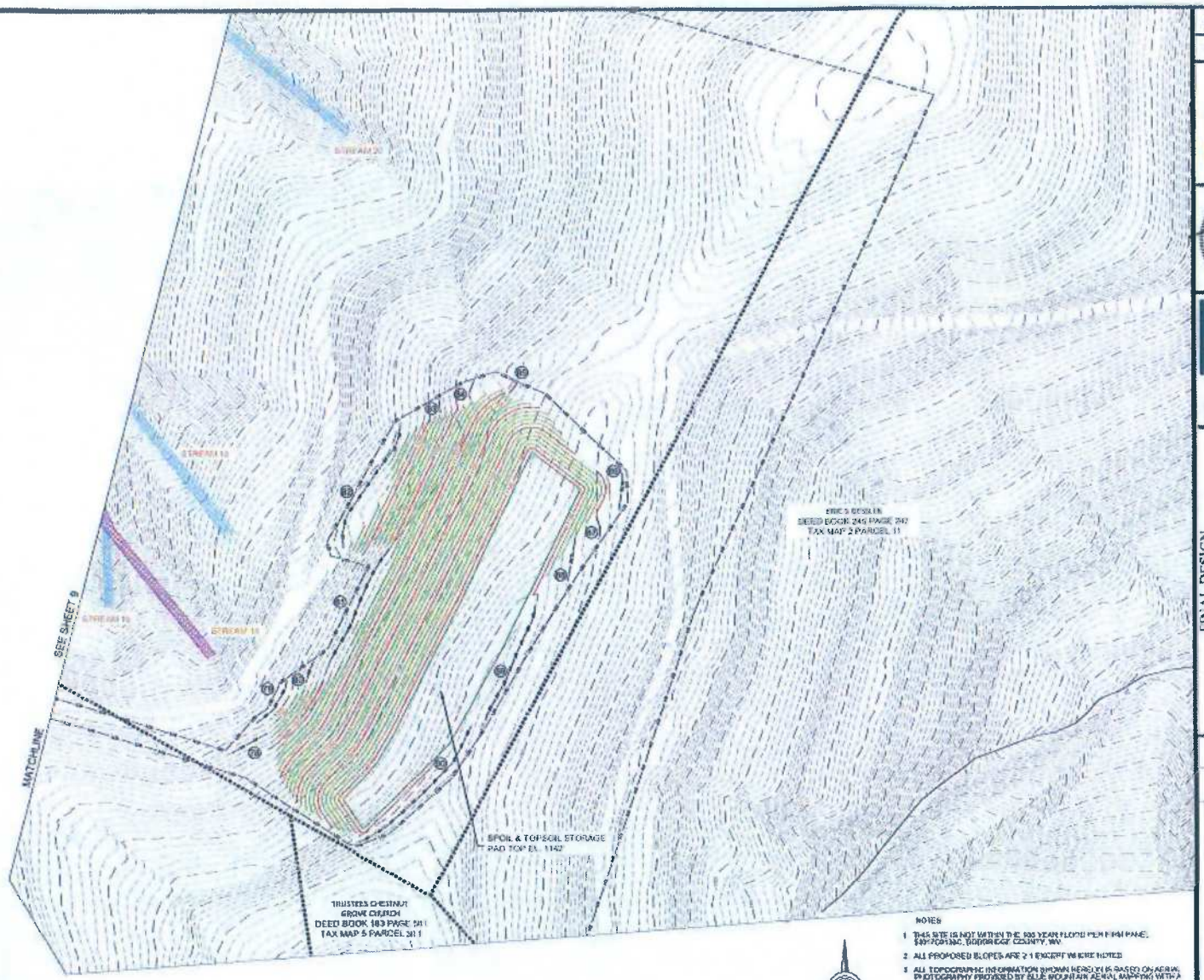


EXHIBIT 1, PAGE 3

APPROVED
WVDEP OOG
SAY 5/29/2013



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY LINE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- NHD EPHEMERAL STREAM
- NHD PERENNIAL STREAM
- NWI WETLANDS
- NWI INTERMITTENT
- NWI WETLANDS
- DITCH
- SF, SSF AND SILT SOCK INDICATOR

GRAPHIC SCALE

NOTES

1. THIS SITE IS NOT WITHIN THE 500 YEAR FLOOD PER FIRM PANEL 540170F DNC, DODDRIDGE COUNTY, WV.
2. ALL PROPOSED SLOPES ARE 2:1 EXCEPT WHERE NOTED.
3. ALL TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON AERIAL PHOTOGRAPHY PROVIDED BY BLUE MOUNTAIN AERIAL MAPPING WITH A FLIGHT DATE OF 3-29-12.
4. FILL OVER 50 VERTICAL FEET ON A SPOIL PAD REQUIRES A 10' BENCH.
5. ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON THE DETAIL SHEETS.
6. POSITIVE FLOW FROM PAD TO SUMPS SHALL BE MAINTAINED. SEDIMENT AND MATERIAL REMOVED FROM THE PAD SUMPS SHALL BE PUMPED TO AN ON-SITE HOLDING/STORAGE TANK AND SUBSEQUENTLY BE REMOVED FROM SITE BY AN APPROVED COMMERCIAL VENDOR.
7. ALL ENVIRONMENTAL DELINEATIONS PROVIDED BY ALLSTAR ECOLOGY.

FINAL DESIGN
SITE PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP.

ANTERO RESOURCES

SSP Page 31

EXHIBIT 1, PAGE 2

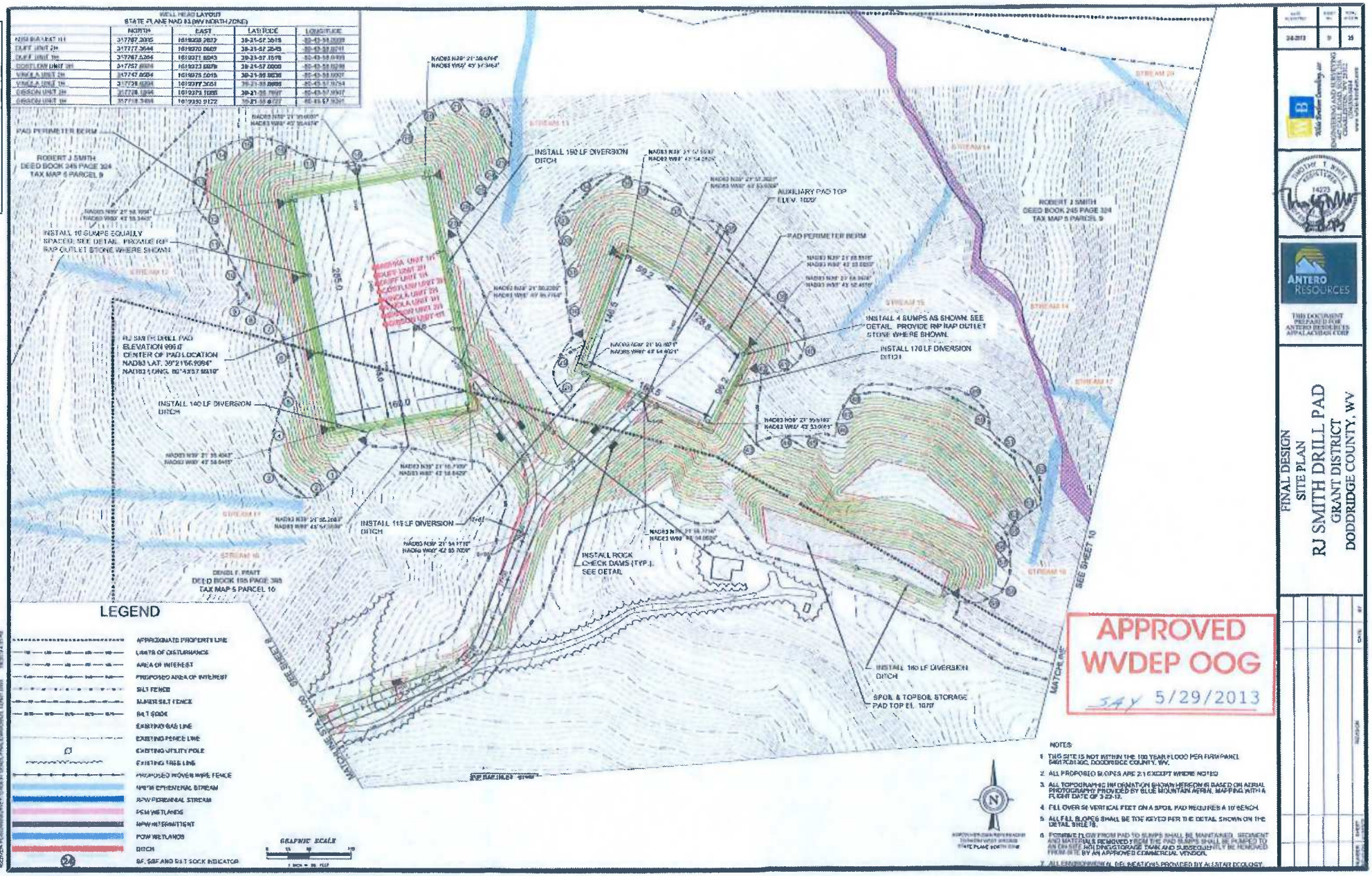


EXHIBIT 1, PAGE 1

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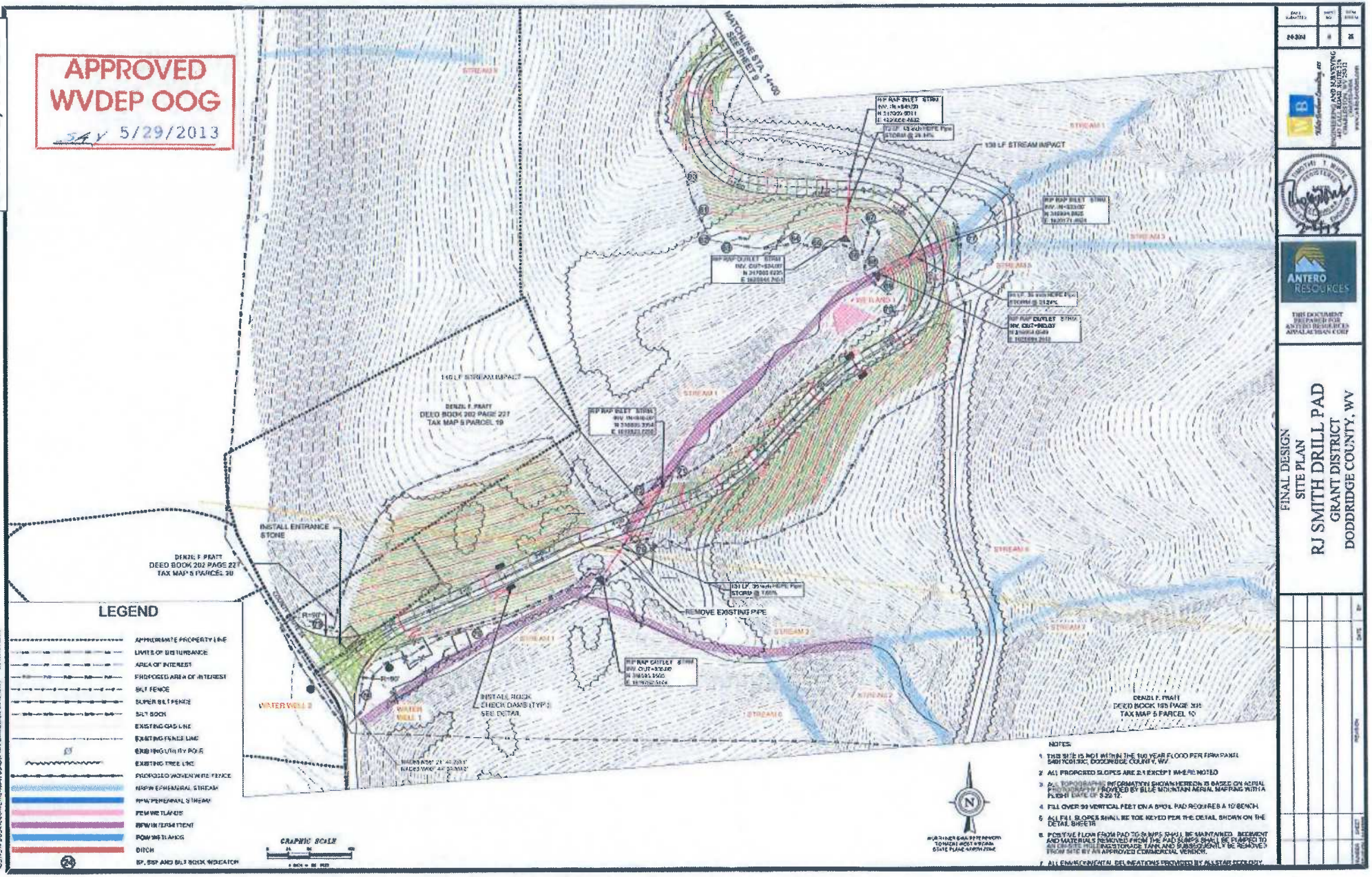
WVDEP OOG
5/29/2013



Appendix F. **CONTINUED**

	Completions -CONTINUED	
Super Scale Inhibitor	112 gallons	Tote
WFR-3B(Friction Reducer)	372 gallons	Tote

	Service/Work over	
FR-1100(Friction Reducer)	800 gallons	Bucket
FR-1205(Pipe on Pipe)	265 gallons	Bucket
FR1302(Liquid Beads)	80 gallons	Bucket
FR-1400(Gel Sweep/Friction Reducer)	550 gallons	Tote
76 DynaLife LEP Grease	20 gallons	Bucket
LithoPlex rt. No. 2 grease	2 gallons	Tube
Hi Temp red grease	3 gallons	Tube
50/50 antifreeze	15 gallons	Bucket
Hydraulic oil 68	15 gallons	Bucket
Hydraulic oil 46	25 gallons	Bucket
Premium Lithium grease	1 gallon	Spray Can
P.B. Blaster	2 gallons	Spray Can
Transmission fluid	10 gallons	Bucket
Max-gear	15 gallons	Bucket
Brakleen	3 gallons	Spray Can
Off-road diesel	700 gallons	Double Walled Tank

	Reclamation	
Diesel Fuel Oil	2000 gallons	Double Walled Bulk Tank

	Salem Compressor Station	
Used Oil	50 barrels	Bulk Tank
Compressor Oil	1600 gallons	Bulk Tank
Engine Oil	1600 gallons	Bulk Tank
Ethylene Glycol	2000 gallons	Bulk Tank
Produced Water	420 barrels	Bulk Tank

Note: The attached list represents anticipated materials used for planned operations on the well site. In the event of an unplanned event on the well site, additional materials may be required. Additional MSDS for any unplanned events will be maintained on the well site in accordance with OSHA CFR 1910.1200 standards.

The Drilling Supervisor or Contractor of the Operator will maintain Material Data Safety Sheets (MSDS) for all materials and chemicals used on the well site in accordance with OSHA CFR 1910.1200 standards. The MSDS should be located in the Company Representative's Office on-site. Copies of the MSDS may also be obtained from the area Safety Coordinator, the operator contact for maintaining MSDS, by calling the local Antero Resource Office at 304-622-3842 or 800-878-1373.

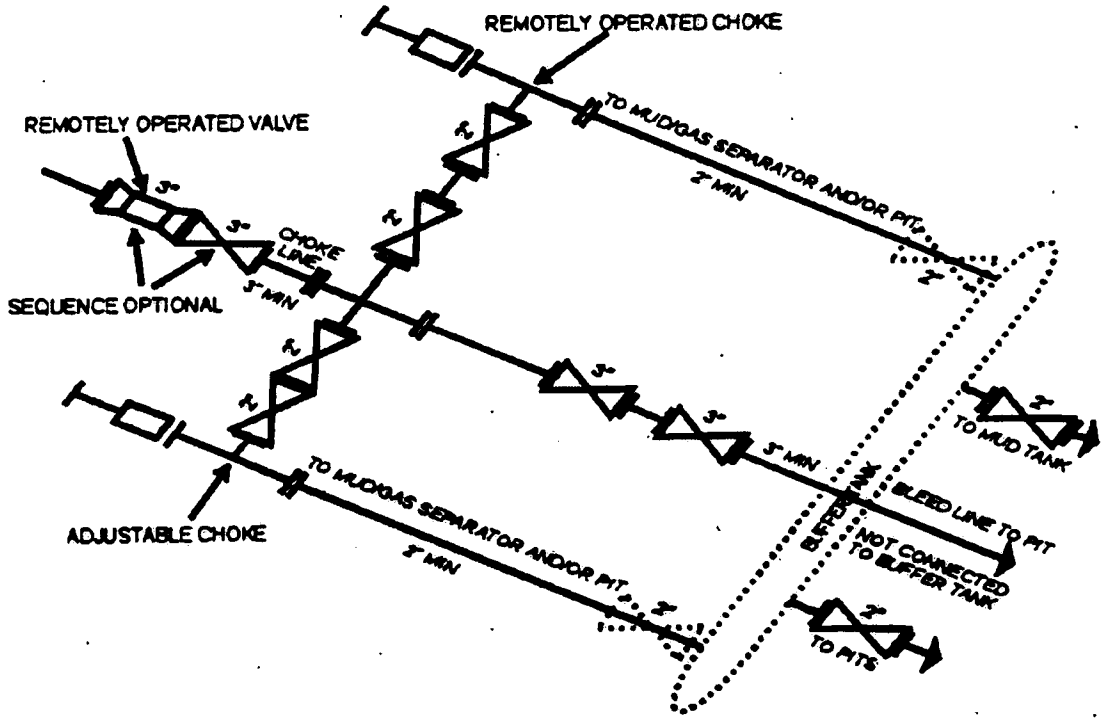
Appendix F. **List of Hazardous Chemicals used during Phases of Operation:**

Chemical Name	Daily Qty. on Location	Storage Container
	Construction	
Diesel Fuel Oil	2000 Gallons	Double Walled Tank
	Drilling	
Airfoam HD	275 gallons	Drum
Alpha 1655	220 gallons	Drum
Aluminum Stearate	150 lbs	Tote
Caustic Soda	1500 lbs	Bag
Claytrol	440 gallons	Drum
Conqor 404	55 gallons	Drum
Diesel Fuel Oil	8000 gallons	Double Walled Tank
Gear Oil	250 gallons	Double Walled Tank
Hydraulic Fluid	250 gallons	Double Walled Tank
KCL (Potassium Chloride)	15000 lbs	Bag
LD-9	100 gallons	Bucket
Lime	2500 lbs	Bag
Mil-Bar	80000 lbs	Super Sack
Mil-Lube	220 gallons	Drum
Milmica	2500 lbs	Bag
Mil-Pac LV	2500 lbs	Bag
Mil-Plug (Walnut Shells)	5000 lbs	Bag
Milstarch	10000 lbs	Bag
Mineral Oil	265 gallons	Tote
Motor Oil	250 gallons	Double Walled Tank
New-Drill	160 gallons	Bucket
Perma-Lose HT	10000 lbs	Bag
Salt	30000 lbs	Super Sack
Soda Ash	1000 lbs	Bag
SWF	265 gallons	Drum
W.O. Defoam	160 gallons	Bucket
Xan-Plex D	1200 lbs	Bag
X-Cide 102	160 gallons	Bucket
	Completions	
15% Hydrochloric Acid	1000 gallons	Acid Tanker
DAP 901 (Scale Inhibitor)	284 gallons	Tote
DAP-923 (Acid Additive)	1.8 gallons	Acid Tanker
Diesel Fuel Oil	8000 gallons	Tanker
DWP-111 (Gel)	4980 gallons	Tote
DWP-204 (Buffer)	496 gallons	Tote
DWP-612 (FR)	1116 gallons	Tote
DWP-901 (Oxide Breaker)	1112 pounds	Bucket
DWP-944 (Biocide)	224 gallons	Tote
Oil 40 (Pump Flush)	300 gallons	Tote
EB-4L(Gel Breaker)	362 gallons	Tote
HCl Acid	1000 gallons	Tanker
KR-153SL(Biocide)	74 gallons	Tote

Appendix E. **List of Well Control Trained Personnel**

1. John Kawcak- Antero
2. Mike Ward- Drilling Consultant
3. Ricky Jones- Drilling Superintendent
4. Mike Alcorn- Drilling Superintendent
5. Landon West- Completion Consultant
6. Jeff Partridge-Completion Consultant
7. Norman Wood- Drilling Consultant
8. Delf Martinez- Drilling Consultant
9. James Harvey- Drilling Consultant
10. Steve Guffey- Drilling Consultant
11. Tim Murell- Drilling Consultant
12. James Neal-Drilling Consultant
13. Virgil Gaither-Drilling Consultant
14. Ralph Ybarra- Drilling Consultant
15. Bob Belcher- Completion Consultant (Willowbend)
16. Kris Humpert- Completion Consultant (Willowbend)
17. Ronnie Fuller- Completion Consultant (Willowbend)
18. Trevor Lively- Completion Consultant (Willowbend)
19. Trey Armstrong- Completion Consultant (Willowbend)
20. Gary Linn- Completion Consultant (Willowbend)
21. Justin Bowers- Completion Consultant (Willowbend)
22. Michael Petitt- Completion Consultant (Willowbend)
23. Stephen Sanders- Completion Consultant (Willowbend)

Appendix D: Choke Manifold Schematic



5M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

Although not required for any of the choke manifold systems, buffer tanks are sometimes installed downstream of the choke assemblies for the purpose of manifolding the bleed lines together. When buffer tanks are employed, valves shall be installed upstream to isolate a failure or malfunction without interrupting flow control. Though not shown on 2M, 3M, 10M, OR 15M drawings, it would also be applicable to those situations.

[54 FR 39528, Sept. 27, 1989]

WHERE TO FIND HELP

Doddridge County:

Ambulance, Fire, Law Enforcement Emergencies **Call 911**
Poison Control Center....1-304-388-4211 or 1-800-222-1222
Emergency Alert System Radio WFBY-FM 106.5

FIRE:	
Doddridge County Ambulance Authority	304-838-5718
Greenwood V.F.D	304-873-3669
McClellan V.F.D	304-782-2774
Smithburg V.F.D	304-873-1493
West Union V.F.D	304-873-1391
B.A.N.C.S V.F.D	304-873-3722
EMS:	
Doddridge County Office of Emergency Service	304-782-2124
Doddridge County EMS	304-873-3330
LAW ENFOREMENT:	
Doddridge County Sheriff Department	304-873-1000
West Union Police Department	304-873-1107
West Virginia State Police Doddridge County Detachment	304-873-2101
OTHER IMPORTANT NUMBERS:	
W.V. Dept. of Health & Human Resources	304-627-2295
National Response Center (Chemical, Oil Spills & Chemical/Biological Terrorism) (State Emergency Spill Notification)	1-800-424-8802 1-800-642-3074
Allegheny Power	1-800-255-3443
WV State Fire Marshal (Arson Hotline)	304-588-2191 1-800-233-3473
Dominion Hope Gas	1-800-688-4673

Contact	Phone Number
Water Moving/Pumping	
TK Stanley	304.476.0396
Pumping Services—Kill Fluids	
Halliburton—Jane Lew	724.743.6601 Central Dispatch
Light Plants	254.434.1469 Hot Lights- Josh
Wolfpack	304-623-1199.
BOPs	
Blue Dot	304.290.7399
Snubbing Services	Basic Energy- 724-825-2548 Bryan Berlison
Cudd Well Control	713.849.2769 Houston
Wild Well Control	281.353.5481
Roustabout Crews	740.473-1305 Hall Drilling Office 304.588.66474 Hall Drilling- Jack 601.410.7440- TK Stanley Office 724.984.7626- TK Stanley- Brett

WV Emergency Reporting

In the event of a hazardous waste or hazardous material release or emergency, please contact: 1-800-642-3074.

Additional Contact Information

1-800-424-8802 National Response Center
1-304-558-5938 DEP Elkview Emergency Response Unit

Email Contacts:

Mike Dorsey Mike.H.Dorsey@wv.gov
Rusty Joins Rusty.T.Joins@wv.gov

Contact	Phone Number
Doddridge County Emergency	911 304.873.3253
Doddridge County LEPC	304.782.2124 Roland W. Kniceley
WV Highway Patrol	304,782,2124 doddridgeoes@dishmail.net
Public Water Intakes (see App G for add'l points)	to be determined
Waste Removal	
TK Stanley—Waste Removal, Vac Truck	304.622.6677
Stallion	330.760.4248
Waste Management	
Contractors	
Hall Drilling Services MT Hall	304588 3368
TK Stanley	304.622.6677
Cleanup Crews	
Ryan Environmental	304.641.0244
Water Haulers	
TK Stanley	304.476.0396
Hall Drilling	304.483.8125
Frac Tank Suppliers	
TK Stanley—Frac Tank Rental	304.622.6677
Stallion	330.760.4248
Winch Trucks	
TK Stanley	304.476.9588

Contact	Phone Number
Safety Manager Rick Blankenship	Direct: (303) 357-7378 Cell: (720) 235-2775 24hr
Vice President Production Kevin Kilstrom	Direct: (303) 357-7335 Cell: (303) 808-0254 24hr
Federal and State Agencies	
National Response Center	(800) 424-8802
West Virginia Office of Water Resources' Emergency Notification Number, Oil Spill Response	1-800-642-3074
West Virginia Office of Oil and Gas Sam Ward, WVDEP Inspector – Harrison County Joe Taylor, WVDEP Inspector – Tyler County David Cowan, WVDEP Inspector – Ritchie County Douglas Newlon, WVDEP Inspector – Doddridge County	 (304) 389-7583 cell Sam Ward (304) 380-7469 cell Joe Taylor (304) 389-3509 cell David Cowan (304) 932-8049 cell Douglas Newlon
Environmental Protection Agency (EPA) Region 3	Phone: 215-814-3231 Fax: 215-814-3163
West Virginia Worker's Compensation	1-888-4WVCOMP 1-304-926-3400
West Virginia Fish and Wildlife Service, Field Office, Elkins, WV	**Phone:** 304-636-6586 **Fax:** 304-636-7824
US OSHA Charles Green	1-800-321-OSHA (1-800-321-6742) 304.347.5937
Local Agencies and Responders	
Sheriff/Police/Fire Department	911
Harrison County LEPC	304.624.9700 John Keeling
Hospital- United Hospital Center--Clarksburg	304. 624.2121
Harrison County Emergency and Dispatch Business Office	911 304.623.6559

Appendix C.

EMERGENCY CONTACT LIST AND PHONE NUMBERS

Contact	Phone Number
Designated Person and Incident Commander:	
John Kawcak, *Operations Manager*	817.368.1553 John
Tim Culberson, Midstream Construction Manager	918.916.0116 Tim
Terry Wyckoff, Midstream Production Manager	304.991.0720 Terry
Designated Backup Person Incident Commander/Response Coordinator:	
Mike Ward	580.276.7484 Mike
Ricky Jones	580.927.6276 Ricky
Norman Wood	903.353.4429 Norman
Stanley Dudley	970.618.7602 Stanley
Jeff Partridge	940.577.2288 Jeff
Landon West	940.389.0602 Landon
Tim Henrich	720.530.3059 Tim H.
Mike Alcorn	304.627.7070 Mike
James Harvey	918.916.4340 James
Tim Murrell	903.256.6040 Tim
Delf Martinez	970.629.0055 Delf
Ralph Ybarra	580.927.5606 Ralph
Virgil Gaither	580.504.2366 Virgil
James Neal	607.644.8701 James
Frontier #3	832.487.7965 Rig Sat Phone
Frontier #14	713.758.0662 Rig Sat Phone
Frontier #17	713,758.0730 Rig Sat Phone
Frontier #8	832.531.7014 Rig Sat Phone
Frontier #22	713.758.0893 Rig Sat Phone
Hall Drilling #3	713.758.0881 Rig Sat Phone
Antero Resources Denver Office 1625 17th Street, Suite 300 Denver, CO 80202	Office: (303) 357-7310 Fax: 303-357-7315
Environmental Manager Jerry Alberts	Direct: (303) 357-7341 Cell: 720-201-0160 24hr

Appendix B.

Daily Personal and Visitor Log

DATE	TIME IN	TIME OUT	NAME	ORGANIZATION

Appendix A: Safety Meeting Log, Personnel and Visitor Log & Emergency Contacts

Safety Meeting Log

Date:_____ Location(Pad):_____ Well Name:_____

	Name	Organization	Job Title
1.			
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25.			

8.0 Notification and Protection Zone Standards

8.1 Method of Notification

In an emergency which requires the notification of residents and emergency personnel that may be affected during drilling such as release of H2S, flaring, etc., the emergency response plan will be immediately implemented. This plan specifies the roles and responsibilities of on-site personnel in case of emergency and addresses emergency notification of potentially affected residents and public emergency response personnel.

In general under the situation presently described, after the activation of the emergency alarm, the on-site personnel will muster for a headcount by the On-Scene Incident Commander which is usually the Drilling Supervisor or Toolpusher. After initial assessment of the situation, the OSIC will notify the public emergency response agency from which direction will be taken. If the agency directs, on-site personnel will notify all local impacted residents of the incident by dispatching a worker by truck to each potentially affected residence. If the public emergency responder does not direct this notification to be made by the operator, then the public response agency will be responsible for this notification. The local emergency responders have, in general, stated that emergency notification of local residents will be accomplished by their means including television and radio announcement as well as public address systems on patrol vehicles. Antero safety coordinators who are located in the field may assist with the notification of local residents.

