PERMIT NO. 13-113

DODDRIDGE COUNTY

FLOODPLAIN DEVELOPMENT

PERMIT

EQT OXFORD 157

PURPOSE FOR PERMIT: CREEK CROSSING EQT OXFORD 159

ISSUED TO EQT Henderson Freshwater Impoundment

115 Professional Place
PO Box 280

ADDRESS: Bridgeport, WV 26330

PROJECT ADDRESS: BLUESTONE

ISSUED BY: Dan Wellings

DATE: 02/03/2014

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

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

U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT

(Domestic Mail Only; No Insurance Coverage Provided)

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

OFFICIAL USE

7013 2250 0001 6914 7554

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

#13-113

WEST UNION WV JAN 13 Postmark Here USPS 26456

Sent To: Charles P. Heaster, Et Al.

Street, Apt. No.; or PO Box No.: Rt. 1 Box 57

City, State, ZIP+4: West Union, WV 26456

PS Form 3800, August 2006 — See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT

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

OFFICIAL USE

7013 2250 0001 6914 7578

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

WEST UNION WV JAN 13 Postmark Here USPS 26456

#13-113

Sent To: Sue Ann Spiker

Street, Apt. No.; or PO Box No.: 166 Linden Lane

City, State, ZIP+4: Jane Lew WV 26378

PS Form 3800, August 2006 — See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT

(Domestic Mail Only; No Insurance Coverage Provided)

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

OFFICIAL USE

7013 2250 0001 6914 7622

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

WEST UNION WV JAN 13 Postmark Here USPS 26456

#13-113

Sent To: Mary Holland Est.

Street, Apt. No.; or PO Box No.: 225 Watchung Frk

City, State, ZIP+4: Westfield, NJ 07090

PS Form 3800, August 2006 — See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT

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

OFFICIAL USE

7013 2250 0001 6914 7615

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

WEST UNION WV JAN 13 Postmark Here USPS 26456

#13-113

Sent To: Janes Donley

Street, Apt. No.; or PO Box No.: Rt 1, Box 33

City, State, ZIP+4: West Union, WV 26456

PS Form 3800, August 2006 — See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT

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

OFFICIAL USE

7013 2250 0001 6914 7608

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

WEST UNION WV JAN 13 Postmark Here USPS 26456

#13-113

Sent To: IL Morris

Street, Apt. No.; or PO Box No.: P.O. Box 397

City, State, ZIP+4: Glenville, WV 26351

PS Form 3800, August 2006 — See Reverse for Instructions

U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT

(Domestic Mail Only; No Insurance Coverage Provided)

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

OFFICIAL USE

7013 2250 0001 6914 7592

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

WEST UNION WV JAN 13 Postmark Here USPS 26456

#13-113

Sent To: Mary Farr Secrist

Street, Apt. No.; or PO Box No.: Rt. 1, Box 56 A

City, State, ZIP+4: West Union, WV 26456

PS Form 3800, August 2006 — See Reverse for Instructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

Arden and Anne Ashcraft
102 Maxwell Ridge Road
West Union, WV 26456

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Ann Ashcraft ☒ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 1-15-14

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 7585

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

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

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

FILED
2014 JAN 16 AM 11:55
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Dan Wellings
Doddridge Co Flood Plain MGT
Room 102
118 E Court St
West Union, WV 26456

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

Charles P. Heaster, Et Al.
Rt. 1, Box 57
West Union, WV 26456

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 1-14-14

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 7554

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

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

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

FILED

2014 JAN 15 AM 11:14

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Don Wellings
Doddridge Co Flood Plain MGT
Room 102
118 E Court St
West Union, WV 26456

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

James Donley
Rt. 1, Box 33
West Union, WV 26456

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jim Donley
☐ Agent
☒ Addressee

B. Received by (*Printed Name*) Jim Donley
C. Date of Delivery 1-18-14

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number
(*Transfer from service label*) 7013 2250 0001 6914 7615

UNITED STATES POSTAL SERVICE

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

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

FILED
2014 JAN 21 AM 11:38
DODDRIDGE COUNTY, WV
COUNTY CLERK

Dan Wellings
Doddridge Co. Flood Plain MGT.
Room 102
118 E. Court St.
West Union, WV 26456

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

Mary Holland Est.
225 Watchung Frk
Westfield, NJ 07090

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 7622

UNITED STATES POSTAL SERVICE

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

FILED
2014 JAN 27 AM 11:
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, W

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

Jennings
Room 102
118 E Court St
West Union WV 26456

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

Sue Ann Spiker
166 Linden Lane
Jane Lew WV 26378

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☒ Agent
☐ Addressee

B. Received by (Printed Name) David Spiker
C. Date of Delivery 7-14-14

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 7578

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

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

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

FILED
2014 JAN 15 AM 11:14
CLERK A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Ian Wellings
Doddridge Co Flood Plain MGT
Room 102
118 E Court St
West Union, WV 26456

26456129799

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

IL Morris
P.O. Box 397
Glenville, WV 26351

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jackie Swiger ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Jackie Swiger
C. Date of Delivery 1-14-14

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 7608

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

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

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

FILED
2014 JAN 15 AM 11:14
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Dan Wellings
Doddridge Co. Flood Plain MGT.
Room 102
118 E. Court St.
West Union, WV 26456

