



west virginia department of environmental protection

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

Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Monday, June 28, 2021
WELL WORK PLUGGING PERMIT
Horizontal 6A Plugging

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit approval for PURSLEY UNIT 1H
47-095-02130-00-00

This well work permit 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 any additional specific 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.

Upon completion of the plugging well work, the above named operator will reclaim the site according to the provisions of WV Code 22-6-30. Please be advised that form WR-38, Affidavit of Plugging and Filling Well, is to be submitted to this office within 90 days of 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.

Per 35 CSR 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- 0450.

A blue ink signature of James A. Martin.

James A. Martin
Chief

Operator's Well Number: PURSLEY UNIT 1H
Farm Name: NALLEY, ROBERT D. & VIRG
U.S. WELL NUMBER: 47-095-02130-00-00
Horizontal 6A Plugging
Date Issued: 6/28/2021

I

PERMIT CONDITIONS

47095021306

West Virginia Code §22-6-11 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. All pits must be lined with a minimum of 20 mil thickness synthetic liner.
2. In the event of an accident or explosion causing loss of life or serious personal injury in or about the well or while working on the well, the well operator or its contractor shall give notice, stating the particulars of the accident or explosion, to the oil and gas inspector and the Chief within twenty-four (24) hours.
3. Well work activities shall not constitute a hazard to the safety of persons.

07/02/2021

WW-4B
Rev. 2/01

- 1) Date May 27, 2021
- 2) Operator's
Well No. Pursley Unit 1H
- 3) API Well No. 47-095-0231

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

APPLICATION FOR A PERMIT TO PLUG AND ABANDON

- 4) Well Type: Oil / Gas / Liquid injection / Waste disposal
(If "Gas, Production or Underground storage) Deep / Shallow
- 5) Location: Elevation 971' Watershed Point Pleasant Creek
District Lincoln County Tyler Quadrangle Paden City 7.5'
- 6) Well Operator Antero Resources Corporation 7) Designated Agent CT Corporation System - Dianna Stamper
Address 1615 Wynkoop Street Address 5400 D Big Tyler Road
Denver, CO 80202 Charleston, WV 25313
- 8) Oil and Gas Inspector to be notified Name Derek Haught 9) Plugging Contractor Name N/A - Antero will plug well
Address 601 57th Street, SE Address _____
Charleston, WV 25304

10) Work Order: The work order for the manner of plugging this well is as follows:

*Please see attached Work Order.

ALL CEMENT PLUGS MUST HAVE A MINIMUM BY WEIGHT OF
6% GEL SPACERS.

GEL - FRESH WATER WITH A MINIMUM OF 6% BENTONITE BY WEIGHT. *JWH*

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Notification must be given to the district oil and gas inspector 24 hours before permitted work can commence.

Work order approved by inspector *[Signature]* Date 6-4-21



Pursley Unit 1H
 Tyler County, WV
 API #47095021300000

Objective: Plug and Abandon Horizontal well.

Well Design:

- 20" Conductor @ 90' (24" hole) – Cemented to Surface
- 13-3/8" Surface Casing @ 353' (17-1/2" hole) – Cemented to Surface
- 9-5/8" 36# J-55 Intermediate Casing @ 2,504' (12-1/4" hole) – Cemented to Surface
- Open hole to 5,200' with packer set @ 2,405'

Oil and Gas Zones:

1. Benson: 4,805'
2. Alexander: 5,015'

Procedure:

GEL SPACERS BETWEEN ALL PLUGS,

1. Check and record casing surface pressures into Wellview. Verify no pressure behind 9 5/8". Bleed off pressure and monitor any build-up prior to performing any more work.
2. Notify WV DEP 24 hours prior to commencing work.
3. Move in and rig up flat tank and frac tank (No pits will be utilized).
4. Confirm and pull barrier plug within the wellhead.
5. MIRU Stalnaker Energy service rig with JU Head. Pressure test well control equipment. Current load fluid is 12.5# WBM with an 80 bbl LCM pill set across Benson/Alexander
6. Trip in hole with 2 3/8" upset tubing to 2,405'. Pull packer that was placed and trip out of hole. Bleed gas if necessary.
7. Trip back in hole with tubing to 5,200'
8. Pump 35 bbl water spacer
9. MIRU cement services. Mix and pump a 495' cement plug (4,705'-5,200'). Covering both Benson and Alexander formations with plug. (Class A cement + 2% CaCl₂, zero excess, yield = 1.15 ft³/sk, WR = 5.2 gal/sk, minimum 500 psi compressive strength)
 - a. 8 1/4" open hole volume = 0.3941 ft³/ft
 - b. 450' plug = 195 ft³ cement.
 - c. Displace to balance plug with 10.0 ppg fluid
 - d. Slowly pull out of cement plug and lay down 500' of 2-7/8" tubing
 - e. Reverse circulate tubing clear of cement with 10.0 ppg fluid
 - f. Continue TOOH to 3,900'.
 - g. Positive Test plug to 500 psi. If successful test, move on to set next plug
10. TOOH laying down tubing in singles to 2,400'
11. Mix & pump a 200' cement plug using Class A cement + 2% CaCl₂, (zero excess yield = 1.15 ft³/sk, WR = 5.2 gal/sk). Plug should cover 100' inside 9-5/8" casing and 100' in open hole.
 - a. WOC 8 hours.
 - b. Trip in hole with 2 3/8" tubing.
 - c. Tag TOC
- 11a. *ADD 100' CEMENT PLUG FROM 400' - 300' gwm*
12. TOOH laying down tubing in singles to 150'
13. Mix and pump the final cement plug to fill up 9-5/8" casing from 150' to surface.

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DMH
 6-4-21

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- a. Mix and pump 7 bbls 10ppg 35ppb weighted Eco spacer from 150'-300' prior to final plug to support cement column
 - b. 64 ft³ Class A cement + 2% CaCl₂, zero excess, yield =1.15 ft³/sk, WR = 5.2 gal/sk, minimum 500 psi compressive strength)
 - a. Volume inside of 9-5/8", 40# casing = 0.4257 ft³/ft
 - b. 150' plug = 64 ft³ cement
 - c. Slowly pull out of cement plug while laying down 150' of 2-3/8" tubing
 - d. Clean up tubing if possible
 - e. Wait on cement 8hrs.
 - f. Observe top of cement at surface.
14. Cut off all casing strings 3' below ground level.
15. Weld marker plate with API No.: 47095021300000

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*Antero is submitting an "Interim" Form WR-35 showing the well work that has been completed to date. This well has been partially drilled to 5200 TVD and we are submitting a second permit to Drill Deeper. We will follow up with the "Final" Form WR-35 & WR-34 within 90 days of completion.

WR-35
Rev. 8/23/13

Page 1 of 4

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 095 - 02130 County Tyler District Lincoln
 Quad Paden City 7.5' Pad Name Nalley Field/Pool Name -----
 Farm name Nalley, Robert D. & Virginia A. Well Number Pursley Unit 1H
 Operator (as registered with the OOG) Antero Resources Corporation
 Address 1615 Wynkoop Street City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey

* This well has been drilled to 5300 TVD. Use well permit or As-Drilled Plat case as basis for drilling deeper to min Total Measured Depth.

Top hole	Northing _____	Easting _____
Landing Point of Curve	Northing _____	Easting _____
Bottom Hole	Northing _____	Easting _____

Elevation (ft) 971' GL Type of Well New Existing Type of Report Interim Final
 Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
 Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
 Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
 Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
 Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
 Production hole Air Mud Fresh Water Brine
 Mud Type(s) and Additive(s)
Air - Foam & 4% KCL
Mud - Polymer

Date permit issued 1/10/2014 Date drilling commenced 7/9/2014 Date drilling ceased 7/28/2014
 Date completion activities began WOC Date completion activities ceased WOC
 Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft <u>267'</u>	Open mine(s) (Y/N) depths <u>No</u>
Salt water depth(s) ft <u>None Identified</u>	Void(s) encountered (Y/N) depths <u>No</u>
Coal depth(s) ft <u>None Identified</u>	Cavern(s) encountered (Y/N) depths <u>No</u>
Is coal being mined in area (Y/N) <u>No</u>	

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Reviewed by: _____

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Page 2 of 4

WR-35
Rev. 8/23/13

API 47-095 - 02130

Farm name Nalley, Robert D. & Virginia A.

Well number Pursley Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	30"	20"	90'	New	133#/J-55	N/A	Y
Surface	17-1/2"	13-3/8"	353'	New	48#/H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2504'	New	36#/J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production							
Tubing							
Packer type and depth set		N/A					

Comment Details *Please note this well has only been drilled to 5200' TVD.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	240 sx	15.6	1.18	86	0'	8 Hrs.
Surface	Class A	400 sx	15.6	1.18	245	0'	8 Hrs.
Coal							
Intermediate 1	Class A	979 sx	15.6	1.18	784	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production							
Tubing							

Drillers TD (ft) 5200' TVD

Loggers TD (ft) N/A

Deepest formation penetrated Alexander

Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5200'

**Logs will be submitted with
FINAL Completion Report.

Check all wireline logs run

- caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No

Conventional Sidewall

Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

Conductor - 0

Surface - 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface

Intermediate - 1 above float joint, 1 above float collar, 1 every 4th joint to surface

WAS WELL COMPLETED AS SHOT HOLE Yes No

DETAILS N/A - WOC

WAS WELL COMPLETED OPEN HOLE? Yes No

DETAILS N/A - WOC

WERE TRACERS USED Yes No

TYPE OF TRACER(S) USED N/A - WOC

07/02/2021

WR-35
Rev. 8/23/13

API 47- 095 - 02130 Farm name Nalley, Robert D. & Virginia A. Well number Pursley Unit 1H

PRODUCING FORMATION(S)	DEPTHS	
	N/A	TVD
_____	_____	_____
_____	_____	_____
_____	_____	_____

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Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface --- psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas --- mcfpd Oil --- bpd NGL --- bpd Water --- bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		

WELL IS WAITING ON DRILLING

Information will be updated on FINAL WR-35 once completed

Please insert additional pages as applicable.

Drilling Contractor Falcon Drilling
Address 102 Broadway St., 300 City Carnegie State PA Zip 15106

Logging Company ----
Address _____ City _____ State _____ Zip _____

Cementing Company Nabors Completion & Production Services, Co.
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company ----
Address _____ City _____ State _____ Zip _____

Please insert additional pages as applicable.

Completed by Kara Quackenbush Telephone 303-357-7233
Signature [Signature] Title Permitting Agent Date 11/28/2016

Submission of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

WW-4A
Revised 6-07

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Environmental Protection

1) Date: May 27 2021
2) Operator's Well Number
Pursley Unit 1H
3) API Well No.: 47 - 095 - 02130

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION TO PLUG AND ABANDON A WELL

4) Surface Owner(s) to be served:	5) (a) Coal Operator
(a) Name <u>Robert D & Virginia A Nalley</u>	Name <u>NO DECLARATIONS ON RECORD WITH COUNTY</u>
Address <u>2549 Tyler Highway</u>	Address _____
<u>Sistersville, WV 26175</u>	_____
(b) Name _____	(b) Coal Owner(s) with Declaration
Address _____	Name <u>NO DECLARATIONS ON RECORD WITH COUNTY</u>
_____	Address _____
(c) Name <u>*All other surface owners with existing access road</u>	Name _____
Address <u>disturbance are off-lease and not required to be notified.</u>	Address _____
_____	_____
6) Inspector <u>Derek Haught</u>	(c) Coal Lessee with Declaration
Address <u>601 57th Street SE</u>	Name <u>NO DECLARATIONS ON RECORD WITH COUNTY</u>
<u>Charleston, WV 25304</u>	Address _____
Telephone <u>304-2067613</u>	_____

TO THE PERSONS NAMED ABOVE: You should have received this Form and the following documents:

- (1) The application to Plug and Abandon a Well on Form WW-4B, which sets out the parties involved in the work and describes the well its and the plugging work order; and
- (2) The plat (surveyor's map) showing the well location on Form WW-6.

The reason you received these documents is that you have rights regarding the application which are summarized in the instructions on the reverses side. However, you are not required to take any action at all.

Take notice that under Chapter 22-6 of the West Virginia Code, the undersigned well operator proposes to file or has filed this Notice and Application and accompanying documents for a permit to plug and abandon a well with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to the well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of this Notice, the Application, and the plat have been mailed by registered or certified mail or delivered by hand to the person(s) named above (or by publication in certain circumstances) on or before the day of mailing or delivery to the Chief.



Well Operator Antero Resources Corporation
 By: Diana Hoff *[Signature]*
 Its: Sr VP of Operations
 Address 1615 Wynkoop Street
Denver, CO 80202
 Telephone 303-357-7310

Subscribed and sworn before me this 27th day of May
 My Commission Expires July 23, 2022 Notary Public Alexandria Castillo

Oil and Gas Privacy Notice
 The Office of Oil and Gas processes your personal information, such as name, address and phone number, as a part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

07/02/2021

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Cut on dotted line.

Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. **DO NOT PHOTO COPY OR ALTER LABEL.**
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, **DO NOT TAPE OVER BARCODE.** Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # :	
9405 5036 9930 0399 1399 39	
Trans. #:	534669411
Print Date:	05/27/2021
Ship Date:	05/27/2021
Expected	
Delivery Date:	06/01/2021
Priority Mail® Postage:	\$7.95
Total:	\$7.95
From: JOHN GIANNAULA 1615 WYNKOOP ST DENVER CO 80202-1106	
To: ROBERT & VIRGINIA NALLEY 2549 TYLER HWY SISTERSVILLE WV 26175-9152	
<small>* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.</small>	



Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

07/02/2021

SURFACE OWNER WAIVER

Operator's Well
Number

Pursley Unit 1H

INSTRUCTIONS TO SURFACE OWNERS NAMED ON PAGE WW4-A

The well operator named on page WW-4A is applying for a permit from the State to plug and abandon a well. (Note: If the surface tract is owned by more than three persons, then these materials were served on you because your name appeared on the Sheriff's tax ticket on the land or because you actually occupy the surface tract. In either case, you may be the only owner who will actually receive these materials.) See Chapter 22 of the West Virginia Code. Well work permits are valid for 24 months. If you do not own any interest in the surface tract, please forward these materials to the true owner immediately if you know who it is. Also, please notify the well operator and the Office of Oil and Gas.

NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.

WHERE TO FILE COMMENTS AND OBTAIN ADDITIONAL INFORMATION:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

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Time Limits and methods for filing comments. The law requires these materials to be served on or before the date the operator files his Application. You have **FIVE (5) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Comments must be in writing. Your comments must include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

The Chief has the power to deny or condition a well work permit based on comments on the following grounds:

- 1) The proposed well work will constitute a hazard to the safety of persons.
- 2) The soil erosion and sediment control plan is not adequate or effective;
- 3) Damage would occur to publicly owned lands or resources;
- 4) The proposed well work fails to protect fresh water sources or supplies;
- 5) The applicant has committed a substantial violation of a previous permit or a substantial violation of one or more of the rules promulgated under Chapter 22, and has failed to abate or seek review of the violation..."

If you want a copy of the permit as it is issued or a copy of the order denying the permit, you should request a copy from the Chief.

VOLUNTARY STATEMENT OF NO OBJECTION

I hereby state that I have read the instructions to surface owners and that I have received copies of a Notice and Application For A Permit To Plug And Abandon on Forms WW-4A and WW-4B, and a survey plat.

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials.

FOR EXECUTION BY A NATURAL PERSON
ETC.

FOR EXECUTION BY A CORPORATION,
ETC.

_____	Date _____	Name _____
Signature		By _____
		Its _____
		_____ Date _____

Signature

Date
07/02/2021

4709502130P

WW-4B

API No.	<u>47-095-02130</u>
Farm Name	<u>Nalley Robert & Virginia</u>
Well No.	<u>Pursley Unit 1H</u>

**INSTRUCTIONS TO COAL OPERATORS
OWNERS AND LESSEE**

The well operator named on the obverse side of WW-4 (B) is about to abandon the well described in the enclosed materials and will commence the work of plugging and abandoning said well on the date the inspector is notified. Which date shall not be less than five days after the day on which this notice and application so mailed is received, or in due course should be received by the Department of Environmental Protection Office of Oil & Gas.

This notice and application is given to you in order that your respective representatives may be present at the plugging and filling of said well. You are further notified that whether you are represented or not the operator will proceed to plug and fill said well in the manner required by Section 24, Article 6, Chapter 22 of the Code and given in detail on obverse side of this application.

NOTE: If you wish this well to be plugged according to 22-6-24(d) then as per Regulation 35CSR4-13.9 you must complete and return to this office on form OB-16 "Request by Coal Operator, Owner, or Lessee for plugging" prior to the issuance of this plugging permit.

WAIVER

The undersigned coal operator ____/ owner ____/ lessee ____/ of the coal under this well location has examined this proposed plugging work order. The undersigned has no objection to the work proposed to be done at this location, provided, the well operator has complied with all applicable requirements of the West Virginia Code and the governing regulations.

Date: _____

By: _____

Its _____

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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 Corporation OP Code 494507062

Watershed Point Pleasant Creek Quadrangle Paden City 7.5'

Elevation 971' County Tyler District Lincoln

Description of anticipated Pit Waste: No pit will be used at this site (All fluids will be stored in tanks and either reused or hauled off site.)

Will a synthetic liner be used in the pit? N/A

DMH
6-4-21

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC Permit # will be provided on Form WR-34)
- Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34)
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
Northwestern Landfill Permit #SWF-1025/
WV0109410
- Other (Explain _____)

Proposed Work For Which Pit Will Be Used:

- Drilling
- Workover
- Other (Explain _____)
- Swabbing
- Plugging

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 Gretchen Kohler

Company Official (Typed Name) Gretchen Kohler

Company Official Title Senior Environmental & Regulatory Manager

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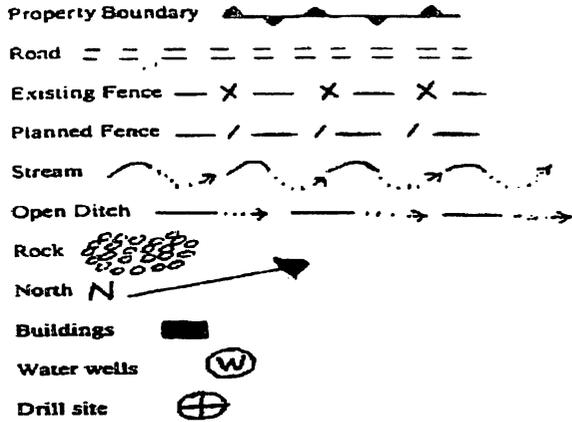
Subscribed and sworn before me this 27th day of May, 20 21

Alexandria X Castillo

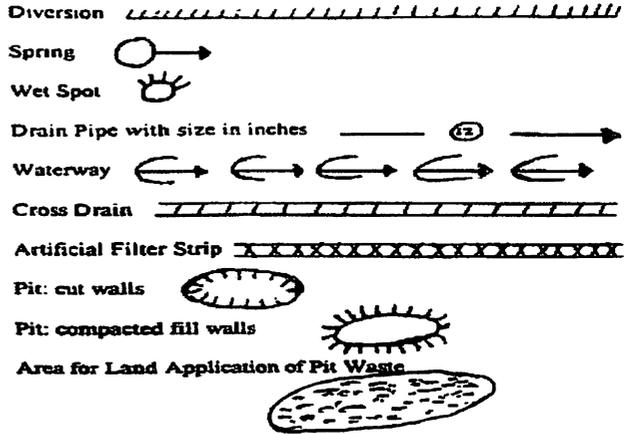
Notary Public

My commission expires July 23, 2022





LEGEND



Proposed Revegetation Treatment: Acres Disturbed 4.85 acres Prevegetation pH _____
 Lime 2-3 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, straw or wood fiber (will be used where needed))

Seed Mixtures

Seed Type	Area I	lbs/acre
KY Blugrass		20

Seed Type	Area II	lbs/acre
Crownvetch		10-15
Tall Fescue		30

Please reference Table IV-4B on page 5 of the Pursely Well Plugging Plan

Please reference Table IV-4A on page 5 of the Pursely Well Plugging Plan

*or type of grass seed requested by surface owner

*or type of grass seed requested by surface owner

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

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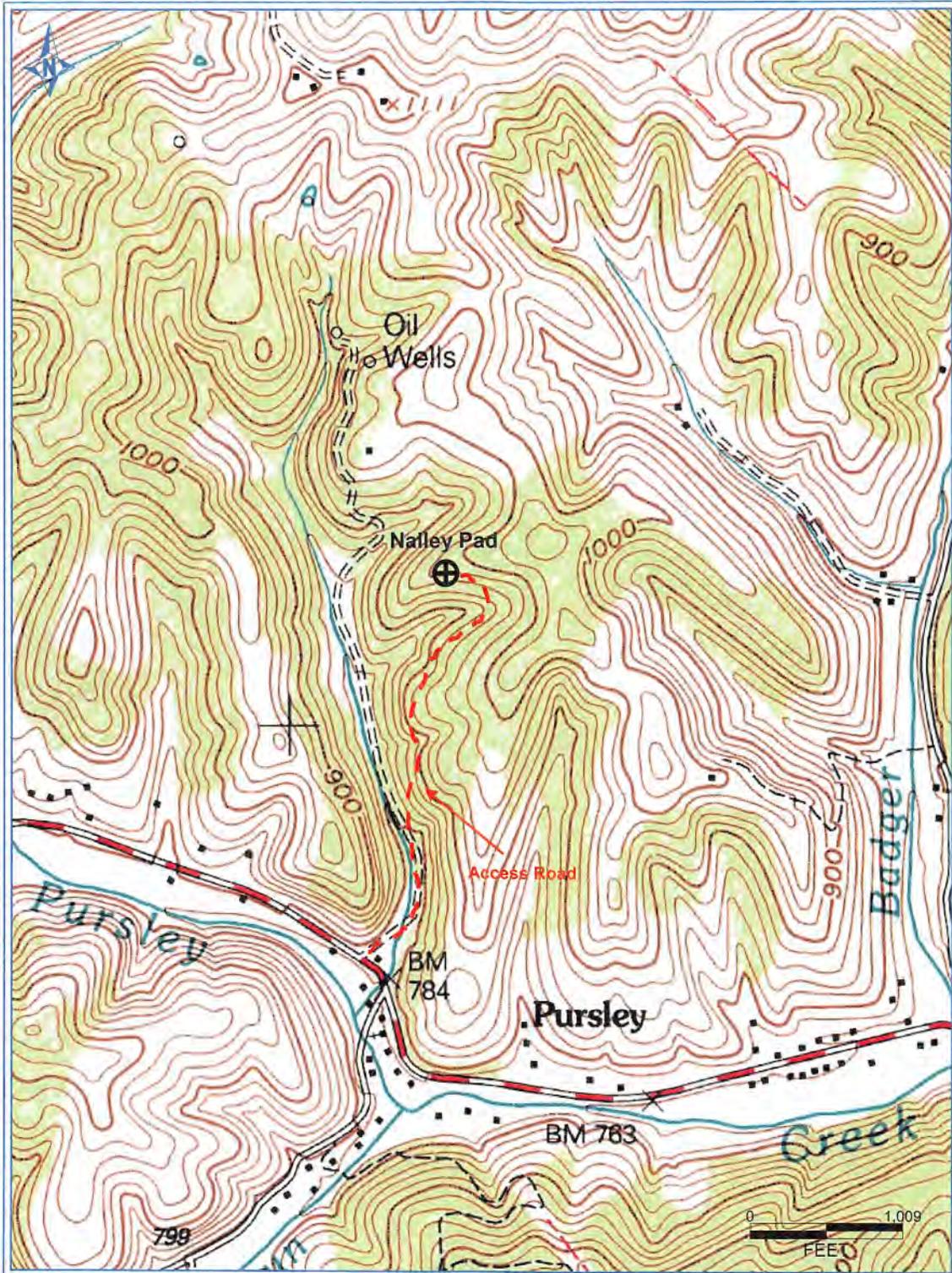
JUN 07 2021

Comments: _____

WV Department of
 Environmental Protection

Title: Oil + Gas Inspector Date: 6-4-21

Field Reviewed? Yes No



PETRA R/D/2013 04R13 AM

Antero Resources Corporation
Appalachian Basin
Pursley Unit
Tyler County

Quadrangle: Paden City
Watershed: Pursley Creek
District: Lincoln
Date: 8-9-2013

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07/02/2021

WW-7
8-30-06



West Virginia Department of Environmental Protection
Office of Oil and Gas

WELL LOCATION FORM: GPS

API: 47-095-02130 WELL NO.: Pursley Unit 1H
 FARM NAME: Robert D. & Virginia D. Nalley
 RESPONSIBLE PARTY NAME: Antero Resources Corporation
 COUNTY: Tyler DISTRICT: Lincoln
 QUADRANGLE: Paden City
 SURFACE OWNER: Robert D. & Virginia D. Nalley
 ROYALTY OWNER: Antero Resources Corporation
 UTM GPS NORTHING: 4377216.43 m
 UTM GPS EASTING: 503899.81 m GPS ELEVATION: 296.27 m (070')

The Responsible Party named above has chosen to submit GPS coordinates in lieu of preparing a new well location plat for a plugging permit or assigned API number on the above well. The Office of Oil and Gas will not accept GPS coordinates that do not meet the following requirements:

1. Datum: NAD 1983, Zone: 17 North, Coordinate Units: meters, Altitude: height above mean sea level (MSL) – meters.
2. Accuracy to Datum – 3.05 meters
3. Data Collection Method:

Survey grade GPS : Post Processed Differential _____
 Real-Time Differential

Mapping Grade GPS : Post Processed Differential _____
 Real-Time Differential

4. **Letter size copy of the topography map showing the well location.**

I the undersigned, hereby certify this data is correct to the best of my knowledge and belief and shows all the information required by law and the regulations issued and prescribed by the Office of Oil and Gas.