8.2 Established Protection Zones

Protection zones will be established and maintained based on the nature, extent and severity of the event. These protection zones will be based on those safe distances outlined in the applicable portions of the DOT Emergency Response Guidebook.

typically located near the well bore on the drilling rig, outside the data van or on the drillers stand.

7.2 H2S Training

All personnel that will be involved in the drilling operations will be trained in H2S in drilling operations to a minimum of the awareness level. Additional training will be given to the Drilling Supervisors both in H2S and emergency response duties related specifically to air toxins. All of the aforementioned training will be completed prior to spudding the well. These records may be kept separate from this plan.

7.3 Personal Protection Equipment

The following personal protection equipment will be available and in use as needed on location:

- Fire Retardant Clothing (FRC),
- Hardhats,
- safety shoes,
- safety glasses and/or safety goggles/face shields,
- hearing protection earplugs,
- cotton and chemical resistant work gloves, and
- dust mask respirators.

In the event that other hazards are identified or presented during the drilling operation, we will attempt to eliminate the hazard, and if not practical, additional PPE will be provided to mitigate the risk to the worker. In the event that H2S is detected, a hazard assessment will be performed for this exposure along with risk mitigation.

7.4 H2S Notification and Control

The emergency alarm will be audible or visual type which will be detectable by all personnel on location. If dangerous levels of H2S are detected, we will immediately implement our Emergency Response Plan which will provide for site control and evacuation as needed. Generally, the site will be secured such that access is allowed only for trained emergency response personnel. Site security will be accomplished by trained workers stationed at safe points on the perimeter and access road to the site.

If H2S is detected and confirmed, a telephonic notification will be made to the local oil and gas inspector.

6.2 Mud Mixing Units

The drilling rig is equipped with 2 mud tanks with agitators and jets such that it can make two pills.

6.3 Kill Procedures

The following paragraph describes the methodology and type of kill procedures that will be used if needed. These procedures are recognized by the IADC.

Once a Kick is detected a prompt shut in of the well is essential. The exact shut in method will be dictated by the operation being performed at the time of the kick, available equipment, plus other extenuating circumstance. The following types of kill operations may be performed to bring the well back under control. The different methods listed below to be used will be determined by the operation being performed at the time of the kick.

Kill Procedures

1.) Drillers Method

2.) Wait and Weight Method

3.) Circulate and Weight Method

4.) Concurrent Method

5.) Reverse Circulation Method

6.) Dynamic Kill Method

7.) Bullheading Method

8.) Volumetric Method

7.0 Hydrogen Sulfide Operations

7.1 H2S Monitoring

The equipment and method used for the monitoring, detection and warning of the presence of hydrogen sulfide gas during drilling, completions and work-over operations will be portable electronic gas detection such as BW gas detectors or equivalent. These detectors will be

6.0 Well Killing Operations

6.1 Mud Mixing Inventory

The following shows the inventory of all materials that will be on-site for the mixing of mud:

- 20 sack of Soda Ash
- 480 sacks of KCL
- 200 sacks of Biolose
- 40 sack of Xan-Plex
- 20 buckets of X-Cide 102
- 3 Drums of KD-40
- 5 Buckets of LD-S
- 15 super sack of MIL Bar
- 100 sacks of Soletex
- 40 Sacks of Graphite
- 300 Sack of Salt

Volume of mixed mud	=pit volume + equivalent volume in tanks = 500 bbls + 500 bbls = 1000 bbls total
Mixed Mud Weight	The mixed mud weight will vary depending on the bottom hole pressures and will calculated and adjusted as we gather more information; we intend to use 12.8 lb – 13.0 lb mud but will adjust the mud weight as information becomes available
Volume of Add'l Weighting Mat'l	Antero will have the necessary materials available to mix up enough mud to weight the mud up 1 lb more than the mud used for drilling; as an estimate, we expect to have 10 pallets of barite on site and 12 pallets of bentonite
Volume Water for Mixing	The rig has a 400 bbl rig water tank and the location will have 800 bbls additional in separate tanks.

5.0 Well Flaring Operations

5.1 Size, Construction and Length of Flare Line

The flare line will be a 4" diameter, steel line that extends 50' from the well. The line will be anchored to the surface of the ground by cross pinning it in place using metal staking at multiple points along the line.

The choke assembly is described in previous section of this document and in drawing "5M Choke Manifold Equipment" BLM drawing Onshore Oil and Gas Order Number 2, Appendix D.

We do not anticipate flaring since we would first attempt to route the flow to the Gas Buster and work the gas kick off from there. Flaring would occur as a last resort or if needed.

5.2 Flare Lighting System

The system for lighting the flare will be an automatic flare igniter using a solar collector panel and battery charger system. A second igniter will be installed as a backup. Should flaring be required or needed.

The Drilling Supervisor will give notification to the local fire department prior to lighting the flare, if practicable, or as soon as possible thereafter.

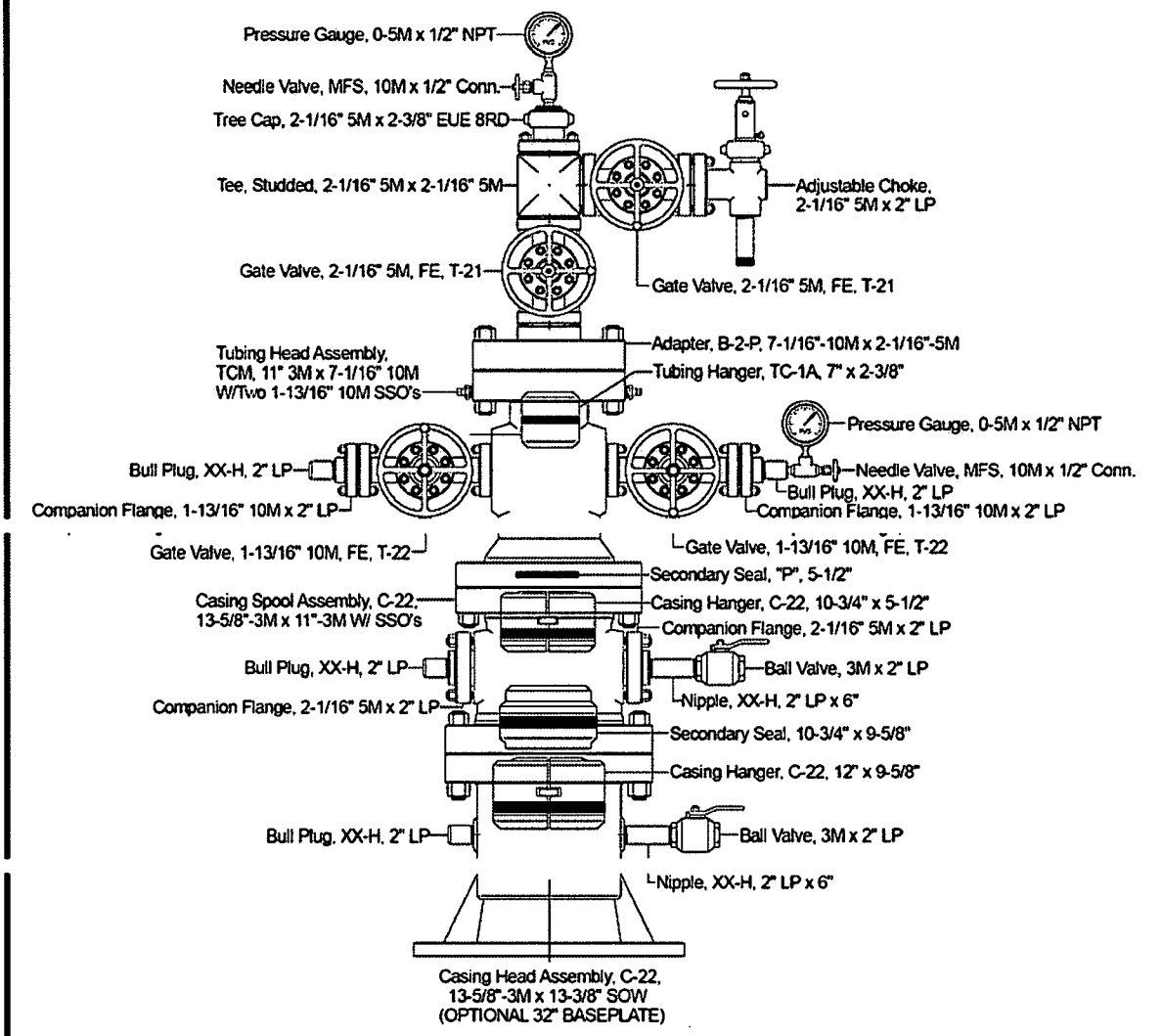
5.3 Flare Safe Distances

The flare line(s) discharge shall be located not less than 50 feet from the well head, having straight lines unless turns are targeted with running tees, and shall be positioned downwind of rig and trailers. The flare system shall have an effective method for ignition. All flammable material beyond the end of the flare line will be cleared to a minimum distance of 50feet.

5.4 Flare Duration

The flare duration should not exceed the maximum time requirements needed to complete the operation.

4.6 Schematic and Description of the Wellhead Assembly



4.3 BOP Installation Schedule

The BOP will be installed after running surface casing as well as after running intermediate casing. BOP equipment shall be installed on the innermost string of casing after the surface casing.

4.4 Well Control Training

All Drilling Supervisors and Toolpushers used on this well will be IADC trained and certified. A trained person will be present during the drilling operations. Training certificates will be available for review on the location. The list of personnel with said training is provided in Appendix E.

4.5 Drilling Record

The Drilling Supervisor will maintain detailed records of significant drilling events such as lost circulation, hydrogen sulfide gas, fluid entry, kicks and abnormal pressures through the electronic data entry and recording system, Wellview. This system allows the Drilling Supervisor to enter daily reports containing the specified information. The records are then retained electronically at Antero Main Office in Denver, CO.

The Emergency Response Plan for this operating area requires the Drilling Supervisor to notify the district oil and gas inspector or the designated Office of Oil and Gas representative any unusual drilling events such as hydrogen sulfide gas or significant kicks that occur during drilling operations. Any encounter of hydrogen sulfide gas requires immediate notification of the Office of Oil and Gas.

4.2 Procedure and Schedule for Testing BOP Equipment

Well Control Equipment Testing

i. Perform all tests described below using clear water or an air..

ii. Ram type preventers and associated equipment shall be tested to approved stack working pressure if isolated by test plug or to 80 percent of internal yield pressure of casing if BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off of pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.

iii. Annular type preventers shall be tested to 70 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.

iv. As a minimum, the above test shall be performed:
   a. when initially installed:
   b. whenever any seal subject to test pressure is broken:
   c. following related repairs: and
   d. 30-day intervals.

v. Valves shall be tested from working pressure side during BOPE tests with all downstream valves open.

vi. When testing the kill line valve(s), the check valve shall be held open or the ball removed.

vii. Annular preventers shall be functionally operated at least weekly.

viii. Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.

ix. A BOPE pit level drill shall be conducted weekly for each drilling crew.

x. Pressure tests shall apply to all related well control equipment.

xi. All of the above described tests and/or drills shall be recorded in the drilling log.

xii. For intermediate wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation.

xiii. For the bottom and horizontal wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation, weekly, and after each bit trip.

Power Availability

Power for the closing unit pumps shall be available to the unit at all times so that the pumps shall automatically start when the closing valve manifold pressure has decreased to the pre-set level.

Accumulator Pump Capacity

Each BOP closing unit shall be equipped with sufficient number and sizes of pumps so that, with the accumulator system isolated from service, the pumps shall be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and obtain a minimum of 200 psi above specified accumulator precharge pressure.

Locking Devices

A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed on all systems of 2M or greater. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

Accumulator working pressure rating	**Minimum acceptable operating pressure**	**Desired precharge pressure**	**Maximum acceptable precharge pressure**	**Minimum acceptable precharge pressure**
1,500 psi	1,500 psi	750 psi	800 psi	700 psi
2,000 psi	2,000 psi	1,000 psi	1,100 psi	900 psi
3,000 psi	3,000 psi	1,000 psi	1,100 psi	900 psi

Remote Controls

Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems shall be capable of closing all preventers. Remote controls for 5M or greater systems shall be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve (if so equipped). No remote control for a 2M system is required.

- Fill-up line above the uppermost preventer.

If repair or replacement of the BOPE is required after testing, this work shall be performed prior to drilling out the casing shoe.

When the BOPE cannot function to secure the hole, the hole shall be secured using cement, retrievable packer or a bridge plug packer, bridge plug, or other acceptable approved method to assure safe well conditions.

Minimum standards for choke manifold equipment.

i. All choke lines shall be straight lines unless turns use tee blocks or are targeted with
ii. running tees, and shall be anchored to prevent whip and reduce vibration.
iii. ii. Choke manifold equipment configuration shall be functionally equivalent to the appropriate example diagram shown in Appendix C. The actual configuration of the chokes may vary.

All valves (except chokes) in the kill line choke manifold, and choke line shall be a type that does not restrict the flow (full opening) and that allows a straight through flow).

Pressure gauges in the well control system shall be a type designed for drilling fluid service

5M and higher system accumulator shall have sufficient capacity to open the hydraulically-controlled gate valve (if so equipped) and close all rams plus the annular preventer (for 3 ram systems add a 50 percent safety factor to compensate for any fluid loss in the control system or preventers) and retain a minimum pressure of 200 psi above precharge on the closing manifold without use of the closing unit pumps. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir shall be maintained at the manufacturer's recommendations. Two independent sources of power shall be available for powering the closing unit pumps. Sufficient nitrogen bottles are suitable as a backup power source only, and shall be recharged when the pressure falls below manufacturer's specifications.

Accumulator Precharge Pressure Test
This test shall be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure shall be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limit specified below (only nitrogen gas may be used to precharge):

casing and cementing program is designed to maintain well control and integrity. The casing setting depths are sufficient to cover and seal off those zones as identified in Exhibit 4.

4.0 BOP Requirements

4.1 BOP Equipment

The following is a list of all BOP equipment with types, sizes and ratings to be utilized and available during the drilling, completion and work-over of the well.

5M system:

- Annular preventer*
- Pipe ram, blind ram, and, if conditions warrant, as specified by the authorized officer, another pipe ram shall also be required*
- A second pipe ram preventer shall be used with a tapered drill string
- Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)*
- 3 inch diameter choke line
- 2 choke line valves (3 inch minimum)*
- Kill line (2 inch minimum)
- 2 chokes with 1 remotely controlled from rig floor
- 2 kill line valves and a check valve (2 inch minimum)*
- Upper kelly cock valve with handle available
- When the expected pressures approach working pressure of the system, 1 remote kill line tested to stack pressure (which shall run to the outer edge of the substructure and be unobstructed)
- Lower kelly cock valve with handle available
- Safety valve(s) and subs to fit all drill string connections in use
- Inside BOP or float sub available
- Pressure gauge on choke manifold
- All BOPE connections subjected to well pressure shall be flanged, welded, or clamped*

A list of Emergency Contacts, including Antero's 24 hour emergency contact telephone number, any contractors of the operator, the Department, the local oil and gas inspector, and local emergency response units are found in Appendix C. This list will be posted at the well site.

2.5 Local Schools and Public Facilities

In the event of an emergency requiring the evacuation of schools and public facilities the Drilling Supervisor or Toolpusher will make the required notifications unless the local public emergency responders take on this responsibility. Generally, local emergency responders have stated that they will assume this responsibility. Exhibit 3 lists all schools and public facilities, with their contact information, within a one-mile radius of the horizontal well location.

2.6 Material Safety Data Sheets

The Drilling Supervisor or Contractor of the Operator will maintain Material Data Safety Sheets (MSDS) for all materials and chemicals used on the well site. The MSDS sheets should be located in the Company Representatives Office on-site. Copies of the MSDS sheets may also be obtained from the area Safety Coordinator, the operator contact for maintaining MSDSs, by calling the local Antero Resource Office at 304-622-3842. See Appendix F for a list of hazardous chemicals used during phases of operation.

3.0 Casing Requirements

3.1 Geologic Prognosis

A list of anticipated freshwater, saltwater, oil and gas, hydrogen sulfide, thief zones, and high pressure and high volume zones, including their expected depth are attached to this plan in Exhibit 4, WW-6B.

3.2 Casing and Cementing Program

Exhibit 4 shows the detailed casing and cementing program, which meets the standards of the American Petroleum Institute (API) and employs a minimum of three strings of casing which are of sufficient weight, quantity and quality for the anticipated conditions to be encountered. This

2.2 Personnel and Visitor Log

This log is intended to provide a current headcount of all persons present at the site at any given time. All personnel and visitors must sign in upon entering the site and sign out upon departure. This log, or one similar, is provided in Appendix B and will be maintained at all times by the Drilling Supervisor or Toolpusher.

2.3 Evacuation Plan

The Drilling Supervisor or Toolpusher will establish a muster point at which all persons on site will assemble for personnel safety and verification of headcount. This point will be located at the entrance to the site.

In the event of an emergency requiring the evacuation of personnel, an audible or visual alarm will be sounded. The Drilling Supervisor and/or the Toolpusher will determine if local residents should be evacuated at this time depending on the outcome of their assessment of the situation.

If local resident evacuation is indicated, the Drilling Supervisor and/or the Toolpusher will be responsible for notifying the local impacted residents, or the local authorities will take this responsibility depending on the urgency, availability and direction of the local authorities. Local authorities have indicated that they will take this responsibility typically and will notify of evacuation mandates via television and radio media announcements in addition to public address units on patrol vehicles. In the event that Antero is directed to take this responsibility, notification will be by dispatching a worker to each affected residence to inform them of evacuation requirements and procedures. See section 8.1 for additional information.

Evacuated local residents may be temporarily housed in local hotels depending on the severity and duration of the emergency. Included in Exhibits 1 & 2 are maps and drawings that may assist in the emergency response and evacuation process.

The Drilling Supervisor and/or the Toolpusher will secure the Personnel and Visitor log before evacuating the site in order to perform a headcount at the muster point.

2.4 Emergency Response Personnel

Requesting public emergency response assistance for this location would be accomplished by the Drilling Supervisor or Toolpusher via telephone to Harrison County Dispatch which can be reached by dialing 911. From there, they will dispatch the appropriate and available emergency response agencies depending on the nature and extent of the emergency.

Site Specific Safety Plan
Antero Resources

1.0 Siting Requirements

1.1. Exhibit 1 provides a plan view map showing the well location, access road, pits, flare lines, dwellings, and noting the north and prevailing wind directions.

1.2. Exhibit 2 also provides an area topographical map showing the well site location

2.0 Site Safety Plan

2.1. Safety Meeting

Safety meetings will be conducted as follows:

- Pre-Drilling,
- Pre-Completion,
- Pre-Workover
- Post Accident/Near Miss, and
- As-Needed.

Safety meetings should be held on-site weekly, at a minimum, prior to the beginning of operations, and:

- Includes personnel employed and involved in the operations, and
- Includes the District Oil and Gas Inspector (or other designated Office of Oil and Gas representative, for the pre-spud meeting only).

Typically, contractor of the operator will conduct these safety meetings with Antero Resources personnel participating as needed. Please list the above personnel as a record of attendance using the form found in Appendix A, or one similar. These records may be maintained separate from this plan.

Plan Modification*

Revision No.	Description of Revision	Antero Preparer	Antero Reviewer/Approver	Agency Approval	Date

*The Office of Oil and Gas must approve all changes and modifications to previously approved plans.

Approval Sheet

The West Virginia Department of Environmental Protection Office of Oil and Gas has set forth minimum requirements for a Well Site Safety Plan which shall be submitted with each horizontal well application. A horizontal well shall be any well which meets the definition as provided for in Title 35, Series 8, Section 2.2 of the West Virginia Department of Environmental Protection Office of Oil and Gas.

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

The Safety Plan, once approved, may only be modified upon approval by the West Virginia Department of Environmental Protection Office of Oil and Gas ("Office").

This plan has met the requirements of the West Virginia Department of Environmental Protection Office of Oil and Gas Well Site Safety Plan Standards.

Approved this day _____of month_____, 20__ by

_____ Date: _____

_____ Date: _____

ANTERO
RESOURCES

Well Site Safety Plan
Antero Resources

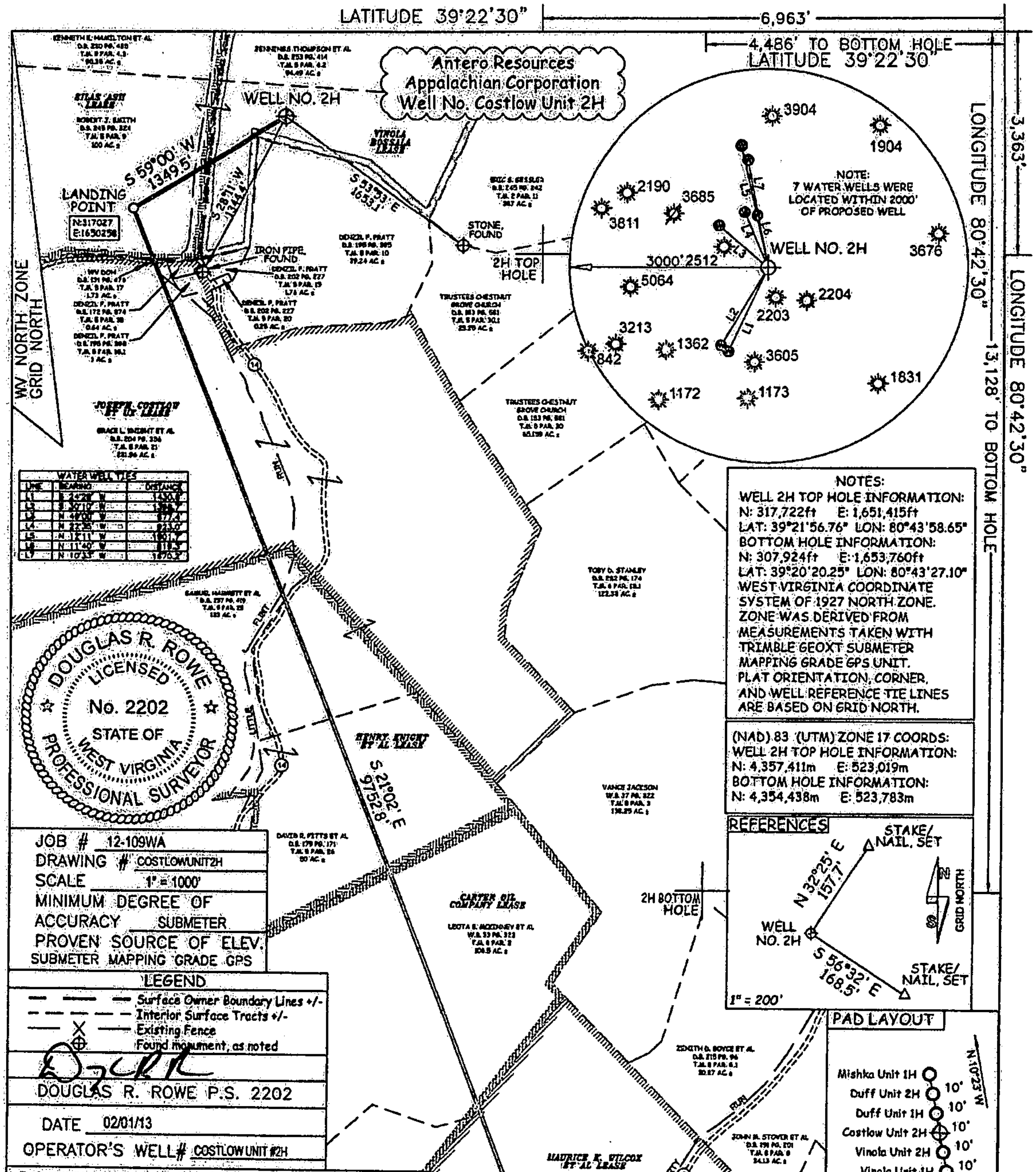
Well Name: **Duff Unit 1H (API#47-017-06246), Duff Unit 2H (API#47-017-06247), Mishka Unit 1H (API#47-017-06259), Costlow Unit 2H (API#47-017-06220), Vinola Unit 1H, Vinola Unit 2H, Gibson Unit 1H and Gibson Unit 2H**

Pad Location: **RJ SMITH PAD**
Doddridge County/ Grant District

GPS Coordinates: Lat 39°21'56.94"/Long 80°43'57.99" (NAD83)

Driving Directions:

Beginning in West Union: Head east on Davis St (Old U.S. 50) for 1.5 miles. Turn left on Co Route 5/Rock Run Rd, continue for 2.8 miles. Take a left turn onto Co Route 28/Nutter Fork/Johnson Williams Hollow Rd and drive for 0.3 miles. Turn right onto Co Route 14/Little Flint Rd and continue for 2.5 miles to access road on right.



LATITUDE 39°22'30"
6,963'
4,486' TO BOTTOM HOLE
LATITUDE 39°22'30"
3,363'
LONGITUDE 80°42'30"
13,128' TO BOTTOM HOLE
LONGITUDE 80°42'30"
Antero Resources Appalachian Corporation Well No. Costlow Unit 2H
WELL NO. 2H
LANDING POINT
N:317027
E:1650298
S 59°00' W 1349.5'
S 28°11' W 1344.4'
S 53°33' E 1653.1'
STONE FOUND
IRON PIPE FOUND
2H TOP HOLE
3000'2512
NOTE: 7 WATER WELLS WERE LOCATED WITHIN 2000' OF PROPOSED WELL
3904
1904
2190
3685
3811
3676
5064
2204
2203
3213
842
1362
3605
1831
1172
1173
WV NORTH ZONE GRID NORTH
WATER WELL TIES
NOTES:
WELL 2H TOP HOLE INFORMATION:
N: 317,722ft E: 1,651,415ft
LAT: 39°21'56.76" LON: 80°43'58.65"
BOTTOM HOLE INFORMATION:
N: 307,924ft E: 1,653,760ft
LAT: 39°20'20.25" LON: 80°43'27.10"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT.
PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.
(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 4,357,411m E: 523,019m
BOTTOM HOLE INFORMATION:
N: 4,354,438m E: 523,783m
REFERENCES
STAKE/ NAIL, SET
N 32°25' E 157.7'
WELL NO. 2H
S 56°32' E 168.5'
STAKE/ NAIL, SET
GRID NORTH
1" = 200'
DOUGLAS R. ROWE LICENSED No. 2202 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR
S 21°02' E 9752.8'
HENRY KNIGHT ET AL LEASE
CARTER OIL COMPANY LEASE
2H BOTTOM HOLE
MAURICE K. WILCOX ET AL LEASE
M.V. UNDERWOOD ET AL LEASE
WELL NO. 2H BOTTOM HOLE
PAD LAYOUT
Mishka Unit 1H
Duff Unit 2H
Duff Unit 1H
Costlow Unit 2H
Vinola Unit 2H
Vinola Unit 1H
Gibson Unit 2H
Gibson Unit 1H
10'
N 10°23' W
NOT TO SCALE
JOB # 12-109WA
DRAWING # COSTLOWUNIT2H
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS
LEGEND
Surface Owner Boundary Lines +/-
Interior Surface Tracts +/-
Existing Fence
Found monument, as noted
DOUGLAS R. ROWE P.S. 2202
DATE 02/01/13
OPERATOR'S WELL# COSTLOW UNIT #2H
COUNTY NAME
PERMIT

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PERSCRIBED BY THE DEPTARTMENT OF ENVIRONMENTAL PROTECTION.