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: #13-113

Mary Farr Secrist
Rt. 1, Box 56 A
Weat Union, WV 26456

COMPLETE THIS SECTION ON DELIVERY

A. Signature
Mary Farr Secrist ☐ Agent ☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery 1-14-14

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

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 7592

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

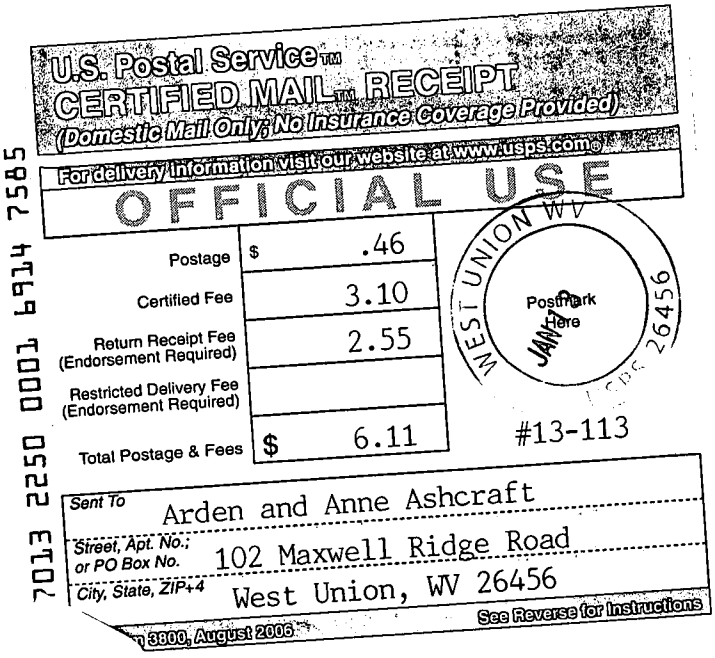
UNITED STATES POSTAL SERVICE

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

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

FILED
2014 JAN 15 AM 11:14
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Dan Wellings
Doddridge Co Flood Plain MGT
Room 102
118 E Court St
West Union, WV 26456



U.S. Postal Service™
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OFFICIAL USE

Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

WEST UNION WV
Postmark Here
JAN
26456

#13-113

7013 2250 0001 6914 7585

Sent To: Arden and Anne Ashcraft
Street, Apt. No.; or PO Box No.: 102 Maxwell Ridge Road
City, State, ZIP+4: West Union, WV 26456

PS Form 3800, August 2006
See Reverse for Instructions

Doddridge County, West Virginia

RECEIPT NO: 1265 DATE: 2014/01/13

FROM: SMITH LAND SURVEYING **AMOUNT:** $ 13,750.00

THIRTEEN THOUSAND SEVEN HUNDRED FIFTY DOLLARS AND 00 CENTS

FOR: #13-113 EQT OXF 157, 159 WELL PAD & PIT
HENDERSON CENTRALIZED FRESHWATER IMPD

00000017860 FP-BUILDING PERMITS 019-318 **TOTAL:** $13,750.00

MICHAEL HEADLEY
SHERIFF &TREASURER

MEC
CLERK

Customer Copy

Legal Advertisement:

Doddridge County

Floodplain Permit Application

Please take notice that on the 13th day of January, 2014

EQT PRODUCTION COMPANY –OXF 157 & 159 PROPOSED WELL PAD AND ASSOCIATED PIT AND HENDERSON CENTRALIZED FRESHWATER IMPOUNDMENT. PERMIT # 13-113

filed an

application for a Floodplain Permit to develop land located at or about: **SURFACE OWNERS: JUSTIN L. HENDERSON**

WEST UNION DISTRICT (PROPERTY IS TAXED IN SOUTHWEST DIST.)

BLUESTONE 1602.90 AC, W/B 29/224, AND MAP 6-1.

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 **FEBURARY 3RD , 2014.**

Delivered to the:

Clerk of the County Court

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

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

SLS SMITH LAND SURVEYING, INC.
P.O. BOX 150, GLENVILLE, WV 26351
(304) 462-5634 • FAX (304) 462-5656

LETTER OF TRANSMITTAL

DATE	JOB NO.
1/7/14	7889
ATTENTION: Dan Wellings	
RE: EQT Production Company OXF 157 & OXF 159	

TO: Doddridge County Floodplain Coordinator
118 East Court Street
West Union, WV 26456

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Doddridge Co. Floodplain Permit with attachments for EQT OXF 157 & OXF 159
1			SLS Check #17860 in the amount of $13,750.00 for Floodplain Permit Fee

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☒ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 20_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO SLS Files; EQT Production Company

SIGNED: Deanna McVicker

If enclosures are not as noted, kindly notify us at once.

#13-113
EQT-OXF 157 & 159
Proposed Well Pad and Associated Pit
Henderson Centralized Freshwater
Impoundment.

DODDRIDGE COUNTY

FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

FILED
2014 JAN -8 PM 12:22
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

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 Megan E Jarrett

DATE 1-3-14

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

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

APPLICANT'S NAME: EQT Production Company

ADDRESS: 115 Professional Place P.O. Box 280 Bridgeport WV 26330

TELEPHONE NUMBER: 304-848-0076

BUILDER'S NAME: EQT Production Company

ADDRESS: 115 Professional Place P.O. Box 280 Bridgeport, WV 26330
TELEPHONE NUMBER: 304-848-0076

ENGINEER'S NAME: Cyrus S. Kump/ Navitus Engineering Inc.
ADDRESS: 151 Windy Hill Lane Winchester VA 22602
TELEHONE NUMBER: 888-662-4185

PROJECT LOCATION:

The OXF 157, 159, and Henderson Centralized Impoundment Sites is located west of Maxwell Ridge along Bluestone Creek off of County Route 13. The Entrance to the site is approximately ¾ mile southwest of the County Route 13 and County Route 13/3 intersection. The coordinates of the site are:

Site entrance: Latitude 39.227701 Longitude -80.758964 (NAD 83)

OXF 157:
Well Pad entrance: Latitude 39.234468 Longitude -80.764983 (NAD 83)
Well Pad: Latitude 39.236047 Longitude -80.766261 (NAD 83)
Associated Pit: Latitude 39.238452 Longitude -80.764291 (NAD 83)

