

Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit gives approval for the development/ project listed that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible, and must remain posted during entirety of development.

Permit: # 16-440
WEC Anode Well

Date Approved: December 6, 2016

Expires: December 6, 2017

Issued to: Antero Midstream, LLC.

POC: Rachel Grzybek
(304) 842-4008

Company Address: 535 White Oaks Boulevard
Bridgeport, WV 26330

Project Address: 4801 Long Run Road, Greenwood

Firm: 54017C0105C

Lat/Long: 39.320767N, 80.840225W

Purpose of development: Installation of cathodic protection system

Issued by: George C. Eidel, CFM, OEM Director/Doddridge County FPM (or designee)

Date:

For additional information regarding this permit, please contact
Doddridge County Floodplain Manager at 304.873.2631, or via email at
doddridgecountyfpm@gmail.com
118 East Court Street; West Union, WV 26456

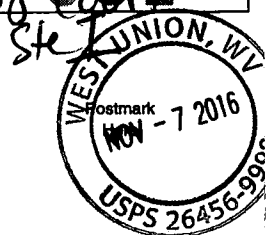
7014 0150 0001 7356 7795

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CERTIFIED MAIL™ RECEIPT
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For delivery information visit our website at www.usps.com

OFFICIAL USE

Postage	\$.49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	\$ 6.74



#16-440

Sent To

Street, Apt. No.,
or PO Box No.

City, State, ZIP+4

PS Form 3800, August 2006 See Reverse for Instructions

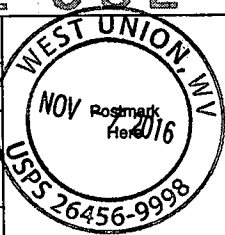
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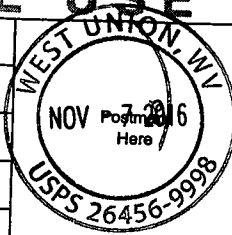
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or PO Box No.

City, State, ZIP+4

PS Form 3800, August 2006 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

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

**Carlie James
151 Kelley James Lane
West Union, WV 26456**



9590 9402 1601 5362 0147 31

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

Carlie James

Agent

Addressee

B. Received by (Printed Name)

C. Date of Delivery

11-9-16

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

160440

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)

- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

USPS TRACKING#

CHARLESTON



PM 1 L

9590 9402 1601 5362 0147 31

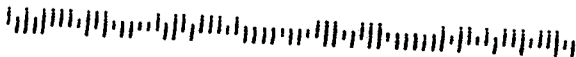


First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

**United States
Postal Service**

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

George Eidel
Doddridge County OEM/CFM
108 Court St. Ste 1
West Union, WV 26456



SENDER: COMPLETE THIS SECTION

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

James Shepherd
4801 Long Run Road
Pennsboro, WV 26415



9590 9402 1601 5362 0147 24

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *Jim Shepherd*

- Agent
 Addressee

B. Received by (Printed Name)

C. Date of Delivery

11/10/16

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

16-440

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING #



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

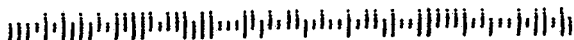
9590 9402 7803 5362 0147 24

**United States
Postal Service**

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

George Eidel
Doddridge County OEM/CFM
108 Court St. Ste 1
West Union, WV 26456

209501



SENDER: COMPLETE THIS SECTION

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

Michael Shepherd
4362 Long Run Road
Pennsboro, WV 26415



9590 9402 1601 5362 0147 17

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature

M. Shepherd

Agent

Addressee

B. Received by (Printed Name)

M. S. Shepherd

C. Date of Delivery

11-21-16

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

110-440

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

USPS TRACKING #



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

9590 9402 1601 5362 0147 17

**United States
Postal Service**

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

George Eidel
Doddridge County OEM/CFM
108 Court St. Ste 1
West Union, WV 26456





ANTERO MIDSTREAM
1615 WYNKOOP STREET
DENVER, COLORADO 80202

Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Nov-02-2016	104860	\$500.00

INV #	INV DATE	DESCRIPTION	AMOUNT	DISCOUNTS	NET AMOUNT
KAD1122016	11/02/16	FLOODPLAIN PERMIT FEE - WEC ANODE W	500.00	0.00	500.00

#16-440

COPY

COPY

COPY

TOTAL INVOICES PAID ==> 500.00 0.00 500.00

DETACH AND RETAIN FOR TAX PURPOSES

THIS CHECK HAS A COLORED FACE ON WHITE STOCK AND AN ARTIFICIAL WATERMARK ON THE BACK



ANTERO MIDSTREAM
1615 WYNKOOP STREET
DENVER, COLORADO 80202

Wells Fargo
Denver, CO

Check No. 104860

11-24
412

800 - AP ACCT WELLS FARGO

Void After 90 Days

CHECK NUMBER	DATE	PAY EXACTLY
104860	Nov-02-2016	\$500.00

PAY EXACTLY **500dols00cts**
Five Hundred Dollars and Zero Cents

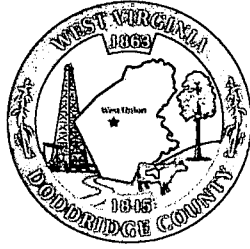
TO THE ORDER OF

DODDRIDGE COUNTY COMMISSION
BETH A ROGERS, CLERK-118 EAST COURT STREET-ROOM 10
2
WEST UNION, WV 26456

COPY

[Handwritten Signature]

⑈ 104860 ⑈ ⑆ 04 1 2038 24 ⑆ 9657481710 ⑈



Doddridge County Floodplain Permits

(Week of November 13, 2016)

Please take notice that on the 3rd day of **November, 2016**, **Antero Midstream, LLC**. filed an application for a Floodplain Permit (**#16-440**) to develop land located at or about **4801 Long Run Road, Greenwood**. The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **December 5, 2016** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Clerk of the County Court at 108 Court Street Ste. 1, West Union, WV 26456. **This project is installation of cathodic protection system.**


Antero Midstream Partners LP
Antero Midstream, LLC
535 White Oaks Blvd
Bridgeport, WV 26330
Office 304.842.4100
Fax 304.842.4102

October 28, 2016

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

Mr. Eidel:

Antero Midstream LLC would like to submit a Doddridge County Floodplain permit application for our *WEC Anode Well*. Our project is located in Doddridge County, Central District where the cathodic protection is located at approximate coordinates 39.320767N, 80.840225W. Per the FIRM Map #54017C0105C, this location is in the floodplain.

Attached you will find the following:

- Doddridge County Floodplain Permit Application
- Site Location Map/Project Details/Design Plans
- No-Rise Certificate
- WV Flood Tool Map
- FIRM Map

If you have any questions please feel free to contact me at (304) 842-4008.

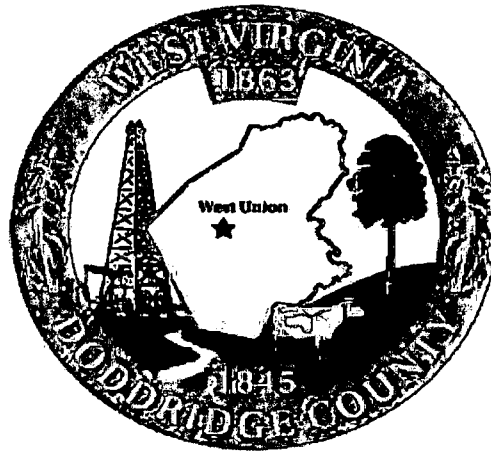
Thank you in advance for your consideration.

Sincerely,



Rachel Grzybek
Environmental Specialist II
Floodplain Engineer
Antero Resources Corporation

Enclosures



Permit# 16-440
Project Name: WEC Anode Well
Permittees Name: Antero Midstream,
UC.

Doddridge County, WV

Floodplain Development Permit Application

This document is to be used for projects that impact/potentially impact the FEMA---designated floodplain and/or floodway of Doddridge County, WV pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance.