Man [Signature]
Signature

Permitting Supervisor
Title

5/27/21
Date

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07/02/2021

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Rev. 10-10

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Discharge Monitoring Report
Oil and Gas General Permit

Company Name: Antero Resources Corporation
 API No: 047-095-02130 County: Tyler
 District: Lincoln Well No: Pursley Unit 1H
 Farm Name: Robert D. & Virginia A. Nalley
 Discharge Date/s From:(MMDDYY) - _____ To: (MMDDYY) - _____
 Discharge Times. From: - _____ To: - _____
 Total Volume to be Disposed from this facility (gallons): N/A - Not Completed
 Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: - _____ (Include a topographical map of the Area.)
 (2) UIC: - _____ Permit No. - _____
 (3) Offsite Disposal: - _____ Site Location: - _____
 (4) Reuse: - _____ Alternate Permit Number: - _____
 (5) Centralized Facility: - _____ Permit No. - _____
 (6) Other method: - _____ (Include an explanation)

Follow Instructions below to determine your treatment category:

Optional Pretreatment test: N/A Cl- mg/l N/A DO mg/l

1. Do you have permission to use expedited treatment from the Director or his representative?
(Y/N) N/A If yes, who? _____ and place a four (4) on line 7.
If not go to line 2
2. Was Frac Fluid or flowback put into the pit? (Y/N) N/A If yes, go to line 5. If not, go to line 3.
3. Do you have a chloride value pretreatment (see above)? (Y/N) N/A If yes, go to line 4
If not, go to line 5.
4. Is the Chloride level less than 5000 mg/l? (Y/N) N/A If yes, then enter a one (1) on line 7.
5. Do you have a pretreatment value for DO? (See above) (Y/N) N/A If yes, go to line 6
If not, enter a three (3) in line 7.
6. Is the DO level greater than 2.5 mg/l?(Y/N) N/A If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
7. N/A is the category of your pit. Use the Appropriate section.
8. Comments on Pit condition: N/A No Pit on Site

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Name of Principal Exec. Officer: Gretchen Kohler
 Title of Officer: Senior Environmental and Regulatory Manager
 Date Completed: 11/28/16

WV Department of
Environmental Protection

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments 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 and imprisonment.


Signature of a Principal Exec. Officer or Authorized agent.

07/02/2021

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Page 2 of 3

Category 1
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	5	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl	5,000	_____	5,000	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

*** Al is only reported if the pH is above 9.0

Category 2
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	10	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

** Include a description of your aeration technique.

*** Al is only reported if the pH is above 9.0

Date: _____

Aeration Code: _____

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WV Department of
Environmental Protection

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Category 3
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	20	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

Date: _____

** Include a description of your aeration technique.

Aeration Code: _____

*** Al is only reported if the pH is above 9.0.

Category 4
Sampling Results
API No: _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	1	_____	N/A	N/A	Days
Fe	Monitor	_____	Monitor	_____	mg/l
D.O.	Monitor	_____	Monitor	_____	mg/l
Settleable Sol.	Monitor	_____	Monitor	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Activated Carbon (0.175)		_____	N/A	N/A	lb/B1
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

Date: _____

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10 days from dis.

WV Department of
Environmental Protection



May 27, 2021

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

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Mr. Jeff McLaughlin
601 57th Street, SE
Charleston, WV 25304

**RE: PERMIT TO PLUG & ABANDON
Pursley (API# 47-095-02130-00)**

Mr. McLaughlin:

Antero Resources Corporation (Antero) would like to submit the following applications for permits to plug and abandon the existing subject wells located on property owned by Antero Resources Corporation in Tyler County, West Virginia.

Attached you will find the following:

- Pursely Unit 1H Submitted Well Records
- Plug and Abandon Permit Application Package
- Form WW-7 Well Location Form: GPS and Topo Map

If you have any questions please feel free to contact me at (303) 357-7223.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink that appears to read "M Stanton".

Mallory Stanton
Permitting Supervisor
Antero Resources Corporation

Enclosures

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MAY 28 2021

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07/02/2021

API#47-095- WELL PLUGGING

LINCOLN DISTRICT, TYLER COUNTY
POINT PLEASANT CREEK W

USGS 7.5 PADEN CITY QU

LOCATION COORDINATES

ACCESS ROAD ENTRANCE
LATITUDE: 39.537176 LONGITUDE: -80.956037 (NAD 83)
LATITUDE: 39.537099 LONGITUDE: -80.956208 (NAD 27)
N 4376391.21 E 503777.86 (UTM ZONE 17 METERS)

CENTROID OF WELL PAD
LATITUDE: 39.544550 LONGITUDE: -80.954729 (NAD 83)
LATITUDE: 39.544474 LONGITUDE: -80.954900 (NAD 27)
N 4377209.71 E 503889.89 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION

THE EXISTING ACCESS ROAD AND WELL PAD ARE BEING UPGRADED TO AID IN THE PLUGGING OF EXISTING INDIVIDUAL GAS WELL.

FLOODPLAIN NOTE

THE SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54095C0040C.

ENTRANCE PERMIT:

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

ENVIRONMENTAL NOTES

WETLAND DELINEATIONS WERE PERFORMED NOVEMBER, 2018 BY KLEINFELDER TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE DECEMBER 06, 2018 JURISDICTIONAL FEATURES MAP (MAP 1) WAS PREPARED BY KLEINFELDER AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

PROJECT CONTACTS:

OPERATOR:

ANTERO RESOURCES CORPORATION
535 WHITE OAKS BLVD.
BRIDGEPORT, WV 26330
PHONE: (304) 842-4100
FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER &
REGULATORY MANAGER
OFFICE: (304) 842-4088 CELL: (304) 476-9770

DIANA HOFF - SVP OPERATIONS
OFFICE: (303) 357-6904

AARON KUNZLER - CONSTRUCTION SUPERVISOR
CELL: (405) 227-8344

ROBERT B. WIRKS - FIELD ENGINEER
OFFICE: (304) 842-4100 CELL: (304) 627-7405

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
CELL: (304) 719-6449

DAVID PATSY - LAND AGENT
CELL: (304) 476-6090

ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (888) 662-4155 CELL: (540) 686-6747

ENVIRONMENTAL:

KLEINFELDER
MATT ALBRIGHT - PROJECT MANAGER
OFFICE: (724) 772-7072 CELL: (609) 947-5296



2000 0 2000
SCALE: 1" = 2000'

WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

MISS Utility of West Virginia
1-800-245-4848
West Virginia State Law
(Section XIV: Chapter 24-C)
Requires that you call two
business days before you dig in
the state of West Virginia.
IT'S THE LAW!!

REPRODUCTION NOTE

THESE PLANS WERE CREATED TO BE PLOTTED ON 22"X34" (ANSI D)
PAPER. HALF SCALE DRAWINGS ARE ON 11"X17" (ANSI B) PAPER.

THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY
REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF
INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

07/02/2021

CONSTRUCTION AND E&S

CONSTRUCTION NOTES:

1. THE CONTRACTOR IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND WILL NOTIFY NAVITUS ENGINEERING AT (866) 662-4186 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN. ANY WORK PERFORMED BY THE CONTRACTOR AFTER THE FINDING OF SUCH DISCREPANCIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
2. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS. SHOULD A CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, AND PLANS OCCUR, THE MOST STRINGENT REQUIREMENT WILL APPLY. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
3. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE. ALSO, A REPRESENTATIVE OF THE DEVELOPER MUST BE AVAILABLE AT ALL TIMES.
4. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING MUD FROM TRUCKS AND/OR OTHER EQUIPMENT PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS, ALLAY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE STREETS ARE MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITION AT ALL TIMES.
5. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS AND/OR GIS DATA. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES AS NEEDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY CONFLICTS ARISING FROM HIS EXISTING UTILITY VERIFICATION AND THE PROPOSED CONSTRUCTION.
6. THE CONTRACTOR SHALL PROVIDE NOTIFICATION TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPELINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS WITH THE EXISTING RIGHT-OF-WAY.
8. WHEN GRADING IS PROPOSED WITHIN EASEMENTS OF UTILITIES, LETTERS OF PERMISSION FROM ALL INVOLVED COMPANIES MUST BE OBTAINED PRIOR TO GRADING AND/OR SITE DEVELOPMENT.
9. THE DEVELOPER WILL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITIES WHICH IS REQUIRED AS A RESULT OF HIS PROJECT. THE RELOCATION SHOULD BE DONE PRIOR TO CONSTRUCTION.
10. THESE PLANS IDENTIFY THE LOCATION OF ALL KNOWN GRAVESITES. GRAVESITES SHOWN ON THIS PLAN WILL BE PROTECTED IN ACCORDANCE WITH STATE LAW. IN THE EVENT GRAVESITES ARE DISCOVERED DURING CONSTRUCTION, THE OWNER AND ENGINEER MUST BE NOTIFIED IMMEDIATELY.
11. THE CONTRACTOR(S) SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NOT MORE THAN TEN (10) WORKING DAYS, PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION.
12. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.
13. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR 2 DAYS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR IS RESPONSIBLE FOR ALL FILL MATERIAL PLACEMENT REQUIRED DURING THE CONSTRUCTION OF THIS PROJECT. ALL MATERIAL TESTS SHALL BE CONDUCTED BY THE ON-SITE INSPECTOR. ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THE CONSTRUCTED FACILITY. FAILURE TO CONDUCT THE DENSITY TESTS AND/OR NECESSARY REPAIRS TO DEFICIENT AREAS AS A RESULT OF THE DENSITY TESTING SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE CONSTRUCTED FACILITY.
15. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SITE IN ACCORDANCE WITH THE DESIGN PLANS AND CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK SHALL CONFORM WITH THE GRADES, BERMS, DEPTHS, DIMENSIONS, ETC. SHOWN HEREON.
16. SUPER SILT FENCE CAN BE USED IN PLACE OF ANY COMPOST FILTER SOCK.
17. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS, INCLUDING THE 1970 OSHA ACT. PRECAUTION FOR THE PROTECTION OF PERSONS, INCLUDING EMPLOYEES AND PROPERTY, SHALL ALWAYS BE EXERCISED BY THE CONTRACTOR. INITIATION, MAINTENANCE, AND SUPERVISION OF ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK, INCLUDING ALL REQUIREMENTS PER CFR 1910.146, SHALL ALSO BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE AREAS SHOWN ON THE PLANS WITHIN THE LIMITS OF DISTURBANCE, UNLESS OTHERWISE AUTHORIZED BY ANTERO RESOURCES CORPORATION. MODIFICATION PLAN MUST BE SUBMITTED TO THE DEP FOR ANY ACTIVITIES PERFORMED OUTSIDE OF THE LIMITS OF DISTURBANCE.
19. PRESERVATION OF BENCHMARKS, PROPERTY CORNERS, REFERENCE POINTS, STAKES AND OTHER SURVEY REFERENCE MONUMENTS OR MARKERS IS THE RESPONSIBILITY OF THE CONTRACTOR. IN CASES OF WILLFUL OR CARELESS DESTRUCTION THE CONTRACTOR SHALL BE REQUIRED TO REPLACE OR RESTORE SAID MONUMENT OR MARKER. RESETTling OF MARKERS SHALL BE PERFORMED BY A PROFESSIONAL SURVEYOR AS APPROVED BY ANTERO RESOURCES CORPORATION.
20. THE CONTRACTOR SHALL MAINTAIN ADEQUATE CLEARANCE FROM ALL ELECTRIC LINES, IF ANY, IN ACCORDANCE WITH NATIONAL ELECTRICAL SAFETY CODE.
21. THE CONTRACTOR SHALL MINIMIZE ALL CLEARING AND DISTURBANCE TO THE ENVIRONMENT TO THE MAXIMUM EXTENT POSSIBLE. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE.
22. ANY DIGITAL FILES PROVIDED TO THE CONTRACTOR BY NAVITUS ENGINEERING, INC. ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONSTRUCTION OF THE SITE SHALL MEET ALL DESIGN PARAMETERS OF THE WDEP APPROVED NAVITUS ENGINEERING, INC. DESIGN PLANS. NAVITUS ENGINEERING, INC. WILL NOT BE HELD LIABLE FOR THE CONTRACTOR USING THE DIGITAL FILES TO WAIVER FROM THE APPROVED DESIGN PLANS.
23. ANY CONSTRUCTION ISSUES OR QUESTIONS SHALL BE BROUGHT TO THE ENGINEER IMMEDIATELY. THE CONSTRUCTION INSPECTOR SHALL BE CONTACTED AND MUST RELAY THESE ISSUES OR QUESTIONS TO THE ENGINEER FOR RESOLUTION. TEMPORARY STABILIZATION SHALL BE APPLIED AS NECESSARY.
24. ALL EXISTING AND DESIGNED CULVERTS AND CULVERT SUMPS SHALL BE CLEANED AND CLEARED OF DEBRIS DURING THE COURSE OF CONSTRUCTION. ANY EXCESS EROSION DUE TO THE PLUGGING OF A CULVERT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

EROSION AND SEDIMENT CONTROL NARRATIVE:

PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT A GAS WELL DRILLING PAD AND WATER CONTAINMENT PAD TO AID IN THE DEVELOPMENT OF INDIVIDUAL GAS WELLS. THE ACCESS ROAD ENTRANCE TO THE PROPOSED SITE IS LOCATED NORTH SIDE OF WV. RT. 18, 0.03 MILES NORTHWEST OF THE INTERSECTION OF CO RT. 10 & WV. RT. 18 IN LINCOLN DISTRICT, TYLER COUNTY, WEST VIRGINIA. THE TOTAL APPROXIMATE LAND DISTURBANCE ASSOCIATED WITH THIS PROJECT IS 4.86 ACRES.