OXF 159:
Well Pad entrance: Latitude 39.227701 Longitude -80.758964 (NAD 83)
Well Pad: Latitude 39.218821 Longitude -80.766744 (NAD 83)
Associated Pit: Latitude 39.216627 Longitude -80.767649 (NAD 83)

HENDERSON CENTRALIZED FRESHWATER IMPOUNDMENT:
Entrance: Latitude 39.227701 Longitude -80.758984 (NAD 83)
Impoundment: Latitude 39.224948 Longitude -80.765453 (NAD 83)

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Justin L. Henderson

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT)
P.O. Box 100 Meadowbrook, WV 26404
DISTRICT: West Union District (Property is taxed in Southwest District, but the wells/site are in West Union) **DATE/FROM WHOM PROPERTY**

PURCHASED: _____ **LAND**

BOOK DESCRIPTION: Bluestone 1602.90 AC

DEED BOOK REFERENCE: Book- WB29 page- 224

TAX MAP REFERENCE: Map 6-1 (Taxed in Southwest)

EXISTING BUILDINGS/USES OF PROPERTY: _____

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY N/A

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

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

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVEOPLMENT ACTIVITIES:

[X] Fill [] Mining [X] Drilling [] Pipelining

[X] Grading

[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)

[] Watercourse Altercation (including dredging and channel modification)

[X] Drainage Improvements (including culvert work)

[X] Road, Street, or Bridge Construction

[] Subdivision (including new expansion)

[] Individual Water or Sewer System

[] Other (please specify)

_____

C. STANDARD SITE PLAN OR SKETCH

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

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ OXF 157= $982,500 OXF 159= $1,253,000 HEND= $414,500

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

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

NAME: James Donley
ADDRESS: Rt 1 Box 33
West Union, WV 26456

NAME: Sue Ann Spiker
ADDRESS: 166 Linden Lane
Jane Lew, WV 26378

NAME: IL Morris
ADDRESS: P.O. Box 397
Glenville, WV 26351

NAME: Mary Holland Estates
ADDRESS: 225 Watchung Frk
Westfield, NJ 07090
07090

NAME: Mary Farr Secrist
ADDRESS: Rt 1 Box 56 A
West Union, WV 26456

NAME: Charles P. Heaster, Et AL.
ADDRESS: Rt 1 Box 57
West Union, WV 26456

NAME: Arden and Anne Ashcraft
ADDRESS: 102 Maxwell Ridge Road
West Union, WV 26456

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

NAME: Mary Farr Secrist
ADDRESS: Rt 1 Box 56 A
West Union, WV 26456

NAME: Charles P. Heaster, Et AL.
ADDRESS: Rt 1 Box 57
West Union, WV 26456

NAME: Arden and Anne Ashcraft
ADDRESS: 102 Maxwell Ridge Road
West Union, WV 26456

NAME: James Donley
ADDRESS: Rt 1 Box 33
West Union, WV 26456

E. CONFIRMATION FORM

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

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

(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.

(C) PUBLICATION.

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

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

NAME (PRINT): Megan E. Sandfried

SIGNATURE: Megan E. Sandfried **DATE:** 1-3-14

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 230
Dated: 10/04/2011

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

[X] Is located in Special Flood Hazard Area.
FIRM zone designation A
100-Year flood elevation is: N/A NGVD (MSL)

[] Unavailable

[] The proposed development is located in a floodway.
FBFM Panel No._____ Dated_____

[] See section 4 for additional instructions.

SIGNED [signature] **DATE** 02/03/2014

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

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

[] A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

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

_____

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

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

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

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

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

[] Other:

_____

_____

_____

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

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

SIGNED_____DATE_____

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

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

CONDITIONS:_____
_____
_____
_____

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

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

COMPLETE 1 OR 2 BELOW:

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

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

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

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

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

INSPECTIONS:

DATE:_____ **BY:**_____

DEFICIENCIES ? **Y/N**

COMMENTS_____

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

Certificate of Compliance issued: DATE:_____ BY:_____

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

PERMIT NUMBER:_____

PERMIT DATE:_____

PURPOSE –

CONSTRUCTION LOCATION:_____

OWNER'S ADDRESS:_____

_____

_____

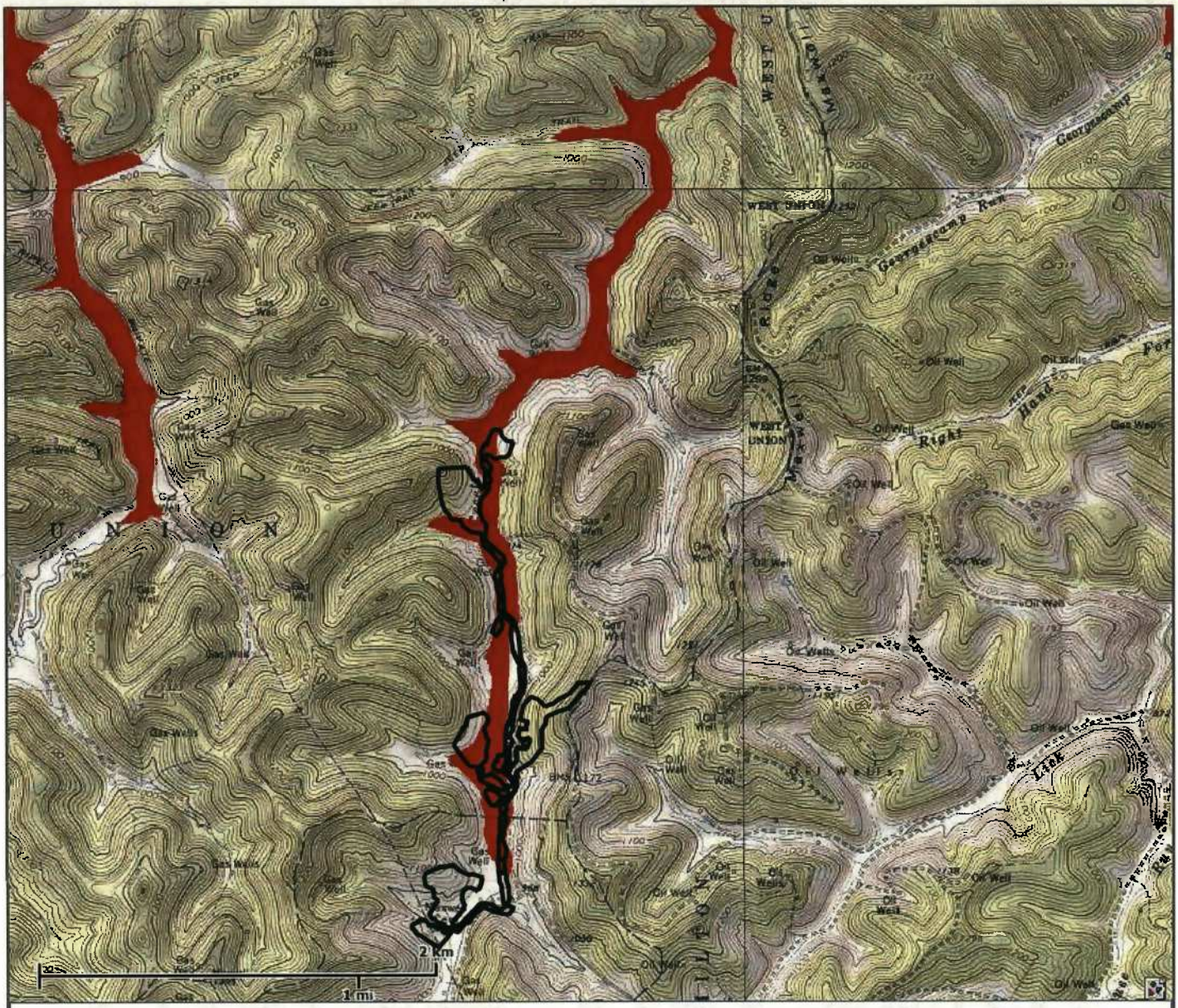
THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN ADMINISTRATOR/MANAGER OR HIS/HER AGENT.

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

SIGNED_____**DATE**_____

13-113

OXF 157, 159 HENDERSON



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

Map Created on 12/6/2013

Location of the mouse click

Flood Hazard Zone
(1% annual chance floodplain)

User Notes:

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 is supported by FEMA, WV NFIP Office, and WV GIS Technical Center (http://www.MapWV.gov/flood)

Flood Hazard Area: Selected site is NOT WITHIN any identified flood hazard area. Unmapped flood hazard areas may be present.

Elevation: About 1030 feet

Location (long, lat): 80.740107 W, 39.194401 N

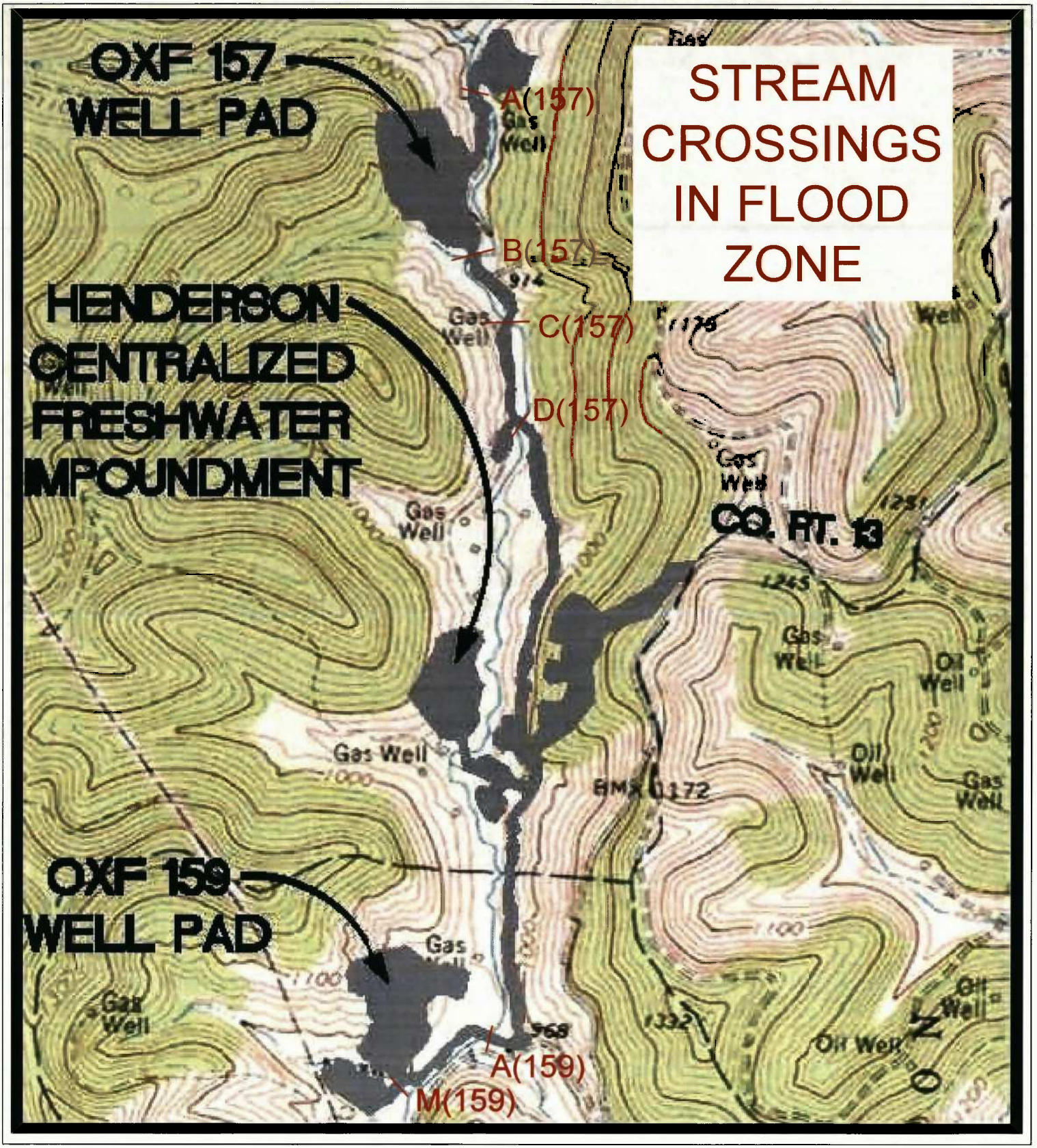
Location (UTM 17N): (522443, 4338382)