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

Brian A. [Signature]

DATE

11-1-16

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: Antero Midstream, LLC.		
Corporate Mailing Address: 1615 Wynkoop Street		
City: Denver	State: CO	Zip: 80202
Corporate Point of Contact (POC):		
Corporate POC Title:		
Corporate POC Primary Phone:		
Corporate POC Primary Email:		
Corporate FEIN:	Corporate DUNS:	
Corporate Website: www.anteroresources.com		
Local Mailing Address: 535 White Oaks Boulevard		
City: Bridgeport	State: WV	Zip: 26330
Local Project Manager (PM):		
Local PM Primary Phone:		
Local PM Secondary Phone:		
Local PM Primary Email:		
Person Filing Application: Rachel Grzybek		
Applicant Title: Environmental Specialist II		
Applicant Primary Phone: (304) 842-4008		
Applicant Secondary Phone: (304) 641-2396		
Applicant Primary Email: rgrzybek@anteroresources.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Proposed Development:

Please check all elements of the proposed project that apply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVELOPMENT ACTIVITIES:

- Fill Mining Drilling Pipelining
- Grading
- Excavation (except for STRUCTURAL DEVELOPMENT checked above)
- Watercourse Alteration (including dredging and channel modification)
- Drainage Improvements (including culvert work)
- Road, Street, or Bridge Construction
- Subdivision (including new expansion)
- Individual Water or Sewer System
- Other (please specify)

Installation of the cathodic protection system

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 1 of 1

Site/Property Information:		
Legal Description: Long Run 4.41 AC		
Physical Address/911 Address: 4801 Long Run Road, Pennsboro, WV, 26415		
Decimal Latitude/Longitude: 39.320767 N, 80.840225 W		
DMS Latitude/Longitude: 39 19' 14.76" N, 80 50' 24.81" W		
District: 1 - Central	Map: 4	Parcel: 1
Land Book Description:		
Deed Book Reference: Book 312, Page 461		
Tax Map Reference: 09-01-0004-0001-0002		
Existing Buildings/Use of Property: Antero Midstream, LLC's WEC Anode Well will be located on this property.		

Floodplain Location Data: (to be completed by Floodplain Manager or designee)			
Community:	Number:	Panel:	Suffix:
Location (Lat/Long):		Approximate Elevation:	
		Estimated BFE:	
Is the development in the floodway? <input type="checkbox"/> Yes <input type="checkbox"/> No		Is the development in the floodplain? <input type="checkbox"/> Yes <input type="checkbox"/> No Zone: _____	
Notes:			

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Property Owner Data:

Please provide data on current site/property landowner(s), both surface and mineral rights (as applicable). Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 1 of 1

Property Owner Data:		
Name of Primary Owner (PO): James E. Shepherd II		
PO Address: 4801 Long Run Road		
City: Pennsboro	State: WV	Zip: 26415
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email: 7014 0150 0001 7356 7788		

Surface Rights Owner Data:		
Name of Primary Owner (PO):		
PO Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Mineral Rights Owner Data: (As Applicable)		
Name of Primary Owner (PO):		
PO Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Contractor Data:

Please provide all pertinent data for contractors and sub---contractors that may be participating in this project. Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: ___ of ___

Contractor/Sub-Contractor (C/SC) Information:		
C/SC Company Name:		
C/SC WV License Number:		
C/SC FEIN:	C/SC DUNS:	
Local C/SC Point of Contact (POC):		
Local C/SC POC Title:		
C/SC Mailing Address:		
City:	State:	Zip-Code:
Local C/SC Office Phone:		
Local C/SC POC Phone:		
Local C/SC POC E-Mail:		

Engineer Firm Information:		
Engineer Firm Name:		
Engineer WV License Number:		
Engineer Firm FEIN:	Engineer Firm DUNS:	
Engineer Firm Primary Point of Contact (POC):		
Engineer Firm Primary POC Title:		
Engineer Firm Mailing Address:		
City:	State:	Zip-Code:
Engineer Firm Office Phone:		
Engineer Firm Primary POC Phone:		
Engineer Firm Primary POC E-Mail:		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Michael Shepherd		
Physical Address: 4362 Long Run Road		
City: Pennsboro	State: WV	Zip: 26415
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email: 7014 0150 0001 7356 7771		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO):		
Physical Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): Carlie James		
Physical Address: 151 Kelley James Lane		
City: West Union	State: WV	Zip: 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email: 7014 0150 0001 7356 7795		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO):		
Physical Address:		
City:	State:	Zip:
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

A Site Plan is an accurate and detailed map of the proposed development for this project. It shows the size, shape, location and special features of the project property, and the size and location of any development planned to the property, especially as that development will impact the floodplain and/or floodway. Site plans show what currently exists on the project property, and any changes or improvements you are proposing to make. **A certified and licensed engineering firm should complete site plans.**

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

1. Legal description of the parcel, north arrow and scale
2. All property lines and their dimensions
3. Names of adjacent roads, location of driveways
4. Location of sloughs, tributaries, streams, rivers, wetlands, ponds, and lakes, with setbacks indicated, and including FEMA floodplain data based on most updated FIRM.
5. Location, size, shape of all buildings, existing and proposed, with elevation of lowest floor indicated.
6. Location and dimensions of existing or proposed on-site sewage systems.
7. Location of all propane tanks, fuel tanks or other liquid storage tanks whether above ground or below ground level.
8. Location and dimensions of any proposed pipeline placement(s) into floodplain/floodway.
9. Location and dimensions of any roadway development into floodplain/floodway. *(Includes initial development access roads)*
10. Location and dimensions of any bridge and/or culvert development into floodplain/floodway.
11. Location and dimensions of any storage yard or facility into the floodplain/floodway.
12. Location of any existing utilities and/or proposed utility placement and/or displacement.
13. Location, dimensions and depth of any existing or proposed fill on site.
14. A survey showing the **existing ground elevations** of at least location on the building site. **ELEVATION NOTE:** All vertical datum will reference either NGVD 29 or NAVD 88. Assumed datum will not be acceptable unless the property is located in an area where vertical datum has not been published. For those areas where vertical datum has not been established, a site plan with contours, elevations using assumed datum, high water marks and existing water levels of sloughs, rivers, lakes or streams and proposed lowest floor elevation.

Applicant

Please read print name, sign and date below:

- I certify that I am authorized to submit this application for the primary project developer.
- I certify that the information included in this application is to the best of my knowledge true and complete.
- I certify that all required Federal, State, and local permits required by law and/or ordinance for the above described development of this project have been properly attained, are current and valid, and must be presented with this application before a Doddridge County Floodplain Permit may be issued.
- I understand that if in the course of the development project additional permits become required that were not needed during the initial proposal, the primary developer must notify the Doddridge County Floodplain Manager within 48 hours of such need, and that a "Stop Work" order may be issued for all project work directly impacting the floodplain or floodway, until such time the required additional permits are acquired.
- I understand that once the floodplain permit is submitted, the application will be entered into official public record at the next regularly scheduled Doddridge County Commission meeting after the date of submittal.
- I understand that from the date of submittal of the fully completed permit application, the Doddridge County Floodplain Manager has ninety (90) days to make a determination to either grant or deny said permit application. During this approval period, the Doddridge County Floodplain Manager may, at his or her discretion, conduct a review and/or additional study of provided documentation by means of an independent engineering firm. All costs associated with said review and/or study must be reimbursed to the County before issuance of approved permit.
- I understand that during the approval period, the Doddridge County Floodplain Manager or designee may at his or her discretion conduct site visits and document conditions of proposed development pursuant to the permit application.
- I understand that once the Floodplain Permit is granted, the permit will be entered into official public record at the next scheduled Doddridge County Commission meeting after the date of issuance. Appeals to the permit may be made no later than twenty (20) days after said issuance. If a valid appeal is submitted, as determined by the Doddridge County Floodplain Manager, a "Stop Work" order will be issued for all project development directly involving the floodplain or floodway. A public hearing by the Doddridge County Appeals Board will be scheduled no less than ten (10) days after the next regularly scheduled Doddridge County Commission meeting.
- I understand that all decisions of the Doddridge County Appeals Board shall be final.
- I understand issuance of a Floodplain Permit authorizes me to proceed with construction as proposed. A Certificate of Compliance is required upon substantial completion of the project.
- In signing this application, the primary developer hereby grants the Doddridge County Floodplain Manager or designee the right to enter onto the above-described location to inspect the development work proposed, in progress, and/or completed.
- I understand that if I do not follow exactly the site-plan submitted and approved by this permit that a "Stop Work" order may be issued by the Wirt County Floodplain Manager and that I must stop all construction immediately until discrepancies of actual work vs. proposed work is resolved.