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

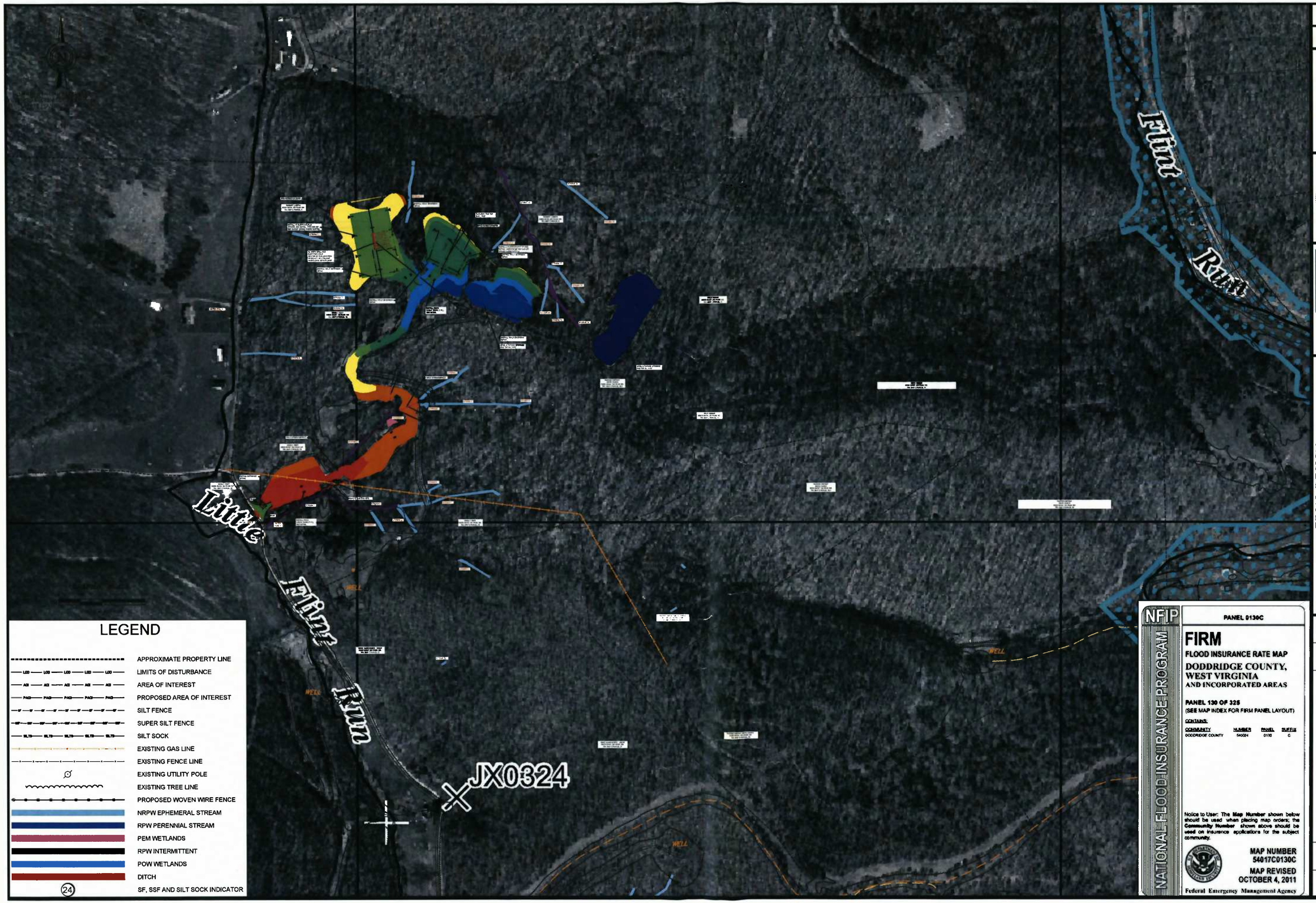
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

API WELL # 47 - 017 - 06220H6A
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 996' WATERSHED LITTLE FLINT RUN
QUADRANGLE SMITHBURG 7.5' DISTRICT GRANT COUNTY DODDRIDGE
SURFACE OWNER ROBERT J. SMITH ACREAGE 100 ACRES +/-
OIL & GAS ROYALTY OWNER VINOLA BOSSALA; SILAS ASH; JOSEPH COSTLOW ET UX; HENRY KNIGHT ET AL; CARTER OIL CO.; MAURICE K. WILCOX ET AL; M.V. UNDERWOOD ET AL
LEASE ACREAGE 120 ACRES±; 120 ACRES±; 350 ACRES±; 213 ACRES±; 224.75 ACRES±; 101 ACRES±; 44 ACRES±
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) ___
PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,400' TVD 18,600' MD
WELL OPERATOR ANTERO RESOURCES APPALACHIAN CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1625 17TH STREET, DENVER, CO 80202 ADDRESS CT CORPORATION SYSTEM, 5400 D BIG TYLER ROAD, CHARLESTON, WV 25313

FORM WW-6



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY POLE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- NRPW EPHEMERAL STREAM
- RPW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- (24) SF, SSF AND SILT SOCK INDICATOR

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0130C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 130 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0130	C

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

MAP NUMBER 54017C0130C

MAP REVISED OCTOBER 4, 2011

Federal Emergency Management Agency

DATE SUBMITTED	SHEET NO.	TOTAL SHEETS
2-6-2013	26	25

White Brothers Consulting, LLC
ENGINEERING AND SURVEYING
417 CALL ROAD, SUITE 216
CHARLESTON, WV 25312
(304)550-9484
www.white-brothers.com

TIMOTHY T. WHITE
REGISTERED
14275
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
SITE PLAN FLOOD EXHIBIT

RJ SMITH DRILL PAD

GRANT DISTRICT
DODDRIDGE COUNTY, WV

NUMBER	REVISION	DATE	BY
SHEET NUMBER			

API#1706220
API#1706246
API#1706247
API#1706259

RJ SMITH DRILL PAD SITE
FINAL SITE DESIGN, CONSTRUCTION PLAN, AND EROSION & SEDIMENT CONTROL PLANS

ANTERO RESOURCES APPALACHIAN CORPORATION

Electronic Version of Plans Can Be Viewed at: Q\OIL GAS\SAY FILES\REVIEWS

APPROVED
WVDEP OOG
SAY 5/29/2013

WELL HEAD LAYOUT STATE PLANE NAD 83 (WV NORTH ZONE)	NORTH	EAST	LATITUDE	LONGITUDE
[illegible] UNIT 1H	[illegible]	[illegible]	[illegible]	[illegible]
DUFF UNIT 2H	[illegible]	[illegible]	[illegible]	[illegible]
DUFF UNIT 1H	[illegible]	[illegible]	[illegible]	[illegible]
COSTLOW UNIT 2H	[illegible]	[illegible]	[illegible]	[illegible]
VINCLA UNIT 2H	[illegible]	[illegible]	[illegible]	[illegible]
VINCLA UNIT 1H	[illegible]	[illegible]	[illegible]	[illegible]
GIBSON UNIT 2H	[illegible]	[illegible]	[illegible]	[illegible]
GIBSON UNIT 1H	[illegible]	[illegible]	[illegible]	[illegible]

● PROJECT LOCATION

WATERSHED (HUC8): LITTLE MUSKINGUM MIDDLE ISLAND

SMITHBURG 7.5 QUAD

● PROJECT LOCATION
SCALE 1" = 2000'

AFFECTED TAX PARCELS:

DENZIL F. PRATT	DENZIL F. PRATT	DENZIL F. PRATT	ROBERT J. SMITH
DB 202 PAGE 227	DB 202 PAGE 227	DB 195 PAGE 395	DB 243 PAGE 324
TM 5 PARCEL 20	TM 5 PARCEL 19	TM 5 PARCEL 10	TM 5 PARCEL 9
GRANT DISTRICT	GRANT DISTRICT	GRANT DISTRICT	GRANT DISTRICT

WELL LOCATION RESTRICTIONS

THE PAD COMPLIES WITH THE FOLLOWING RESTRICTIONS (EXCEPTION NOTED):

- 250' FROM AN EXISTING WELL OR DEVELOPED SPRING USED FOR HUMAN OR DOMESTIC ANIMALS
- 625' FROM AN OCCUPIED DWELLING OR BARN GREATER THAN 2500SF USED FOR POULTRY OR DAIRY MEASURED FROM THE CENTER OF THE PAD. EXCEPTION IS DISTANCE OF [illegible]' FROM CENTER OF PAD TO HUNTING CABIN.
- 100' FROM EDGE OF DISTURBANCE TO WETLANDS, PERENNIAL STREAMS, NATURAL OR ARTIFICIAL LAKE, POND OR RESERVOIR
- 300' FROM EDGE OF DISTURBANCE TO NATURALLY REPRODUCING TROUT STREAMS
- 1000' OF SURFACE OR GROUND WATER INTAKE TO A PUBLIC WATER SUPPLY

PROJECT CONTACTS

ANTERO RESOURCES
ANTHONY SMITH, FIELD ENGINEER
304-[illegible] OFFICE
304-673-[illegible] CELL

ELI WAGONER, ENVIRONMENTAL ENGINEER
304-622-3842, EXT. 311
OFFICE 304-476-9770

JOHN KAWCAK, ENGINEER
817-368-1553

AARON KUNZLER, CONSTRUCTION SUPERVISOR
405-227-8344

SURVEYOR & ENGINEER
WHITE BROTHERS CONSULTING, LLC
LEE SNYDER, P.S.
304-580-6484
TIMOTHY T. WHITE, P.E.
304-[illegible]-4477

SITE LOCATIONS STATE PLANE NAD 83 (WV NORTH ZONE)	LATITUDE	LONGITUDE
CENTER OF PAD	[illegible]	[illegible]
BEGIN ENTRANCE ROAD	[illegible]	[illegible]
CENTER OF PAD (UTM 83-17 M)	N 4357[illegible]	E [illegible]

TOTAL DISTURBANCE (ACRES) LAND OWNER	AREA
DENZIL F. PRATT (PAR. 10)	5.78
DENZIL F. PRATT (PAR. 20)	0.22
DENZIL F. PRATT (PAR. 20)	0.24
ROBERT J. SMITH (PAR. 9)	7.10

LOD AREAS (ACRES) DESCRIPTION	AREA
MAIN ACCESS ROADS TO PADS	5.09
DRILL PAD	2.79
AUXILIARY PAD	1.00
SPOIL PADS	3.92
TOTAL	13.30
TOTAL WOODED	13.30

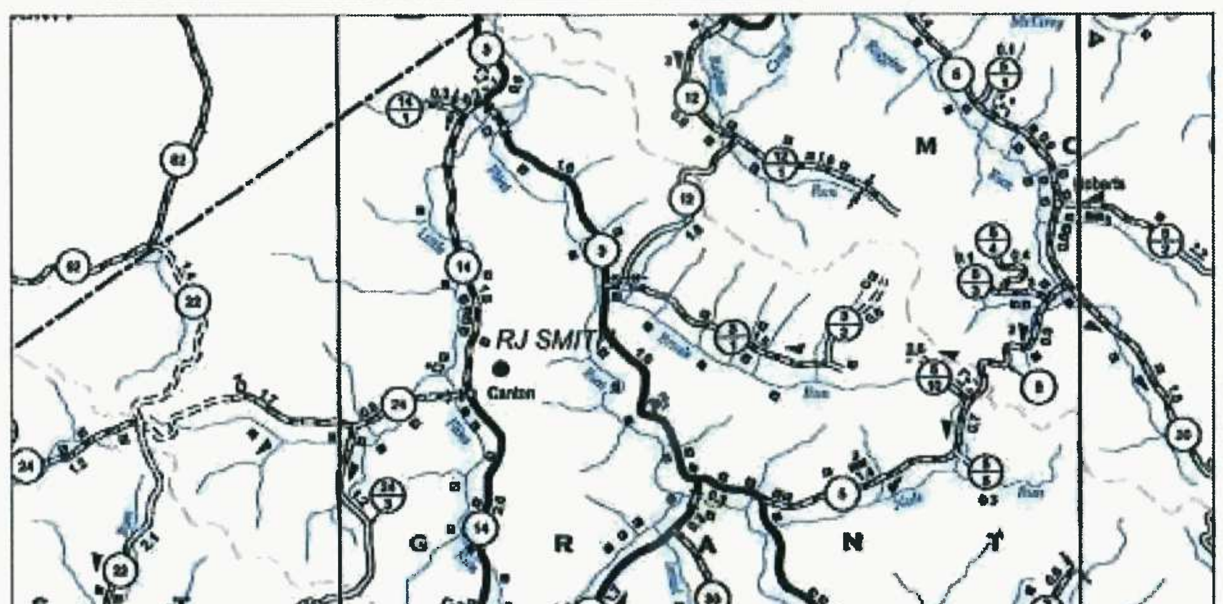
LENGTH (FEET) DESCRIPTION	FEET
COUNTY ROUTE TO PAD	2,[illegible]
TOTAL	2,[illegible]

STREAM IMPACTS (LINEAR FEET) DESCRIPTION	LINEAR FEET
RPW PERENNIAL	0
NRPW EPHEMERAL	45
PEM WETLANDS	0
RPW INTERMITTENT	239
TOTAL	284

FLOODPLAIN CONDITIONS	
DO SITE CONSTRUCTION ACTIVITIES TAKE PLACE IN FLOODPLAIN	NO
PERMIT NEEDED FROM COUNTY FLOODPLAIN COORDINATOR:	NO
HEC-RAS STUDY COMPLETED:	N/A
FLOODPLAIN SHOWN ON DRAWINGS:	N/A
FIRM MAP NUMBER(S) FOR SITE:	5401[illegible]C
ACREAGES OF CONSTRUCTION IN FLOODPLAIN:	N/A

MISS UTILITY OF WEST VIRGINIA
1-800-245-4848
WEST VIRGINIA STATE LAW REQUIRES THAT YOU CALL TWO BUSINESS DAYS BEFORE YOU DIG IN THE STATE OF WEST VIRGINIA. IT'S THE LAW!!

811
Know what's below. Call before you dig.



SHEET INDEX

DESIGN CERTIFICATION
THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS §35-4-21.

MM-109 PERMIT
ANTERO RESOURCES WILL OBTAIN AN ENCROACHMENT PERMIT (MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP.

FINAL SITE DESIGN, QUANTITIES AND CONSTRUCTION SEQUENCE
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

SCHEDULE OF QUANTITIES RJ SMITH DRILL PAD SITE				
ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
1. CLEARING, GRUBBING, E&S CONTROLS				
A. CLEARING & GRUBBING	AC	13.38	$	$
B. TIMBER REMOVAL	AC	13.39	$	$
C. 24" SILT SOCK OR SILT FENCE	LF	1,891	$	$
D. SUPER SILT FENCE	LF	1,250	$	$
2. EXCAVATION (CUT ONLY)				
A. CONSTRUCTION ENTRANCE	EA	1	$	$
B. DRILL PAD	CY	14,542	$	$
C. AUXILIARY PAD	CY	10,203	$	$
D. ACCESS ROADS	CY	26,531	$	$
E. TOPSOIL	CY	6,400	$	$
F. DIVERSION DITCH	LF	735	$	$
G. ROADSIDE DITCH	LF	2,780	$	$
H. DITCH LINING (ACCESS ROAD)				
1. SYNTHETIC MATTING (TRM)	SY	741	$	$
2. RIP RAP	SY	2,039	$	$
I. 4" PVC OUTLET PIPE & RISER PIPE	LF	200	$	$
K. 24" SUMP	EA	14	$	$
3. STONE				
A. 6"-8" RIP RAP (INLETS/OUTLETS)	TN	22	$	$
B. #3 STONE (DITCH CHECKS)	TN	6	$	$
4. AGGREGATE SURFACING - DRILL PAD				
A. DRILL PAD 40 MIL. LINER	SY	5,565	$	$
B. DRILL PAD 10 OZ. FELT	SY	5,565	$	$
C. DRILL PAD 1" MINUS CRUSHER RUN AGGREGATE (2")	TN	565	$	$
D. DRILL PAD 3" CLEAN AGGREGATE (6")	TN	1,695	$	$
E. DRILL PAD #57 STONE (2")	TN	565	$	$
F. ACCESS ROADS 4" MINUS CRUSHER RUN AGREGATE (8")	TN	2,125	$	$
G. ACCESS ROADS GEOTEXTILE FABRIC (US 200)	SY	4,800	$	$
5. AGGREGATE SURFACING - AUXILIARY PAD				
A. DRILL PAD 40 MIL. LINER	SY	2,736	$	$
B. DRILL PAD 10 OZ. FELT	SY	2,736	$	$
C. DRILL PAD 1" MINUS CRUSHER RUN AGGREGATE (2")	TN	270	$	$
D. DRILL PAD 3" CLEAN AGGREGATE (6")	TN	805	$	$
E. DRILL PAD #57 STONE (2")	TN	270	$	$
6. HYDRO SEEDING	AC	10.86	$	$
7. RECLAMATION	AC	2.76	$	$
8. ROAD CULVERTS				
A. 18" HDPE	LF	72	$	$
A. 36" HDPE	LF	225	$	$
TOTAL				$

TOPSOIL QUANTITY FOR THIS SITE WAS ESTIMATED AT A UNIFORM THICKNESS OF 3" OVER THE ENTIRE EXCAVATED AREA. ACTUAL QUANTITY MAY VARY.

* GRADING VOLUMES			
DESCRIPTION	CUT (CY)	FILL (CY)	NET (CY)
MAIN ACCESS ROAD TO PAD & AUXILIARY PAD	26,531	6,899	19,542
DRILL PAD	14,542	10,858	3,684
AUXILIARY PAD	10,203	7,587	2,616
SPOIL PADS	0	31,853	-31,853
TOTAL	51,276	57,287	-6,011

*THE EARTHWORK QUANTITIES PROVIDED ARE AN ESTIMATE FOR CONSIDERATION. THE QUANTITIES SHOWN MAY BE GREATER OR LESS THAN ACTUALLY EXCAVATED. THE ENGINEER IS NOT RESPONSIBLE FOR VARIANCES FROM THE ESTIMATED QUANTITIES AND DOES NOT CERTIFY TO THEIR ACCURACY.

GRADING	
CUT SLOPE	2:1
FILL SLOPE	2:1
PAD CONTAINMENT BERM SLOPE	1.5:1
CUT SHRINK FACTOR	0.80
FILL SWELL FACTOR	1.00
PAD ELEVATION	890.0

ANTERO RESOURCES
THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP.

FINAL DESIGN
SCHEDULE OF QUANTITIES
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

CONSTRUCTION SPECIFICATIONS

1. THE AUXILIARY PAD AND DRILL PAD SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK AND SHALL CONFORM GENERALLY WITH THE GRADES, BERMS, DEPTHS AND DIMENSIONS SHOWN.

2. THE CONSTRUCTION DOCUMENTS SHOW THE EXISTING AND NEW GRADES AND BERMS, ETC. THAT ALL CUT AND FILL ESTIMATES ARE BASED UPON. THE ENGINEER'S ESTIMATES OF THE QUANTITIES ARE ONLY ESTIMATES AND MAY CHANGE BASED ON ACTUAL FIELD CONDITIONS.

3. THE GRADES, BERMS, DEPTHS, AND DIMENSIONS MAY CHANGE BASED ON ACTUAL FIELD CONDITIONS. THE ENGINEER RESERVES THE RIGHT TO CHANGE GRADES, BERMS, DEPTHS AND DIMENSIONS AS NECESSARY TO MEET FIELD CONDITIONS.

4. THE CONTRACTOR SHALL PROVIDE THE ENGINEER ALL REASONABLE FACILITIES AND PROVIDE INFORMATION AND SAMPLES AS REQUIRED BY THE ENGINEER FOR PROPER MONITORING AND TESTING OF MATERIAL WORKMANSHIP.

5. THE CONTRACTOR SHALL HAVE ON SITE AT ALL TIMES WHEN CONSTRUCTION IS IN PROGRESS A COMPETENT SUPERINTENDENT THOROUGHLY FAMILIAR WITH THE CONSTRUCTION OF EARTH BERMS AND EMBANKMENTS, THE COMPACTION OF SOILS AND PLACEMENTS OF LINERS.

6. THE CONTRACTOR SHALL INSTALL 24" SILT SOCK OR SILT FENCE PRIOR TO CLEARING AND GRUBBING AS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH WV DEP BEST MANAGEMENT PRACTICES MANUAL CHAPTER 3. SURFACE WATER SHALL BE DIVERTED AWAY FROM ALL EXCAVATIONS AND THE FACE OF ALL FILLS TO PREVENT FLOODING AND SOFTENING OF THE SUBGRADE OR COMPACTED MATERIALS.

7. CLEARING AND GRUBBING SHALL REMOVE ALL BRUSH, TREES, ROOTS, STUMPS, FENCES, SIGNS OR ANY OTHER MATERIAL THAT IS NOT TO BE REUSED FOR THE CONSTRUCTION. SOME STUMPS MAY REMAIN AT THE APPROVAL OF THE ENGINEER. NO CLEARING DEBRIS SHALL BE BURIED ON-SITE WITHOUT THE LANDOWNER'S AND ENGINEER'S WRITTEN PERMISSION. ANY DEBRIS BURIAL SITE SHALL BE SEEDED AND MULCHED.

8. TOP SOIL SHALL BE STRIPPED AND STOCKPILED WITH APPROPRIATE STABILIZATION AND SILT FENCE TO PREVENT EROSION. THE TOP SOIL SHALL BE REUSED DURING THE RECLAMATION PROCESS OR ON THE FACE OF THE IMPOUNDMENT PRIOR TO SEEDING.

9. TOE CUTS OF 12' MINIMUM WIDTH SHALL BE EXCAVATED ON ALL RECEIVING SLOPES TO PROVIDE A BASE FOR THE IMPOUNDMENT BERM.

10. PRIOR TO PLACING ANY FILL, THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE.

11. FRAC PIT BERMS SHALL BE UNIFORMLY GRADED SOIL FREE FROM AGGREGATE EXCEEDING 6". THE FILL SHALL BE FREE OF ALL ORGANIC MATERIAL, STUMPS, BRUSH, OR OTHER DELETERIOUS MATTER.

12. ALL FILL SHALL BE PLACED IN LOOSE LIFTS OF UP TO 12" AND SHALL BE COMPACTED TO AT LEAST 95% OF THE LABORATORY MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST METHOD (ASTM D 698). THE MOISTURE CONTENT SHALL BE CONTROLLED WITHIN PLUS OR MINUS 4% OF THE OPTIMUM TO FACILITATE COMPACTION. CONTRACTOR IS RESPONSIBLE FOR THE ORIGINAL SOIL TEST AND PROVIDING A COPY OF THE RESULTS WITH MOISTURE-DENSITY CURVE TO THE ENGINEER. THE CONTRACTOR SHALL DO IN-PLACE DENSITY TESTS EVERY THIRD LIFT OF SOIL AND SHALL BE DONE IN TWO RANDOM PLACES ON EACH STRAIGHT SIDE OF THE IMPOUNDMENT BERM. FIELD DENSITY TESTS FOR COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D 2922 (NUCLEAR METHOD). RECORDS SHALL BE MAINTAINED OF TEST LOCATION AND RESULTS AND PROVIDED TO THE ENGINEER ON REQUEST. AREAS THAT FAIL FOR COMPACTION SHALL BE REMOVED, RE-COMPACTED AND RETESTED FOR COMPLIANCE. IN LIEU OF STANDARD PROCTOR TESTING, THE CONTRACTOR MAY PROOF-ROLL THE SOIL EVERY 24" OF SOIL LIFT WITH A LOADED 16 TON TANDEM DUMP TRUCK. SOIL THAT DEFLECTS UNDER THE REAR WHEELS GREATER THAN 1/2" SHALL BE REMOVED, RE-COMPACTED AND RETESTED. COMPACTION OF SOIL SHALL BE DONE WITH A 5 TON SMOOTH, SHEEPS FOOT, OR VIBRATORY ROLLER.

13. ON-SITE FILL SHALL BE USED TO THE MAXIMUM EXTENT POSSIBLE. ANY IMPORTED FILL SHALL BE CERTIFIED BY THE CONTRACTOR TO BE CLEAR OF ALL HAZARDOUS SUBSTANCES OR MATERIALS. IF MATERIAL IS ENCOUNTERED THAT CANNOT BE RIPPED BY A CAT D8 WITH A SINGLE TOOTH RIPPER, THEN THE CONTRACTOR SHALL CONTACT THE ENGINEER WHO WILL VISIT THE SITE AND DETERMINE IF THE MATERIAL MAY BE USED AS IS OR MUST BE REMOVED BY OTHER MEANS. IF UNSUITABLE SOILS IN THE SUBGRADE ARE FOUND THEY SHALL BE REMOVED AND REPLACED WITH APPROPRIATE FILL AT THE CONTRACTOR'S EXPENSE AND THE ENGINEER'S DISCRETION.

14. IF SPRINGS OR SEEPS ARE ENCOUNTERED, SUBSURFACE DRAINAGE FEATURES SHALL BE INSTALLED PRIOR TO FILL PLACEMENT. CONTACT ENGINEER FOR EVALUATION AND RECOMMENDATION OF CORRECTIVE MEASURES.

15. THE FILL TOE FOR ALL FILL EMBANKMENTS SHALL BE BENCHED OR KEYED INTO THE NATURAL SOIL. ALL FILL TOES SHALL BE SUPPORTED BY COMPETENT BEDROCK OR SOIL MATERIAL.

16. FILL PLACED AGAINST EXISTING SLOPES SHALL BE BENCHED INTO THE EXISTING MATERIAL DURING FILL PLACEMENT TO REDUCE THE POTENTIAL FOR DEVELOPMENT OF A SMOOTH INTERFACE BETWEEN THE FILL AND EXISTING SLOPE.

17. ANY SOFT AREAS SHALL BE OVER-EXCAVATED TO A FIRM MATERIAL AND BACKFILLED WITH A WELL COMPACTED STRUCTURAL FILL.

18. FILL REQUIRED TO OBTAIN DESIGN GRADES SHALL BE PLACED AS CONTROLLED, COMPACTED FILL. THE FILL SHALL BE FREE OF TRASH, WOOD, TOPSOIL, ORGANICS, COAL, COAL MINE REFUSE, FROZEN MATERIAL AND PIECES OF ROCK GREATER THAN 6" IN ANY DIMENSION.

19. DURING PLACEMENT OF MATERIAL, MOISTEN OR AERATE EACH LAYER OF FILL, AS NECESSARY, TO OBTAIN THE REQUIRED COMPACTION. FILL SHOULD NOT BE PLACED ON SURFACES THAT ARE MUDDY OR FROZEN, OR HAVE NOT BEEN APPROVED BY PRIOR PROOF-ROLLING. FREE WATER SHALL BE PREVENTED FROM APPEARING ON THE SURFACE DURING OR SUBSEQUENT TO COMPACTION OPERATIONS.

20. SOIL MATERIAL WHICH IS REMOVED BECAUSE IT IS TOO WET TO PERMIT PROPER COMPACTION MAY BE SPREAD AND ALLOWED TO DRY. DRYING CAN BE FACILITATED BY DISCING OR HARROWING UNTIL THE MOISTURE CONTENT IS REDUCED TO AN ACCEPTABLE LEVEL. WHEN THE SOIL IS TOO DRY, WATER MAY BE UNIFORMLY APPLIED TO THE LAYER TO BE COMPACTED.

21. THE FILL OUTSLOPES SHALL BE OVERFILLED AND TRIMMED BACK TO DESIGN CONFIGURATIONS TO VERIFY PROPER COMPACTION.

22. GRANULAR MATERIALS, SUCH AS AASHTO NO. 57 STONE SHALL BE COMPACTED TO 85% OF ITS RELATIVE DENSITY, AS DETERMINED BY ASTM D 4253 AND D 4254 TEST METHODS.

23. THE INSIDE OF THE FRAC PIT SHALL BE BOTH BOTH SMOOTH DRUM ROLLED AND FREE OF PROTRUDING OR SHARP ROCKS IN ORDER TO RECEIVE THE LINER.

24. PRIOR TO THE LINER INSTALLATION, THE CONTRACTOR SHALL CONTACT THE SURVEYOR TO DO AN AS-BUILT SURVEY OF THE IMPOUNDMENT TO ENSURE CONFORMANCE WITH THE ENGINEER'S DRAWINGS. THE SURVEYOR SHALL PROVIDE THE INFORMATION TO THE ENGINEER WHO WILL MAKE DETERMINATIONS ON ANY VARIATION FROM THE DRAWINGS AND DIRECT THE CONTRACTOR TO DO CORRECTIVE WORK.

25. LINER SHALL BE POLYFLEX IMPERVIOUS TEXTURED HDPE GEOMEMBRANE, [illegible], INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. THE TOP OF THE LINER SHALL BE TURNED DOWN INTO A 4' ANCHOR TRENCH AT THE TOP OF THE BERM AND BACKFILLED WITH SELECT FILL AS SHOWN ON THE DRAWINGS OR AS REQUIRED BY THE LINER MANUFACTURER.

26. PHOTOGRAPHIC DOCUMENTATION SHALL BE TAKEN BY THE CONTRACTOR AND PROVIDED TO THE ENGINEER OF THE FOLLOWING ACTIVITIES: 1. SITE AFTER CLEARING AND GRUBBING. 2. THE SITE AFTER TOPSOIL REMOVAL. 3. TOE, KEY AND INSPECTION TRENCH CONSTRUCTION. 4. DAILY PHOTOS OF CUT AND FILL OPERATIONS. 5. PROOF-ROLLING TESTS.

27. PRIOR TO AS-BUILT CERTIFICATION, THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A COMPLETE BINDER THAT INCLUDES ALL PHOTO DOCUMENTATION, ALL COMPACTION TEST REPORTS, RESULTS AND MAPS, AND A REPORT OF ALL CUT AND FILL VOLUMES IN CUBIC YARDS.

GENERAL NOTES

1. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND SPECIFICATIONS AND SITE CONDITIONS OR ANY INCONSISTENCIES OR AMBIGUITIES IN DRAWINGS OR SPECIFICATIONS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, IN WRITING, WHO SHALL PROMPTLY ADDRESS SUCH PROBLEMS. WORK DONE BY THE CONTRACTOR AFTER THE DISCOVERY OF SUCH DISCREPANCIES, INCONSISTENCIES, OR AMBIGUITIES SHALL BE DONE AT THE CONTRACTOR'S RISK.

2. WORK ON THIS PROJECT SHALL CONFORM TO THE LATEST EDITIONS OF THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE HANDBOOK. IN THE EVENT OF CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, OR PLANS, THE MOST STRINGENT WILL GOVERN.

3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED DAILY, RELOCATED WHEN NECESSARY AND SHALL BE CHECKED AFTER EVERY RAINFALL. SEEDED AREAS SHALL BE CHECKED REGULARLY AND SHALL BE WATERED, FERTILIZED, RESEEDED AND MULCHED AS NECESSARY TO OBTAIN A DENSE STAND OF GRASS.

4. ALL DRAIN INLETS SHALL BE PROTECTED FROM SILTATION. INEFFECTIVE PROTECTION DEVICES SHALL BE REPLACED AND THE INLET CLEANED. FLUSHING IS NOT AN ACCEPTABLE MEANS OF CLEANING.

5. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL PUBLIC OR PRIVATE UTILITIES WHICH LIE IN OR ADJACENT TO THE CONSTRUCTION SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR, AT HIS OR HER EXPENSE, OF ALL EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. FORTY-EIGHT HOURS PRIOR TO ANY EXCAVATION THE CONTRACTOR SHALL CALL MISS UTILITY AT (800) 245-4848.