FEMA Issued Flood Map: 54017C0230C

Contacts: Doddridge County

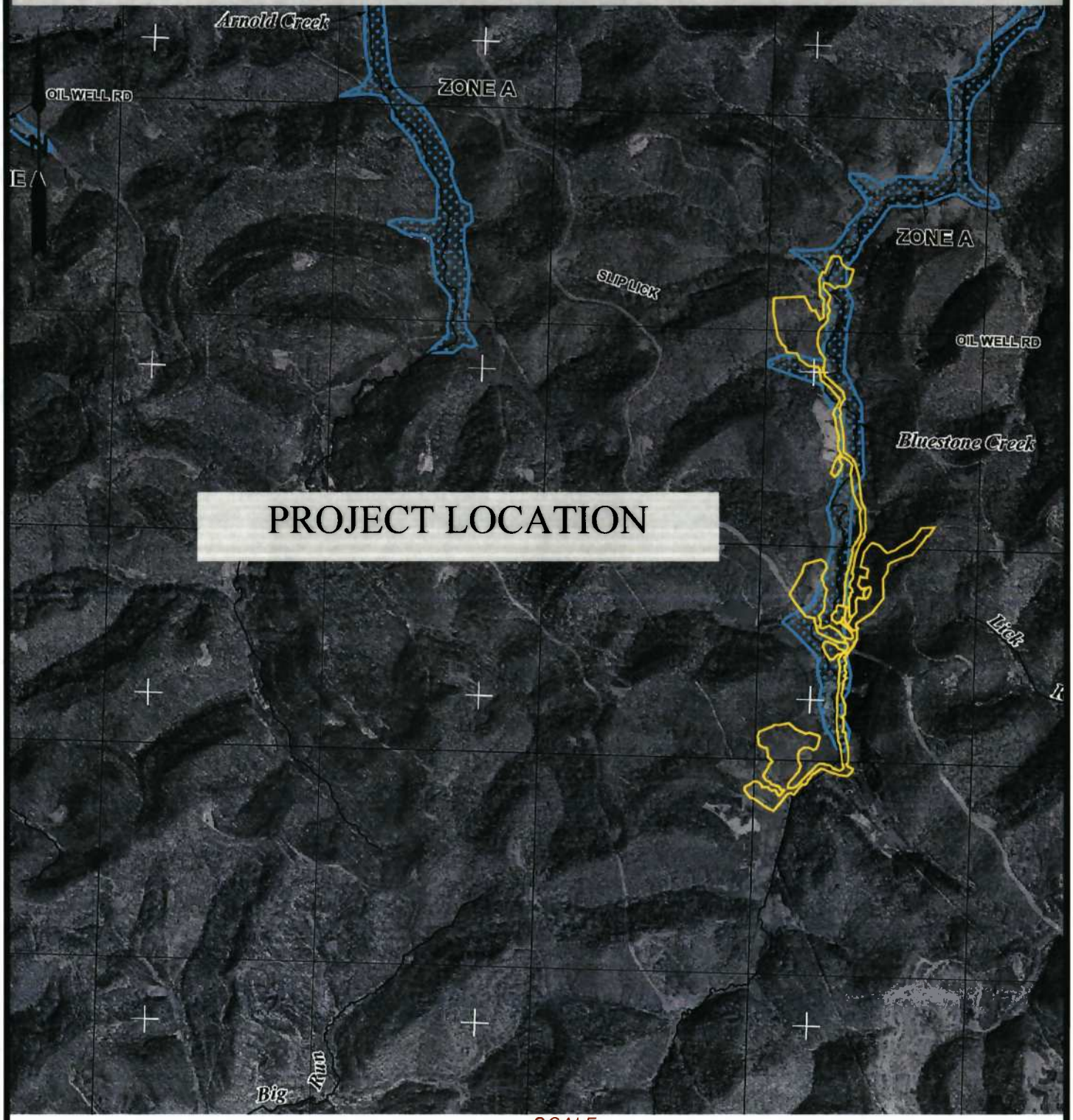
CRS Information: No CRS information available

Parcel Number:


OXF 157
WELL PAD
A(157)
B(157)
C(157)
D(157)
HENDERSON
CENTRALIZED
FRESHWATER
IMPOUNDMENT
STREAM
CROSSINGS
IN FLOOD
ZONE
CO. RT. 13
OXF 159
WELL PAD
A(159)
M(159)
Gas Well
Oil Well