Applicant Signature:  Date: 11-1-16

Applicant Printed Name: BRIAN GUARNEROS

WEC Anode Well



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

User Notes:

Map created on October 19, 2016

- Flood Hazard Zone
- ⊕ Flood Point of Interest

Disclaimer:

The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov. *WV Flood Tool* (<http://www.MapWV.gov/flood>) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

Flood Hazard Area:	
Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.	
FEMA Issued Flood Map: 54017C0105C	
Watershed (HUC8):	Little Musringum-Middle Island (5
Elevation:	About 751 ft
Location (long, lat):	(80.839969 W,39.320597 N)
Location (UTM 17N):	(513795, 4352366)
Contacts:	Doddridge
CRS Information:	N/A
Parcel Number:	



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFP

PANEL 0105C

FIRM

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

PANEL 105 OF 325
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COUNTY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	54017C	0105C	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
54017C0105C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

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



REFERENCE

- 1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, WEST UNION QUADRANGLE, WEST VIRGINIA DATED: 1961, PHOTOREVISED: 1976.



Civil & Environmental Consultants, Inc.

600 Marketplace Ave · Suite 200 · Bridgeport, WV 26330
 Ph: 304.933.3119 · Fax: 304.933.3327
 www.cecinc.com

ANTERO MIDSTREAM, LLC
 WEC ANODE WELL
 DODDRIDGE COUNTY, WEST VIRGINIA

PROJECT LOCATION MAP

DRAWN BY:	BGB	CHECKED BY:	APD	APPROVED BY:	FIGURE NO.:
DATE:	OCT. 2016	DWG SCALE:	AS SHOWN	PROJECT NO:	163-065

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**ANTERO MIDSTREAM, LLC
CATHODIC PROTECTION INSTALLATION & COMMISSIONING SURVEY
WEST END CONNECTOR and SMITH SUCTION & DISCHARGE PIPELINES
PROJECT INFORMATION**

SCOPE OF WORK

- Perform a native pipe-to-soil survey on the West End Connector pipeline; *complete*
- Manage the installation of the CP system for Antero's West End Connector and Smith Suction and Discharge pipelines;
- Perform a commissioning survey on the West End Connector pipeline;
- Perform a Close Interval Survey upon completion of the commissioning survey; *still to be determined (TBD) – waiting on Antero authorization / NTP*; and
- Prepare a summary report to document the native potentials, CP system installation details, commissioning survey results, and *CIS results (TBD)*.

SCHEDULE

Task Mode	Task Name	Duration	Start	Finish	Predecessors
Auto Scheduled	Antero - WEC CP Installation Services	1 day	Fri 4/8/16	Fri 4/8/16	
Auto Scheduled	Meter Pole Installation / Inspection	1 day	Fri 7/29/16	Fri 7/29/16	
Auto Scheduled	Utility Service Requested	14 days	Mon 8/1/16	Thu 8/18/16	2
Auto Scheduled	Task 1 - Native Survey	3 days	Tue 8/9/16	Thu 8/11/16	
Auto Scheduled	Task 2 - CP System Installation	3 days	Thu 10/13/16	Mon 10/17/16	
Manually Scheduled	Task 3 - CP Commissioning Survey	4 days	Tue 10/18/16	Fri 10/21/16	5,3
Auto Scheduled	<i>Close Interval Survey - to run concurrently with Commissioning Survey</i>	14 days	Tue 10/18/16	Fri 11/4/16	
Auto Scheduled	Task 4 - Report / Recommendations	21 days	Mon 11/7/16	Mon 12/5/16	7

Task 1 - Native Survey

- Baseline readings taken 8/9-8/11
- **SURVEY NOTES:**
 - *Coupon test station at STA. 28+50 on the Smith line is installed but there are extra leads making the lid not close and may need to be repaired*
 - *Some test stations may not have been found due to access concerns – no access road, steep terrain, and/or landowner gates*

Meter pole installation / inspection

- Pole installed and inspection completed 7/29/16
 - Mon Power Work Order #000740425539 – Inspector Jack Jamison \

- Utility work order submitted 8/1/16 (~14 days for service = 8/18/16)

Task 2 - CP System Installation

- Scheduled to begin on 10/13
- Ground bed and rectifier - see location information (**Attachment A**) for "Rectifier 1"
 - CP design drawings / modifications (**Attachment B**)
- Junction boxes
 - Negative located at the compressor station
 - Positive located at the rectifier
- Current span test station installation
 - Installation of up to (3) 200-foot current span test stations
- Positive and negative header cables will be put in PVC casing
- What considerations / risks are present with this project?
 - The line was purged with gas on 7/12/16
 - Recommended safe distance from power lines is 20-feet – are there any powerlines present?
 - Equipment / materials – verified by PCS during field trip (week of 7/25/16)
 - Discuss with Antero during kick-off meetings / daily safety tail gates

Daily Field Report (DFR) & Communication Plan

- DFRs maintained for all site activities
- Maintain contact with Kleinfelder /PCS team and Antero field inspectors on a daily basis
 - Field contacts are Steve Burden, and/or Joe Burch

Task 3 – CP Commissioning Survey

- Scheduled to begin on 10/18
- Kleinfelder will make the connections between the rectifier and ground-bed at the deep well location
- Kleinfelder will perform a CP commissioning survey which includes rectifier adjustments and P/S measurements at all test stations (**Attachment C**)

Task 4 – Report / Recommendations for CP Installation

Summary Report

- Consists of standard template with data tables – native potentials, CP system (updated / revised) installation details, commissioning results

CONTACT INFORMATION

Name	Company	Role / Responsibility	Cell Phone
Joe Dennis	Kleinfelder	Technical Lead / ITR	307-277-2127
Stephanie Biagiotti	Kleinfelder	Technical Support / QR	303-910-9564
Cay Strother	Kleinfelder	Technical ITR / QR	303-999-5081
Autumn M. Long	Kleinfelder	Project Manager	720-626-4535
Joe Fazzini	Kleinfelder	WV Team Resource	304-695-3144
Don Trickey	Kleinfelder	WV Team Coordinator	301-697-1941
Kim Fulkerson	PCS	Corrosion Manager	678-447-7056
Nathan Budge	Antero	Operations Engineer	720-354-7688
Steve Burden	Antero	Field Inspector	918-759-0930
Joe Burch	Antero	Field Inspector	985-285-4321
Jack Jamison	Mon Power	Field Inspector	304-692-9779

HEALTH & SAFETY PLAN (HASP) – Attachment D

Kleinfelder PM will provide Antero the project specific HASP prior to field work commencing.

- Hazards will be discussed at daily tailgate meetings

STATUS UPDATES

Kleinfelder PM will provide weekly status updates unless otherwise directed.

All attachments are included in the initial Kick-Off / Project Information package (dated 8-5-16)

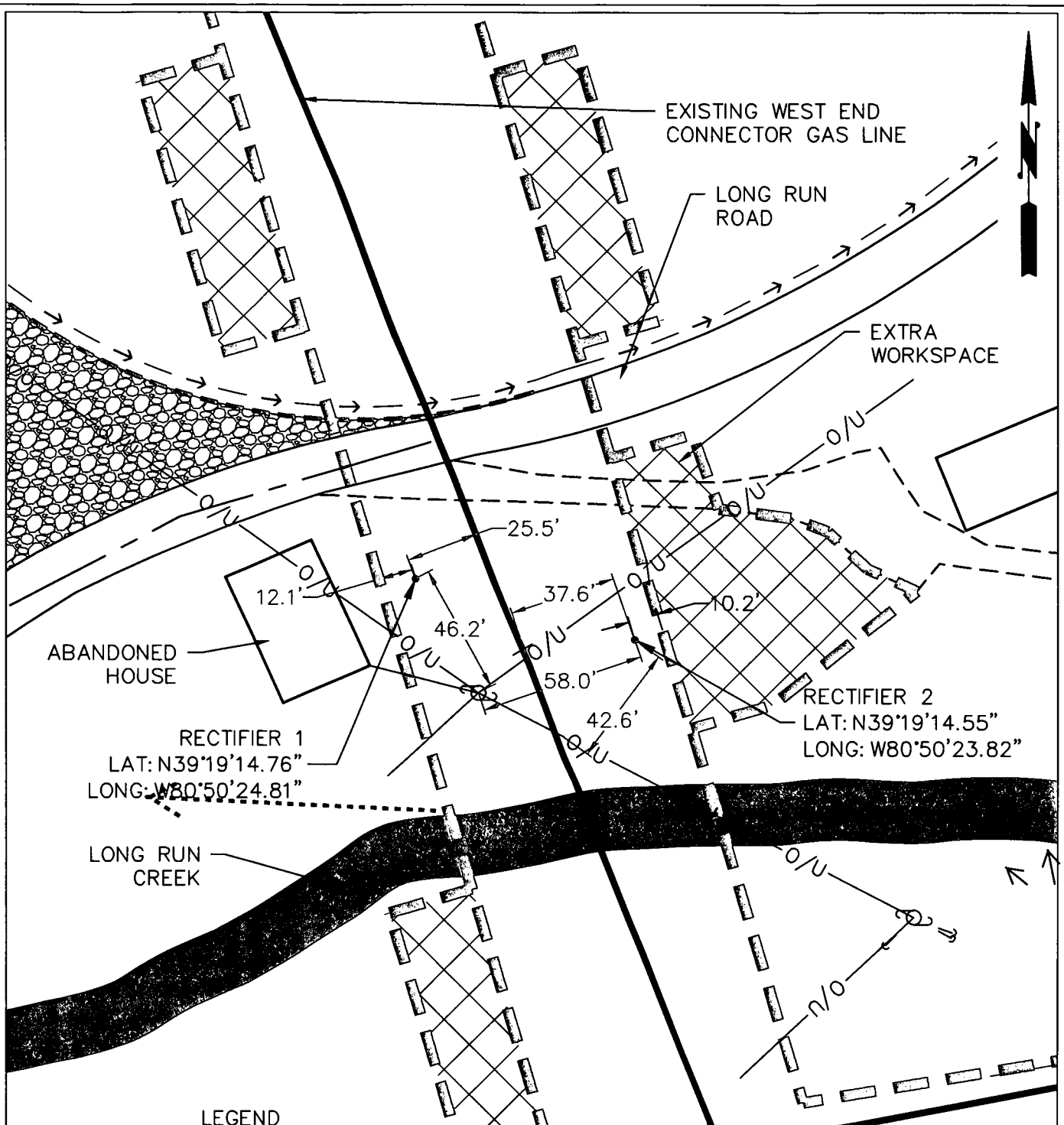
Attachment A – Proposed Rectifier Installation Location