6. INSTALLATION OF CONCRETE, CORRUGATED METAL, OR HDPE STORM PIPE SHALL BE IN CONFORMANCE WITH THESE DRAWINGS.

7. ALL MATERIALS USED FOR FILL OR BACK FILL SHALL BE FREE OF WOOD, ROOTS, ROCKS, BOULDERS OR ANY OTHER NON-COMPACTABLE SOIL TYPE MATERIALS. UNSATISFACTORY MATERIALS ALSO INCLUDE MAN MADE FILLS AND REFUSE DEBRIS DERIVED FROM ANY SOURCE.

8. MATERIALS USED TO FILL AROUND DRAINAGE STRUCTURES IN UTILITY TRENCHES OR ANY OTHER DEPRESSION REQUIRING FILL OR BACK FILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST AS SET FORTH IN ASTM STANDARD D-698. THE CONTRACTOR SHALL, PRIOR TO ANY OPERATIONS INVOLVING FILLING OR BACK FILLING, SUBMIT THE RESULTS OF THE PROCTOR TEST TOGETHER WITH A CERTIFICATION THAT THE SOIL TESTED IS REPRESENTATIVE OF THE MATERIALS TO BE USED ON THE PROJECT. THE TESTS SHALL BE CONDUCTED BY A CERTIFIED MATERIALS TESTING LABORATORY AND THE CERTIFICATIONS MADE BY A LICENSED PROFESSIONAL ENGINEER REPRESENTING THE LABORATORY. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THESE TESTS AND THEIR SUBMITTALS.

9. FILL SHALL BE PLACED IN LIFTS AT A MAXIMUM UNCOMPACTED DEPTH OF 12-INCHES WITH SOIL FREE FROM AGGREGATES EXCEEDING 6".

10. ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER. FAILURE TO CONDUCT DENSITY TESTS SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE FACILITY. TESTS SHALL BE CONDUCTED AT THE SOLE COST OF THE CONTRACTOR OR HIS AGENT.

11. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD PRIOR TO THE START OF CONSTRUCTION.

12. SATISFACTORY MATERIALS FOR USE AS FILL FOR PAD AREAS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS GW, GP, GM, GC, SW, SP, SM, SC, ML, AND CL GROUPS. THE MOISTURE CONTENT SHALL BE CONTROLLED WITHIN PLUS OR MINUS 4% OF THE OPTIMUM TO FACILITATE COMPACTION. GENERALLY, UNSATISFACTORY MATERIALS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CH, MH, OL, OH AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER. SOILS SHALL HAVE A MINIMUM DRY DENSITY OF 92 LB/CF PER ASTM D-698 AND SHALL HAVE A PLASTICITY INDEX LESS THAN 17.

13. CONTRACTOR SHALL SUBMIT AND ADHERE TO A GENERAL GROUNDWATER PROTECTION PLAN.

EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL ARRANGE FOR A PRE-CONSTRUCTION CONFERENCE WITH THE APPROPRIATE EROSION AND SEDIMENT CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK.

2. ALL EROSION CONTROL DEVICES AS SHOWN OR AS REQUIRED, ARE TO BE CONSTRUCTED TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL AND ARE TO BE IN PLACE PRIOR TO ALL CONSTRUCTION.

3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED CONTINUOUSLY, RELOCATED WHEN AND AS NECESSARY AND SHALL BE CHECKED AFTER EVERY RAINFALL. SEEDED AREAS SHALL BE CHECKED REGULARLY AND SHALL BE WATERED, FERTILIZED, RESEEDED AND MULCHED AS NECESSARY TO OBTAIN A DENSE STAND OF GRASS.

4. ALL DISTURBED AREAS NOT PAVED OR BUILT UPON ARE TO BE FERTILIZED AND HYDRO-SEEDED WITH STRAW AND COTTON PRODUCT WITH TACK AGENTS BY THE CONTRACTOR IN ACCORDANCE WITH THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

5. ALL DRAIN INLETS SHALL BE PROTECTED FROM SILTATION. INEFFECTIVE PROTECTION DEVICES SHALL BE IMMEDIATELY REPLACED AND THE INLET CLEANED. FLUSHING IS NOT AN ACCEPTABLE METHOD OF CLEANING.

6. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 21 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

7. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING DEVICES.

8. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

9. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHERN STRUCTURES SUCH AS IMPOUNDMENTS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

10. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

11. ALL DISTURBED AREAS NOT PAVED OR BUILT UPON SHALL BE HYDRO-SEEDED AND FERTILIZED. PERFORM PERMANENT TOP SOILING, SEEDING AND FERTILIZING AS SOON AFTER FINISH GRADING AS POSSIBLE. SEEDING SHALL COMPLY WITH THE FOLLOWING:
    - A. TOPSOIL – 4 INCH MINIMUM FOR PERMANENT TURF.
    - B. FERTILIZER – 500 LBS. PER ACRE OF 10-20-10 FERTILIZER OR EQUIVALENT POUNDAGE OF DIFFERENT ANALYSIS. WORK INTO SOIL PRIOR TO SEEDING.
    - C. LIME (PERMANENT SEEDING) – AGRICULTURAL LIME SPREAD AT RATE OF 4 TONS PER ACRE. WORK INTO SOIL PRIOR TO SEEDING.
    - D. MULCH – WOOD FIBER OR CHOPPED STRAW AT RATE OF 2 TONS PER ACRE, HYDRO-MULCH AT RATE OF 30 BALES PER ACRE.
    - E. SEED – 45 LBS. PER ACRE TALL FESCUE AND 20 LBS. PER ACRE PERENNIAL RYE GRASS. TO BE APPLIED WITH A HYDRO-SEEDER.

EROSION AND SEDIMENT CONTROL NARRATIVE

1. PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS TO GRADE AND INSTALL EROSION AND SEDIMENT CONTROL MEASURES, IN PREPARATION FOR THE CONSTRUCTION OF A GAS WELL PAD NORTHEAST OF WEST UNION, WEST VIRGINIA, IN DODDRIDGE COUNTY, OFF CR 14. THE CONSTRUCTION INCLUDES ONE ACCESS ROAD TO DRILL PAD, ONE ACCESS ROAD TO AUXILIARY PAD, DRILL PAD, STORM WATER CONTROLS, AND INCIDENTAL WORK. THE TOTAL APPROXIMATE LAND DISTURBANCE ASSOCIATED WITH THIS PROJECT IS 13.39 ACRES.

2. EXISTING SITE CONDITIONS: THE EXISTING SITE IS PREDOMINATELY UPLAND HARDWOODS. THE SLOPES ARE MODERATELY STEEP WITH 5% TO 25% GRADES. NO EROSION WAS NOTICED ON SITE, OR IN ANY NATURAL DRAINAGE WAYS.

3. ADJACENT PROPERTY: THE SITE IS BORDERED ON ALL SIDES BY UPLAND HARDWOODS.

4. SOILS: NO SOIL STUDIES OR SUBSURFACE INVESTIGATIONS WERE PERFORMED FOR THIS PROJECT.

5. OFF SITE AREAS: THERE SHALL BE NO BORROW AREA OUTSIDE OF THE PROPOSED GRADING AND CONSTRUCTION AREA.

6. CRITICAL EROSION AREAS—CONTROL MAINTENANCE: ALL 3:1 SLOPES AND STEEPER, DITCHES AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED & MAINTAINED DAILY AND AFTER EACH RAIN FALL OF 0.5 INCHES OR GREATER. THE LOCAL GOVERNING AUTHORITY WILL HAVE THE AUTHORITY TO RECOMMEND THE PLACEMENT OF ADDITIONAL EROSION CONTROL MEASURES IN THESE AREAS IF IT BECOMES EVIDENT DURING CONSTRUCTION THAT THE ONES IN PLACE ARE NOT FUNCTIONING SUFFICIENTLY.

7. EROSION AND SEDIMENT CONTROL MEASURES: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL. THE CONTRACTOR SHALL OBTAIN A COPY OF THIS MANUAL FROM THE WVDEP WEBSITE AND CONSTRUCT ALL DEVICES BASED ON THIS MANUAL OR A HANDBOOK THAT IS COMPARABLE OR EXCEEDS THE SPECIFICATIONS OF THE WEST VIRGINIA MANUAL. THE MINIMUM STANDARDS OF THIS MANUAL SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE. SEE PLANS FOR ALL PROPOSED EROSION AND SEDIMENT CONTROL MEASURES.

8. STRUCTURAL PRACTICES:
    - -DIVERSION DITCHES: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
    - -DIVERSION BERMS: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
    - -OUTLET PROTECTION: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
    - -24" SILT SOCK/SILT FENCE/SUPER SILT FENCE: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.

9. VEGETATIVE PRACTICE TOPSOILING: TOPSOIL WILL BE STRIPPED FROM THE SITE AND STOCKPILED IN AN AREA DETERMINED IN THE FIELD. UPON THE COMPLETION OF THE PROJECT, TOPSOIL WILL BE PLACED ON ALL DISTURBED AREAS AT A MINIMUM DEPTH OF 4 INCHES. TEMPORARY SEEDING: ALL DENUDED AREAS LEFT DORMANT FOR MORE THAN 20 DAYS SHALL BE SEEDED WITH A FAST GERMINATING SEED. THE TIME OF YEAR WILL BE THE BASIS FOR THE SEED MIXTURE. PERMANENT SEEDING: ALL SEEDED AREAS WILL BE RESEEDED, MULCHED AND FERTILIZED AS NEEDED TO OBTAIN AN ADEQUATE STAND OF GRASS. PERMANENT SEEDING SHALL BE PLACED WITHIN SEVEN DAYS UPON ACHIEVING FINAL GRADE. WATER, MULCH, AND RESEED AS NECESSARY TO OBTAIN AN ADEQUATE STAND OF VEGETATION, IN THE OPINION OF THE ENGINEER.

10. MANAGEMENT STRATEGIES: CONSTRUCTION WILL BE SEQUENCED SO THAT GRADING OPERATIONS WILL BEGIN AND END AS SOON AS POSSIBLE. THE JOB SUPERINTENDENT SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES. AFTER ACHIEVING ADEQUATE STABILIZATION THE TEMPORARY EROSION AND SEDIMENT CONTROLS SHALL BE REMOVED AND ANY AREAS DISTURBED DURING THIS PROCESS SHALL BE STABILIZED.

11. SEQUENCE OF EVENTS:
    - A. A PRE-CONSTRUCTION CONFERENCE WILL BE HELD ON SITE WITH CONTRACTOR TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.
    - B. CONSTRUCT THE CONSTRUCTION ENTRANCE.
    - C. CONSTRUCT ALL PROPOSED SEDIMENT CONTROL DEVICES AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW. DIVERSIONS AND SEDIMENT BASINS SHALL BE SEEDED AND MULCHED IMMEDIATELY.
    - D. CLEAR AND GRUB, REMOVE TOPSOIL AND PLACE AT AN AREA DETERMINED IN THE FIELD WHERE EROSION WILL NOT TAKE PLACE. TOPSOIL STOCKPILE TO BE SEEDED AND MULCHED. SILT FENCE SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES.
    - E. GRADING OPERATIONS AS REQUIRED. CUT SLOPES AND FILL SLOPES SHALL BE TOPSOILED AS NEEDED. DITCH LINES SHALL BE CLEANED. ALL DITCHES WILL HAVE AT LEAST GRASS LINING PROTECTION OR GREATER BASED ON DITCH SLOPE WITH THE FOLLOWING DETERMINATION; 0 TO 4%– ORGANIC JUTE MATTING, 4 TO 10%– SYNTHETIC MATTING (TRM), AND 10%–20%– RIPRAP.
    - F. CULVERT INLET AND OUTLET PROTECTION SHALL BE CONSTRUCTED IMMEDIATELY UPON PLACEMENT OF INLETS AND CULVERTS. INSTALLATION OF MATTING AND/OR RIP RAP TO OCCUR ONCE DITCHES ARE CONSTRUCTED.
    - G. WHEN FINAL GRADE IS ACHIEVED, TOPSOIL TO BE PLACED ON ALL DISTURBED AREAS NOT LINED. HYDRO-SEED ALL DISTURBED AREAS AS REQUIRED. A SOIL SAMPLE SHOULD BE TAKEN AND TESTED TO DETERMINE RECOMMENDED RATES. IF NO SOILS SAMPLE IS TAKEN THE FOLLOWING RATES SHOULD BE APPLIED AS A MINIMUM: LIME AT A RATE OF 4 TONS PER ACRE. FERTILIZE AT A RATE OF 500 LBS. OF 10-20-10 PER ACRE. SEED WITH 45 LBS. PER ACRE OF TALL FESCUE AND 20 LBS. PER ACRE OF PERENNIAL RYE GRASS.
    - H. LIME, FERTILIZER, AND SEED WILL BE APPLIED BY USING A HYDRO-SEEDER. HYDRO-MULCH PRODUCTS SHALL BE USED AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
    - I. FINAL SEEDING MUST OCCUR WITHIN 7 DAYS OF FINAL GRADING.
    - J. WHEN SITE IS STABILIZED, ALL EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED AND REPAIR/STABILIZE THOSE AREAS IN ACCORDANCE WITH STATE STANDARDS.
    - K. MAKE MODIFICATIONS FOR PERMANENT STORM WATER MANAGEMENT.
    - L. FINAL SITE INSPECTION.

12. PERMANENT STABILIZATION: ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN 7 DAYS. AT NO TIME SHALL LAND LAY DORMANT FOR LONGER THAT 21 DAYS. SEE SEQUENCE OF EVENTS FOR RATES.

13. MAINTENANCE AND OTHER CONSIDERATIONS AND GROUND WATER PROTECTION: ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH RAINFALL OF 0.5 INCH OR MORE. THEY WILL BE INSPECTED FOR UNDERMINING, DETERIORATION, EROSION AND EXCESS DEPOSITED MATERIAL. ALL DEFICIENCIES WILL BE CORRECTED IMMEDIATELY. EXCESS MATERIAL WILL BE SPREAD ON THE SITE IN A MANNER WHERE IT IS NOT LIKELY TO ERODE IN THE FUTURE. CLEANING PROCEDURES WILL BE COMPLETED AT REGULAR INTERVALS AND AT LEAST WHEN SEDIMENT REACHES 30% OF CAPACITY, OR AS SHOWN ON APPLICABLE DETAILS. RECORDS OF CLEANING AND CORRECTIONS WILL BE MAINTAINED BY THE CONTRACTOR. THE "GENERIC GROUNDWATER PROTECTION PLAN FOR CONSTRUCTION SITES" WILL BE USED AND AVAILABLE ON SITE AT ALL TIMES. AN AREA WILL BE PROVIDED FOR VEHICLE AND EQUIPMENT MAINTENANCE. MOBILE FUEL TRUCKS WITH APPROVED TANKS WILL BE USED ON THE SITE. PORTABLE SANITARY FACILITIES WILL BE AVAILABLE FOR EMPLOYEES. IF CONCRETE IS USED, EXCESS CONCRETE WILL BE DISPOSED OF PROPERLY AND NOT ALLOWED TO REMAIN ON THIS SITE. MACHINERY WILL NOT BE ALLOWED IN LIVE STREAMS. FLUIDS SUCH AS DIESEL FUEL, GAS, OIL OR ANTIFREEZE WILL BE KEPT IN PROPER CONTAINERS AND ANY SPILLAGE WILL BE CLEANED AND TAKEN OFF SITE TO A PROPER FACILITY. SOLID OR HAZARDOUS WASTES WILL BE DISPOSED IN ACCORDANCE WITH APPROPRIATE STATE AND FEDERAL REGULATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE CHANGES AND NOTIFY WVDEP ON ANY CHANGES TO GPP. A FINAL INSPECTION WILL BE MADE AT THE CONCLUSION OF THE PROJECT AND ALL CORRECTIONS MADE BEFORE SIGN-OFF OF THE PROJECT SITE.

APPROVED
WVDEP OOG
5/29/2013

FILE NUMBER	SHEET NO.	TOTAL SHEETS
[illegible]	8	25

ENGINEERING AND SURVEYING
[illegible]
CHARLESTON, WV [illegible]

THOTHY P. WHITE
REGISTERED
14715

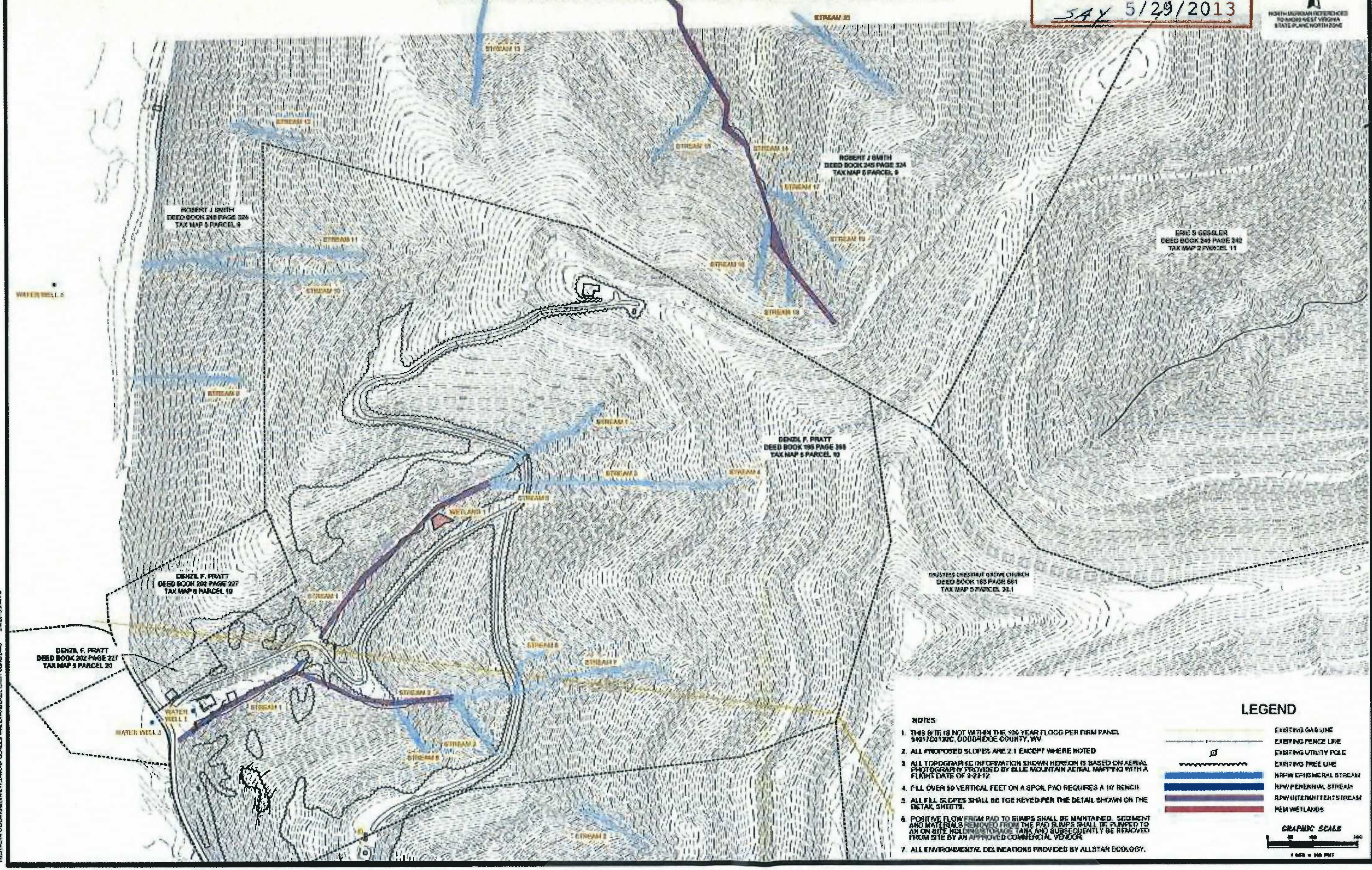
ANTERO RESOURCES

THIS DOCUMENT
PREPARED FOR
ANTERO RESOURCES
APPALACHIAN CORP.

FINAL DESIGN
GENERAL NOTES
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

RJ SMITH DRILL PAD SITE
EXISTING CONDITIONS PLAN
ANTERO RESOURCES APPALACHIAN CORPORATION

APPROVED
WVDEP OOG
5/29/2013



NORTH MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE
STREAM 13
STREAM 12
STREAM 11
STREAM 10
STREAM 9
STREAM 14
STREAM 15
STREAM 16
STREAM 17
STREAM 18
STREAM 19
STREAM 20
STREAM 1
STREAM 2
STREAM 3
STREAM 4
STREAM 5
STREAM 6
STREAM 7
STREAM 8
WETLAND 1
ROBERT J SMITH
DEED BOOK 245 PAGE 324
TAX MAP 5 PARCEL 9
ERIC S GESSLER
DEED BOOK 240 PAGE 242
TAX MAP 2 PARCEL 11
DENZIL F. PRATT
DEED BOOK 195 PAGE 355
TAX MAP 5 PARCEL 10
DENZIL F. PRATT
DEED BOOK 202 PAGE 227
TAX MAP 5 PARCEL 19
DENZIL F. PRATT
DEED BOOK 202 PAGE 227
TAX MAP 5 PARCEL 20
TRUSTEES CHESTNUT GROVE CHURCH
DEED BOOK 163 PAGE 561
TAX MAP 5 PARCEL 32.1
WATER WELL 1
WATER WELL 2
WATER WELL 3
LEGEND
EXISTING GAS LINE
EXISTING FENCE LINE
EXISTING UTILITY POLE
EXISTING TREE LINE
NRPW EPHEMERAL STREAM
RPW PERENNIAL STREAM
RPW INTERMITTENT STREAM
PEM WETLANDS
GRAPHIC SCALE

NOTES

1. THIS SITE IS NOT WITHIN THE 100 YEAR FLOOD PER FIRM PANEL [illegible], DODDRIDGE COUNTY, WV
2. ALL PROPOSED SLOPES ARE 2:1 EXCEPT WHERE NOTED
3. ALL TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON AERIAL PHOTOGRAPHY PROVIDED BY BLUE MOUNTAIN AERIAL MAPPING WITH A FLIGHT DATE OF 3-27-12
4. FILL OVER 50 VERTICAL FEET ON A SPOIL PAD REQUIRES A 10' BENCH
5. ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON THE DETAIL SHEETS.
6. POSITIVE FLOW FROM PAD TO SUMPS SHALL BE MAINTAINED. SEDIMENT AND MATERIALS REMOVED FROM THE PAD SUMPS SHALL BE PUMPED TO AN ON-SITE HOLDING/STORAGE TANK AND SUBSEQUENTLY BE REMOVED FROM SITE BY AN APPROVED COMMERCIAL VENDOR.
7. ALL ENVIRONMENTAL DELINEATIONS PROVIDED BY ALLSTAR ECOLOGY.

ENGINEERING AND SURVEYING
CHARLESTON, WV

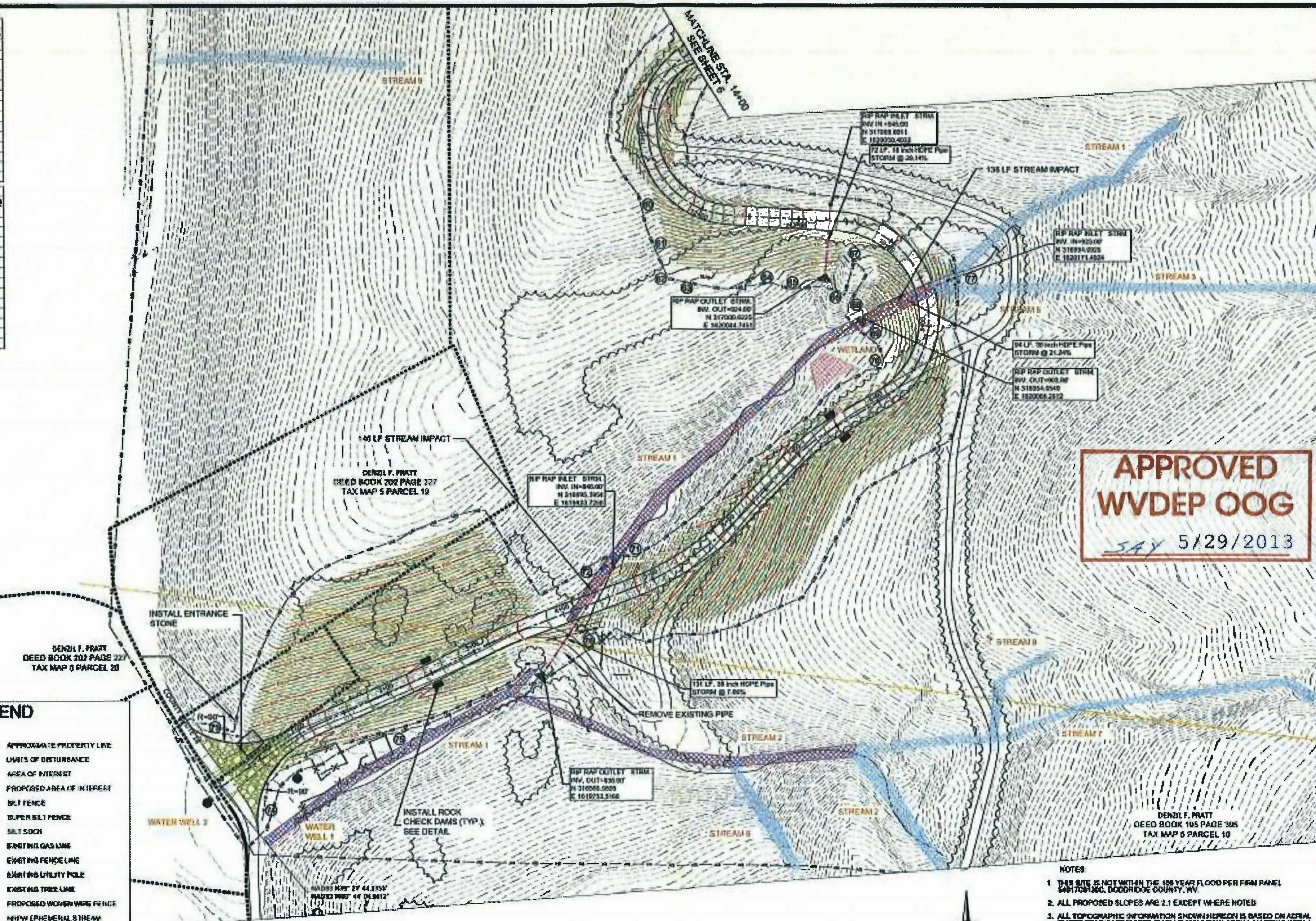
ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
EXISTING CONDITIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

SF, SSF & SILT SOCK TABLE			
ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
60			10
61			14
62			24
63			26
64			48
65			19
66			20
67			32
68			18
69			13
70			17
71			7
72			34
73	46		

SF, SSF & SILT SOCK TABLE			
ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
74	60		
75		225	
76		62	
77		42	
SUBTOTAL 1	111	329	276



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY POLE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- NHW EPHEMERAL STREAM
- RPW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- (24) SF, SSF AND SILT SOCK INDICATOR

GRAPHIC SCALE

NORTH MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE

NOTES:

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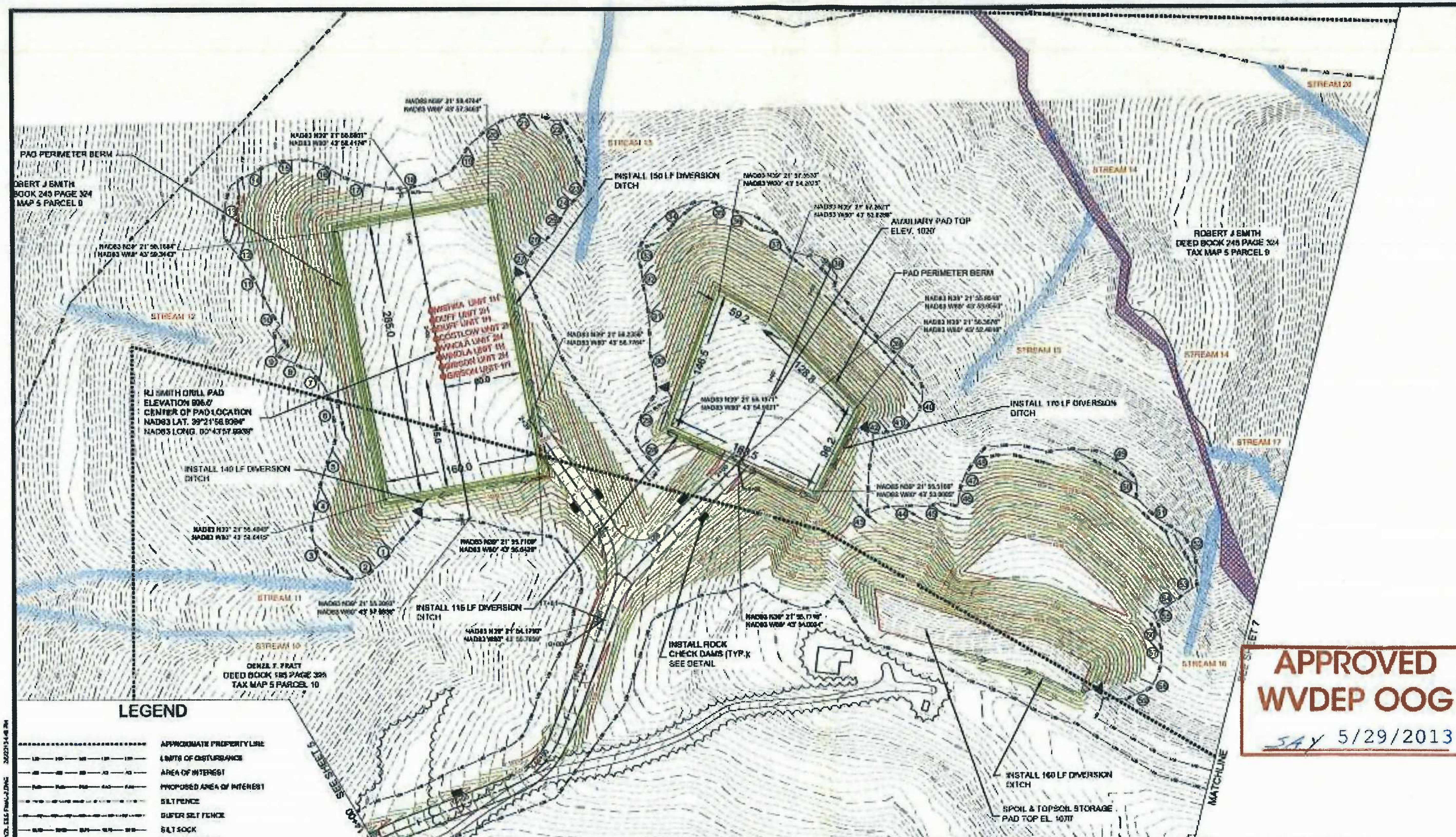
ENGINEERING AND SURVEYING
CHARLESTON, WV