13-113

OXF 157,159, & HENDERSON CENTRALIZED IMPOUNDMENT FEMA MAP



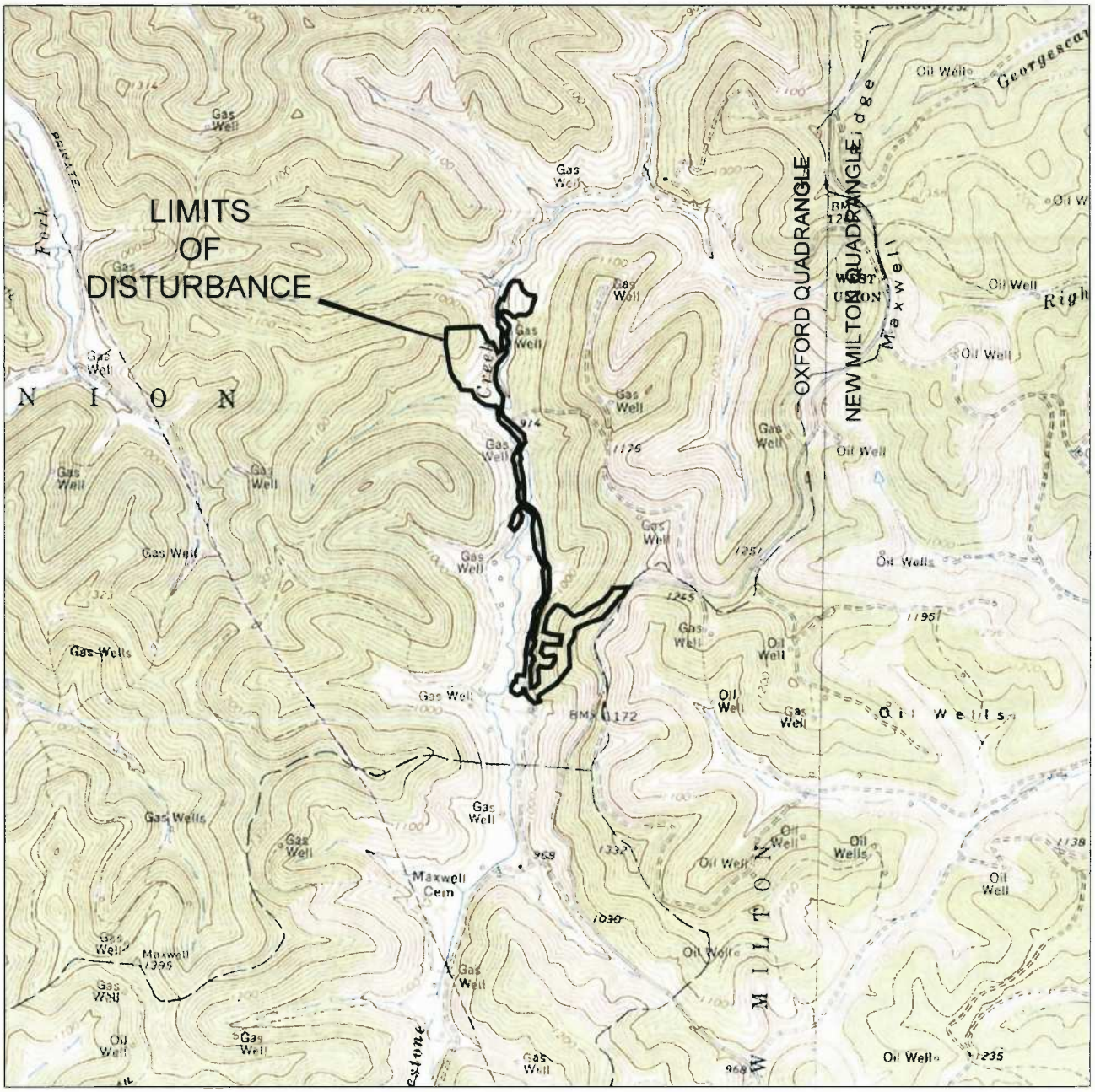
Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING
SURVEYORS PROJECT MGMT. SLS ENGINEERS ENVIRONMENTAL
226 West Main St. P.O. Box 150 Glenville, WV 26351 (304) 462-5634
98065 Dilles Bottom Road Shadyside, OH 43947 (740) 671-9911
HONESTY. INTEGRITY. QUALITY

SCALE
1 INCH = 2000-FEET

0' 2000' 4000' 6000'

FILE NO.	DATE	CADD FILE:
7889	12/26/13	7889MAPS.dwg

OXFORD 157 VICINITY MAP



NOTES
DODDRIDGE COUNTY, WV: OXFORD AND NEW MILTON TOPO QUADS

SCALE
1 INCH= 2000-FEET

0′ 2000′ 4000′ 6000′

SCALE: 1"= 2000'
DATE: 06-24-14
DRAWN BY: CMH
JOB #: 7889

OXFORD 157

THIS DOCUMENT WAS PREPARED BY:
SMITH LAND SURVEYING, INC.
FOR: EQT

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634
WWW.SLSSURVEYS.COM

EQT
Where energy meets innovation.

CAD FILE: R:\Data\CADD\WORK 7800-7899\7889\PERMITTING\OXF 157 MODIFIED SITE 6.24.14\OXFD 157 PERMITS 7889.dwg LAYOUT: 2000 USER: chittel