EXISTING SITE CONDITIONS: THE EXISTING SITE IS APPROXIMATELY 0.00% WOODED. THE TOPOGRAPHY RANGES FROM MODERATE TO STEEP TERRAIN (2% TO 60% SLOPES). PRESENT ON SITE ARE OVERHEAD UTILITIES, EXISTING PIPELINES, AND EXISTING STRUCTURES. 1 PERENNIAL STREAM, 2 INTERMITTENT STREAMS, 7 EPHEMERAL STREAMS, 1 POND, AND 2 PEM WETLANDS ARE LOCATED ON SITE. THE SITE IS LOCATED ON A RIDGE AND DRAINS TO PURSLEY CREEK AND UNNAMED TRIBUTARIES OF PURSLEY CREEK. 3 SLIDE(S) WERE NOTICED ON SITE.

ADJACENT PROPERTY: THE SITE IS BORDERED BY WV. RT. 18 TO THE SOUTH, AND FORESTED LAND ON ALL OTHER SIDES. THERE ARE MULTIPLE EXISTING STRUCTURES NEAR THE SITE.

CRITICAL AREAS: THE AREA(S) SHOWN ALONG THE FIELD DELINEATED STREAMS, WETLANDS, AND PONDS, AS SHOWN ON THE PLANS, ARE DESIGNATED AS CRITICAL AREA(S), IF PRESENT. ALL 3:1 SLOPES AND STEEPER, DITCHES, AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED AND MAINTAINED DAILY DURING CONSTRUCTION AND AFTER EACH RAINFALL OF 0.5 INCHES OR GREATER. COMPOST FILTER SOCKS ARE TO BE USED TO PROTECT THESE FIELD DELINEATED AREA(S) FROM SEDIMENT LEAVING THE SITE. ADDITIONALLY, ORANGE SAFETY FENCE IS RECOMMENDED TO BE INSTALLED ABOVE/AROUND THESE AREA(S), TO SERVE AS A PHYSICAL BARRIER, ENSURING THE AREA(S) ARE NOT DISTURBED. 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.

OFF SITE AREAS: THERE ARE NO BORROW AREA(S) OR EXPORT STOCKPILE AREA(S) OUTSIDE OF THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT.

EROSION AND SEDIMENT CONTROL MEASURES: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

STRUCTURAL PRACTICES:

1. INSTALL ORANGE SAFETY FENCE TO ENSURE NO DISTURBANCE TO THE DELINEATED AREA(S).
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
3. INSTALL COMPOST FILTER SOCKS AND/OR SILT FENCE AS SHOWN ON THE PLANS TO REMOVE SEDIMENT FROM RUNOFF. SELECTIVELY REMOVE TREES REQUIRED TO INSTALL COMPOST FILTER SOCK IN WOODED AREAS. CLEARING AND GRUBBING SHALL BE KEPT AT A MINIMUM TO INSTALL E&S CONTROLS.
4. FILL SLOPE SURFACE SHALL BE LEFT IN A ROUGHENED CONDITION TO REDUCE EROSION. CONTRACTOR SHALL REDIRECT RUNOFF AWAY FROM THE FILL SLOPE BY INSTALLING EARTHEN DIVERSION BERMS AND DIVERTING THE RUNOFF TO SEDIMENT TRAPPING DEVICES.
5. INSTALL V-DITCHES, DITCH RELIEF CULVERTS, AND OUTLET PROTECTION (RIP-RAP APRONS) AS SHOWN ON THE PLANS.

DEVICES LISTED ABOVE ARE CONSIDERED MINIMUM EROSION AND SEDIMENT CONTROLS. ADDITIONAL CONTROL MEASURES MAY BE NECESSARY DUE TO CONTRACTOR PHASING OR OTHER UNFORESEEN CONDITIONS. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMP'S TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION. ALL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL. ALL RUNOFF FROM DISTURBED AREAS SHALL PASS THROUGH A SEDIMENT FILTERING DEVICE LOCATED BELOW THE DISTURBED AREA. AT NO TIME WILL UNFILTERED SEDIMENT LADEN RUNOFF BE ALLOWED TO LEAVE THE SITE AND ENTER STATE WATERS.

PERMANENT STABILIZATION: ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN SEVEN (7) DAYS. AT NO TIME SHALL LAND LAY DORMANT LONGER THAN TWENTY-ONE (21) DAYS.

MAINTENANCE PROGRAM: DURING CONSTRUCTION ACTIVITIES, ALL CONTROL MEASURES SHALL BE INSPECTED DAILY BY THE SITE SUPERINTENDENT OR HIS REPRESENTATIVE AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY SIGNIFICANT RAIN EVENT, WHICH SHALL BE DEFINED AS RAINFALL OF TWO (2) INCHES OR MORE IN A SIX (6) HOUR PERIOD. ONCE CONSTRUCTION ACTIVITIES HAVE CONCLUDED, THE SITE SHALL BE INSPECTED EVERY TWO (2) WEEKS FOR THE LIFE OF THE FACILITY AND WITHIN TWENTY-FOUR (24) HOURS OF A SIGNIFICANT RAIN EVENT AS DEFINED ABOVE. ANY DAMAGED STRUCTURAL MEASURES ARE TO BE REPAIRED, BY THE END OF THE DAY, OR AT THE EARLIEST TIME IN WHICH IT IS SAFE TO DO SO. SEEDING AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. ALL AREAS SHALL BE FERTILIZED AND RESEDED AS NEEDED UNTIL GRASS IS ESTABLISHED.

TRAPPED SEDIMENT IS TO BE REMOVED AS REQUIRED TO MAINTAIN 50% TRAP AND/OR SOCK EFFICIENCY AND DISPOSED OF AS ENGINEERED FILL ON THE STOCKPILES.

INLETS AND OUTLETS OF DITCH RELIEF CULVERTS SHALL BE CHECKED REGULARLY FOR SEDIMENT BUILD-UP. IF THE INLET AND/OR OUTLET IS CLOGGED BY 50% OR GREATER, IT SHALL BE REMOVED AND CLEANED OR REPLACED IMMEDIATELY.

SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED OR SWEEPED INTO ANY ROADSIDE DITCH, CULVERT OR SURFACE WATER.

ANY DISTURBED AREAS ALONG THE ACCESS ROAD SHALL BE STABILIZED AS CONSTRUCTION PROCEEDS, PRIOR TO CONTINUING FURTHER ACCESS ROAD CONSTRUCTION, WITH EITHER ROCK STABILIZATION OR SEEDING AND MULCHING METHODS.

NOTE: THE WV DEP RETAINS THE RIGHT TO ADD AND/OR MODIFY THESE EROSION AND SEDIMENT CONTROL MEASURES DURING THE CONSTRUCTION PROCESS, WITHIN REASON, TO ENSURE ADEQUATE PROTECTION TO THE PUBLIC AND THE ENVIRONMENT.

SEEDING (SOIL STABILIZATION):

1. CONTRACTOR SHALL APPLY SEED AND STABILIZATION IN ACCORDANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL, BASED UPON SITE SPECIFIC SOIL CHARACTERISTICS.
2. WHEREVER SEEDING IS TO BE APPLIED TO STEEP SLOPES (\geq 3H:1V), SEED MIXTURES SHOULD BE SELECTED THAT ARE APPROPRIATE FOR STEEP SLOPES.

DUST CONTROL:

1. TEMPORARY SEEDING SHALL BE APPLIED TO ALL DISTURBED AREAS SUBJECT TO LITTLE OR NO CONSTRUCTION TRAFFIC.
2. ALL HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES SHALL BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET AND REPEATED AS NEEDED TO CONTROL DUST.

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CONTROL NOTES

CONSTRUCTION SEQUENCE:

CONSTRUCTION OF THIS SITE SHALL BE CONSISTENT WITH THE FOLLOWING GENERAL ORDER OF CONSTRUCTION. THE CONTRACTOR SHALL IMPLEMENT, MAINTAIN, AND OPERATE ALL EROSION AND SEDIMENT CONTROL MEASURES TO EFFECTIVELY MITIGATE THE HAZARD POTENTIAL OF EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S SUPERINTENDENT AS NEEDED TO AVOID ANY POTENTIAL EROSION CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WV DEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

THE LIMITS OF CONSTRUCTION AND MARK/FLAG ALL IDENTIFIED WETLANDS, STREAMS, AND OTHER AREAS OF CONCERN FOR CONSTRUCTION ACTIVITIES. INSTALL SIGNS TO IDENTIFY THESE AREAS AND ORANGE SAFETY FENCE TO IDENTIFY IMPORTANT PROJECT LIMITS SUCH AS APPROVED ACCESS ROADS, NO REVEALING ZONES, WETLANDS/STREAMS, ETC.

CONSTRUCTION CONFERENCE WITH THE CONTRACTOR AND THE APPROPRIATE EROSION CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.

CONDUCT THE ROCK CONSTRUCTION ENTRANCE: ALL VEHICLES ENTERING AND EXITING THE SITE SHALL DO SO VIA THE ROCK CONSTRUCTION ENTRANCE.

CONDUCT ALL BMP'S AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW. ONCE COMPLETED, THE AREA ENCOMPASSING THE BMP'S OUTSIDE OF THE GRADING LIMITS SHALL BE MULCHED IMMEDIATELY.

INSTALLABLE CONVEY UP/SLOPE DRAINAGE AROUND THE ACCESS ROAD, WELL PAD AND WATER CONTAINMENT PAD AREAS BY CONSTRUCTING ALL DIVERSION BERM(S) AND/OR COMPOST SOCK DIVERSION(S) AS SHOWN ON THE PLANS.

CLEAR AND GRUB THE SITE. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, LIMBS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY EROSION CONTROL. TREES, BRUSH, AND STUMPS SHALL BE CUT AND/OR GRUBBED AND CULMS (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY OTHER MEANS AS APPROVED BY WV DEP.

INSTALLABLE. INSTALL ALL WETLAND OR STREAM CROSSINGS AS SHOWN ON THE PLANS.

THE TOPSOIL FROM THE ACCESS ROAD, TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT ACCESS ROAD. PRIOR TO PLACING ANY FILL, THE TOPSOIL SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND LEVEL SURFACE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN ON THE PLANS OR RE-Spread AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED 2:1 OR FLATTER SLOPES AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.

CONDUCT THE ACCESS ROAD. ALL FILL AREAS, INCLUDING EXCESS MATERIAL STOCKPILES, SHALL BE TRIEVED IN AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. ALL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS. IT IS ALSO RECOMMENDED THAT EACH LIFT BE PROOF ROLLED WITH A LOADED HAUL TRUCK WHERE APPROPRIATE. DITCH RELIEF CULVERTS SHALL BE INSTALLED AT A GRADE OF 1-8% TO MAINTAIN VELOCITIES TO THE EXTENT POSSIBLE. INSTALL DITCH PROTECTION ONCE RELIEF CULVERTS ARE INSTALLED, AS SHOWN ON PLANS. STABILIZE THE ROAD WITH GEOTEXTILE FABRIC & STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. EXCESS MATERIAL SHALL BE STOCKPILED (IF NECESSARY) IN AREAS SHOWN IN THE PLANS IMMEDIATELY STABILIZED. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS TO CONSTRUCTION OF STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED, TOPSOIL IS REAPPLIED AT A DEPTH OF 2"-4" SLOPES SHALL BE TRACKED BY RUNNING TRACKED EQUIPMENT UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. OTHER LINES SHALL BE CLEARED PRIOR TO INSTALLATION OF LINED PROTECTION. IT IS RECOMMENDED THAT THE CONTRACTOR PRIORITIZE COMPLETING THE CONSTRUCTION OF THE ENTRANCE AND LEASE ROAD.

THE TOPSOIL FROM THE WELL PAD AND WATER CONTAINMENT PAD. TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT WELL PAD AND WATER CONTAINMENT PAD PRIOR TO PLACING ANY FILL. THE EXPOSED SUBGRADE SHALL BE TRIEVED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SURFACE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS, OR RE-Spread AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED 2:1 OR FLATTER SLOPES, AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.