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
EROSION & SEDIMENT CONTROL PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

REVISION	DATE	BY



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY POLE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- NRPW EPHEMERAL STREAM
- RPW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- SF, SSF AND SILT SOCK INDICATOR

GRAPHIC SCALE

SF, SSF & SILT SOCK TABLE

ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
1			16
2			12
3			51
4			20
5			14
6			88
7			68
8			18
9			32
10			17
11			20
12			12
13			25
14			12

SF, SSF & SILT SOCK TABLE

ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
15			13
16			13
17			43
18			38
19			13
20			11
21			98
22			60
23			11
24			13
25			12
26			14
27			14
28			12

SF, SSF & SILT SOCK TABLE

ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
29			30
30			14
31			16
32			17
33			24
34			58
35			16
36			48
37			31
38			56
39		144	
40			13
41			12
42			15

SF, SSF & SILT SOCK TABLE

ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
43		38	
44		23	
45		40	
46			52
47			17
48			70
49			71
50			22
51			52
52			48
53			10
54			12
55			14
56			25

SF, SSF & SILT SOCK TABLE

ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
57			20
58			17
59			16
SUBTOTAL 2	0	245	1,346
SUBTOTAL 1	133	329	276
TOTALS	133	574	1,621

APPROVED WVDEP OOG
5/29/2013

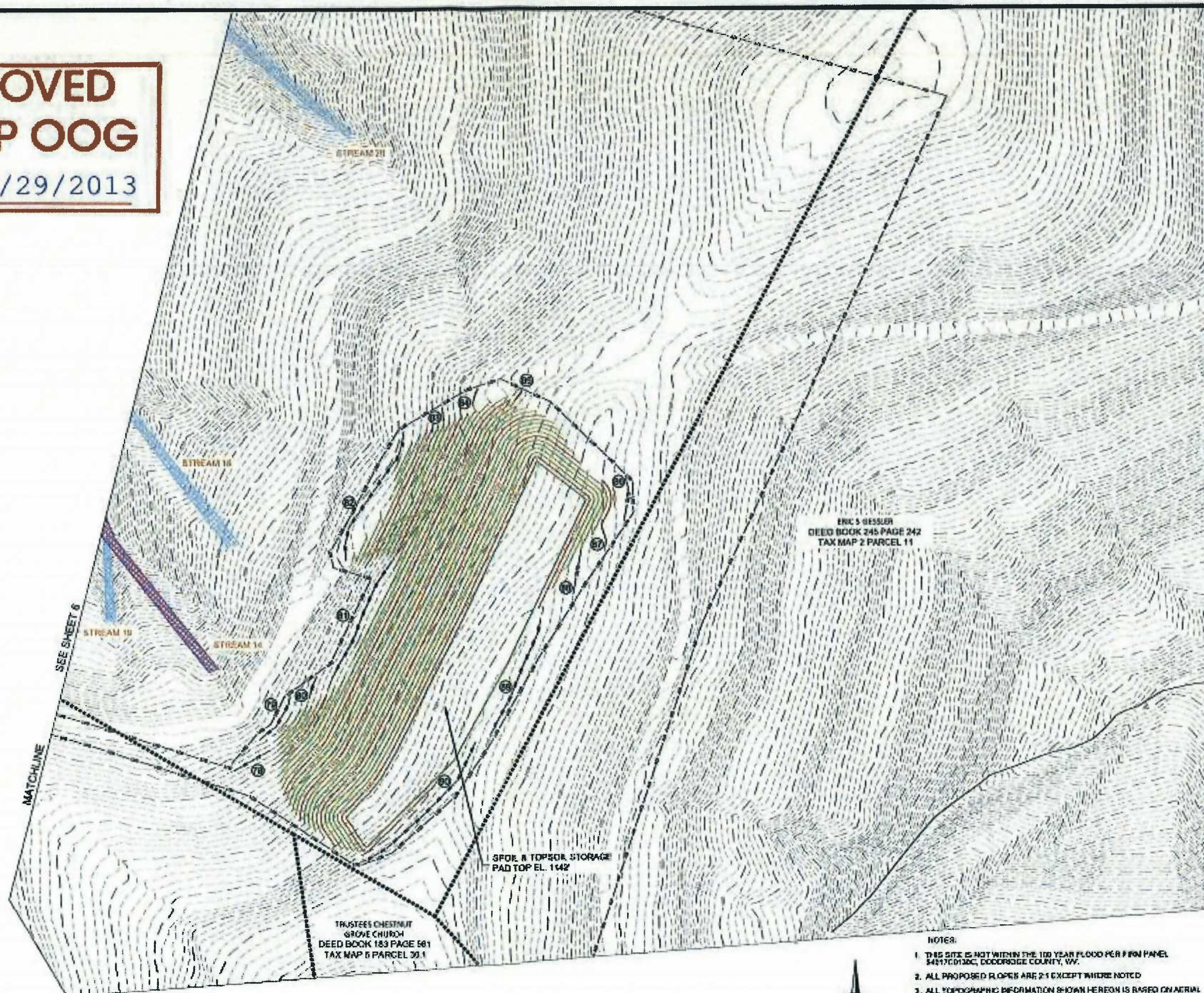
ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN EROSION & SEDIMENT CONTROL PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

SF, SSF & SILT SOCK TABLE			
ID NUMBER	SF (LF)	SSF (LF)	SS (LF)
78		41	
79		55	
80		33	
81		127	
82		148	
83		13	
84			20
85			13
86			42
87			20
88			42
89		123	
90		152	
SUBTOTAL 3	0	652	137
SUBTOTAL 2	0	249	1,345
SUBTOTAL 1	133	329	276
TOTALS	133	1,258	1,758

APPROVED
WVDEP OOG
SAY 5/29/2013



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY POLE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- NPFW EPHEMERAL STREAM
- RPFW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- 24 SF, SSF AND SILT SOCK INDICATOR

GRAPHIC SCALE

NOTES:

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ANTERO RESOURCES

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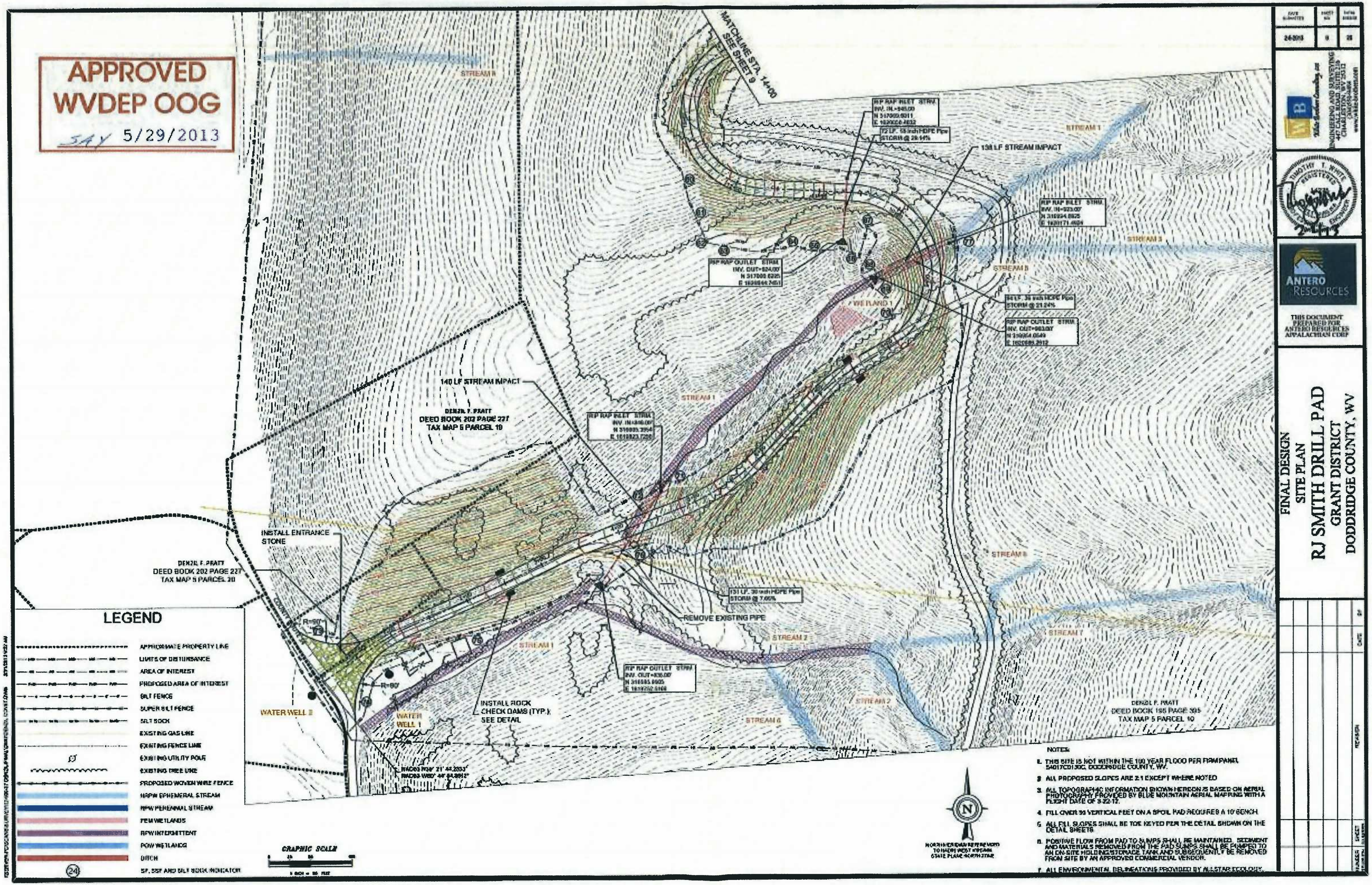
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV



APPROVED
WVDEP OOG
5/29/2013
MATCHLINE STA. 14+00
SEE SHEET 9
STREAM 1
STREAM 3
STREAM 5
STREAM 2
STREAM 6
STREAM 7
WETLAND 1
138 LF STREAM IMPACT
140 LF STREAM IMPACT
DENZIL F. PRATT
DEED BOOK 202 PAGE 227
TAX MAP 5 PARCEL 19
DENZIL F. PRATT
DEED BOOK 202 PAGE 227
TAX MAP 5 PARCEL 20
DENZIL F. PRATT
DEED BOOK 195 PAGE 395
TAX MAP 5 PARCEL 10
INSTALL ENTRANCE STONE
INSTALL ROCK CHECK DAMS (TYP.) SEE DETAIL
REMOVE EXISTING PIPE
WATER WELL 2
WATER WELL 1
LEGEND
APPROXIMATE PROPERTY LINE
LIMITS OF DISTURBANCE
AREA OF INTEREST
PROPOSED AREA OF INTEREST
SILT FENCE
SUPER SILT FENCE
SILT SOCK
EXISTING GAS LINE
EXISTING FENCE LINE
EXISTING UTILITY POLE
EXISTING TREE LINE
PROPOSED WOVEN WIRE FENCE
NRPW EPHEMERAL STREAM
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SF, SSF AND SILT SOCK INDICATOR
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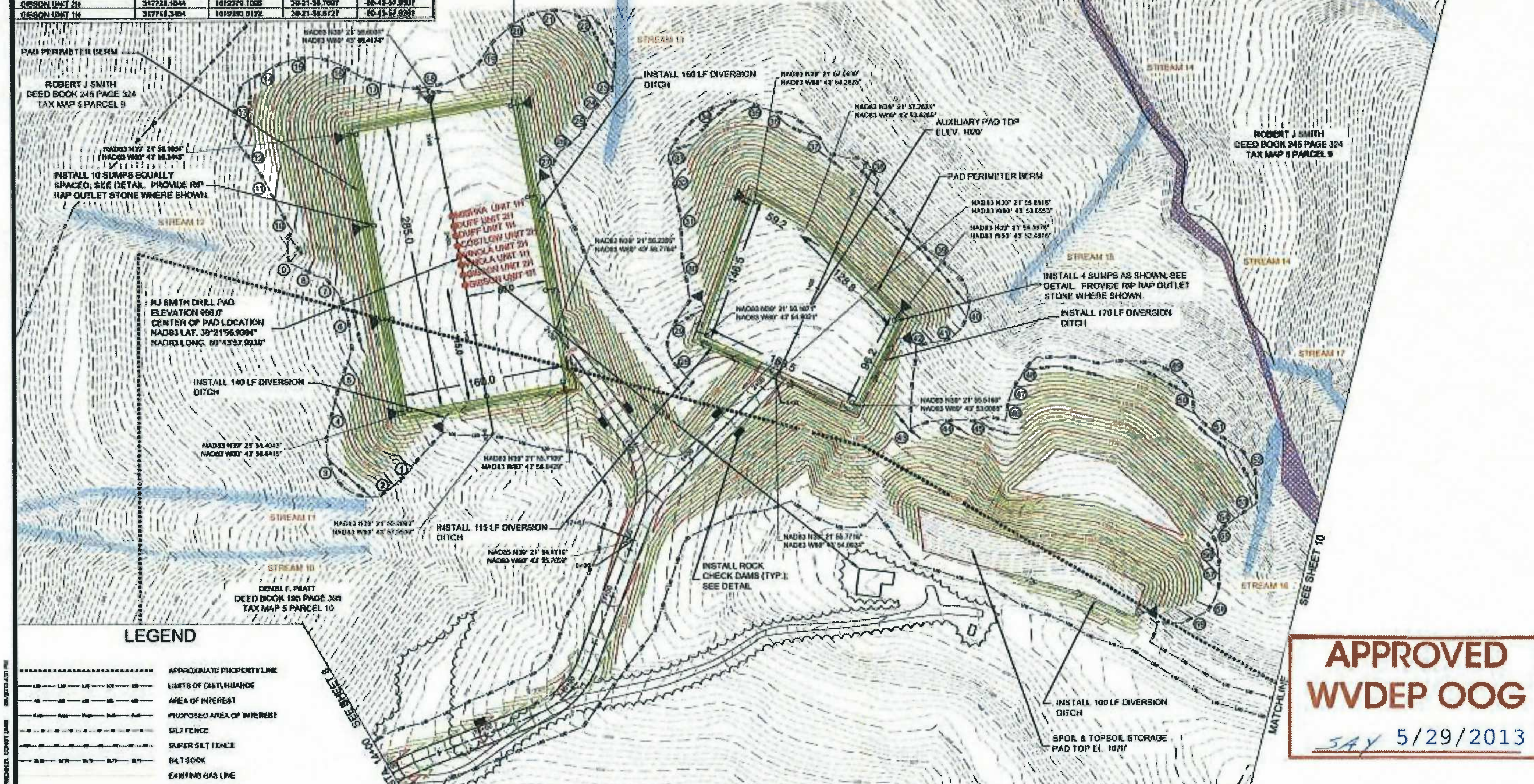
ENGINEERING AND SURVEYING
CHARLESTON, WV 25312
TIMOTHY T. WHITE
REGISTERED
ENGINEER
ANTERO RESOURCES
THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP
FINAL DESIGN
SITE PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

WELL HEAD LAYOUT
STATE PLANE NAD 83 (WV NORTH ZONE)

	NORTH	EAST	LATITUDE	LONGITUDE
MISHKA UNIT 1H	317787.2003	1619368.2872	39-21-57.3815	-80-43-58.0395
DUFF UNIT 2H	317777.3544	1619370.0907	39-21-57.2545	-80-43-59.0741
DUFF UNIT 1H	317767.8284	1619371.8945	39-21-57.1576	-80-43-59.0493
COSTLOW UNIT 2H	317757.6924	1619373.6979	39-21-57.0008	-80-43-59.0248
VINCLA UNIT 2H	317747.8584	1619375.5015	39-21-56.9638	-80-43-59.0001
VINCLA UNIT 1H	317738.0204	1619377.3051	39-21-56.8996	-80-43-57.0754
GIBSON UNIT 2H	317728.1844	1619379.1085	39-21-56.7897	-80-43-57.0507
GIBSON UNIT 1H	317718.3484	1619380.0172	39-21-56.6727	-80-43-57.0261



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY POLE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- WPW EPHEMERAL STREAM
- RPW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- SF, SSF AND SILT SOCK INDICATOR

GRAPHIC SCALE
1 INCH = 50 FEET

NORTH MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE

NOTES:

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APPROVED
WVDEP OOG
SAY 5/29/2013

FINAL DESIGN
SITE PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

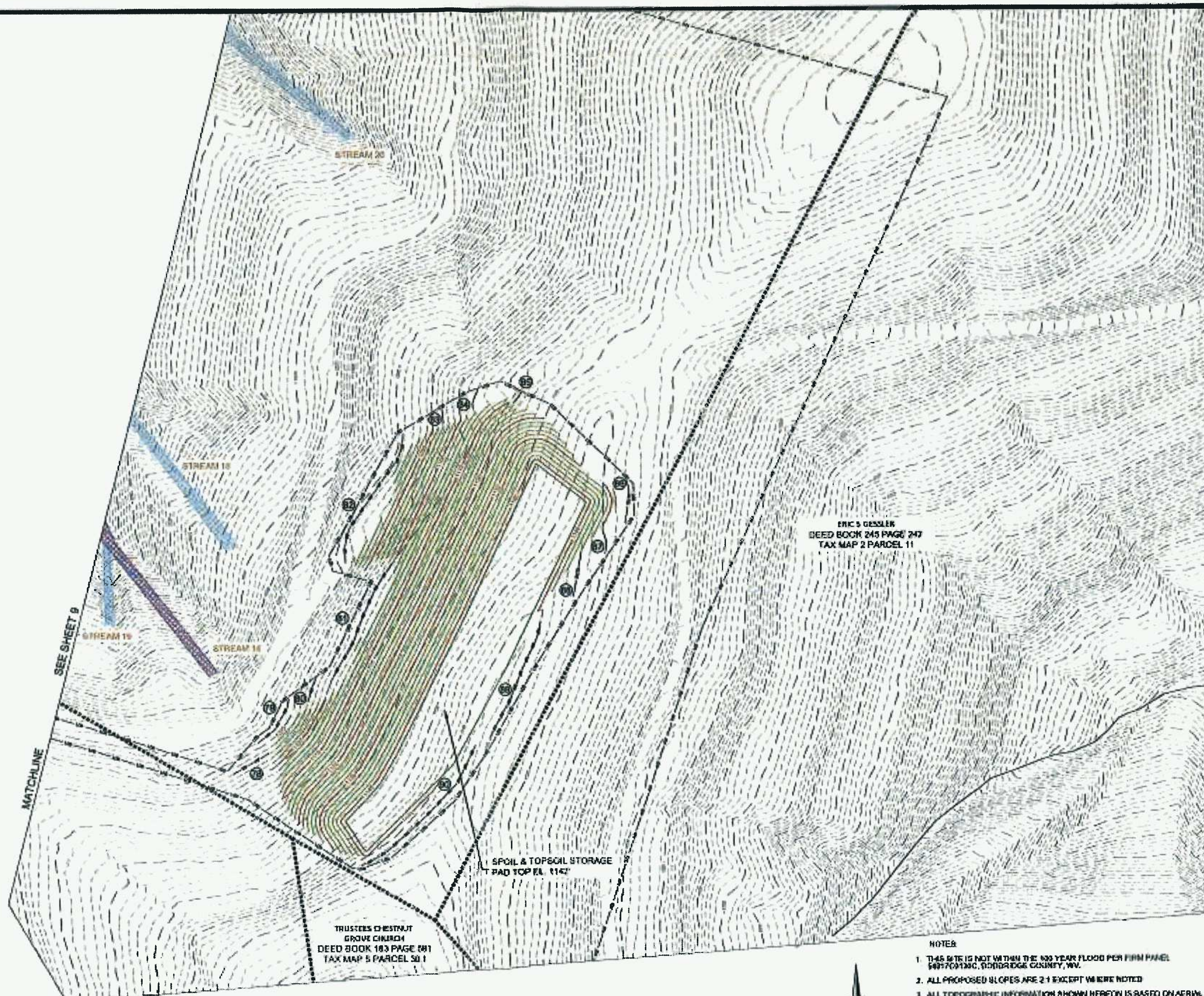
ANTERO RESOURCES

TIMOTHY T. WHITE
REGISTERED
14229

White Surveying
ENGINEERING AND SURVEYING
CHARLESTON, WV

DATE	SHEET NO.	TOTAL SHEETS
24-3H3	9	25

APPROVED
WVDEP OOG
SAY 5/29/2013



LEGEND

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- POW WETLANDS
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GRAPHIC SCALE

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DATE	SHEET	TOTAL SHEETS
3-8-2013	10	25

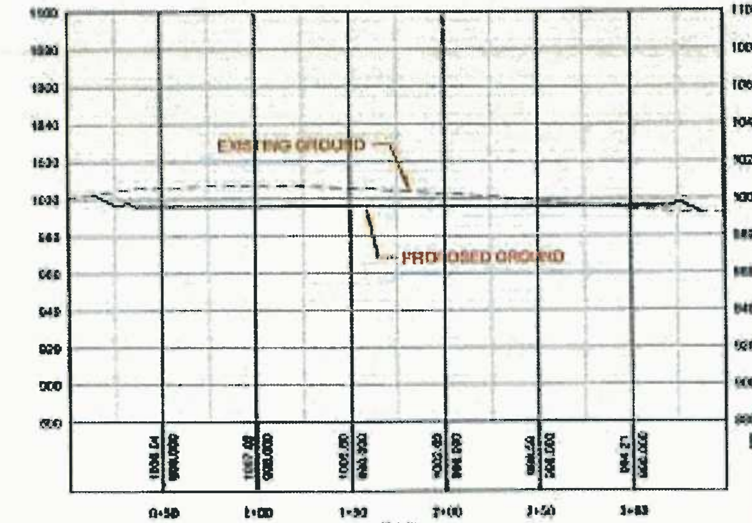
Willie Brothers Consulting, LLC
ENGINEERING AND SURVEYING

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
SITE PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

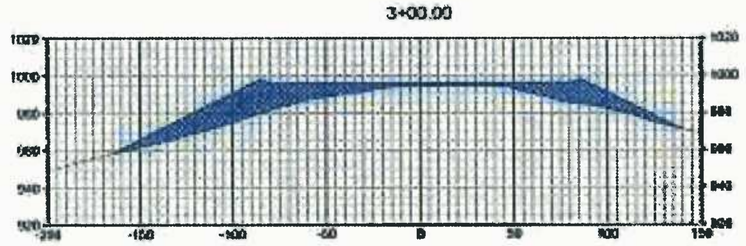
REVISION	DATE	BY



PAD PROFILE

GRAPHIC SCALE

3+00.00



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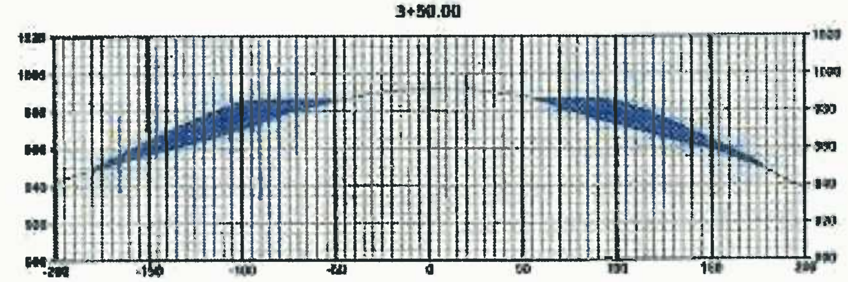
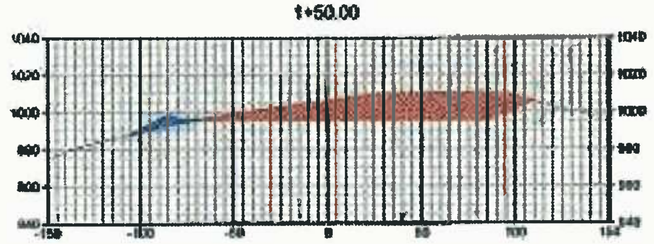


APPROVED WVDEP OOG
SAY 5/29/2013

1+50.00



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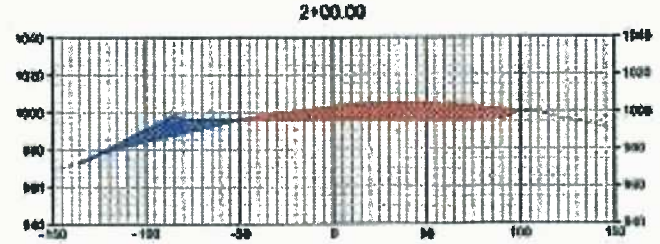

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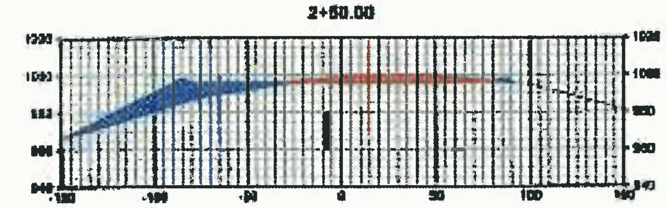

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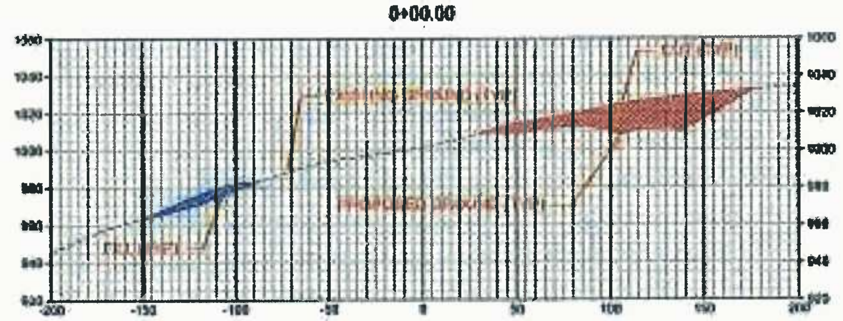

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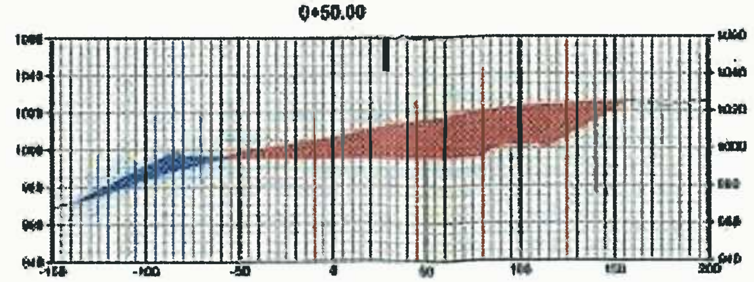

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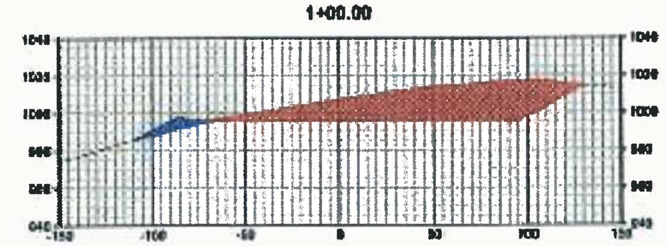


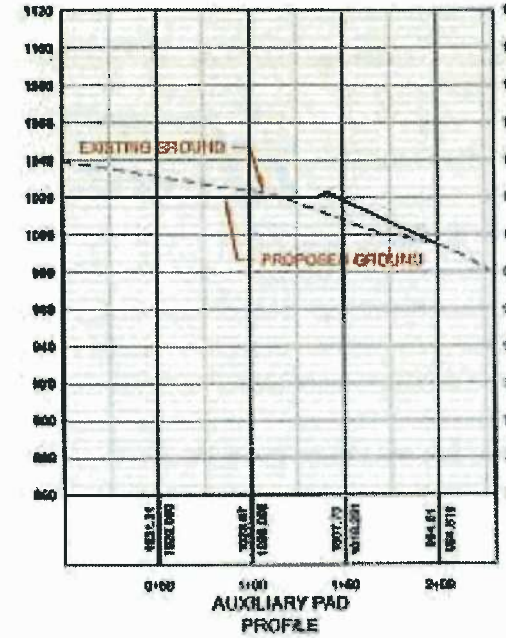
GRAPHIC SCALE

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
PAD PROFILE AND CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