OXFORD 157 FEMA MAP

NOTES

DODDRIDGE COUNTY, WV: FEMA FIRM MAP 54017C0225C

SCALE
1 INCH= 2000-FEET

0′ 2000′ 4000′ 6000′

SCALE: 1"= 2000'
DATE: 06-24-14
DRAWN BY: CMH
JOB #: 7889

OXFORD 157

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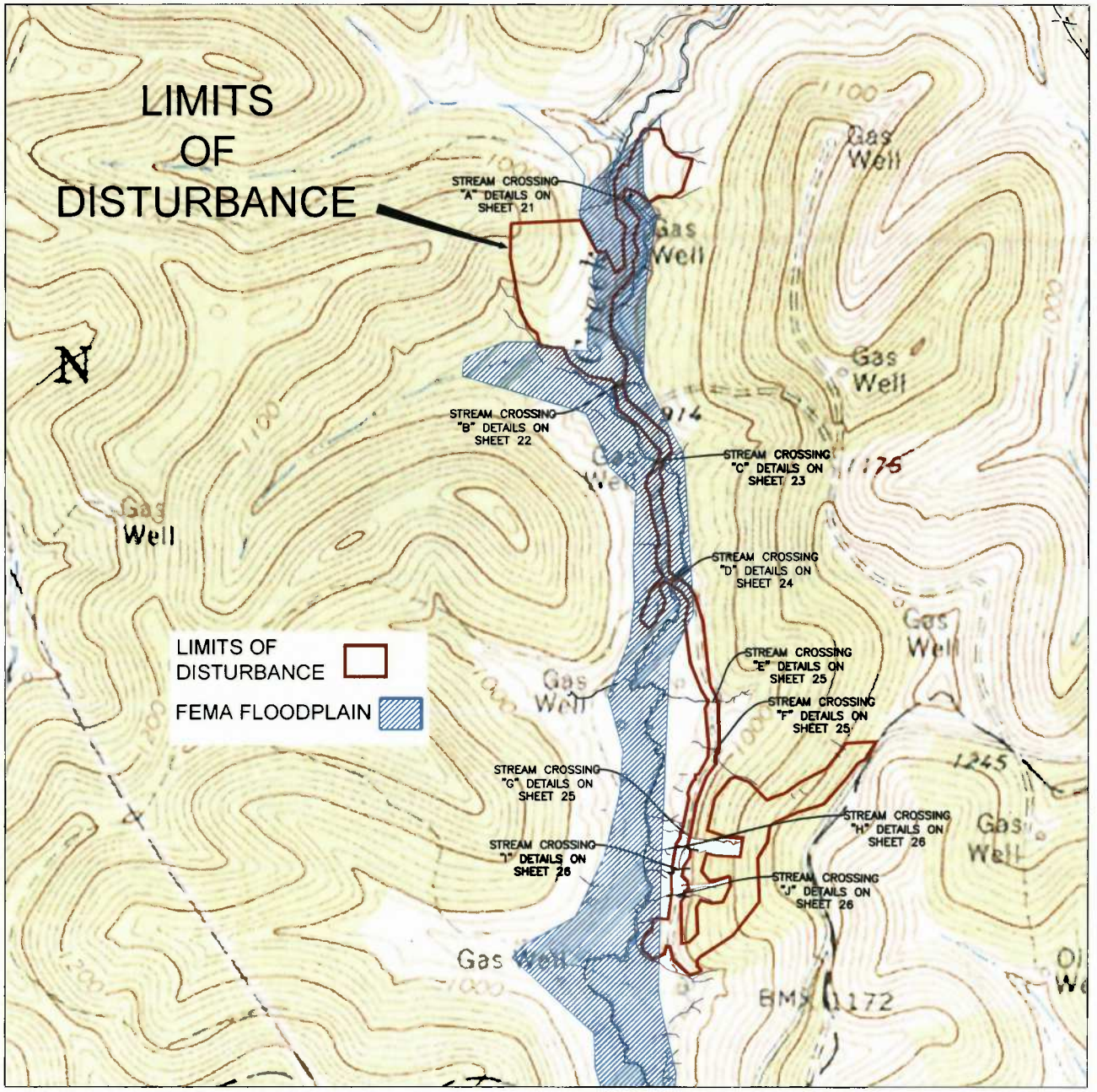
CAD FILE: R:\Data\CADD\WORK 7800-7899\7889\PERMITTING\OXF 157 MODIFIED SITE 6.24.14\OXFD 157 PERMITS 7889.dwg LAYOUT: FEMA USER: chittel

OXFORD 157 STREAM CROSSINGS AND FEMA MAP



NOTES

DODDRIDGE COUNTY, WV: OXFORD AND NEW MILTON TOPO QUADS

SCALE
1 INCH= 1000-FEET

0′ 1000′ 2000′ 3000′

SCALE: 1"= 1000′

DATE: 06-24-14

DRAWN BY: CMH

JOB #: 7889

OXFORD 157

THIS DOCUMENT WAS PREPARED BY:
SMITH LAND SURVEYING, INC.
FOR: EQT

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS ENGINEERS ENVIRONMENTAL PROJECT MGMT.
(304) 462-5634
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EQT
Where energy meets innovation.

CAD FILE: R:\Data\CADD\WORK 7800-7899\7889\PERMITTING\OXF 157 MODIFIED SITE 6.24.14\OXFD 157 STREAM CROSSING MAP.dwg LAYOUT: ST CROSS AND FEMA US

PROFESSIONAL ENERGY CONSULTANTS
A DIVISION OF SMITH LAND SURVEYING, INC.

July 10, 2014

Mr. Bo Wriston
Floodplain Manager
Doddridge County Commission
118 East Court Street
West Union, WV 26456

Re: EQT Production Company- OXF 157 Proposed Well Pad, Associated Pit, and Access Road Modification

Mr. Wriston,

On behalf of EQT, Smith Land Surveying, Inc. is applying for a modification to an existing Doddridge County Floodplain Permit (No. 13-113). EQT has proposed a well pad, associated pit, and an access road to aid in the development of multiple Marcellus Shale gas wells. The site is located in Doddridge County west of Maxwell Ridge along Bluestone Creek off County Route 13. The entrance to the site is approximately ¾ mile southwest of the County Route 13 and County Route 13/3 Intersection. The total disturbance area of the site is approximately 36.97 acres.