Attachment B – CP Design Drawings

Attachment C – Test Station Locations

Attachment D – Health & Safety Plan (HASP)

CAD FILE: R:\050-5428 - ANTERO - KARL EXPRESS\Survey\EXHIBITS\LONG RUN RECTIFIER.dwg
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LEGEND

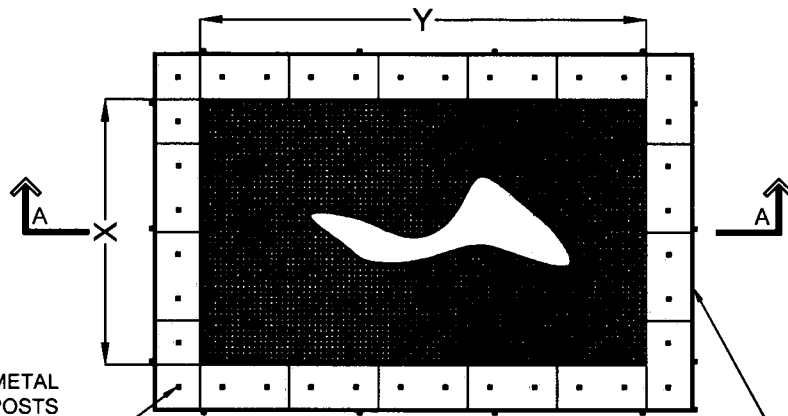
- O/U — = OVERHEAD UTILITY LINE
- ▭ = LIMITS-OF-DISTURBANCE
- = EXISTING GAS LINE
- ⊙ = UTILITY POLE

THRASHER

600 WHITE OAKS BLVD
 BRIDGEPORT, WV 26330
 PHONE 304-624-4108

ANTERO MIDSTREAM LLC			
RECTIFIER EXHIBIT ON THE LANDS OF MICHAEL SHEPHERD			
DODDRIDGE COUNTY, WEST VIRGINIA			
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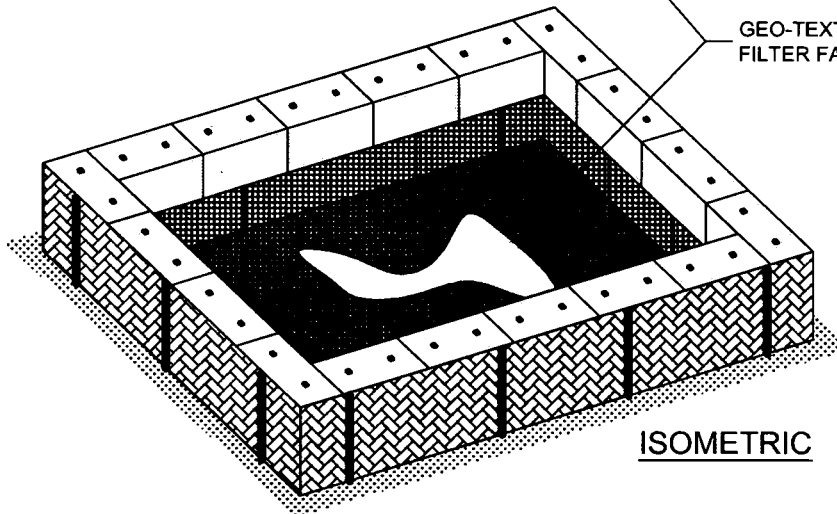
PLAN VIEW

6" METAL T-POSTS OR 2"x2"x4" WOODEN STAKES

SILT FENCE

GEO-TEXTILE FILTER FABRIC PINNED BETWEEN BALES

CROSS SECTION A-A



ISOMETRIC

GEO-TEXTILE FILTER FABRIC

DEWATERING STRUCTURE DIMENSIONS (FEET)		MAXIMUM PUMPING RATE (GALLONS PER MINUTE)
X	Y	
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500
25	30	550
30	30	600

4 STRAW BALE DEWATERING
NTS



PROJECT NO. 138753
 DATE: 04-08-2014
 DRAWN BY: MDI
 CHECKED BY: JBC
 FILE NAME:
 SWPPP DETAIL SHEETS.dwg

**STRAW BALE DEWATERING DETAIL
DOTSON PIPELINE**

ANTERO MIDSTREAM LLC

DETAIL


4

NOTES:

1. STRAW BALES SHOULD BE PLACED ON THEIR SIDES WITH THE TWINE FACING OUT.
2. STRAW BALES SHOULD BE STACKED TWO HIGH WITH GEO-TEXTILE FABRIC PINNED BETWEEN BALES.
3. 6 FOOT METAL T-POSTS ARE RECOMMENDED, DRIVEN THROUGH BOTH STRAW BALES. IF METAL T-POSTS ARE NOT AVAILABLE, WOODEN STAKES SHOULD BE A MINIMUM OF 2"X2"X 4'. STAKES SHOULD BE DRIVEN AROUND THE PERIMETER OF THE STRAW BALES AS STRUCTURAL SUPPORT AS WELL AS THROUGH THE BALES TO HELP PIN THE GEO-TEXTILE FABRIC IN PLACE.
4. DEWATERING STRUCTURES DIMENSIONS SHOULD BE DESIGNED TO ACCOMMODATE THE SIZE OF THE WATER PUMP BEING UTILIZED.
5. DEWATERING STRUCTURE DIMENSIONS MAY NEED TO BE ADJUSTED TO SUIT THE VARIOUS SIZES OF FILTER BAGS, THOUGH SQUARE FOOTAGE SPECIFICATIONS SHOULD STILL BE MAINTAINED. THE STRUCTURE SHOULD COMPLETELY ENCOMPASS THE BAG BEING UTILIZED.
6. WHEN PUMPING LARGE AMOUNTS OF WATER FOR AN EXTENDED PERIOD OF TIME, (LARGE BELL HOLES, ETC.) INTERVAL PUMPING MAY BE NECESSARY TO AVOID OVERPOWERING THE DEWATERING STRUCTURE.
7. USE OF MULTIPLE DEWATERING STRUCTURES MAY NECESSARY UNDER SPECIAL CIRCUMSTANCES.
8. FOR STREAM CROSSINGS, WHEN PUMPING OUT THE TRENCH WITH A 2 INCH TRASH PUMP AT ½ THROTTLE, A STANDARD 10' BY 10' DEWATERING STRUCTURE WITH A COMPARABLE FILTER BAG SHOULD BE ADEQUATE. FIELD ADJUSTMENTS WILL BE MADE IF FLOW IS OVERPOWERING THE STRUCTURE.
9. ADDITIONAL EROSION CONTROLS MAY BE UTILIZED DOWNSLOPE OF DEWATERING STRUCTURES WHERE NEEDED.
10. DEWATERING STRUCTURE WILL BE PLACED TO MAXIMIZE AVAILABLE VEGETATIVE STRIP.