REVISION	DATE	BY



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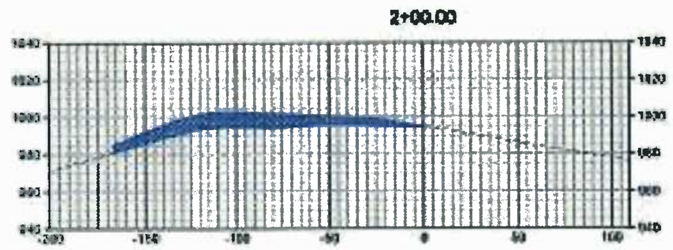

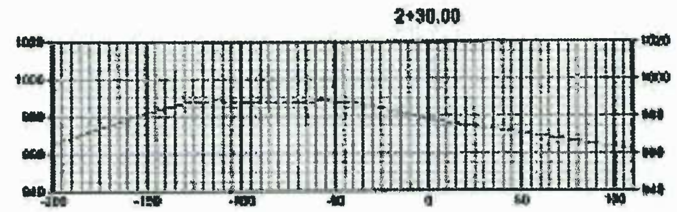

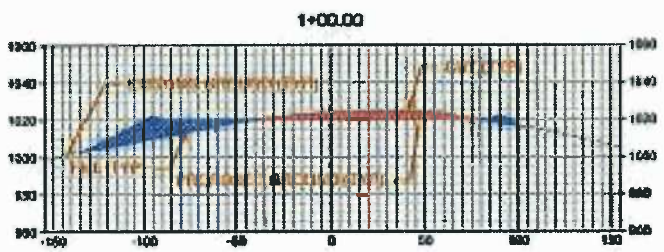

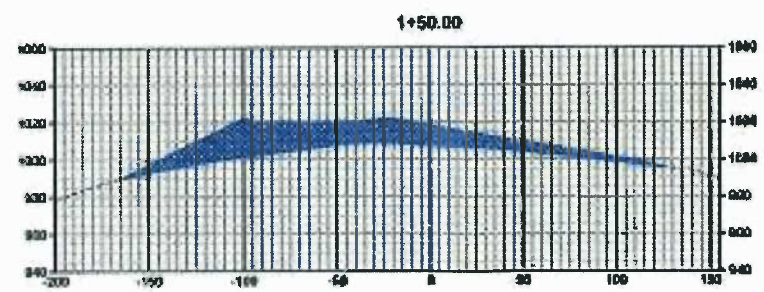

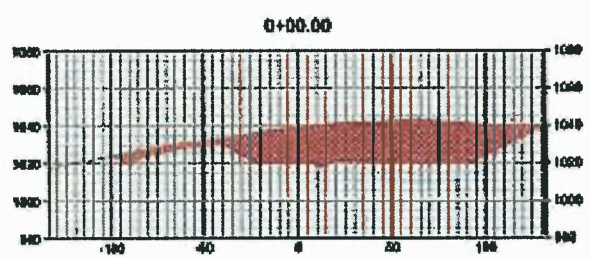

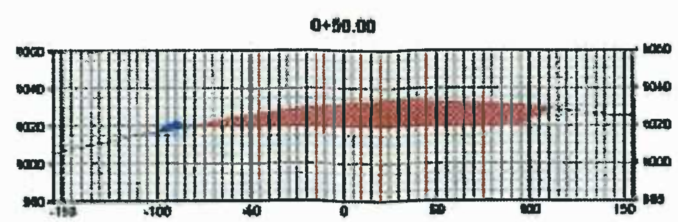

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WVDEP OOG
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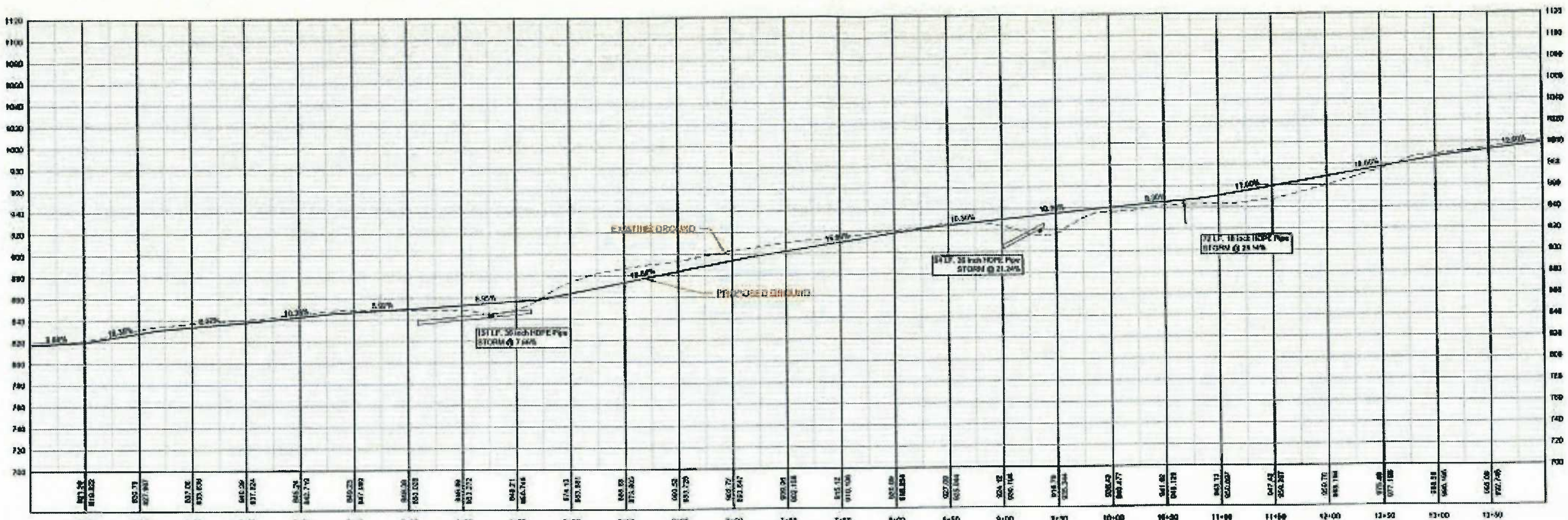
GRAPHIC SCALE

ENGINEERING AND SURVEYING

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
AUX. PAD PROFILE AND CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV



MAIN ROAD ENTRANCE
PROFILE

NOTE:

1. CONTRACTOR SHALL INSTALL DITCH LINING AS FOLLOWS:
   JUTE MATTING = 0% TO 4%
   SYNTHETIC MATTING (TRM) = 4% TO 10%
   6"-8" RIPRAP = 10% TO 20%

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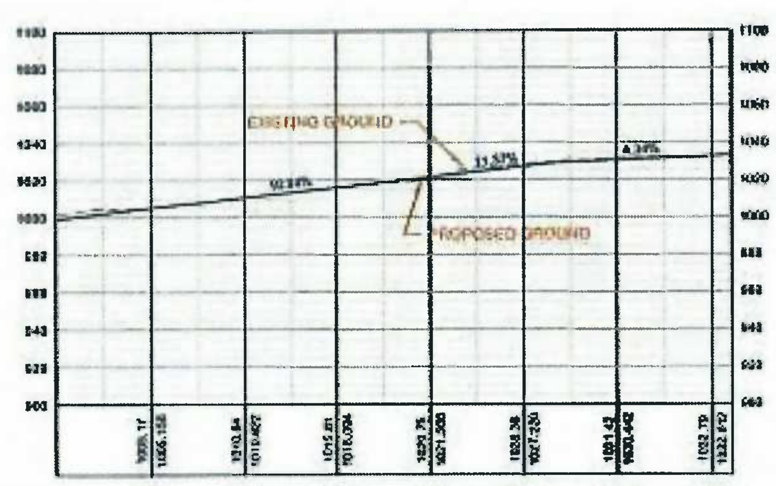
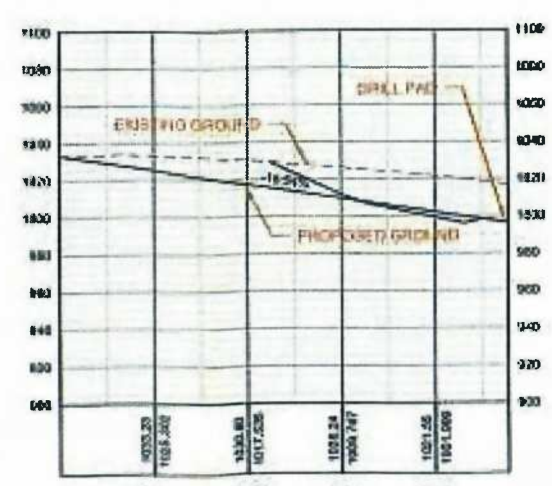
WVDEP OOG
SAY 5/29/2013

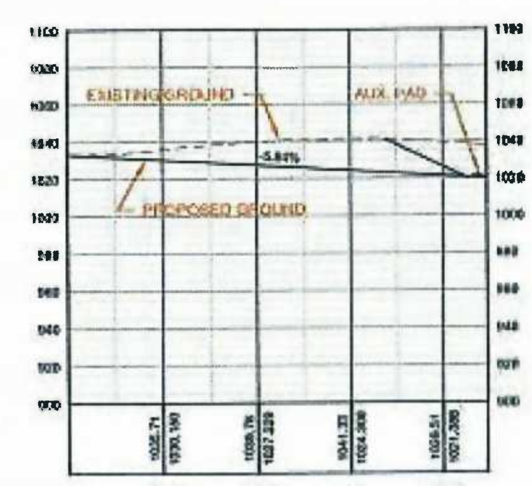
GRAPHIC SCALE



MAIN ROAD ENTRANCE
PROFILE



DENZIL PAD 1
PROFILE



DENZIL PAD 2
PROFILE

ANTERO RESOURCES

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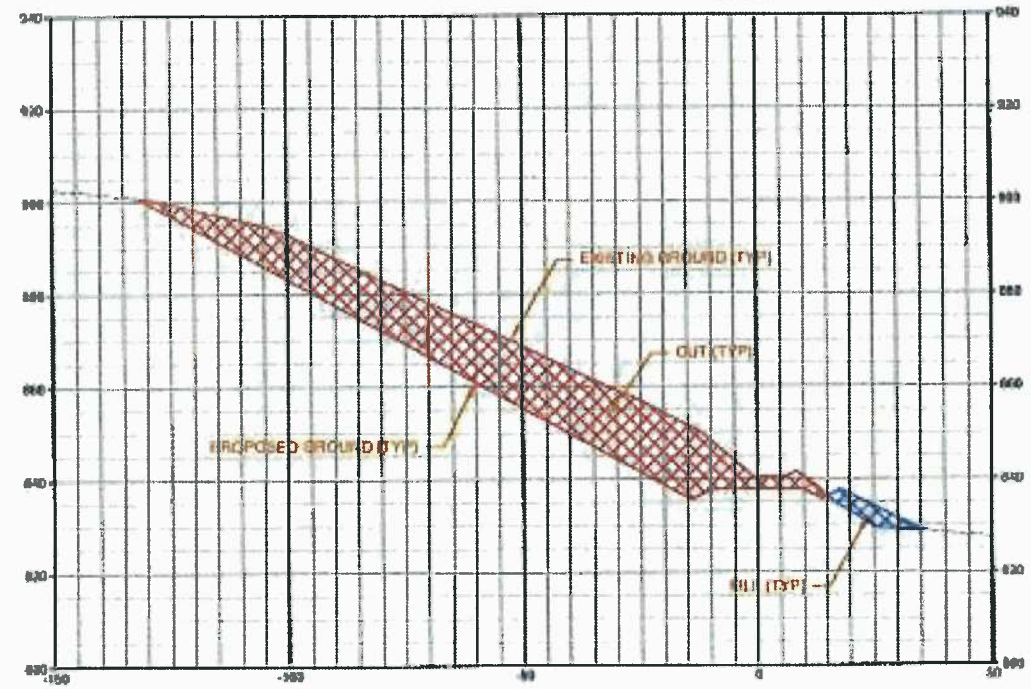
FINAL DESIGN
ROAD PROFILES
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

APPROVED
WVDEP OOG
5/29/2013

2+00.00



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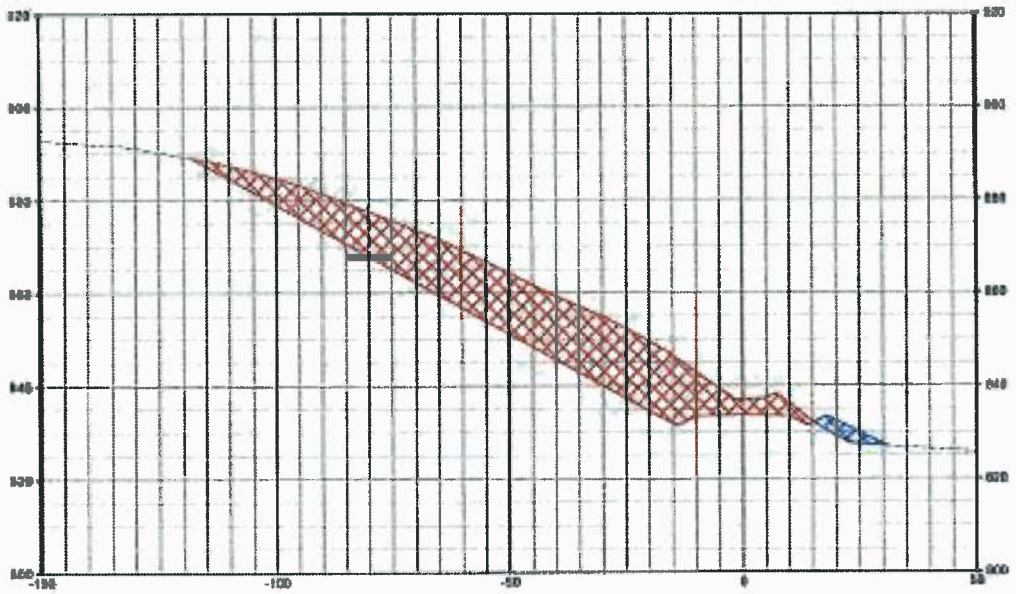

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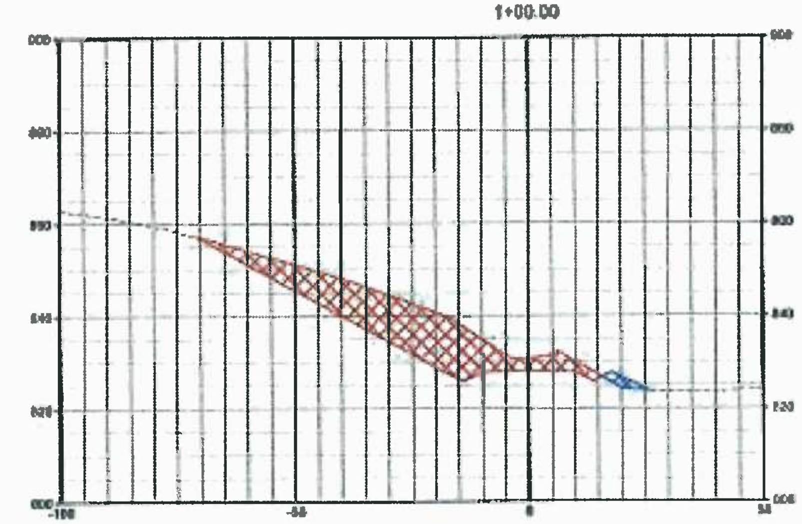

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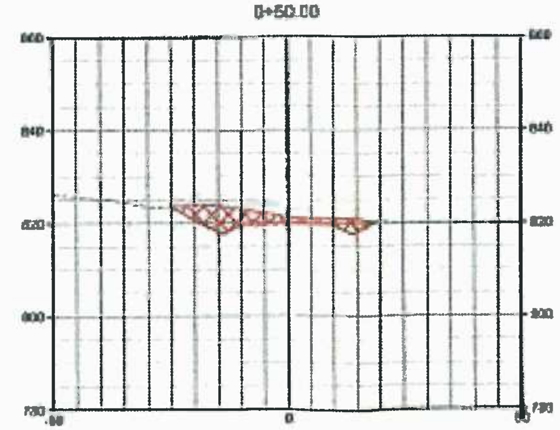

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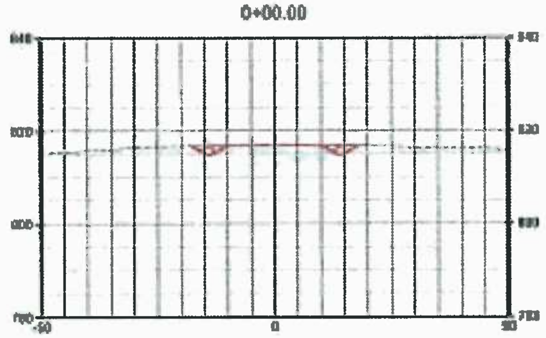

GRAPHIC SCALE

ENGINEERING AND SURVEYING

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

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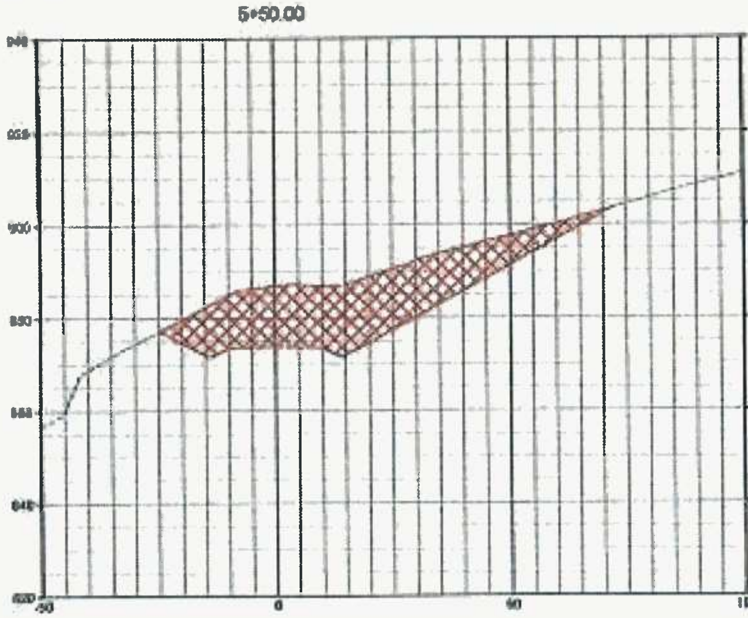
WVDEP OOG
SAY 5/29/2013

5+50.00



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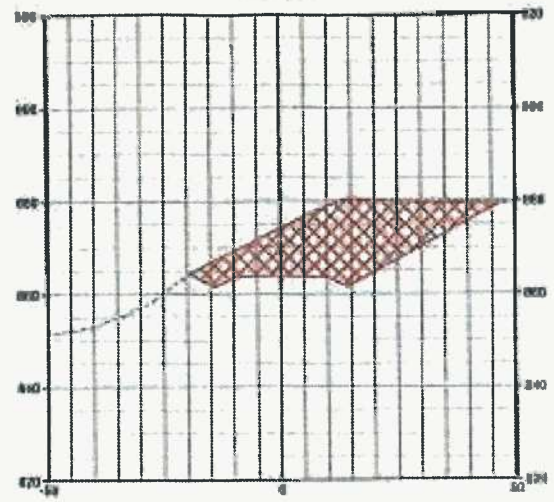

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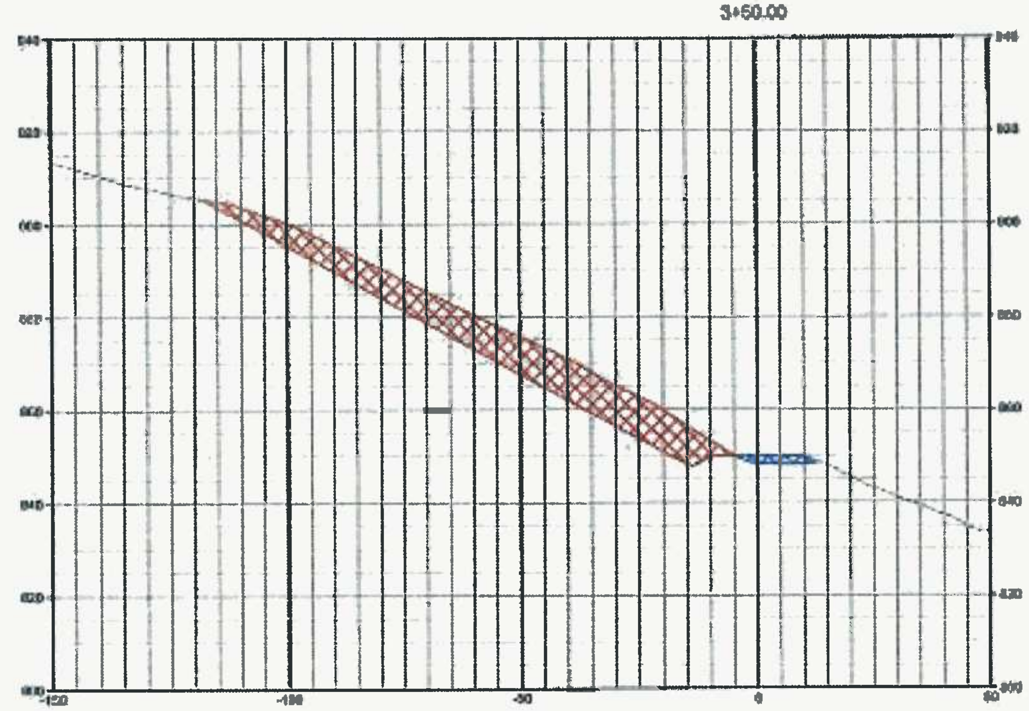

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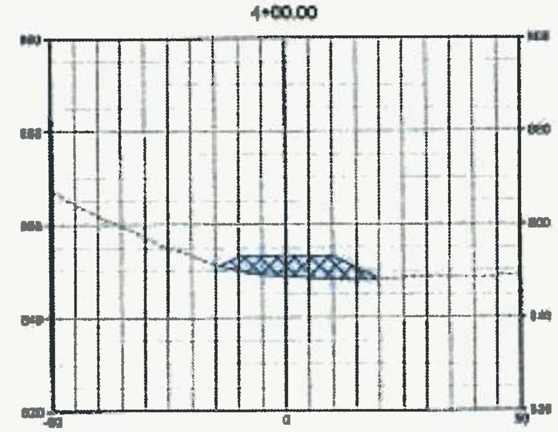

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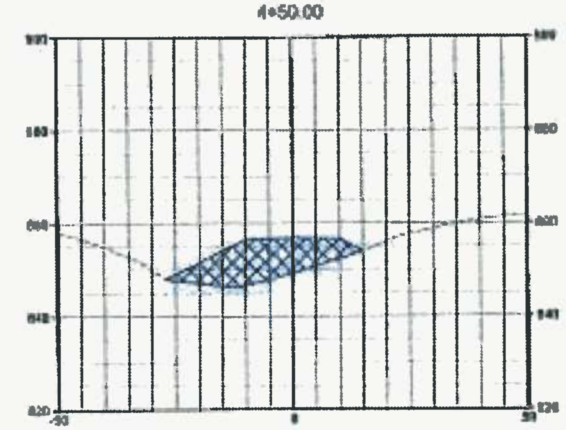

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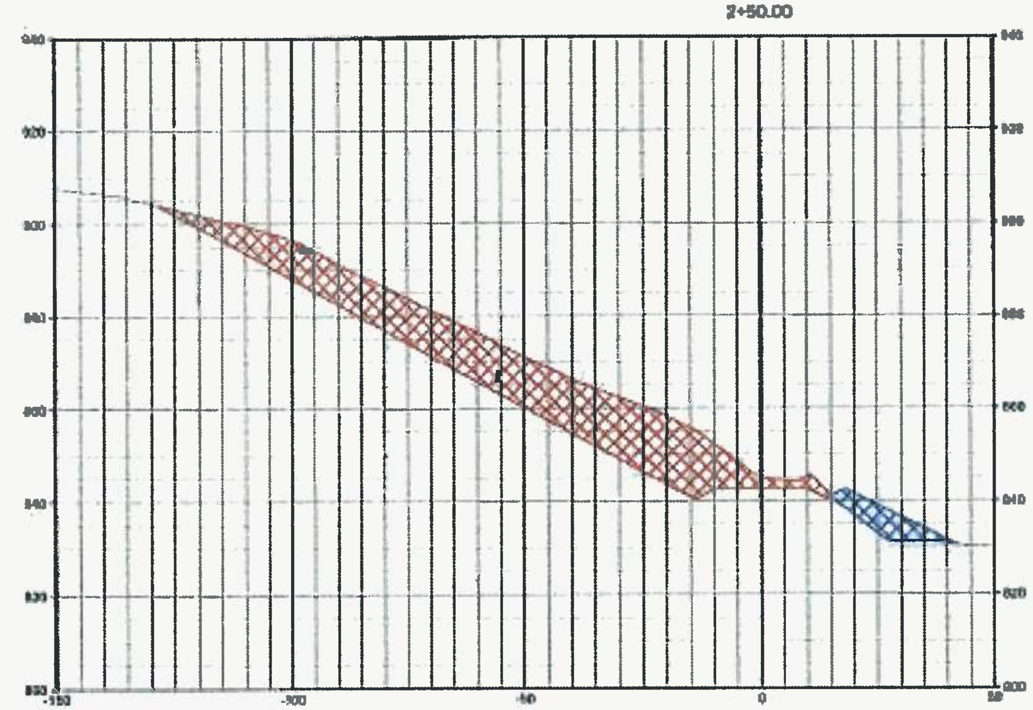

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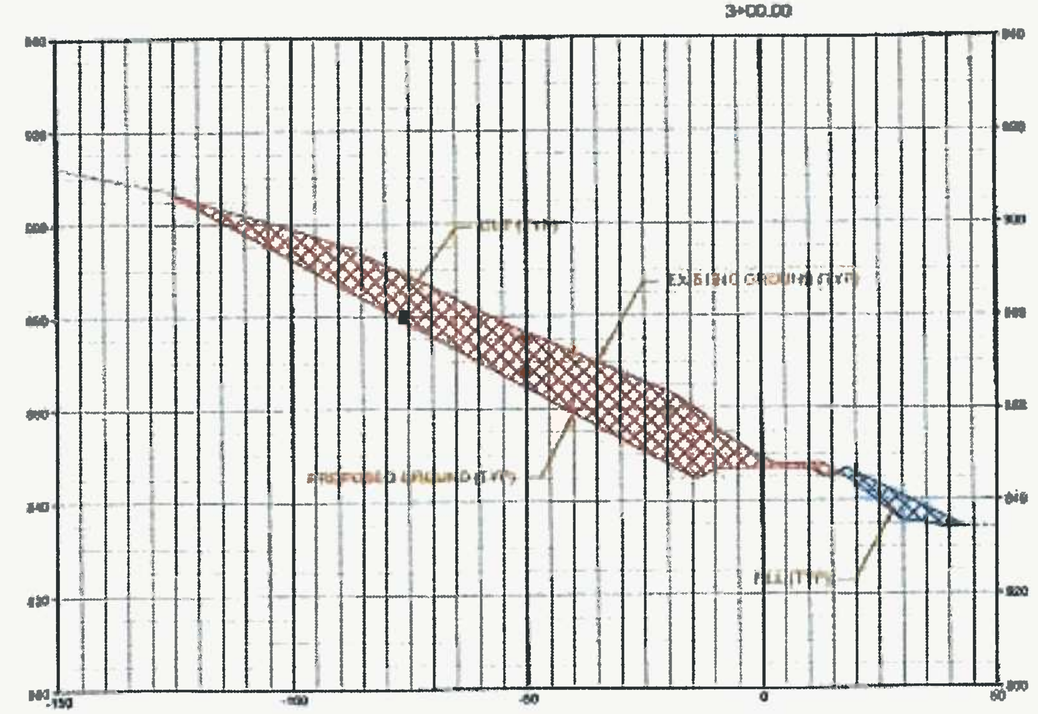
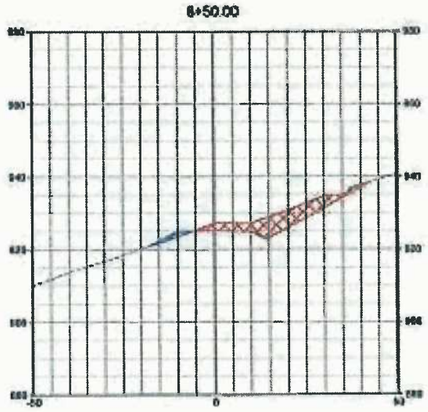