THE WELL PAD AND WATER CONTAINMENT PAD AREAS AS SHOWN ON THE PLANS. WATER PAD STUMPS (WITH 4" PVC DRAIN PIPE AND OUTLET PROTECTION) AND CONTAINMENT LINES SYSTEM IMMEDIATELY STABILIZE THE OUTER AREAS OF THE WELL PAD AND WATER CONTAINMENT PAD. THE WELL PAD AND WATER CONTAINMENT PAD AREAS SHALL BE COVERED WITH GEOTEXTILE FABRIC & STONE AND THE SIDE SLOPES WITH SEED AND MULCH. ALL STRAW MATS AS SHOWN ON PLANS. APPLY SEED AND MULCH TO ALL EXPOSED AREAS. THIS SHALL INCLUDE ALL AREAS THAT WILL NOT BE SUBJECT TO REGULAR TRAFFIC ACTIVITY (TO BE STABILIZED WITH STONE), OR ANY DISTURBED AREA THAT WILL NOT BE DISTURBED BEFORE SITE RECLAMATION BEGINS.

CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION OF FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 50% GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY COVER SUCH AS PAVEMENT OF BUILDINGS. IT SHOULD BE NOTED THAT THE TOTAL PERCENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE DISTURBED AREA.

WELL DRAINAGE ACTIVITY:

WELLS MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF THE BANK ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE REGULAR INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RAINFALL EVENT IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.

AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDDED.

RECLAMATION NARRATIVE:

CONSTRUCTION - THE CONSTRUCTION SITE SHALL BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. THE ESTABLISHMENT OF FINAL COVER MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. THE ACCESS ROADS AND WELL PAD ARE TO BE MAINTAINED THROUGHOUT THE LIFE OF THE FACILITY. ALL CULVERTS, ROADSIDE DITCHES, DITCHES, DIVERSION DITCHES, ETC. MUST BE MAINTAINED IN PROPER WORKING ORDER. THAT IS DISTURBED ALONG THE ACCESS ROAD OR WELL PAD MUST BE REVEGETATED IN ACCORDANCE WITH THESE PLANS AND THE WVDEP OFFICE OF OIL AND GAS FIELD MANUAL. IF ANY TEMPORARY BMP MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP. ANY AREAS DISTURBED BY REMOVAL OF BMP'S SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDDED.

CONSTRUCTION SITE RECLAMATION ALL FILL AREAS SHALL BE COMPACTED IN 12" MAXIMUM LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

CONSTRUCTION STANDARDS:

THE DESIGN, CONSTRUCTION, AND REMOVAL OF FILL FOR OIL AND GAS SITES MUST BE ACCOMPLISHED IN SUCH A MANNER AS TO PROTECT THE HEALTH AND SAFETY OF THE PEOPLE, THE NATURAL RESOURCES, AND ENVIRONMENT OF THE STATE. THE SITE SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO BE STRUCTURALLY SOUND AND REASONABLY PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES.

- ALL FILL AREAS SHOULD BE CLEARED OF TREES, STUMPS, AND ANY VEGETATION AND STRIPPED OF TOPSOIL/ORGANIC SOILS PRIOR TO THE START OF FILL PLACEMENT.
- ANY GROUNDWATER ENCOUNTERED DURING CONSTRUCTION SHALL BE DRAINED TO THE OUTSIDE/DOWNSTREAM TOE OF THE SLOPE. CONSTRUCTED DRAIN SYSTEM SHALL BE AN EXCAVATED 2' x 2' TRENCH AND BACK FILLED WITH STONE. COMPACTED BY HAND TAMPER. GEOTEXTILE FABRIC SHALL BE USED TO LINE TRENCH.
- 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.
- GENERALLY, UNSATISFACTORY MATERIALS INCLUDING MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CL, MH, OL, OH, AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER.
- ALL FILL AREAS SHALL BE "LIFTED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED BY THE GEOTECHNICAL REPORT. ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.
- ROCK LIFTS ARE NOT PROPOSED FOR THE CONSTRUCTION OF THIS SITE. HOWEVER, LARGER ROCK PARTICLES OR BOULDERS THAT ARE ENCOUNTERED DURING CONSTRUCTION NEED TO BE BROKEN DOWN TO A MANAGEABLE SIZE (MAXIMUM 3'x3'x3') THICK TO BE PLACED AS FILL DURING PLACEMENT OF FILL CONTAINING LARGE SIZE ROCK PARTICLES. IT IS CRITICAL THAT NO VOID SPACES BE LEFT BETWEEN THE ROCKS. SMALLER ROCK FRAGMENTS AND SOIL MUST BE WORKED INTO ANY OPENINGS BETWEEN THE Boulders AFTER THEY ARE PUT IN PLACE. ADDITIONAL GUIDANCE REGARDING ENCOUNTERED ROCK CAN BE FOUND IN THE GEOTECHNICAL REPORT.
- THE PLACEMENT OF ALL FILL MATERIAL SHALL BE FREE OF WOOD, STUMPS AND ROOTS, LARGE ROCKS AND BOULDERS, AND ANY OTHER NONCOMPACTABLE SOIL MATERIAL. NO FILL SHALL CONTAIN OR BE PLACED ON FROZEN MATERIAL. THE FILL SHALL BE COMPACTED TO A MINIMUM OF VISIBLE NON-MOVEMENT, HOWEVER, THE COMPACTION EFFORT SHALL NOT EXCEED THE OPTIMUM MOISTURE LIMITS.
- ALL EXPOSED AREAS, NOT COVERED BY COMPACTED GRAVEL OR RIP-RAP SHALL BE LIMED, FERTILIZED, SEEDDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVER IN COMPLIANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL FIELD MANUAL MUST BE ESTABLISHED UPON THE COMPLETION OF CONSTRUCTION. SLOPES SHALL BE MAINTAINED WITH A GRASSY VEGETATIVE COVER AND FREE OF BRUSH AND/OR TREES.
- IF STANDING WATER IS PRESENT ON SITE, CONTRACTOR TO CORRECT DRAINAGE ISSUES BY DIRECTING WATER TO PROPER L&S CONTROLS OR OUTLET WITH POSITIVE DRAINAGE. IF NECESSARY, CONTACT ENGINEER FOR GUIDANCE IN CORRECTING DRAINAGE ISSUES.
- ALL DRAINAGE DITCHES, DIVERSIONS, AND CULVERTS SHALL HAVE POSITIVE DRAINAGE AND OUTFALL INTO THE PROPER OUTLET PROTECTION OR LEVEL SPREADING DEVICE. SUPER SITE FENCE OR APPROVED ALTERNATIVE SHALL BE INSTALLED WITHIN 5 FEET OF THE OUTLET PROTECTION OR LEVEL SPREADING DEVICE TO PREVENT EROSION DOWNSTREAM. IF EROSION IS PRESENT DOWNSTREAM OF AN EROSION CONTROL DEVICE, CONTRACTOR TO INSTALL ADDITIONAL EROSION CONTROLS AND STABILIZATION TO PREVENT FURTHER EROSION.
- ALL DRAINAGE DITCHES AND DIVERSIONS THAT ARE ROCK LINED SHALL BE INSTALLED PER THE DETAILS ON THIS PLAN INCLUDING THE NECESSARY INSTALLATION OF ANY GEOTEXTILE FABRIC UNDERNEATH THE ROCK LINING.
- IF THE EROSION CONTROL DEVICES SHOW EVIDENCE OF BEING INADEQUATE DUE TO CONSTRUCTION MEANS AND METHODS, THE CONTRACTOR IS TO INSTALL ADDITIONAL DRAINAGE DEVICES OR EROSION CONTROLS TO PREVENT FURTHER EROSION FROM OCCURRING.
- CONTRACTOR IS TO EXTEND ALL KEYWAY AND BONDING BENCH OUTLET DRAINS A MINIMUM OF ONE FOOT PAST THE FINISHED GRADE OF THE SLOPE AND INSTALL THE PROPER OUTLET PROTECTION PER THE DETAIL ON THESE PLANS. ALL OUTLET DRAINS ARE TO BE CLEARLY VISIBLE AND MARKED.
- ALL SLOPES SHALL BE TRACKED IN PER THE DETAILS ON THESE PLANS. CONTRACTOR SHALL REPEAT THIS METHOD ANY TIME AN AREA HAS BEEN DISTURBED PRIOR TO THAT AREA BEING STABILIZED.
- ALL MAINTENANCE OF EROSION AND SEDIMENT CONTROLS MUST BE PERFORMED IMMEDIATELY ONCE THE CONTRACTOR IS NOTIFIED OF THE DISCREPANCY. CONTRACTOR TO PERFORM MAINTENANCE OR IMMEDIATELY NOTIFY THE SUB-CONTRACTOR PERFORMING THE E&S TASKS. ANY EROSION CONTROL MAINTENANCE THAT IS DEEMED TO BE AN EMERGENCY SHALL BE PERFORMED IMMEDIATELY UPON THE CLIENT, ENGINEER, OR STATE'S REQUEST.
- ALL LANDOWNER ACCESS ROADS AND EXISTING WELL ROADS THAT ARE BEING MAINTAINED SHALL BE KEPT OPEN DURING THE ENTIRE COURSE OF CONSTRUCTION TO PROVIDE CONTINUOUS ACCESS. IF CLOSURE IS NECESSARY, THE CONTRACTOR SHALL PROVIDE AN EQUIVALENT DETOUR ROUTE TO THE SATISFACTION OF THE LANDOWNER OR WELL OWNER.
- ANY WATER INFILTRATING AROUND THE WELL PAD DEWATERING SYSTEM SHALL BE CORRECTED IMMEDIATELY TO PREVENT THE FAILURE OF THE SOILS AND DESIGN ASPECTS OF THE DEWATERING SYSTEM. ANY EXCESS EROSION OR SLOPE FAILURES DUE TO THE WATER INFILTRATION IN THE SUMP AREA SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- ALL DITCH RELIEF AND STREAM CROSSING CULVERTS SHALL MEET ALL MANUFACTURER SPECIFICATIONS INCLUDING THE MINIMUM AND MAXIMUM COVER. IF MANUFACTURER SPECIFICATIONS CANNOT BE MET, CONTRACTOR SHALL CONSULT THE ENGINEER OR MANUFACTURER FOR ALTERNATIVES.

SITE CLEANUP & RECYCLE PROGRAM:

- GARBAGE, FUELS OR ANY SUBSTANCE HARMFUL TO HUMAN, AQUATIC OR FISH LIFE, WILL BE PREVENTED FROM ENTERING SPRINGS, STREAMS, PONDS, LAKES, WETLANDS OR ANY WATER COURSE OR WATER BODY.
- OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.
- ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.
- ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDDED AND MULCHED, AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.
- ALL POLLUTION AND EMERGENCY SPILLS SHALL BE IMMEDIATELY REPORTED TO ANTERO RESOURCES CORPORATION AND THE WVDEP OFFICE OF OIL AND GAS (EMERGENCY #)-800-942-3074).