4
/
NTS

STRAW BALE DEWATERING

 <p>KLEINFELDER <i>Bright People. Right Solutions.</i> www.kleinfelder.com</p>	PROJECT NO. 138753	STRAW BALE DEWATERING DETAIL DOTSON PIPELINE	DETAIL
	DATE: 04-08-2014		4A
	DRAWN BY: MDI		
	CHECKED BY: JBC	ANTERO MIDSTREAM LLC	
	FILE NAME: SWPPP DETAIL SHEETS.dwg		



October 27, 2016

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

Subject: Antero Midstream, LLC.
WEC Anode Well
No-Rise Certificate
Doddridge County, West Virginia
CEC Project 163-065

Civil & Environmental Consultants, Inc. (CEC) is pleased to evaluate the potential floodplain impacts for the above referenced project on behalf of Antero Midstream, LLC., 535 White Oaks Blvd, Bridgeport, WV 26330. Antero Midstream, LLC. proposes to install a cathodic protection (CP) system for Antero's West End Connector and Smith Suction and Discharge Pipelines. Portions of the proposed project are located within the Long Run Zone 'A' flood hazard area according to the Flood Insurance Rate Map for Doddridge County, Map Panel #54017C0105C, with a map revised date of October 4, 2011. Proposed erosion and sediment control measures include a straw bale dewatering structure. Since the spoil material will be relocated to the another location outside of any floodplain, the proposed project will not result in a decrease of the available floodplain storage area and will not adversely affect the existing base flood elevation of Long Run.

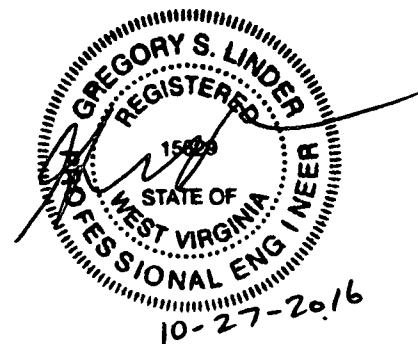
This no-rise certificate is provided in support of the floodplain development permit application. Your time and effort in reviewing this floodplain development permit application is appreciated. Please feel free to contact me at 304-933-3119 or via e-mail at glinder@cecinc.com or contact Ms. Rachel Grzybek at 304-842-4008 or via e-mail at rgrzybek@anteroresources.com if you have questions or need additional information.

Respectfully submitted,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

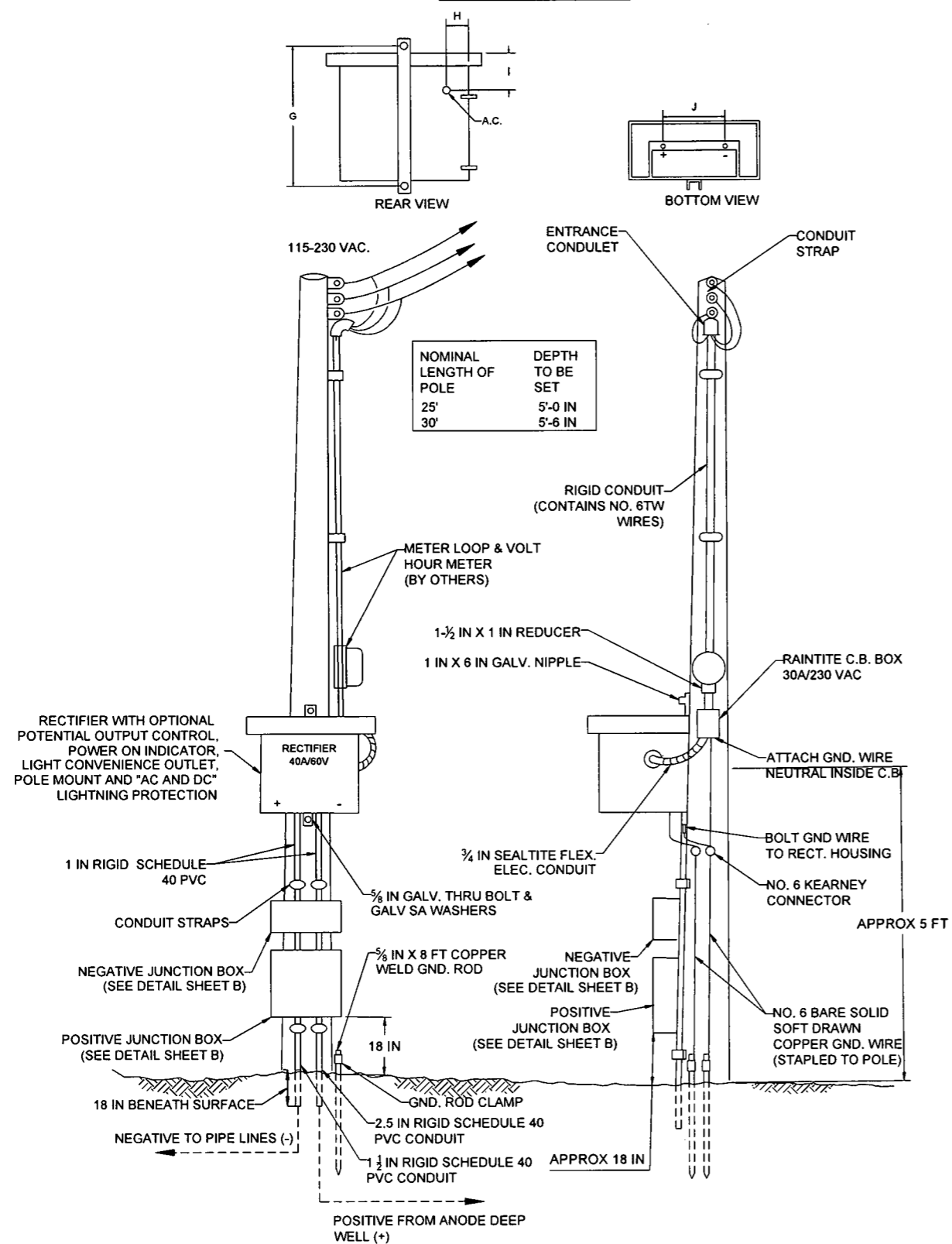
Andrew P. Darnell, E.I.
Project Consultant

Greg S. Linder, P.E.
Project Manager



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 USER: maria ayler
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INSTALLING THE RECTIFIER



NOTES:

1. CAUTIONS FOR WORKING AROUND POWER:
 - a. ALWAYS USE CAUTION WHEN WORKING NEAR ELECTRICITY;
 - b. ASSUME THAT ALL OVERHEAD WIRES ARE ENERGIZED AT LETHAL VOLTAGES. NEVER ASSUME THAT A WIRE IS SAFE TO TOUCH EVEN IF IT IS DOWN OR APPEARS TO BE INSULATED. ELECTRICAL HAZARDS CAN CAUSE BURNS, SHOCKS AND ELECTROCUTION (DEATH);
 - c. NEVER TOUCH A FALLEN OVERHEAD POWER LINE. CALL THE ELECTRIC UTILITY COMPANY TO REPORT FALLEN ELECTRICAL LINES;
 - d. ASSUME A MEASURED POTENTIAL COULD BE HAZARDOUS, DO NOT TOUCH A CIRCUIT UNTIL IT IS KNOWN TO BE SAFE;
 - i. AVOID SPARKS IN HAZARDOUS LOCATIONS;
 - e. STAY AT LEAST 20 FEET AWAY FROM OVERHEAD WIRES (UP TO 350KV AND 50 FT AWAY 350KV TO 1000KV) DURING CLEANUP AND OTHER ACTIVITIES. IF WORKING AT HEIGHTS OR HANDLING LONG OBJECTS, SURVEY THE AREA BEFORE STARTING WORK FOR THE PRESENCE OF OVERHEAD WIRES;
 - f. IF AN OVERHEAD WIRE FALLS ACROSS YOUR VEHICLE WHILE YOU ARE DRIVING, STAY INSIDE THE VEHICLE AND CONTINUE TO DRIVE AWAY FROM THE LINE. IF THE ENGINE STALLS, DO NOT LEAVE YOUR VEHICLE. WARN PEOPLE NOT TO TOUCH THE VEHICLE OR THE WIRE. CALL OR ASK SOMEONE TO CALL THE LOCAL ELECTRIC UTILITY COMPANY AND EMERGENCY SERVICES;
 - g. CONSIDER POSSIBLE SHOCK HAZARDS WHEN WORKING NEAR WATER;
 - h. NEVER REPAIR ELECTRICAL CORDS OR EQUIPMENT UNLESS QUALIFIED AND AUTHORIZED;
 - i. HAVE A QUALIFIED ELECTRICIAN INSPECT ELECTRICAL EQUIPMENT THAT HAS GOTTEN WET BEFORE ENERGIZING IT;
 - j. INSPECT ELECTRIC CORDS AND EQUIPMENT TO ENSURE THAT THEY ARE IN GOOD CONDITION AND FREE OF DEFECTS, AND USE A GROUND-FAULT CIRCUIT INTERRUPTER (GFCI).
2. MEASURE AND RECORD THE DISTANCE BETWEEN THE TOP BOLT CONNECTION AND THE BOTTOM CONNECTION (G) ON RECTIFIER.
3. HANG RECTIFIER AT APPROXIMATELY 5 FEET AT CENTER BY INSTALLING THE TOP LAG BOLT IN POWER POLE APPROXIMATELY 6- FEET FROM THE GROUND.
4. DRILL THE HOLE FOR THE BOTTOM LAG BOLT PER MEASUREMENT (G).
5. MOUNT RECTIFIER ON THE POLE BY SLIDING OVER THE TOP LAG BOLT AND INSTALL BOTTOM LAG BOLT:
 - a. DRILL HOLES AND MOUNT NEGATIVE JUNCTION BOX BELOW RECTIFIER AND POSITIVE JUNCTION BOX BELOW, APPROX. 18 INCH OFF THE GROUND.
6. CONNECT THE GROUND WIRE TO THE RECTIFIER BOX.
7. CONNECT THE POSITIVE AND NEGATIVE CONDUITS TO THE BOTTOM HOLES (MARKED J).
8. CONNECT THE POSITIVE AND NEGATIVE JUNCTION BOX LEADS TO THE PROPERLY MARKED CONNECTORS. LEAVE APPROXIMATELY A 3" LOOP OF SLACK IN BOTH WIRES BEFORE CONNECTING.
9. CONNECT THE FLEXIBLE AC CONDUIT TO THE BACK OF THE RECTIFIER (MARKED A.C.).
10. CONNECT THE 2- AC POWER LEADS TO RECTIFIER POWER LEADS WITH TWIST CONNECTORS, IF THIS IS WIRE TO WIRE CONNECTIONS. CHECK ALL RECTIFIER CONNECTIONS PRIOR TO START UP. (SEE MANUFACTURER INSTALLATION INSTRUCTIONS)
11. START UP WITH THE TAP SETTINGS AT THE LOWEST SETTING AND THE AC BREAKER IN THE RECTIFIER TURNED OFF, TURN ON THE MAIN AC POWER BREAKER TO THE RECTIFIER:
 - a. MEASURE AND RECORD THE INCOMING AC VOLTAGE AT THE TOP CONNECTION TO THE AC BREAKER IN THE RECTIFIER, IN RECTIFIER BOOK;
 - b. TURN ON THE AC BREAKER IN THE RECTIFIER, AND IF RECTIFIER IS EQUIPPED WITH DC BREAKER SWITCH BE SURE TO TURN ON;
 - c. MEASURE AND RECORD THE DC VOLTAGES ACROSS THE POSITIVE AND NEGATIVE TERMINALS;
 - d. MEASURE THE DC CURRENT BY MEASURING THE SHUNT READING;
 - e. ADJUST THE TAP SETTING TO OBTAIN THE DESIRED CURRENT OUTPUT;
 - f. PROCEED TO THE NEAREST TEST POST AND TAKE PIPE-TO-SOIL READINGS ON THE LINE;
 - g. IF THE TEST POST READINGS DO NOT MEET THE MOST CURRENT VERSION OF THE RECOMMENDED NACE SP0169 -0.850 VDC INSTANT OFF OR GREATER, THEN REPEAT STEPS 16 AND 17;
 - h. VERIFY THE PIPE-TO-SOIL READINGS ARE AT THE DESIRED LEVEL OVER THE LENGTH OF THE PIPELINE AFFECTED BY THIS RECTIFIER, IF NOT CONTINUE STEPS e TO g UNTIL THE PIPE-TO-SOIL READINGS ARE AT THE DESIRED LEVEL ON THE PIPELINE.
12. INSTALL A CP CURRENT SPAN TEST STATION APPROXIMATELY 100 FEET FROM RECTIFIER ON EACH PROTECTED PIPELINE. DISTANCE VARY DEPENDING ON SPECIFIC PIPELINE CONFIGURATIONS (SEE DETAIL SHEET G).

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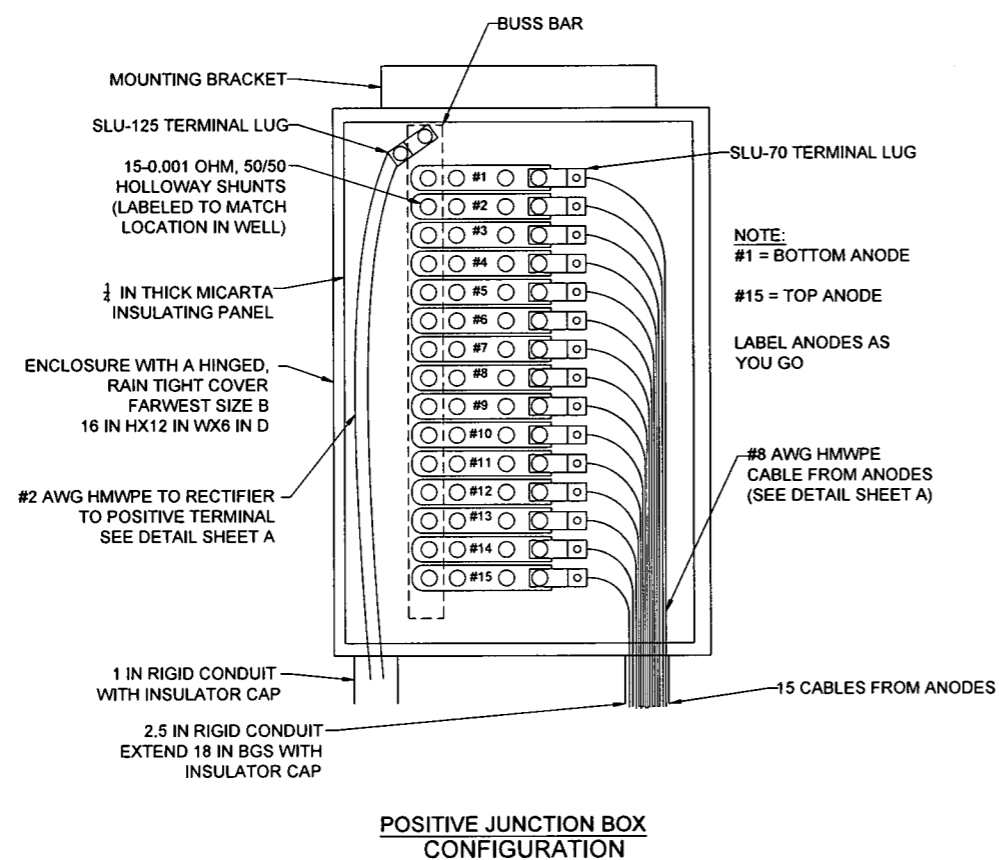
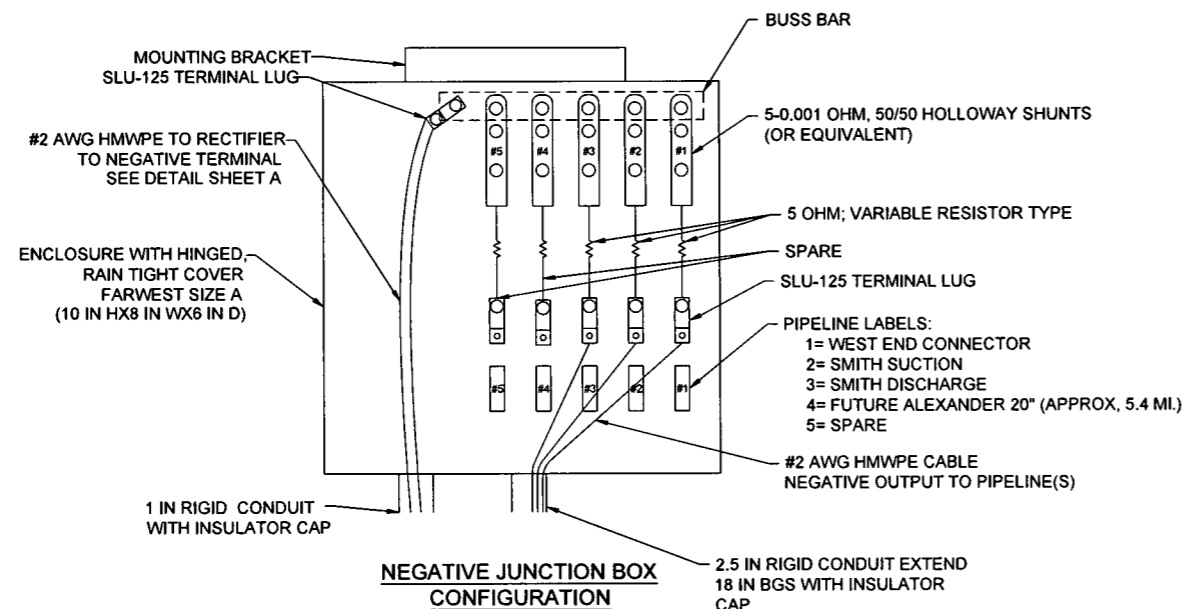
KLEINFELDER
Bright People. Right Solutions.