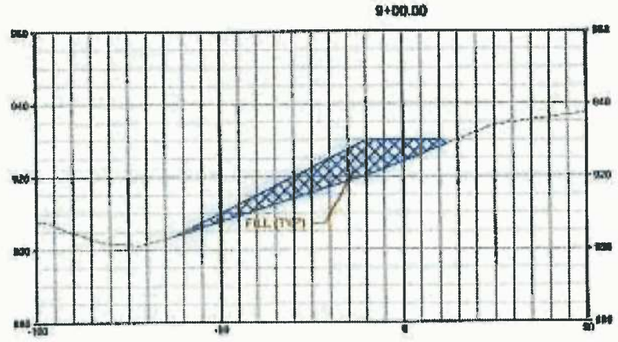
GRAPHIC SCALE

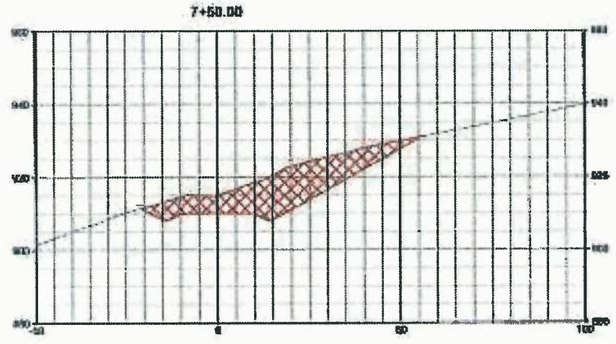
ANTERO RESOURCES

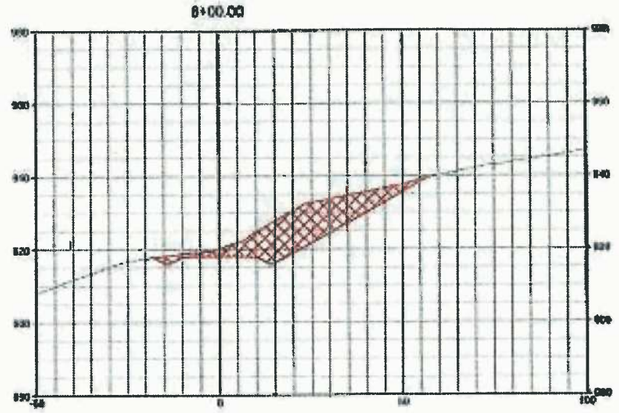
THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV









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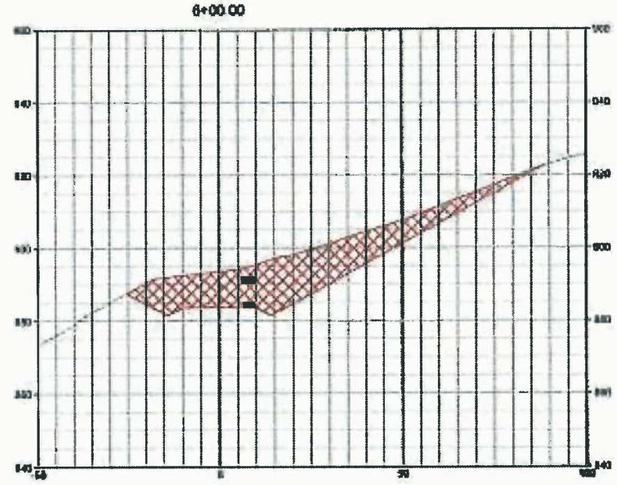
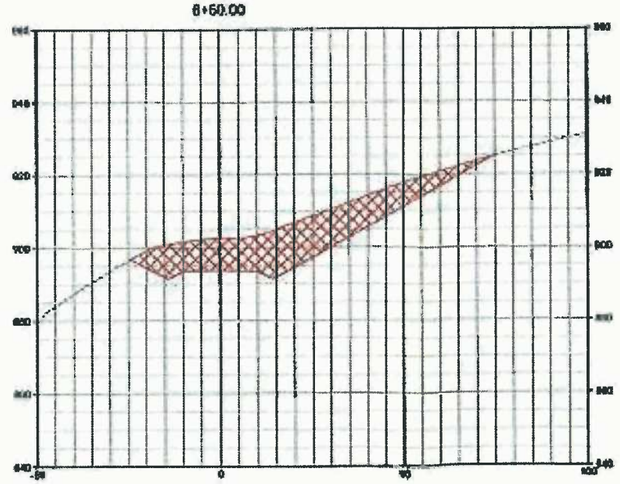
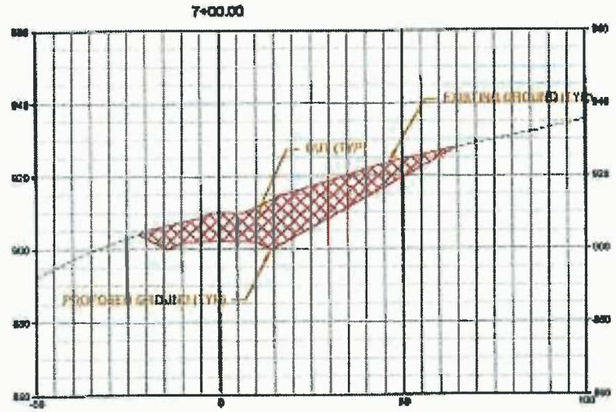
SAY 5/29/2013







GRAPHIC SCALE

1 inch = 50 feet

DATE	SHEET NO.	TOTAL SHEETS
2-4-2013	19	35

The Thrasher Group, Inc.
ENGINEERING AND SURVEYING
417 CALL ROAD, SUITE 216
CHARLESTON, WV 25312
www.thethrashergroup.com

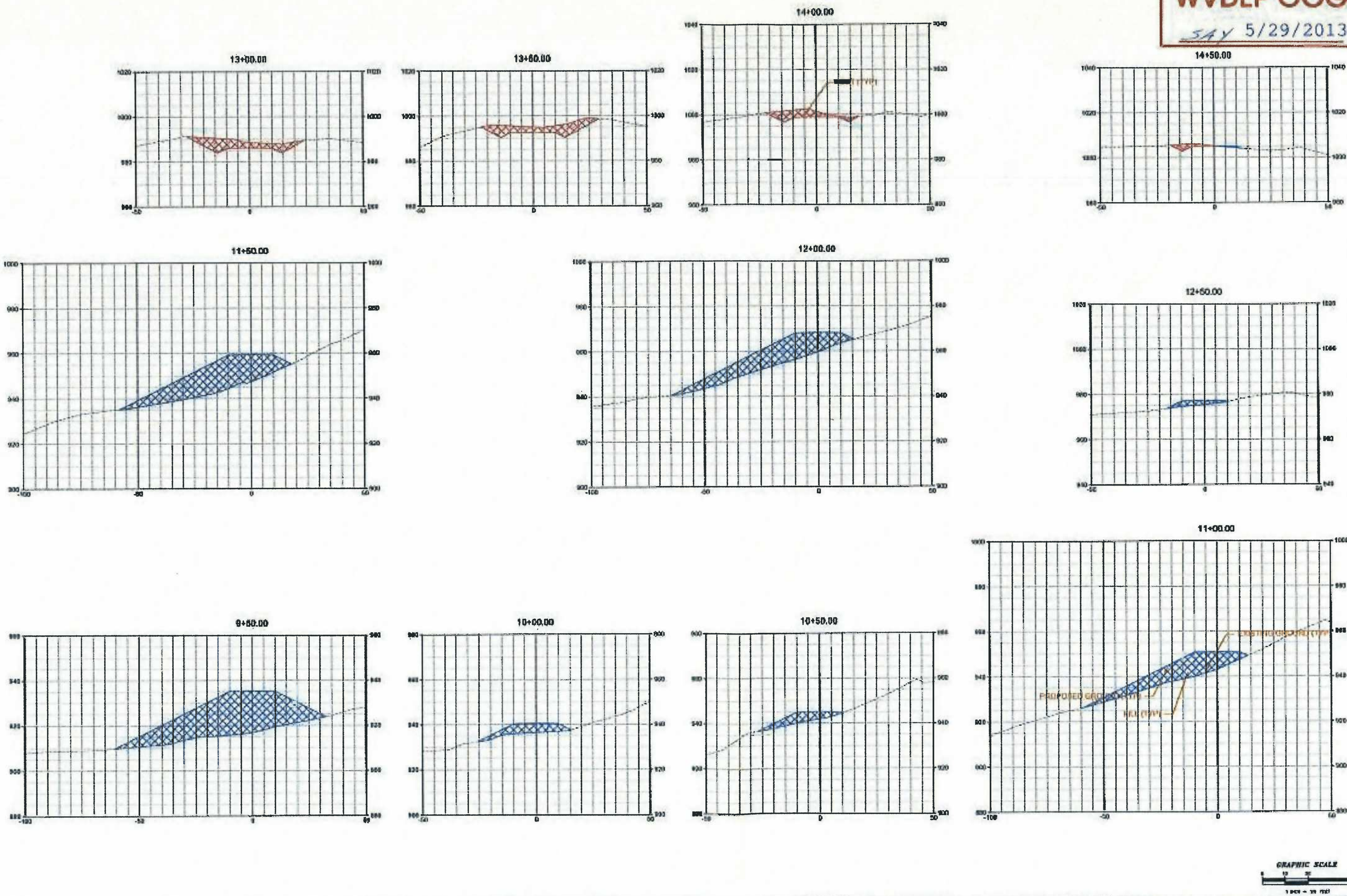
TIMOTHY T. WHITE
REGISTERED

ANTERO RESOURCES

THIS DOCUMENT
PREPARED FOR
ANTERO RESOURCES
APPALACHIAN CORP

FINAL DESIGN
ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

REVISION	DATE	BY



Whitt Brothers Consulting, LLC
ENGINEERING AND SURVEYING
441 CALL ROAD, SUITE 1C
CHARLESTON, WV 25312

TIMOTHY T. WHITE REGISTERED

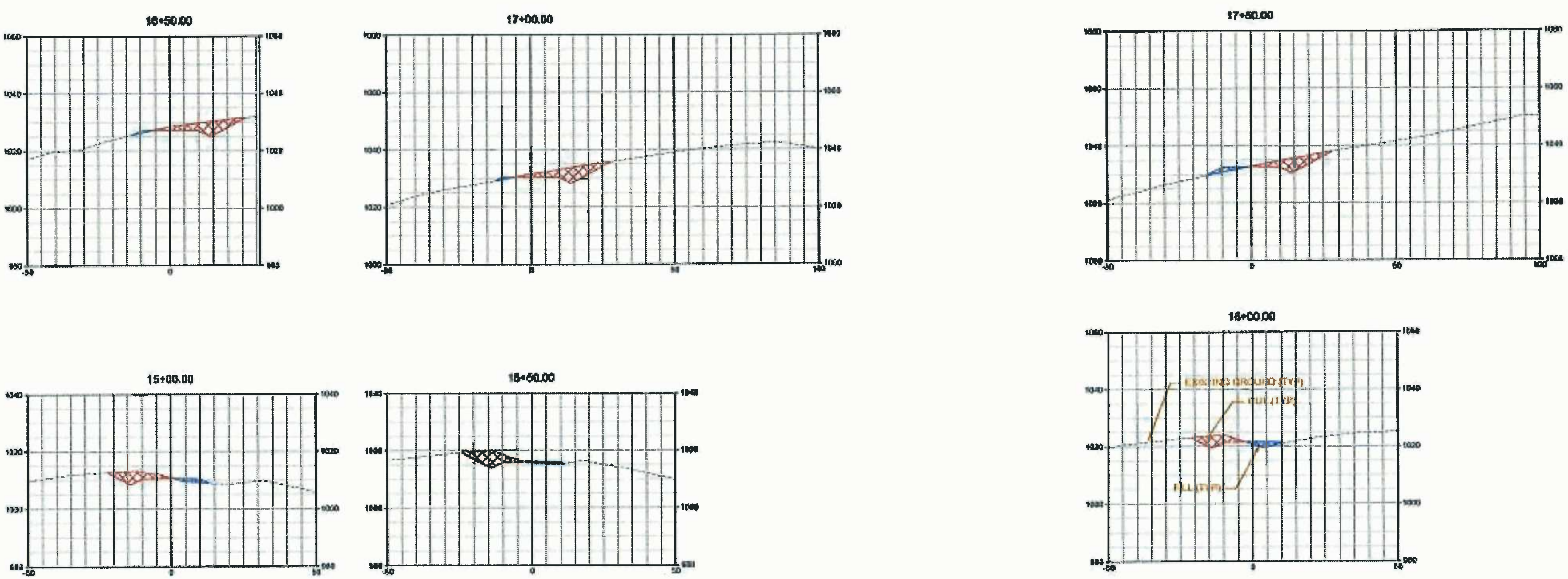
ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

REVISION	DATE	BY

APPROVED
WVDEP OOG
SAY 5/29/2013



GRAPHIC SCALE

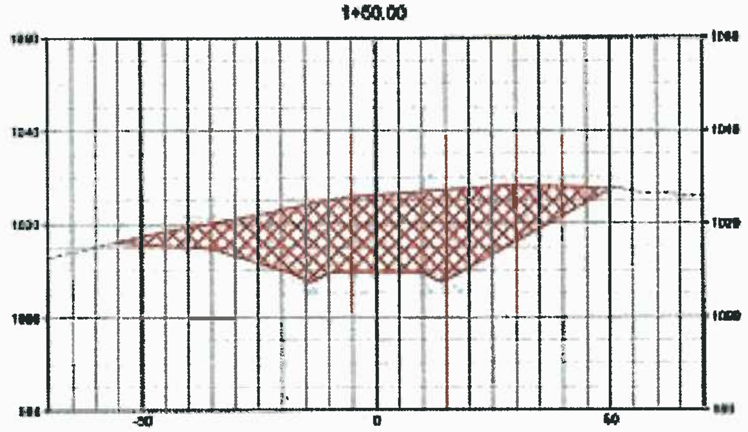
THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

ANTERO RESOURCES

FINAL DESIGN
ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

APPROVED
WVDEP OOG
SAY 5/29/2013

1+50.00



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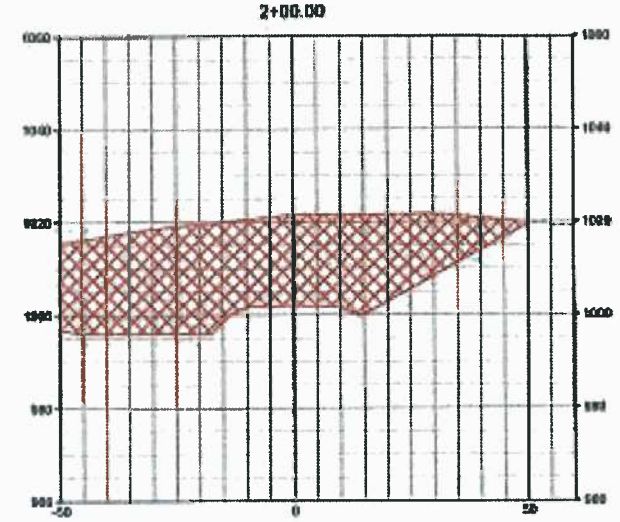

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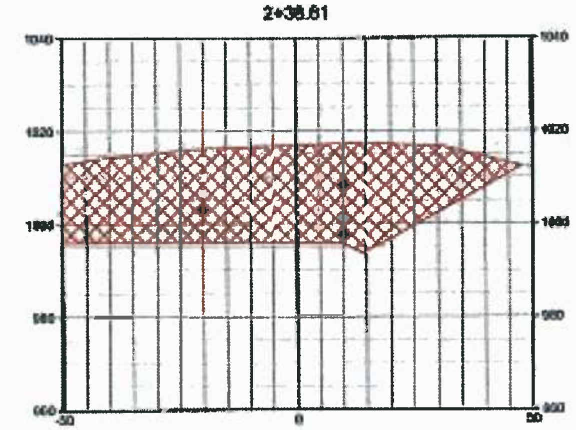

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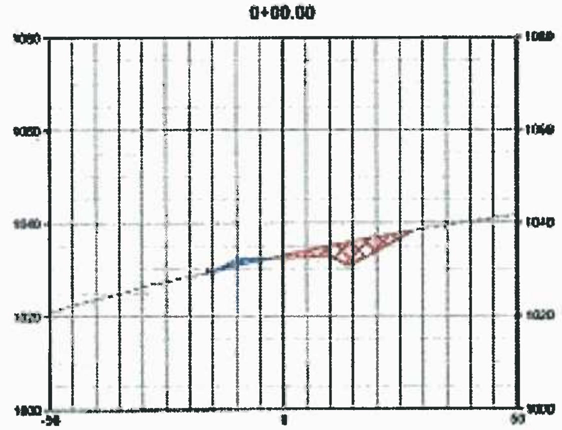

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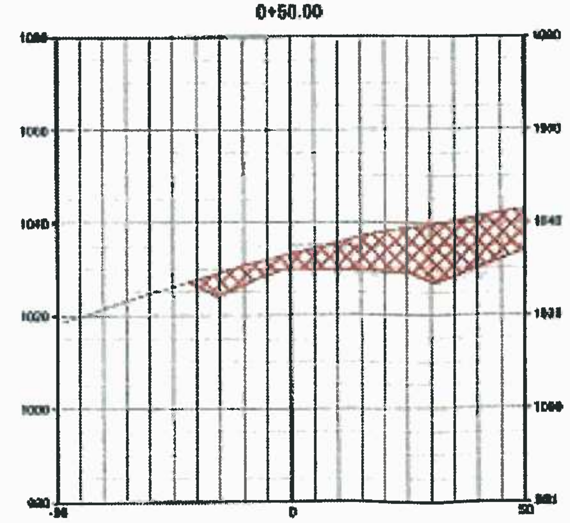

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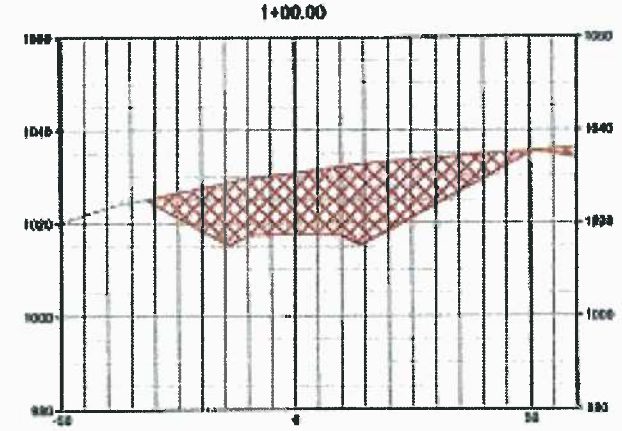

GRAPHIC SCALE

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
DRILL PAD ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

APPROVED
WVDEP OOG
SAY 5/29/2013

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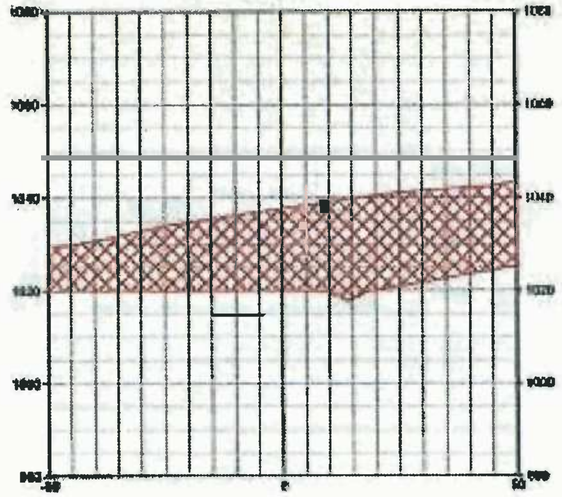

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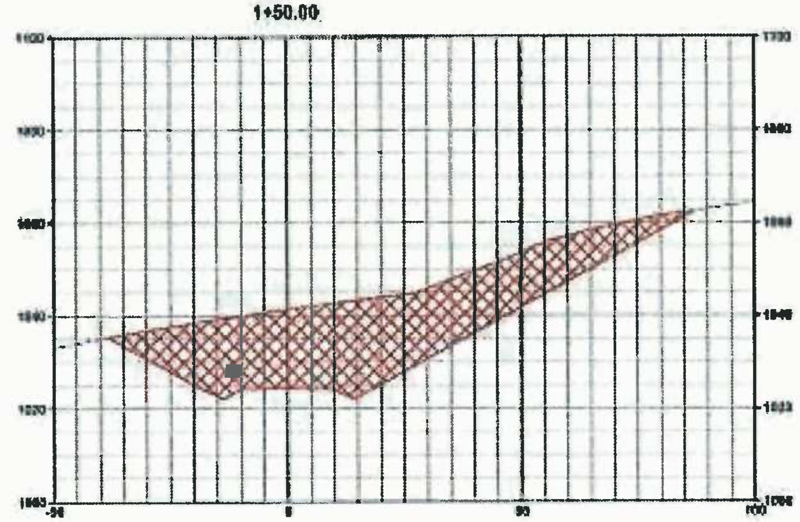

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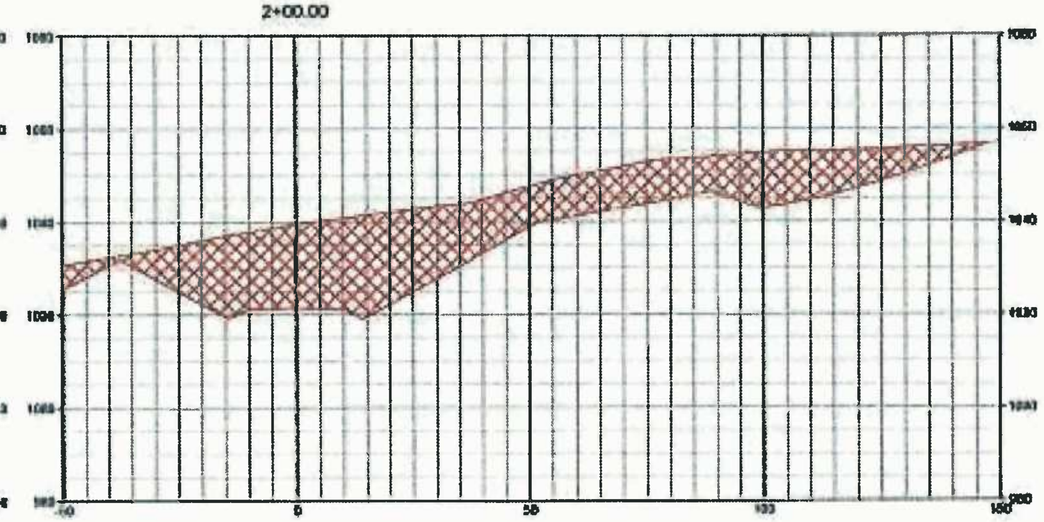

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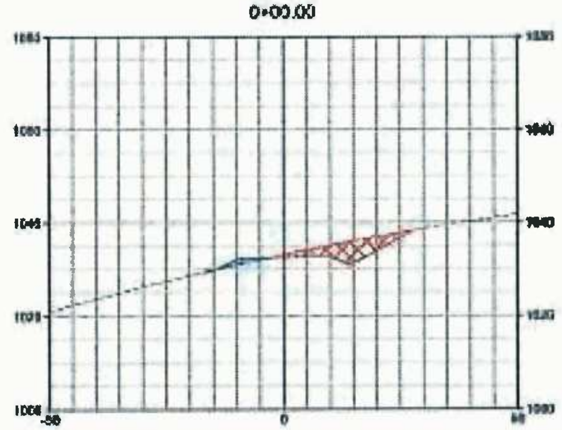

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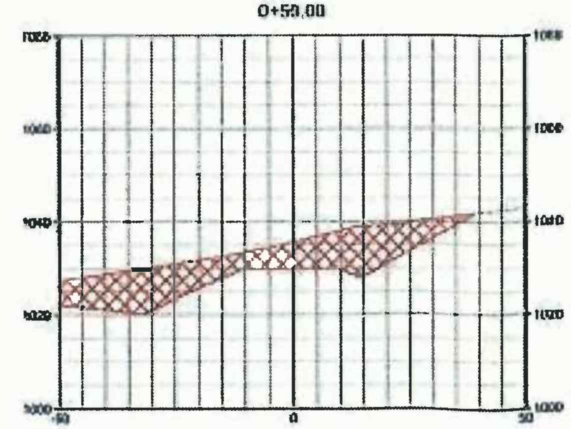

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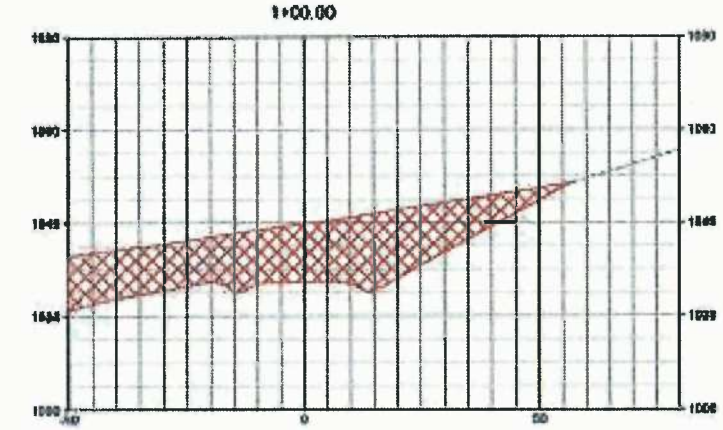
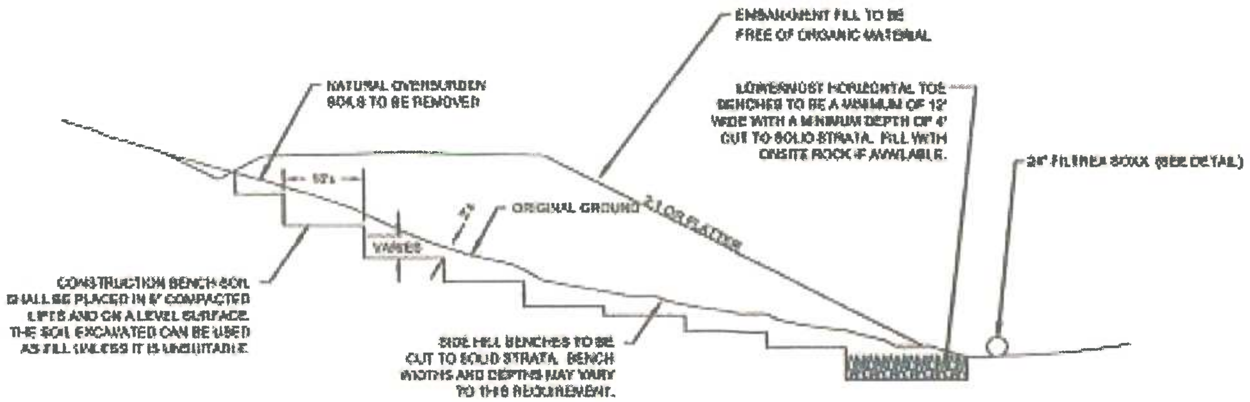


GRAPHIC SCALE

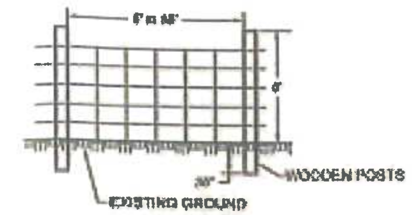
ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
AUXILIARY PAD ROAD CROSS SECTIONS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV



EMBANKMENT FILL BENCH DETAIL (TYP.)
N.T.S.