Telephone: (888) 612-1155 | www.NavitusEng.com

REVISION	DATE



THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

CONSTRUCTION AND E&S CONTROL NOTES
 API# 47-095-02130
 PLUGGING PLAN
 LINCOLN DISTRICT
 TIER 1 COUNTY, WEST VIRGINIA



DATE: 05/17/2021
 SCALE: N/A
 SHEET: 10/10

07/02/2021

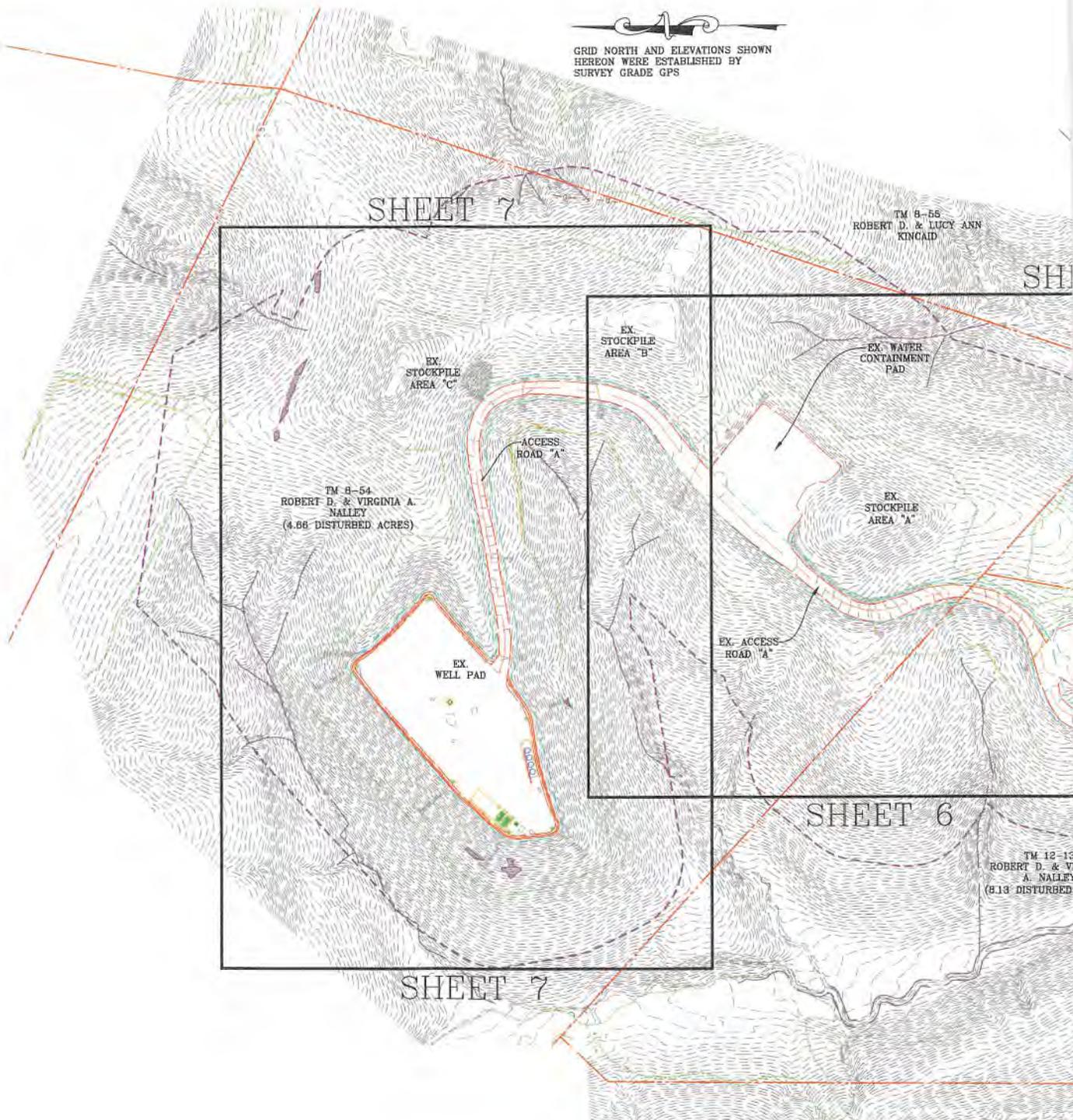
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EX. INDEX CONTOUR & CONTOUR LABEL		PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR		PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE		PR. INTERMEDIATE CONTOUR
EX. TOP OF BERM		PR. INDEX ROAD
EX. ROAD EDGE OF GRAVEL/DIRT		PR. INTERMEDIATE CONTOUR
EX. ROAD EDGE OF PAVEMENT		PR. PADS/STOCKPILES
EX. ROAD CENTERLINE		PERMITTED LIMITS
EX. GUARDRAIL		MODIFICATION LIMITS
EX. BRIDGE		PR. ROAD/IMPOUNDMENT
EX. DITCHLINE/DRAINAGE FEATURE		PR. ROAD EDGE
EX. RIP-RAP		PR. ROAD CENTERLINE
EX. CULVERT		PR. GUARDRAIL
EX. TREELINE		PR. ROCK CONSTRUCTION
EX. BUILDING		PR. AIR BRIDGE
EX. MISCELLANEOUS FEATURE		PR. CULVERT
EX. 100 YR FEMA FLOODPLAIN		PR. DITCH
EX. DELINEATED STREAM		PR. RIP-RAP TRAIL
EX. DELINEATED WETLAND/POND		PR. OUTLET PROTECTION
100' WETLAND/STREAM BUFFER		PR. ROCK LEVEL
STREAM/WETLAND DELINEATION STUDY AREA		PR. COMPOST FILL
EX. FENCELINE		PR. SMART FENCE
EX. GATE		PR. WELL HEAD
EX. PERIMETER SAFETY FENCE		PR. PAD DEWATERING
EX. ACCESS GATE WITH EMERGENCY LIFELINE		PR. TOP OF PAD
EX. WELL HEAD ON DESIGNED PAD		PR. 220' X 320'
EX. GAS WELL		PR. SPOT SHOT
EX. PIPELINE		PR. PERIMETER SAFETY FENCE
EX. PIPELINE R/W		PR. ACCESS GATE
EX. PIPELINE METER		PR. PIPELINE
EX. PIPELINE VALVE		PR. PIPELINE R/W
EX. PIT		PR. OVERHEAD UTILITY
EX. OVERHEAD UTILITY		PR. POWER POLE
EX. POWER POLE/GUY WIRE		PR. OVERHEAD UTILITY
EX. UNDERGROUND ELECTRIC		PR. WATERLINE
EX. UNDERGROUND TELEPHONE		BORING LOCATION
EX. UNDERGROUND FIBER OPTIC		X-SECTION/PROFILING
EX. UTILITY R/W		X-SECTION/PROFILING
EX. WATERLINE		X-SECTION/PROFILING
EX. WATER WELL/EX. SPRING		X-SECTION/PROFILING
EX. COMPOST SOCK		X-SECTION/PROFILING
EX. SMART FENCE HD		X-SECTION/PROFILING
EX. SILT FENCE		MATCHLINE
APPROX. LOCATION OF SLIDE AREA		EX. METER
APPROX. LOCATION OF BORROW/ SPOIL AREA		EX. TANK
PR. TOE BENCH		EX. COMBUSTOR
EX. APPROX. SURFACE & SUB-SURFACE ELECTRIC LINE AREA		EX. GPU
EX. APPROX. SURFACE & SUB-SURFACE DUMP LINE AREA		EX. SEPARATOR
EX. APPROX. SURFACE & SUB-SURFACE WELL LINE AREA		EX. VRT
EX. APPROX. SURFACE & SUB-SURFACE SALES LINE AREA		EX. KNOCK-OUT

07/02/2021

OVERALL PLAN SHEET

GRID NORTH AND ELEVATIONS SHOWN
HEREON WERE ESTABLISHED BY
SURVEY GRADE GPS



- GENERAL NOTES**
1. THE TOPOGRAPHIC MAP IS A REPRODUCTION OF THE ORIGINAL SURVEY MAP OF WEST VIRGINIA.
 2. AS-BUILT INFORMATION IS SHOWN IN RED.
 3. THE PROPER LOCATION OF UTILITIES SHOULD BE DETERMINED BY THE USER.
 4. UTILITIES AND OBSTRUCTIONS WERE FOUND TO BE IN ACCORDANCE WITH THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION THAT ALL UTILITIES NOT SHOWN.
 5. A GENERAL WELL THAT IS TO BE PLUGGED AND ABANDONED IS SHOWN IN GREEN.

07/02/2021

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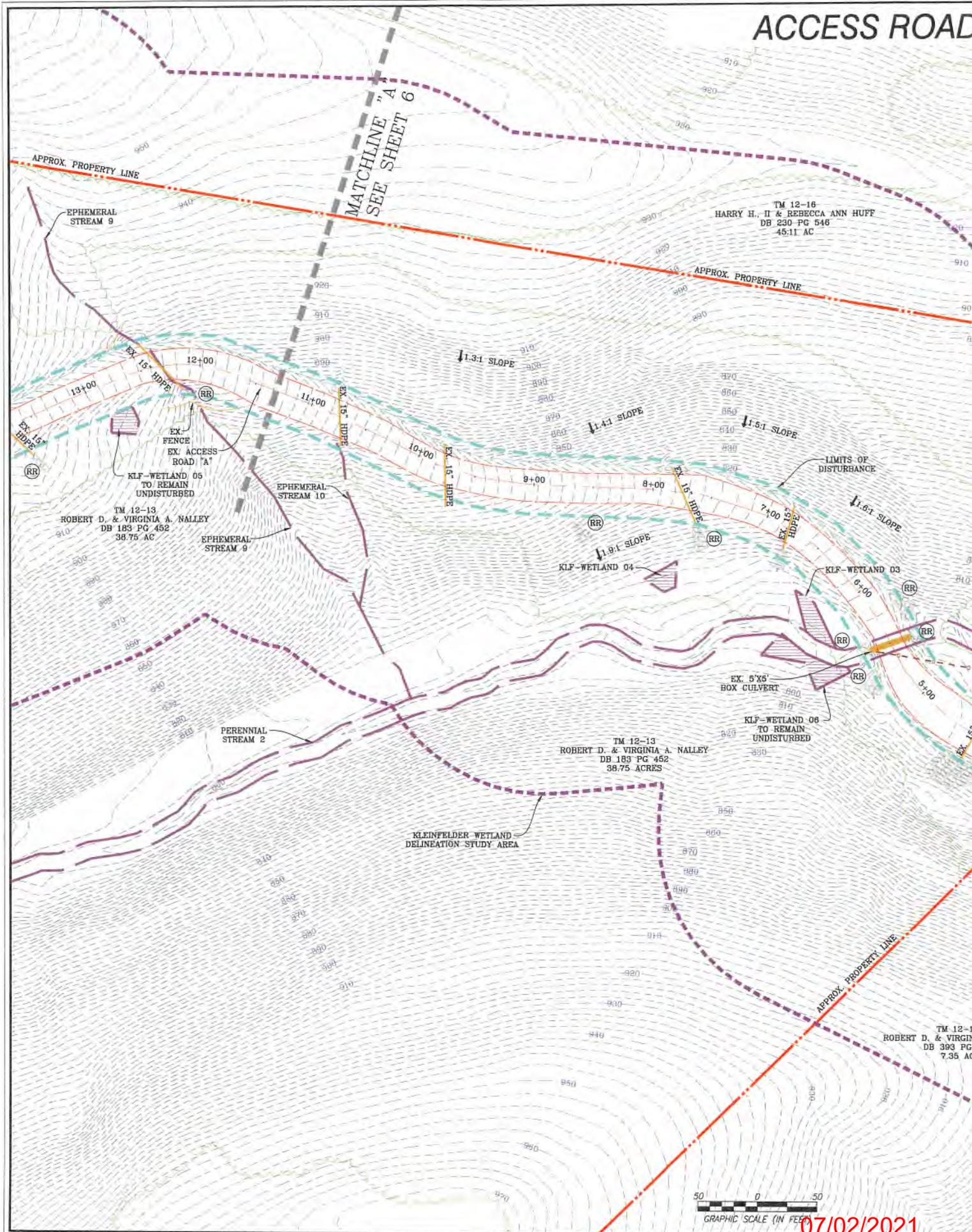
OVERALL PLAN SHEET INDEX
API# 47-095-02130
 PLUGGING PLAN
 LINCOLN DISTRICT
 TYLER COUNTY, WEST VIRGINIA



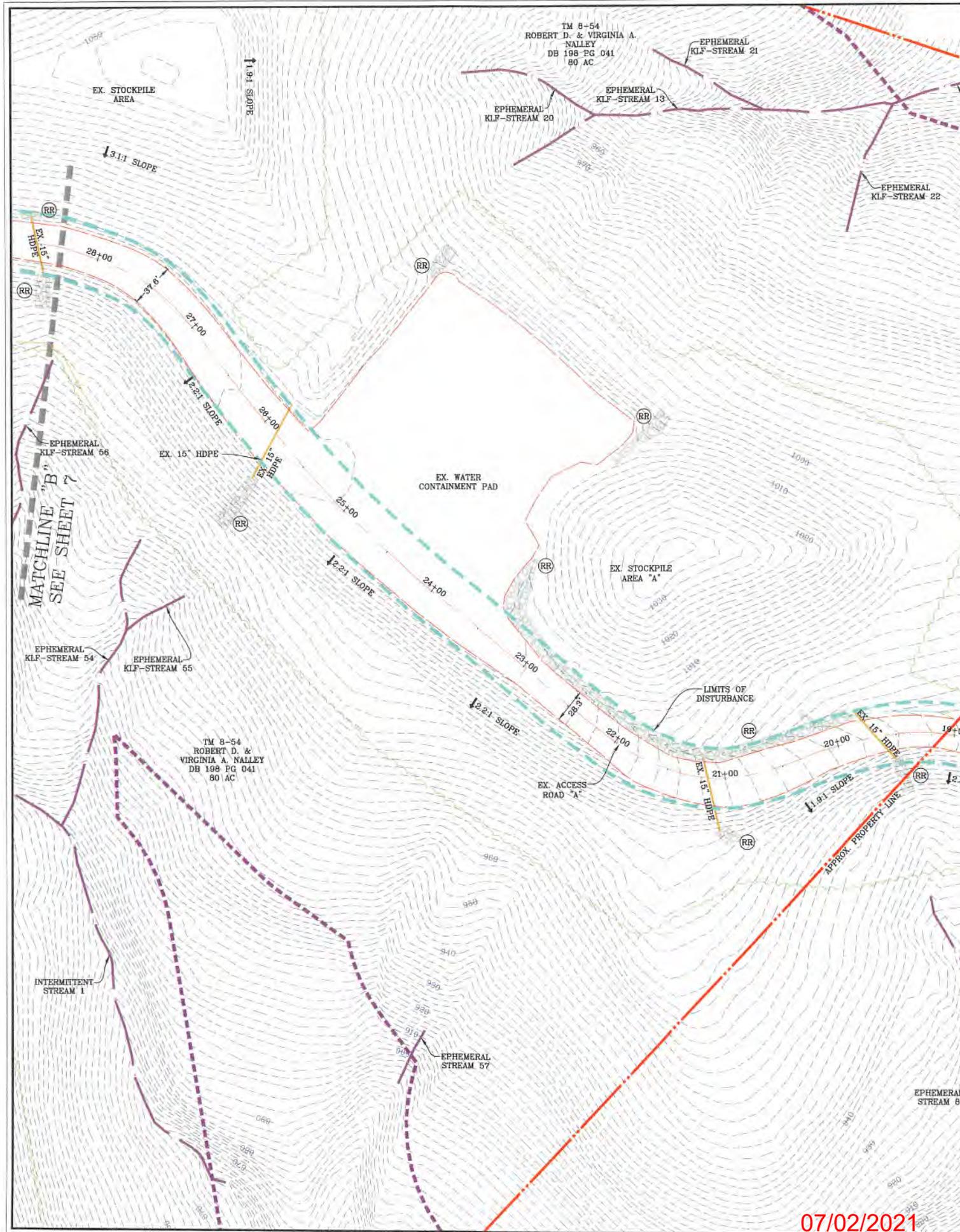
DATE: 05/17/2021
 SCALE: 1" = 150'
 SHEET: 07/02/2021

PHOTOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON APRIL 06, 2013 AERIAL PHOTOGRAPHY COMPILED AUGUST, 2013 BY BLUE MOUNTAIN AERIAL MAPPING, BURTON, VA.
 INFORMATION SHOWN HEREON IS BASED ON FIELD SURVEY PERFORMED BY NAVITUS ENGINEERING, INC. BETWEEN JUNE 2014 - MAY 18, 2015.
 PROPERTY LINES SHOWN HEREON DO NOT REPRESENT A BOUNDARY SURVEY ON ANY OF THE PARCELS SHOWN. PROPERTY CORNERS AND LINES PERTINENT TO WELL PAD ARE BASED ON A FIELD SURVEY. THE REMAINDER OF THE PROPERTY LINES ARE BASED ON COUNTY REAL ESTATE TAX MAPS, GIS INFORMATION AND DEEDS OF RECORD.
 UTILITY LOCATIONS AS SHOWN HEREON ARE BASED ON: A) OBSERVABLE EVIDENCE OF THOSE VISIBLE, ABOVE-GROUND FACILITIES, FEATURES, AND MARKERS WHICH EXIST ON THE SUBJECT PROPERTY AT THE TIME OF SURVEY PERFORMED BY NAVITUS ENGINEERING AND B) FIELD MARKINGS PLACED BY UTILITY COMPANIES IN RESPONSE TO A UTILITY TICKET SUBMITTED BY NAVITUS ENGINEERING. NAVITUS ENGINEERING CANNOT GUARANTEE THE ACCURACY OF THE UTILITY MARKINGS PERFORMED BY OTHERS OR UTILITIES EXISTING WITHIN THE LIMITS OF THIS PLAN ARE SHOWN. ANY UTILITIES ENCOUNTERED SUBSEQUENT TO PLAN APPROVAL OR DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE PLAN SHOULD BE REPORTED TO NAVITUS ENGINEERING AND ANTERO RESOURCES CORPORATION.
 VARIANCE TO THE REQUIREMENTS UNDER 35CSR4-5.5.B SHALL BE REQUESTED BY THE OPERATOR TO THE CHIEF OF THE OFFICE OF OIL AND GAS FOR THE EXISTING WELL PAD. THE WELL PAD WILL BE CUT OFF AND MONUMENTED IN THE SURFACE OF THE WELL PAD. PRIOR TO THIS WELL BEING CUT OFF AND MONUMENTED, THE OPERATOR SHALL SUBMIT A VARIANCE APPLICATION TO THE OFFICE OF OIL AND GAS. THE OPERATOR NEEDS TO DRILL THIS WELL OUT AND COMPLETE A PROPER PLUGGING JOB PRIOR TO WELL PAD CLOSURE.

ACCESS ROAD



07/02/2021



TM 8-54
ROBERT D. & VIRGINIA A.
NALLEY
DB 198 PG 041
80 AC

EPHEMERAL
KLF-STREAM 21

EPHEMERAL
KLF-STREAM 20

EPHEMERAL
KLF-STREAM 13

EPHEMERAL
KLF-STREAM 22

EX. STOCKPILE
AREA

EX. WATER
CONTAINMENT PAD

EX. STOCKPILE
AREA "A"

MATCHLINE "B"
SEE SHEET 7

EPHEMERAL
KLF-STREAM 54

EPHEMERAL
KLF-STREAM 55

TM 8-54
ROBERT D. &
VIRGINIA A.
NALLEY
DB 198 PG 041
80 AC

LIMITS OF
DISTURBANCE

EX. ACCESS
ROAD "A"

INTERMITTENT
STREAM 1

EPHEMERAL
STREAM 57

EPHEMERAL
STREAM 6

07/02/2021

ACCESS ROAD PLAN

GRID NORTH AND ELEVATIONS SHOWN
HEREON WERE ESTABLISHED BY
SURVEY GRADE GPS

EPHEMERAL
KLF-STREAM 13

TM 8-55
ROBERT D. & LUCY ANN KINCAID
DB 353 PG 804
25.62 AC

TM 12-16
HARRY H. II & REBECCA ANN HUFF
DB 230 PG 646
45.11 AC

EX. 15" HDPE

EX. 15" HDPE

EPHEMERAL
KLF-STREAM 5B

TM 12-13
ROBERT D. &
VIRGINIA A. NALLEY
DB 183 PG 452
38.75 AC

TM 12-13
ROBERT D. & VIRGINIA A. NALLEY
DB 183 PG 452
38.75 AC

EX. FENCE
EX. ACCESS
ROAD 'A'

KLF-WETLAND 05
TO REMAIN
UNDISTURBED

EPHEMERAL
STREAM 9

MATCHLINE "A"
SEE SHEET 5



NAVITUS
ENERGY ENGINEERING

Telephone: (888) 662-4166 | www.NavitusEng.com

DATE	REVISION

THIS DOCUMENT
WAS PREPARED FOR:
ANTERO RESOURCES
CORPORATION

ACCESS ROAD PLAN
API# 47-095-02130
PLUGGING PLAN
LINCOLN DISTRICT
TYLER COUNTY, WEST VIRGINIA

CHRIS S. KINCAID
REGISTERED
15579
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
05/17/2021

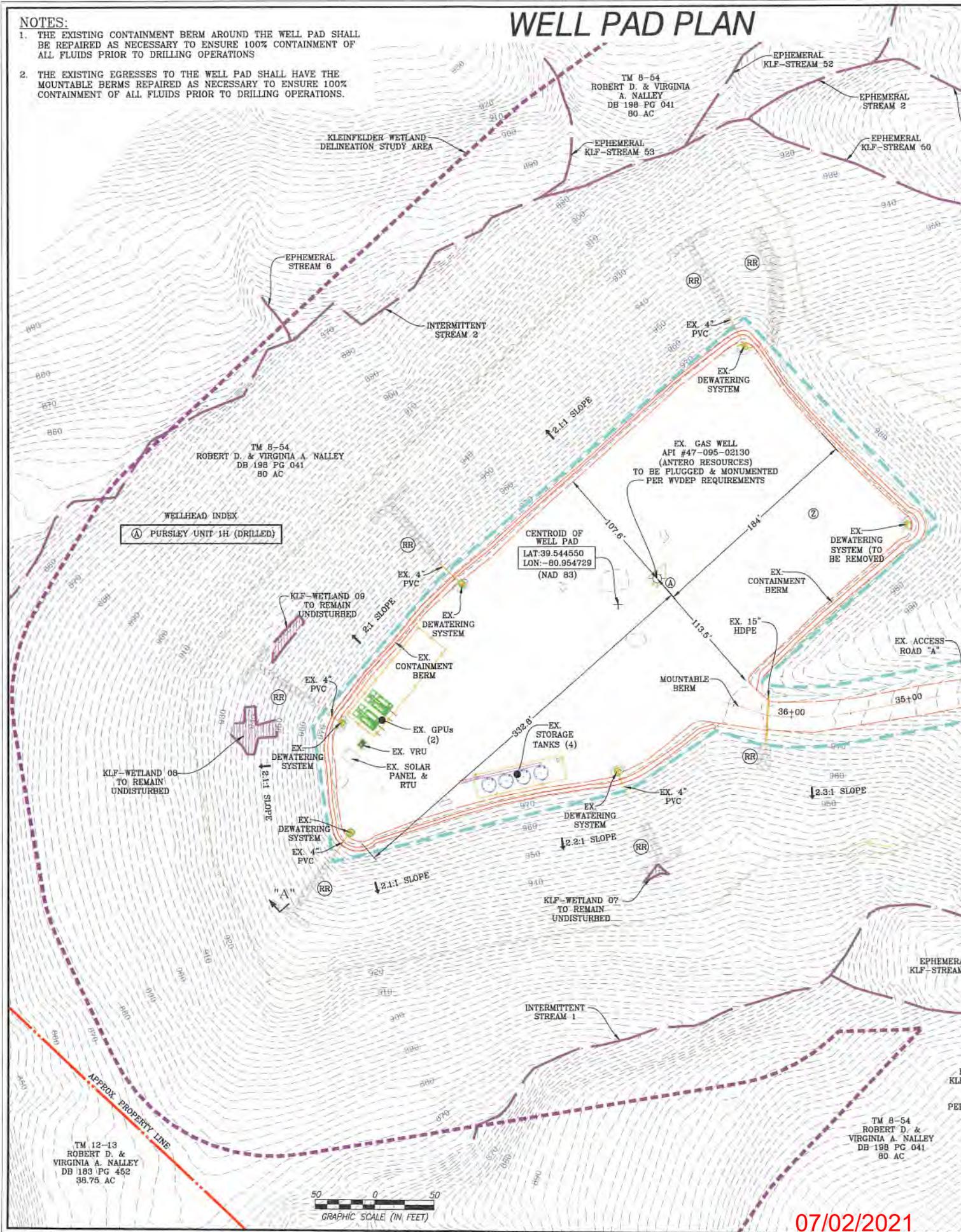
DATE: 05/17/2021
SCALE: 1" = 50'
SHEET: 8

07/02/2021

NOTES:

1. THE EXISTING CONTAINMENT BERM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS
2. THE EXISTING EGRESSES TO THE WELL PAD SHALL HAVE THE MOUNTABLE BERMS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.

WELL PAD PLAN



WELLHEAD INDEX
 (A) PURSLEY UNIT 1H (DRILLED)

CENTROID OF WELL PAD
 LAT: 39.544550
 LON: -80.954729
 (NAD 83)

TM 12-13
 ROBERT D. &
 VIRGINIA A. NALLEY
 DB 183 PG 452
 38.75 AC



07/02/2021



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GRID NORTH AND ELEVATIONS SHOWN HEREON WERE ESTABLISHED BY SURVEY GRADE GPS

TM 8-54
ROBERT D. & VIRGINIA A. NALLEY
DB 196 PG 041
80 AC

REVISION	DATE



THIS DOCUMENT WAS PREPARED FOR:
ANTERO RESOURCES CORPORATION

WELL PAD PLAN
API# 47-095-02130
PLUGGING PLAN
LINCOLN DISTRICT
TYLER COUNTY, WEST VIRGINIA



DATE: 05/17/2021

SCALE: 1" = 50'

SHEET 7

DmH
6-4-21

07/02/2021

REVEGETATION

TAKEN FROM THE
WEST VIRGINIA EROSION AND SEDIMENT CONTROL FIELD MANUAL
WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS
CHARLESTON, W. VA.
SECTION IV

TEMPORARY SEEDING

- 1. GENERAL CONDITIONS WHERE PRACTICE APPLIES
WHERE EXPOSED SOIL SURFACES ARE NOT TO BE FURTHER GRADED OR WORKED FOR PERIODS LONGER THAN 21 DAYS, TEMPORARY VEGETATIVE COVER WITH SEDIMENT CONTROLS MUST BE ESTABLISHED WITHIN 14 DAYS. MULCH SHOULD BE APPLIED TO AREAS THAT WILL BE LEFT UNWORKED FOR A PERIOD OF MORE THAN 30 MONTHS.
- 2. SEED MIXTURES AND PLANTING DATES
REFER TO TABLES IV-2 THROUGH IV-4 FOR RECOMMENDED DATES TO ESTABLISH VEGETATIVE COVER AND THE APPROVED LISTS OF TEMPORARY AND PERMANENT PLANT SPECIES AND PLANTING RATES. TABLE IV-3 GIVES RECOMMENDED TYPES OF TEMPORARY VEGETATION, RATES OF APPLICATION, AND OPTIMUM SEEDING DATES. IN SITUATIONS WHERE ANOTHER COVER IS DESIRED, CONTACT THE LOCAL SOIL CONSERVATION DISTRICT FOR SEEDING RECOMMENDATIONS.
- 3. SEED APPLICATION
APPLY SEED BY BROADCASTING, DRILLING, OR BY HYDROSEED ACCORDING TO THE RATES INDICATED IN TABLE IV-3. PERFORM ALL PLANTING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. WITH (BARR) OR (B) PREPARATION AND ROUGHENING OF THE SOIL SURFACE SHOULD BE DONE JUST PRIOR TO SEEDING. SEEDING PREPARATION MAY NOT BE REQUIRED ON NEWLY DISTURBED AREAS.