ANTERO MIDSTREAM LLC CONSTRUCTION PLANS FOR THE PROPOSED WEST END CONNECTOR PIPELINE & SMITH SUCTION AND DISCHARGE PIPELINES CATHODIC PROTECTION DESIGN

RECTIFIER

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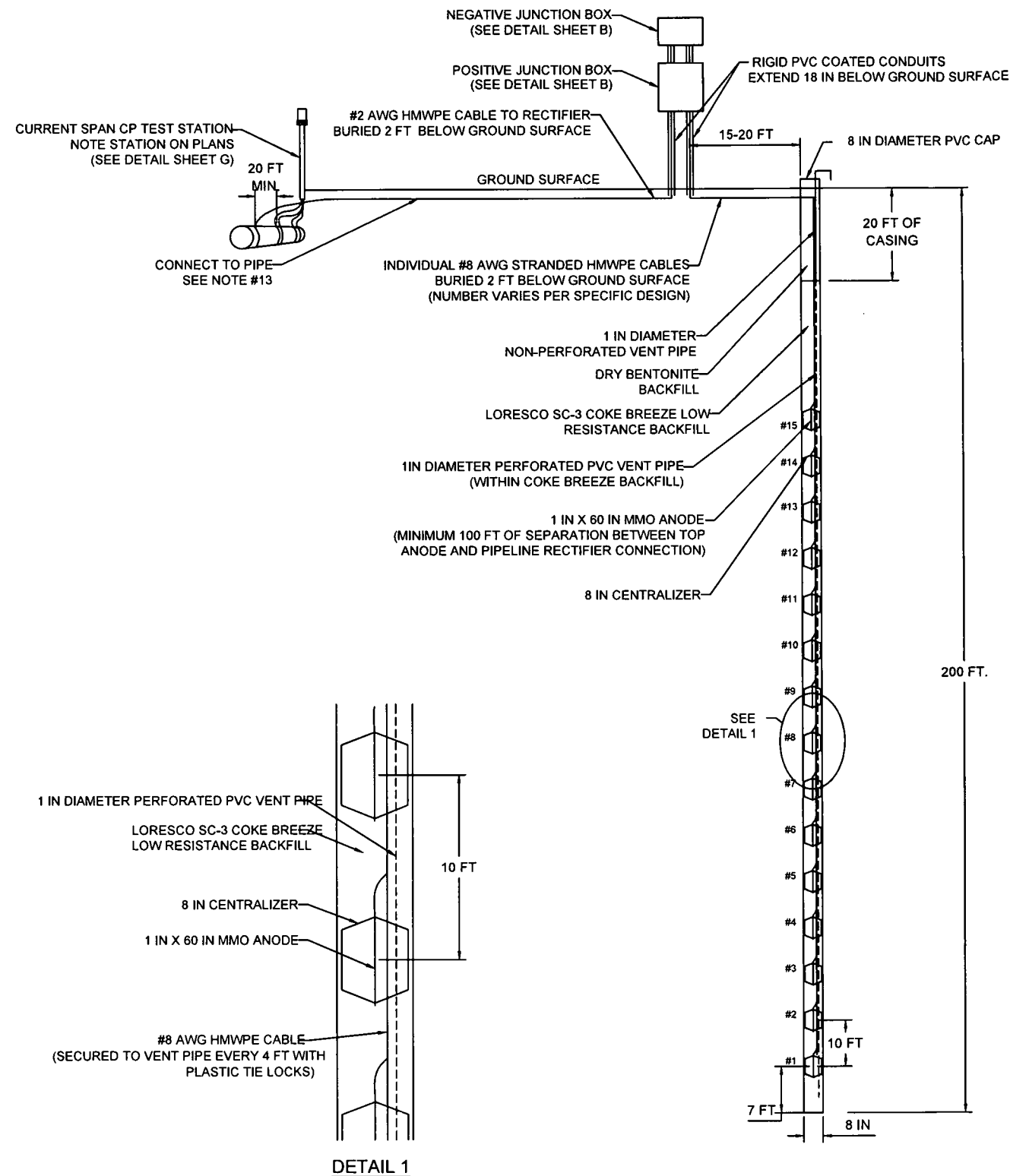


INSTALLATION INSTRUCTIONS FOR POSITIVE AND NEGATIVE JUNCTION BOXES FOR DEEP WELL GROUND BEDS:

1. CAUTIONS FOR WORKING AROUND POWER:
 - a. ALWAYS USE CAUTION WHEN WORKING NEAR ELECTRICITY;
 - b. ASSUME THAT ALL OVERHEAD WIRES ARE ENERGIZED AT LETHAL VOLTAGES. NEVER ASSUME THAT A WIRE IS SAFE TO TOUCH EVEN IF IT IS DOWN OR APPEARS TO BE INSULATED. ELECTRICAL HAZARDS CAN CAUSE BURNS, SHOCKS AND ELECTROCUTION (DEATH);
 - c. NEVER TOUCH A FALLEN OVERHEAD POWER LINE. CALL THE ELECTRIC UTILITY COMPANY TO REPORT FALLEN ELECTRICAL LINES;
 - d. ASSUME A MEASURED POTENTIAL COULD BE HAZARDOUS. DO NOT TOUCH A CIRCUIT UNTIL IT IS KNOWN TO BE SAFE;
 - e. AC MIGHT BE PRESENT, MEASURE FOR IT FIRST;
 - f. BE AWARE OF YOUR SURROUNDINGS;
 - AVOID SPARKS IN HAZARDOUS LOCATIONS;
 - g. STAY AT LEAST 20 FEET AWAY FROM OVERHEAD WIRES (UP TO 350KV AND 50 FEET AWAY 350KV TO 1000KV) DURING CLEANUP AND OTHER ACTIVITIES. IF WORKING AT HEIGHTS OR HANDLING LONG OBJECTS, SURVEY THE AREA BEFORE STARTING WORK FOR THE PRESENCE OF OVERHEAD WIRES;
 - h. IF AN OVERHEAD WIRE FALLS ACROSS YOUR VEHICLE WHILE YOU ARE DRIVING, STAY INSIDE THE VEHICLE AND CONTINUE TO DRIVE AWAY FROM THE LINE. IF THE ENGINE STALLS, DO NOT LEAVE YOUR VEHICLE. WARN PEOPLE NOT TO TOUCH THE VEHICLE OR THE WIRE. CALL OR ASK SOMEONE TO CALL THE LOCAL ELECTRIC UTILITY COMPANY AND EMERGENCY SERVICES;
 - i. CONSIDER POSSIBLE SHOCK HAZARDS WHEN WORKING NEAR WATER;
 - j. NEVER REPAIR ELECTRICAL CORDS OR EQUIPMENT UNLESS QUALIFIED AND AUTHORIZED;
 - k. HAVE A QUALIFIED ELECTRICIAN INSPECT ELECTRICAL EQUIPMENT THAT HAS GOTTEN WET BEFORE ENERGIZING IT;
1. IF WORKING IN DAMP LOCATIONS, INSPECT ELECTRIC CORDS AND EQUIPMENT TO ENSURE THAT THEY ARE IN GOOD CONDITION AND FREE OF DEFECTS, AND USE A GROUND-FAULT CIRCUIT INTERRUPTER (GFCI).
2. MOUNT THE BOTTOM OF THE POSITIVE JUNCTION BOX AT LEAST 18-INCHES ABOVE THE GROUND LEVEL ON THE POWER POLE OR POST, USING LAG BOLTS.
3. INSTALL THE NEGATIVE JUNCTION BOX 8-10 IN ABOVE THE POSITIVE JUNCTION BOX.
4. INSTALL A 1-INCH DIAMETER APPROXIMATELY 3-FEET, RIGID SCHEDULE 40 PVC CONDUIT ON THE LEFT SIDE ON THE POSITIVE JUNCTION BOX:
 - a. THIS HOUSES THE #2 AWG HMWPE POSITIVE CABLE GOING FROM THE BUSS BAR TO THE POSITIVE CONNECTION IN THE RECTIFIER;
 - b. THE BOTTOM END OF THE CONDUIT SHOULD BE BURIED APPROXIMATELY 2-FEET INTO THE GROUND.
5. INSTALL A 2.5-INCH DIAMETER RIGID SCHEDULE 40 PVC CONDUIT ON THE RIGHT SIDE OF THE POSITIVE JUNCTION BOX:
 - a. THIS WILL HOUSE THE 15- #8 AWG HMWPE LEADS FROM EACH ANODE.
 - b. THE BOTTOM END OF THE CONDUIT SHOULD BE BURIED APPROXIMATELY 2-FEET INTO THE GROUND.
6. THE ANODE WIRES SHALL BE NUMBERED DURING INSTALLATION:
 - a. WIRE #1 BEING THE FIRST ANODE PLACED IN THE DEEP WELL.
7. FIFTEEN SHUNTS ARE ATTACHED TO THE BUSS BAR INSIDE THE POSITIVE JUNCTION BOX:
 - a. THE SHUNTS SHALL BE NUMBERED 1-15, STARTING WITH #1 AT THE TOP RIGHT AND CONSECUTIVELY FROM THE TOP TO BOTTOM.
8. ATTACH THE MATCHING NUMBER ANODE WIRE TO THE NUMBER SHUNT:
 - a. VERIFY ALL CONNECTIONS ARE TIGHT.
9. CONNECT A #2 AWG HMWPE CABLE FROM THE BUSS BAR THROUGH THE 1-INCH CONDUIT, ON THE LEFT HAND SIDE, TO THE RECTIFIER'S POSITIVE TERMINAL.
10. IN THE NEGATIVE JUNCTION BOX, THE SHUNTS SHALL BE NUMBERED 1-5, STARTING WITH #1 ON THE RIGHT SIDE:
 - a. LABEL THE TERMINAL LUGS WITH THE CORRESPONDING PIPELINE, NAME AND TERMINAL #. SEE UPPER LEFT, THIS SHEET.
 - b. ATTACH THE MATCHING CABLE TO THE PIPELINE INDICATED;
 - c. CONNECT THE #2 AWG HMWPE CABLE FROM THE BUSS BAR TO THE RECTIFIER'S NEGATIVE TERMINAL;
 - d. CONNECT THE #2 AWG HMWPE CABLES FROM THE SLU-125 LUGS DOWNSTREAM OF RESISTORS TO THE CORRESPONDING PIPELINE;

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SURVEY DATE: N/A	SURVEY REF: N/A	FIELD BOOK No.: N/A	PROJECT No.: 20162182	PROJECT No.: 20162182	PROJECT No.: 20162182
1801 California Street, Suite 1100 Denver, CO 80202 Phone: 303-237-6601 www.kleinfelder.com	KLEINFELDER Bright People. Right Solutions.				
ANTERO MIDSTREAM LLC CONSTRUCTION PLANS FOR THE PROPOSED WEST END CONNECTOR PIPELINE & SMITH SUCTION AND DISCHARGE PIPELINES CATHODIC PROTECTION DESIGN					
POSITIVE & NEGATIVE JUNCTION BOXES					
SHEET No.					B

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 USER: maria amyde



CATHODIC PROTECTION DEEP WELL DESIGN SPECIFICATION:

1. INSTALL AN 8 INCH DIAMETER WELL, 15 TO 20 FEET AWAY FROM THE RECTIFIER, 200 FEET BELOW GROUND SURFACE (BGS), USING DRILL RIG EQUIPMENT OR EQUIVALENT, CASING THE TOP 20 FEET WITH SCH. 40 PVC PIPE. IDEALLY THE SEPARATION DISTANCE BETWEEN THE TOP ANODE AND THE PIPELINE WILL BE 100FT THIS DISTANCE MAY VARY DEPENDING ON SITE CONDITIONS.
2. INSTALL A PERFORATED 1 INCH DIAMETER PVC VENT PIPE FROM THE BOTTOM OF THE WELL TO APPROXIMATELY 20 FEET FROM THE TOP, THEN A NON-PERFORATED 1 INCH PVC PIPE TO EXIT OUT OF THE TOP OF THE WELL.
3. INSTALL 15 1 INCH X 60 INCH MIX METAL OXIDE ANODES (MMO ANODES) ALONG SIDE OF THE PVC VENT PIPE. CABLES TO BE LABELED AT END NEAREST RECTIFIER.
4. CONNECT THE MMO ANODES TO THE 1 INCH DIAMETER PVC VENT PIPE WITH 8 INCH CENTRALIZERS.
5. CONNECT THE #1 MMO ANODE TO THE VENT PIPE 7 FEET FROM THE BOTTOM OF THE WELL.
6. CONNECT THE REMAINING MMO ANODES TO THE VENT PIPE EVERY 10 FEET AS THE VENT IS INSTALLED INTO THE DEEP WELL.
7. CONNECT A #8 AWG HIGH MOLECULAR WEIGHT POLYETHYLENE (HMWPE) INSULATED COPPER CABLE TO EACH MMO ANODE, NUMBERED BY THE LOCATION IN THE WELL.
8. SECURE THE #8 AWG STRANDED HMWPE ANODE CABLES TO THE VENT PIPE EVERY 4 FEET WITH PLASTIC TIE LOCKS.
9. THE #8 AWG STRANDED HMWPE ANODE CABLES EXIT THROUGH THE CASING APPROXIMATELY 2 FEET BELOW GROUND SURFACE AND CONNECT TO THE POSITIVE ANODE JUNCTION BOX (SEE DETAIL SHEET B)
10. UPON COMPLETION OF THE ANODE AND VENT PIPE INSTALLATION, BACKFILL THE WELL WITH LORESCO SC-3 COKE BREEZE LOW RESISTANCE BACKFILL IN A SLURRY TO WITHIN APPROXIMATELY 20 FEET BELOW GROUND SURFACE.
11. ALLOW THE LORESCO SC-3 COKE BREEZE LOW RESISTANCE BACKFILL TO SETTLE AND THEN POUR DRY BENTONITE TO FILL THE REMAINDER OF THE HOLE.
12. PLACE AN 8 INCH PVC CAP ON THE WELL WITH SCREEN CAP ON 1 IN VENT.
13. CONNECT THE NEGATIVE #2 AWG HMWPE CABLE(S) FROM THE NEGATIVE JUNCTION BOX TO THE PIPELINE(S) TO BE PROTECTED BY THE RECTIFIER. FIELD LOCATE THE CONNECTION BASED ON PROJECT CONSTRAINTS. CONNECT A MINIMUM OF 20 FT. UPSTREAM OF CURRENT SPAN TEST STATION:
14. INSTALL A CURRENT SPAN CP TEST STATION AS INDICATED ON PLAN SHEET NEAR RECTIFIER ON EACH PROTECTED PIPELINE (SEE DETAIL SHEET G).

SCALE: NONE	DATE: 10/20/15	NO.	DATE	DESCRIPTION
DRAWN: GRS	CHECKED: CHS	1	02/18/18	PLAN AND DETAIL EDITS
FIELD BOOK NO.: N/A	APPROVED: BPT	2	12/22/15	PLAN AND DETAIL EDITS
PROJECT No.: 20181812	LAYOUT TAB: C	3		DEEP WELL

SUBMIT DATE: N/A	SCALE: NONE
SUBMIT BY: N/A	DRAWN: GRS
FIELD BOOK NO.: N/A	CHECKED: CHS
PROJECT No.: 20181812	APPROVED: BPT
	LAYOUT TAB: C

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