TYPICAL WOVEN WIRE FENCE DETAIL
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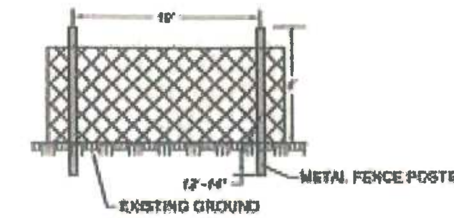
WVDEP OOG
5/29/2013



TYPICAL CONSTRUCTION FENCE DETAIL
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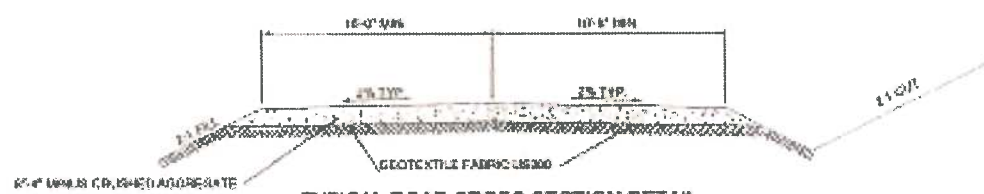
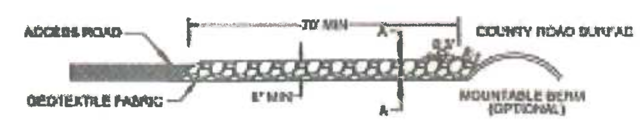
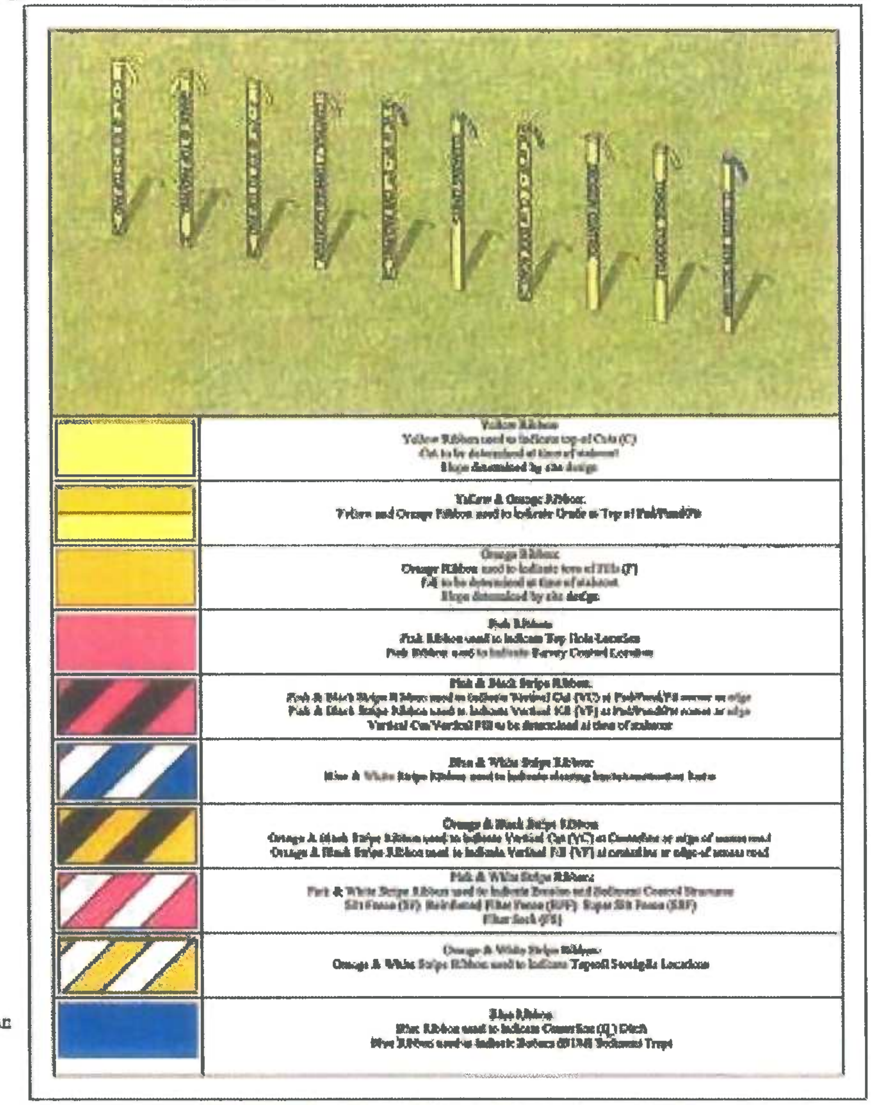


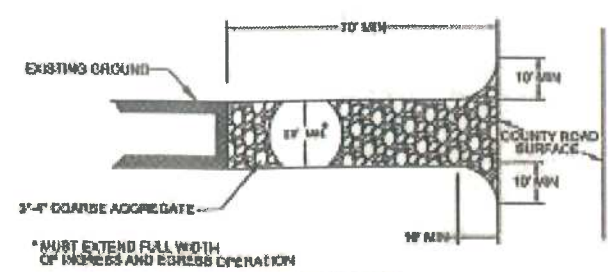
TYPICAL ROAD CROSS-SECTION DETAIL
NTS



SIDE ELEVATION

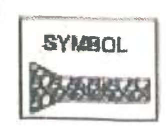


ANTERO RESOURCES STANDARD RIBBON COLOR SCHEME

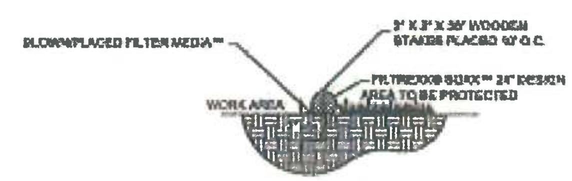


PLAN VIEW

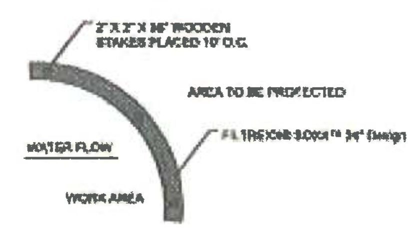
SECTION A-A



STONE CONSTRUCTION ENTRANCE DETAIL
N.T.S.



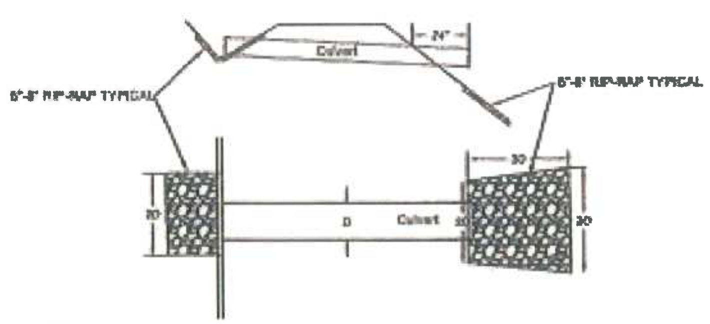
SECTION



PLAN

NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. FILTER MEDIA™ FILL TO MEET APPLICATION REQUIREMENTS.

FILTREXX "SOXX" 24" FILTER SOCK DETAIL
N.T.S.



TYPICAL CULVERT & CULVERT INLET/OUTLET PROTECTION DETAIL
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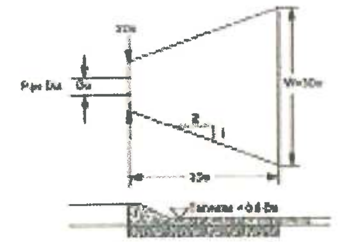

RIP RAP APRON OUTLET PROTECTION
MINIMUM TAILWATER CONDITION
N.T.S.

FINAL SITE DESIGN
DETAILS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

ANTERO RESOURCES
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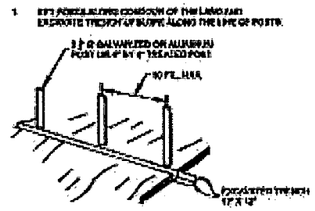
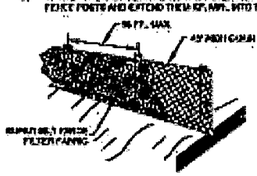
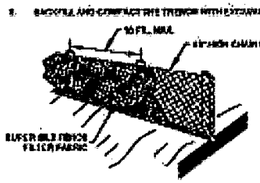
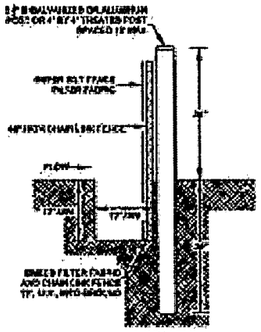
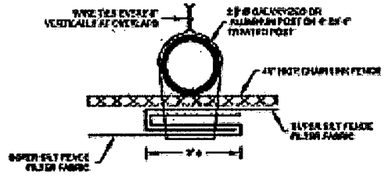
ENGINEERING AND SURVEYING
CHARLESTON, WV

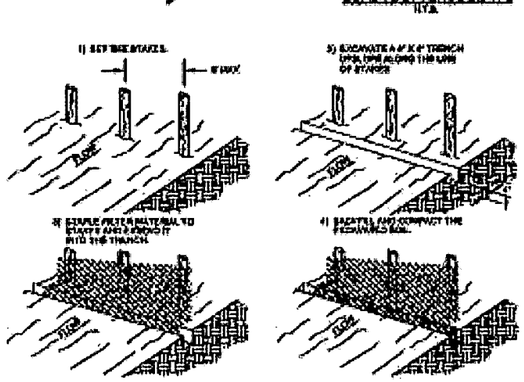


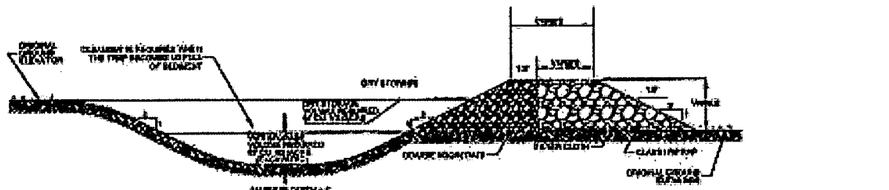












SUPER SILT FENCE NOTES

1. CHAIN LINK FENCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION [illegible] OF THE WVDOH SPECIFICATIONS. CHAIN LINK FENCE SHALL BE FASTENED SECURELY TO THE POSTS WITH WIRE TIES OR STAPLES.
2. POSTS NEED NOT BE SET IN CONCRETE.
3. THE FILTER FABRIC SHALL BE FASTENED TO THE CHAIN LINK FENCE WITH TIES EVERY 24" AT THE TOP AND MID SECTION.
4. FABRIC AND FENCE SHALL BE EMBEDDED 12", MINIMUM, INTO THE GROUND.
5. A 6", MINIMUM, OVERLAP SHALL BE PROVIDED WHERE TWO SECTIONS OF FABRIC ADJOIN. THE OVERLAPPED FABRIC SHALL BE FOLDED TOGETHER AND ATTACHED TO THE CHAIN LINK FENCE.
6. 4" OR 4" PRESSURE TREATED POSTS MAY BE SUBSTITUTED FOR METAL FENCE POSTS WITH THE APPROVAL OF THE ENGINEER.
7. THE LENGTH OF SLOPE ABOVE THE FENCE SHALL NOT EXCEED 400 FEET IN STEEP TERRAIN [illegible] UNLESS THIS LENGTH CAN BE EXTENDED WITH THE APPROVAL OF THE ENGINEER.

SUPER SILT FENCE DETAIL
N.T.S.

APPROVED
WVDEP OOG
5/29/2013

CROSS SECTION OF OUTLET

TEMPORARY SEDIMENT TRAP NOTES

1. [illegible] THE CONTRACTOR SHALL [illegible]
2. SEDIMENT TRAPS SHALL BE USED IN AREAS WHERE THE TOTAL CONTRIBUTING DRAINAGE [illegible]
3. [illegible] COMPACTED IN 8" LAYERS BY TRAVERSING WITH CONSTRUCTION EQUIPMENT.
4. ANY SEDIMENT TRAP EMBANKMENT SHALL BE SEEDED WITH TEMPORARY VEGETATION [illegible] AFTER INSTALLATION.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE UPSTREAM DRAINAGE AREA HAS BEEN STABILIZED.
7. ALL CUT AND FILL SLOPES [illegible] THE SEDIMENT TRAP SHALL BE 2:1 OR FLATTER.
8. [illegible]
9. THE STRUCTURE SHOULD BE CHECKED REGULARLY TO ENSURE THAT IT IS STRUCTURALLY SOUND AND HAS NOT BEEN DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT.
10. A RIPRAP SPILLWAY CHANNEL MAY BE NECESSARY IF A CONCENTRATED OUTLET FLOW IS ANTICIPATED.
11. FILTER STONE SHALL BE REGULARLY INSPECTED TO ENSURE THAT FILTRATION PERFORMANCE IS MAINTAINED. STONE CHOKED WITH SEDIMENT SHALL BE REMOVED AND CLEANED OR REPLACED.

OUTLET (PERSPECTIVE VIEW)

TEMPORARY SEDIMENT TRAP DETAIL
N.T.S.

TYPICAL FRAC. PIT EMBANKMENT DETAIL
N.T.S.

CONSTRUCTION OF SILT FENCE
(WITHOUT WIRE SUPPORT)
N.T.S.

TYPICAL ROAD DITCH DETAIL
N.T.S.

DIVERSION DITCH DETAIL
N.T.S.

TYPICAL PAD CROSS-SECTION DETAIL
NTS

DITCH CHECK DAM DETAIL
SPACING AS INDICATED ON PROPOSED
N.T.S.

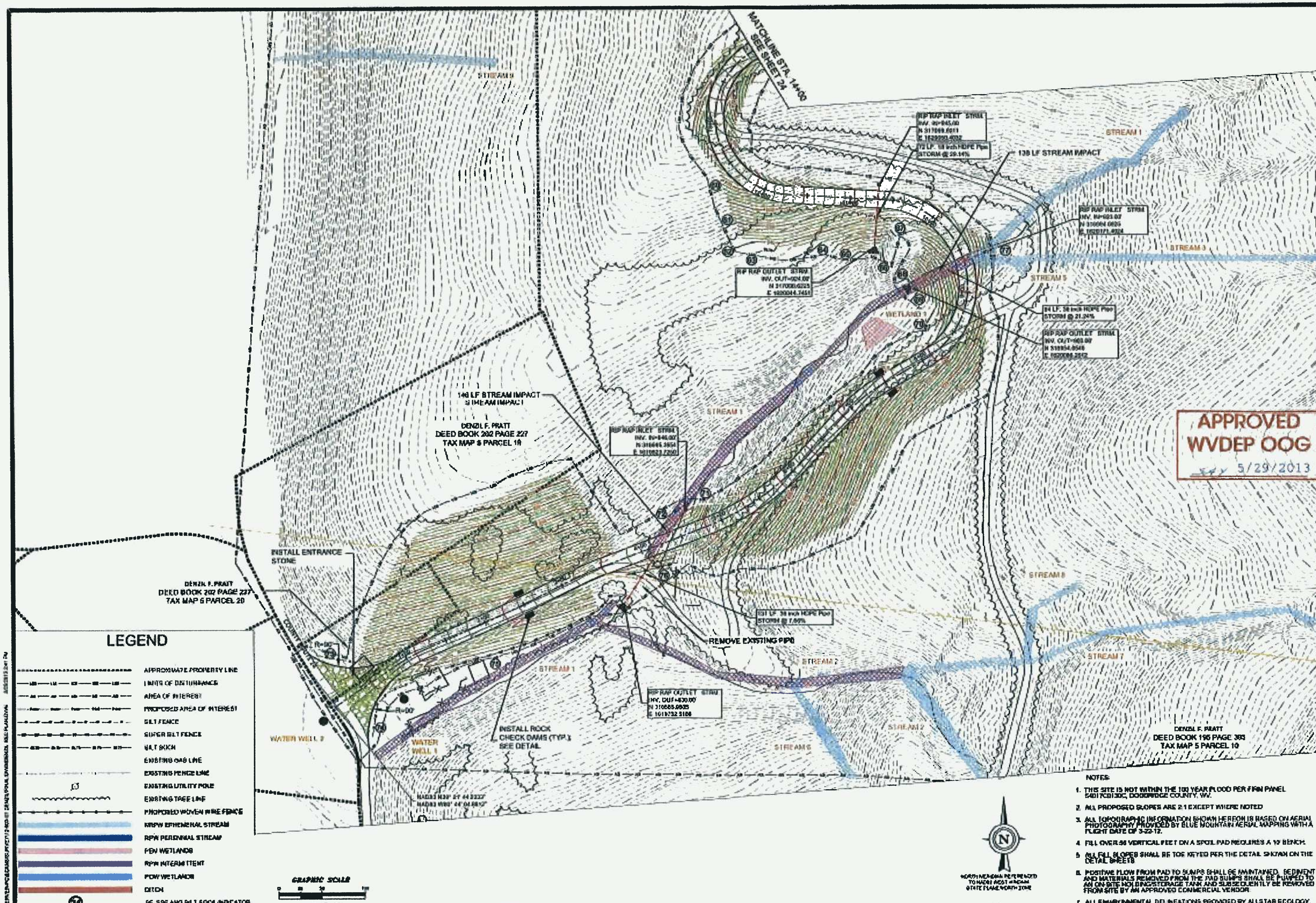
DRILL PAD SUMP PLUMBING DETAIL
NTS

FINAL SITE DESIGN
DETAILS
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

THIS DOCUMENT
PREPARED FOR
ANTERO RESOURCES
APPALACHIAN CORP

ENGINEERING AND SURVEYING

TIMOTHY T. WHITE
REGISTERED
14275



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF DISTURBANCE
- AREA OF INTEREST
- PROPOSED AREA OF INTEREST
- SILT FENCE
- SUPER SILT FENCE
- SILT SOCK
- EXISTING GAS LINE
- EXISTING FENCE LINE
- EXISTING UTILITY POLE
- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- RRPW EPHEMERAL STREAM
- RPW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- RF, RRF AND RLT ROCK INDICATOR

NOTES:

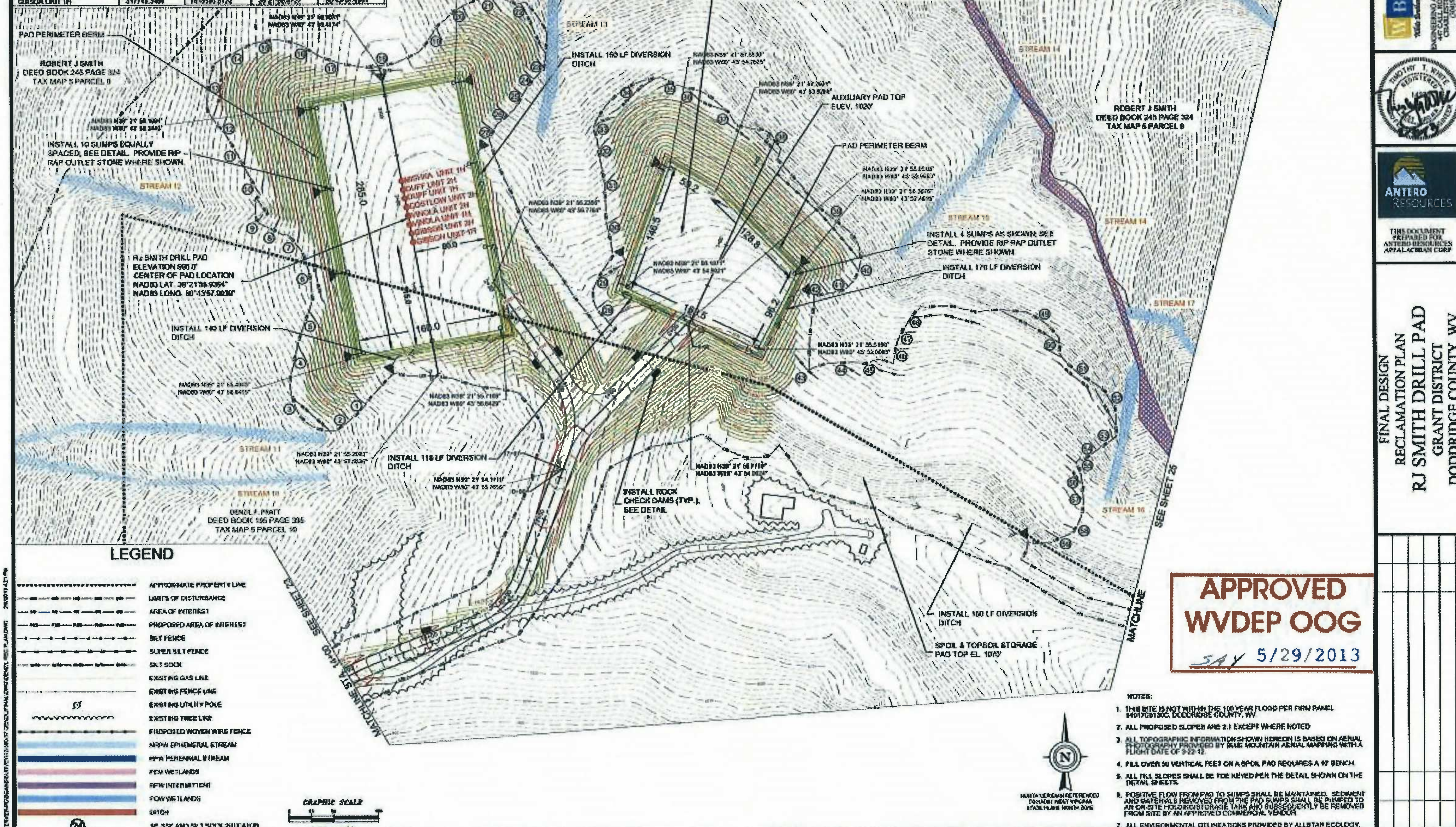
1. THIS SITE IS NOT WITHIN THE 100 YEAR FLOOD PER FIRM PANEL 54017C0130C, DODDRIDGE COUNTY, WV.
2. ALL PROPOSED SLOPES ARE 2:1 EXCEPT WHERE NOTED
3. ALL TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON AERIAL PHOTOGRAPHY PROVIDED BY BLUE MOUNTAIN AERIAL MAPPING WITH A FLIGHT DATE OF 3-22-12.
4. FILL OVER 50 VERTICAL FEET ON A SPOIL PAD REQUIRES A 10' BENCH.
5. ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON THE DETAIL SHEETS
6. POSITIVE FLOW FROM PAD TO SUMPS SHALL BE MAINTAINED. SEDIMENT AND MATERIALS REMOVED FROM THE PAD SUMPS SHALL BE PUMPED TO AN ON-SITE HOLDING/STORAGE TANK AND SUBSEQUENTLY BE REMOVED FROM SITE BY AN APPROVED COMMERCIAL VENDOR.
7. ALL ENVIRONMENTAL DELINEATIONS PROVIDED BY ALLSTAR ECOLOGY.

ANTERO RESOURCES

THIS DOCUMENT PREPARED FOR ANTERO RESOURCES APPALACHIAN CORP

FINAL DESIGN
RECLAMATION PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV

WELL HEAD LAYOUT STATE PLANE NAD 83 (WV NORTH ZONE)	NORTH	EAST	LATITUDE	LONGITUDE
MISHKA UNIT 1H	317787.2003	1619368.2872	39-21-57.3915	-80-43-58.0999
DUFF UNIT 2H	317777.3644	1619370.0007	39-21-57.2549	-80-43-58.0749
DUFF UNIT 1H	317767.5204	1619371.8943	39-21-57.1575	-80-43-58.0499
COSTLOW UNIT 2H	317757.8924	1619373.6079	39-21-57.0698	-80-43-58.0249
VINCLA UNIT 2H	317747.8004	1619375.5015	39-21-56.9836	-80-43-58.0001
VINCLA UNIT 1H	317738.0204	1619377.2051	39-21-56.8986	-80-43-57.9751
GIBSON UNIT 2H	317728.1844	1619379.1088	39-21-56.7997	-80-43-57.9502
GIBSON UNIT 1H	317718.3484	1619380.8122	39-21-56.6727	-80-43-57.9261



AUX. PAD LINER TO BE REMOVED AND DISPOSED OF PROPERLY. THE PAD AREA SHALL BE GRADED TO THE SURFACE OWNERS SPECIFICATIONS OR AS CLOSE TO PRE-DISTURBANCE AS POSSIBLE. THE ADJACENT SPOIL PAD SHALL BE UTILIZED FOR ANY GRADING THE OWNER WISHES TO HAVE COMPLETED.
ALL E&S DEVICES SHALL BE REMOVED UPON COMPLETION OF FINAL VEGETATION AND SITE STABILIZATION.
PAD PERIMETER BERM
ROBERT J SMITH DEED BOOK 245 PAGE 324 TAX MAP 5 PARCEL 9
INSTALL 10 SUMPS EQUALLY SPACED, SEE DETAIL. PROVIDE RIP RAP OUTLET STONE WHERE SHOWN.
STREAM 12
STREAM 13
STREAM 14
STREAM 15
STREAM 16
STREAM 17
STREAM 11
STREAM 10
INSTALL 160 LF DIVERSION DITCH
AUXILIARY PAD TOP ELEV. 1020'
RJ SMITH DRILL PAD ELEVATION 980.0' CENTER OF PAD LOCATION
INSTALL 140 LF DIVERSION DITCH
INSTALL 4 SUMPS AS SHOWN, SEE DETAIL. PROVIDE RIP RAP OUTLET STONE WHERE SHOWN.
INSTALL 170 LF DIVERSION DITCH
INSTALL 110 LF DIVERSION DITCH
INSTALL ROCK CHECK DAMS (TYP.), SEE DETAIL
DENZIL F. PRATT DEED BOOK 195 PAGE 395 TAX MAP 5 PARCEL 10
ROBERT J SMITH DEED BOOK 245 PAGE 324 TAX MAP 5 PARCEL 9
INSTALL 160 LF DIVERSION DITCH
SPOIL & TOPSOIL STORAGE PAD TOP EL. 1070'
SEE SHEET 25
MATCHLINE
LEGEND
APPROXIMATE PROPERTY LINE
LIMITS OF DISTURBANCE
AREA OF INTEREST
PROPOSED AREA OF INTEREST
SILT FENCE
SUPER SILT FENCE
SILT SOCK
EXISTING GAS LINE
EXISTING FENCE LINE
EXISTING UTILITY POLE
EXISTING TREE LINE
PROPOSED WOVEN WIRE FENCE
WETLANDS
DITCH
GRAPHIC SCALE
FINAL DESIGN
RECLAMATION PLAN
RJ SMITH DRILL PAD
GRANT DISTRICT
DODDRIDGE COUNTY, WV
ANTERO RESOURCES

APPROVED WVDEP OOG 5/29/2013

NOTES:

1. THIS SITE IS NOT WITHIN THE 100 YEAR FLOOD PER FIRM PANEL 54017C0130C, DODDRIDGE COUNTY, WV
2. ALL PROPOSED SLOPES ARE 2:1 EXCEPT WHERE NOTED
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5. ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON THE DETAIL SHEETS.
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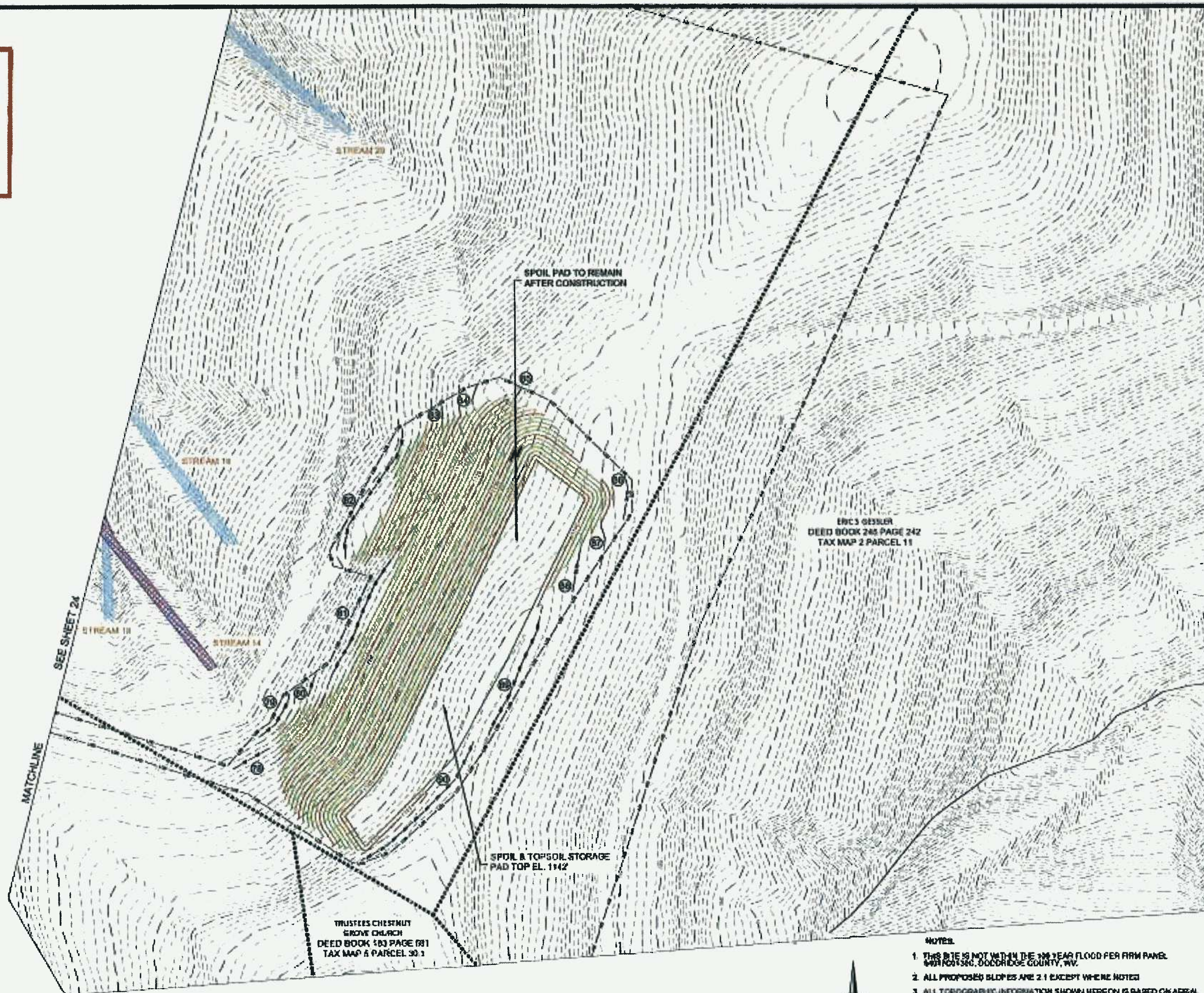
7. ALL ENVIRONMENTAL DELINEATIONS PROVIDED BY ALLSTAR ECOLOGY.

APPROVED
WVDEP OOG
SAY 5/29/2013



LEGEND

- APPROXIMATE PROPERTY LINE
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- EXISTING TREE LINE
- PROPOSED WOVEN WIRE FENCE
- NRPW EPHEMERAL STREAM
- RPW PERENNIAL STREAM
- PEM WETLANDS
- RPW INTERMITTENT
- POW WETLANDS
- DITCH
- (24) SF, SSF AND SILT SOCK INDICATOR

GRAPHIC SCALE

NOTES:

1. THIS SITE IS NOT WITHIN THE 100 YEAR FLOOD PER FIRM PANEL [illegible], DODDRIDGE COUNTY, WV.
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3. ALL TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON AERIAL PHOTOGRAPHY PROVIDED BY BLUE MOUNTAIN AERIAL MAPPING WITH A FLIGHT DATE OF 3-22-12.
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ENGINEERING AND SURVEYING
CHARLESTON, WV

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RJ SMITH DRILL PAD
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DODDRIDGE COUNTY, WV