PERMANENT SEEDING

- 1. GENERAL
PERMANENT VEGETATIVE COVER WILL BE ESTABLISHED WHERE NO FURTHER SOIL DISTURBANCE IS ANTICIPATED OR NEEDED. SOIL FERTILITY AND PH LEVELS SHOULD BE TESTED AND ADJUSTED ACCORDING TO SPECIFIC SPECIES PLANTED. PLANTING OF PERMANENT VEGETATIVE COVERS MUST BE PERFORMED ON ALL DISTURBED AREAS AFTER COMPLETION OF THE DRILLING PROCESS. ANY SITE THAT CONTAINS SIGNIFICANT AMOUNTS OF TOPSOIL SHALL HAVE THE TOPSOIL REMOVED AND STOCKPILED WHEN FEASIBLE. TOPSOIL SHOULD NOT BE ADDED TO SLOPE STEEPER THAN 2:1 UNLESS A GOOD BONDING TO THE SUB-LAYER CAN BE ACHIEVED. AFTER PROPER GRADING AND SOULDED PREPARATION, THE VEGETATION WILL REESTABLISH OPTIMUM COVER FOR THE CONTROL OF SURFACE WATER RUNOFF (EROSION). ALL REQUIRED SEEDBED PREPARATION AND LOOSENING OF SOIL, BY DISHING OR DOZING (TRACING SHOULD BE PERFORMED JUST PRIOR TO SEEDING. IF SEEDBED PREPARATION IS NOT FEASIBLE, 20% MORE SEED SHALL BE ADDED TO THE RECOMMENDED RATES SHOWN IN TABLES IV-3 AND IV-4. WHEN HYDROSEEDING, SEEDBED PREPARATION MAY NOT BE NECESSARY IF ADEQUATE SITE PREPARATION WAS PERFORMED. INCORPORATE THE APPROPRIATE AMOUNT OF LIME AND/OR FERTILIZER IN THE SLURRY (WHEN HYDROSEEDING). WHEN HYDROSEEDING, FIRST MIX THE LIME, FERTILIZER, AND HYDRO-MULCH IN THE RECOMMENDED AMOUNT OF WATER. MIX THE SEED AND INOCULANTS TOGETHER WITHIN ONE HOUR PRIOR TO PLANTING. ADD TO THE SLURRY JUST BEFORE SEEDING. APPLY THE SLURRY UNIFORMLY OVER THE PREPARED SITE. ASSURE THAT AGITATION IS CONTINUOUS THROUGHOUT THE SEEDING OPERATION AND THE MIX IS APPLIED WITHIN ONE HOUR OF INITIAL MIXING.
- 2. LIME AND FERTILIZER
 - 1. LIME SHALL BE APPLIED TO ALL PERMANENT SEEDINGS. THE PH OF THE SOIL IS TO BE DETERMINED AND LIME APPLIED ACCORDINGLY. ONCE THE PH IS KNOWN, SELECT THE AMOUNT OF LIME TO BE APPLIED FROM TABLE IV-5.
 - 2. FERTILIZER SHALL BE APPLIED IN ALL PERMANENT SEEDINGS. APPLY THE EQUIVALENT FOR 500 LBS. MINIMUM 10-20-20 FERTILIZER PER ACRE OR USE THE AMOUNT OF FERTILIZER AND LIME RECOMMENDED IN A CERTIFIED SOIL TEST.
 - 3. APPLICATION FOR BEST RESULTS AND MAXIMUM EFFICIENCY THE LIME AND FERTILIZER ARE TO BE APPLIED AT THE TIME OF SEEDBED PREPARATION.
- 3. PERMANENT SEED MIXTURES
PLANNERS SHOULD TAKE INTO CONSIDERATION THE SPECIES MAKEUP OF THE EXISTING PASTURE AND THE LANDOWNER'S FUTURE PASTURE MANAGEMENT PLANS WHEN RECOMMENDING SEED MIXTURES. SELECTION FROM TABLES IV-4A AND IV-4B PERMANENT SEEDING MIXTURES SUITABLE FOR ESTABLISHMENT IN WEST VIRGINIA.
 - NOTES:
 - 1. ALL LEGUMES MUST BE PLANTED WITH THE PROPER INOCULANTS PRIOR TO SEEDING.
 - 2. LATHROP PLANTAIN IS POTENTIALLY TOXIC TO SOME LIVESTOCK.
 - 3. ONLY ERUPTIVE FREE VARIETIES OF TALL FESCUE SHOULD BE USED. TALL FESCUE AND CROWWEIGHT ARE ALSO VERY INVASIVE SPECIES, NONNATIVE TO WV.
 - 4. FOR UNPREPARED SEEDINGS OR SEEDING OUTSIDE THE OPTIMUM TIMEFRAMES, ADD 50% MORE SEED TO THE SPECIFIED RATE. MIXTURES IN TABLE IV-4B ARE MORE WILDLIFE AND FARM FRIENDLY. THOSE WITH (W) OR (F) SOIL ARE SUITABLE FOR USE IN SHADED WOODLAND SETTINGS. MIXTURES IN ITALIC ARE SUITABLE FOR USE IN FILTER STRIPS.
- 4. SEEDING FOR WILDLIFE HABITAT
CONSIDER THE USE OF THE NATIVE PLANTS OR LOCALLY ADAPTED PLANTS WHEN SELECTING COVER TYPES AND SPECIES FOR WILDLIFE HABITAT. WILDLIFE FRIENDLY SPECIES OR MIXES THAT HAVE MULTIPLE VALUES SHOULD BE CONSIDERED. SEE WILDLIFE FRIENDLY SPECIES MIXTURES IN TABLE IV-4B. CONSIDER SELECTING HIGH OR LOW MAINTENANCE LONG-LIVED PLANTS ADAPTABLE TO SITES WHICH MAY BE DIFFICULT TO MAINTAIN WITH EQUIPMENT.

MULCHING

- 1. GENERAL ORGANIC MULCHES
THE APPLICATION OF STRAW, HAY, OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION. STRAW MADE FROM WHEAT OR OATS IS THE PREFERRED MULCH. THE USE OF HAY IS PERMISSIBLE, BUT NOT ENCOURAGED DUE TO THE RISK OF SPREADING INVASIVE SPECIES. MULCH MUST BE APPLIED TO ALL TEMPORARY AND PERMANENT SEEDING ON ALL DISTURBED AREAS. DEPENDING ON SITE CONDITIONS, IN CRITICAL AREAS SUCH AS WATERWAYS OR STEEP SLOPES, ADDITIONAL OR SUBSTITUTE SOIL PROTECTIVE MEASURES MAY BE USED IF DEEMED NECESSARY. EXAMPLES INCLUDE JUTE MESH AND SOIL STABILIZATION BLANKETS OR EROSION CONTROL MATTING.
AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDING SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING. MULCHES CONSERVE DESIRABLE SOIL PROPERTIES, REDUCE SOIL MOISTURE LOSS, PREVENT CRUSTING AND SEALING OF THE SOIL SURFACE, AND PROVIDE A SUITABLE MICROCLIMATE FOR SEED GERMINATION.
AREAS THAT CANNOT BE SEEDING BECAUSE OF THE SEASON SHOULD BE MULCHED TO PROVIDE SOME PROTECTION TO THE SOIL SURFACE. AN ORGANIC MULCH, STRAW, OR HAY SHOULD BE USED AND THE AREA THEN RESEED AS SOON AS WEATHER OR SEASONAL CONDITIONS PERMIT. DO NOT USE FIBER MULCH (CELLULOSE) (GROSED) ALONE FOR THIS PRACTICE. AT NORMAL APPLICATION RATES IT WILL NOT GIVE THE SOIL PROTECTION OF OTHER TYPES OF MULCH.
WOOD CELLULOSE FIBER MULCH IS USED IN HYDROSEEDING OPERATION AND APPLIED AS PART OF THE SLURRY. IT CREATES THE BEST SEED-SOIL CONTACT WHEN APPLIED OVER THE TOP OF (AS A SEPARATE OPERATION) NEWLY SEEDING AREAS. FIBER MULCH DOES NOT ALONE PROVIDE SUFFICIENT PROTECTION ON HIGHLY ERODIBLE SOILS, OR DURING LESS THAN FAVORABLE GROWING CONDITIONS. FIBER MULCH SHOULD NOT BE USED ALONE DURING THE DRY SUMMER MONTHS OR WHEN USED FOR LATE FALL MULCH COVER. USE STRAW MULCH DURING THESE PERIODS AND FIBER MULCH MAY BE USED TO TACK (ANCHOR) THE STRAW MULCH. FIBER MULCH IS WELL SUITED FOR STEEP SLOPES, CRITICAL AREAS, AND AREAS SUSCEPTIBLE TO WIND.
- 2. CHEMICAL MULCHES, SOIL BINDERS, AND TACKIFIERS
A WIDE RANGE OF SYNTHETIC SPRAY ON MATERIALS ARE MARKETED TO STABILIZE AND PROTECT THE SOIL SURFACE. THESE ARE MIXED WITH WATER AND SPRAYED WITH THE MULCH AND TO THE SOIL. THEY MAY BE USED ALONE IN SOME CASES AS TEMPORARY STABILIZERS, OR IN CONJUNCTION WITH FIBER MULCH, STRAW, OR HAY WHEN USED ALONE. MOST CHEMICAL MULCHES DO NOT HAVE THE CAPABILITY TO INSULATE THE SOIL OR RETAIN SOIL MOISTURE (I.e. ORGANIC MULCH) ESPECIALLY.
- 3. SPECIFICATIONS
FROM TABLE IV-6 SELECT THE TYPE OF MULCH AND RATE OF APPLICATION THAT WILL BEST SUIT THE CONDITIONS AT THE SITE.
- 4. ANCHORING
DEPENDING ON THE FIELD SITUATION, MULCH MAY NOT STAY IN PLACE BECAUSE OF WIND ACTION OR RAIN/WATER RUNOFF. IN SUCH CASES, MULCH IS TO BE ANCHORED MECHANICALLY OR WITH MULCH NETTING.
 - 1. MECHANICAL ANCHORING
APPLY MULCH AND PULL MULCH ANCHORING TOOL OVER THE MULCH. WHEN A TACKER IS USED, SET THE TACKER STRAIGHT AND PULL AWARDS SITE. MULCH MATERIAL SHOULD BE TACKED INTO THE SOIL ABOUT 2".
 - 2. MULCH NETTING
FOLLOW MANUFACTURERS RECOMMENDATION WHEN POSITIONING AND STAPLING THE MULCH NETTING INTO THE SOIL.

ANTERO'S PREFERRED SEED MIXTURE

HALL'S #3 PASTURE MIXTURE			
Species/Component	Price Seed	Quantity	Origin
Bestor Intermediate Ryegrass	29.95¢/lb	90%	OR
Climax Timothy	24.95¢/lb	90%	UK
Annual Ryegrass *	24.92¢/lb	90%	OR
Medium Red Clover	3.99¢/lb	90%	OR
Polomac Orchardgrass	3.45¢/lb	90%	OR
Other Grasses	0.02¢/lb		* Variety Not Stated
Inert Matter	0.69¢/lb		
Ward Seed	0.02¢/lb		SNP 5143

Table IV-1
Recommended Seeding Dates

Planting Date	Recommended Seeding Dates	Suitability
March 1 - April 15 and August 1 - October 1	Best Seeding Period	
April 15 - August 1	HIGH RISK - moisture stress likely	
October 1 - December 1	HIGH RISK - freeze damage to young seedlings	
December 1 - March 1	Good seeding period. Dormant seeding	

Table IV-2

Acceptable Fertilization Recommendation			
Species	N (lb/ac)	P2O5 (lb/ac)	K2O (lb/ac) (optional)
Cool Season Grasses	40	80	400 (lbs. 10-20-20)
Warm Season Grasses & Legume	30	60	300 (lbs. 10-20-20)
Temporary Cover	40	40	200 (lbs. 19-19-19)

Table IV-3

Temporary Cover				
Species	Seeding Rate (lb./acre)	Optimum Seeding Date	Drainage	pH Range
Annual Ryegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Poorly	5.5 - 7.5
Field Bromegrass	40	4/1 - 5/15 or 8/15 - 9/15	Well - Mod. Well	6.0 - 7.0
Spring Oats	95	3/1 - 6/15	Well - Poorly	5.5 - 7.0
Sundgrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Winter Rye	155	8/15 - 10/15	Well - Poorly	5.5 - 7.5
Winter Wheat	160	9/15 - 11/15	Well - Mod. Well	6.0 - 7.0
Japanese Millet	30	5/15 - 8/15	Well	4.5 - 7.0
Redtop	5	3/1 - 6/15	Well	6.0 - 7.5
Annual Ryegrass	25	3/1 - 6/15	Well - Poorly	5.5 - 7.5
Spring Oats	54	3/1 - 6/15	Well - Poorly	5.5 - 7.5

NOTE: These rates should be increased by 50% if planted April 15 - August 1 and October 1 - March 1.