Portions of the site are located within Flood Zone A as indicated on FEMA Panel 54017C0225C. Please see the attached maps where the limit of disturbance has been overlaid onto a FEMA Firmette. The four stream crossings that are in the Flood Zone originally were permitted to be constructed with culverts as permanent stream crossings. The revised plans show the four stream crossings utilizing a permanent concrete low water ford crossing (please see attached "OXF 157 Stream Crossings in Flood Zone" for a detailed description of each of the four streams). These low water ford crossings will not include any culverts and they will be solid concrete with rebar reinforcement level with the existing stream bed. There will be no change in the base flood elevation caused by any of these crossings.

All of the required regulatory permits have been applied for; the USACE application is currently under review and its approval is anticipated shortly.

Included in the attachments are the following: signed and sealed cover letter and signed and sealed floodplain analysis of Bluestone Creek, signed application, Stream Crossing Reports for streams A-J, FEMA map with the site location, an overview map with stream crossings locations (Streams A-D in

P.O. Box 150, 12 Vanhorn Drive, Glenville, WV 26351
T: (304)-462-5634 F: (304)-462-5656
56065 Dilles Bottom Road, Shadyside, OH 43947
T: (740)-671-9911

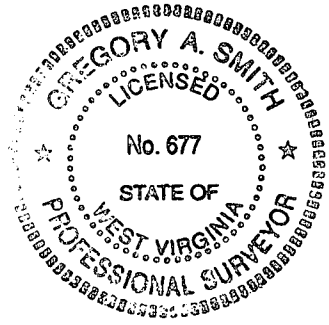
Flood Zone), vicinity map, "Stream Crossings in Flood Zone" writeup, revised site plans dated 6/03/2014, original site plans dated 11/04/2013, a copy of the original permit issued for this site (Permit No. 13-113), and the drilling permit authorization.

On behalf of EQT, SLS is requesting your review of the modified application and attached information to begin construction on the OXF 157 Project once all the required regulatory permits are received. Please feel to contact Leslie Pierce with SLS at 304-462-5634 or lpierce@slssurveys.com, or Megan Landfried with EQT at 304-841-2086 or MLandfried@eqt.com should you have any questions or comments.

Respectfully submitted,

Gregory A. Smith

Gregory A. Smith, P.S./ President



cc: Megan Landfried/EQT Production Company, LLC.

SLS SMITH LAND SURVEYING, INC.
P.O. BOX 150, GLENVILLE, WV 26351
(304) 462-5634 • FAX (304) 462-5656

LETTER OF TRANSMITTAL

DATE	JOB NO.
7/11/14	7889
ATTENTION: Bo Wriston	
RE: EQT Production Company's OXF 157	

TO: Doddridge County Floodplain Manager
118 East Court Street
West Union, WV 26456

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Cover Letter regarding EQT's OXF 157 Proposed Well Pad
1			Application for Floodplain Determination
1			Maps
1			Other attachments listed on cover letter

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☒ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 20_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

FILED
2014 JUL 15 PM 2:45
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

COPY TO SLS Files; EQT Production Company

SIGNED: Deanna McVicker

If enclosures are not as noted, kindly notify us at once.

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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

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

APPLICANT'S SIGNATURE Megan E Sanders

DATE 7/10/14

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

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

APPLICANT'S NAME: EQT Production Company
ADDRESS: 115 Professional Place P.O. Box 280 Bridgeport WV 26330
TELEPHONE NUMBER: 304-848-0076

BUILDER'S NAME: EQT Production Company

ADDRESS: 115 Professional Place P.O. Box 280 Bridgeport, WV 26330

TELEPHONE NUMBER: 304-848-0076

ENGINEER'S NAME: Cyrus S. Kump/ Navitus Engineering Inc.

ADDRESS: 151 Windy Hill Lane Winchester VA 22602

TELEHONE NUMBER: 888-662-4185

PROJECT LOCATION:

The OXF 157 Site (Modification) is located west of Maxwell Ridge along Bluestone Creek off of County Route 13. The Entrance to the site is approximately ¾ mile southwest of the County Route 13 and County Route 13/3 intersection. The coordinates of the site are:

OXF 157:

Site entrance: Latitude 39.227701 Longitude -80.758964 (NAD 83)

Well Pad entrance: Latitude 39.234468 Longitude -80.764983 (NAD 83)

Well Pad: Latitude 39.236047 Longitude -80.766261 (NAD 83)

Associated Pit: Latitude 39.238452 Longitude -80.764291 (NAD 83)

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Justin L. Henderson

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

P.O. Box 100 Meadowbrook, WV 26404

DISTRICT: West Union District (Property is taxed in Southwest District, but the wells/site are in West Union)

DATE/FROM WHOM PROPERTY PURCHASED:

LAND BOOK DESCRIPTION: Bluestone 1602.90 AC

DEED BOOK REFERENCE: Book- WB29 page- 224

TAX MAP REFERENCE: Map 6-1 (Taxed in Southwest)

EXISTING BUILDINGS/USES OF PROPERTY:

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY N/A

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

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

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

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

B. OTHER DEVEOPLMENT ACTIVITIES:

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

C. STANDARD SITE PLAN OR SKETCH

1. **SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED.**
2. **IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED:**
   SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION OF THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE

INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY.

3. **SIGN AND DATE THE SKETCH.**

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ $1,674,600

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

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

NAME: James Donley
ADDRESS: Rt 1 Box 33
West Union, WV 26456

NAME: Sue Ann Spiker
ADDRESS: 166 Linden Lane
Jane Lew, WV 26378

NAME: IL Morris
ADDRESS: P.O. Box 397
Glenville, WV 26351

NAME: Mary Holland Estates
ADDRESS: 225 Watchung Frk
Westfield, NJ 7090

NAME: Mary Farr Secrist
ADDRESS: Rt 1 Box 56 A
West Union, WV 26456

NAME: Charles P. Heaster, Et AL.
ADDRESS: Rt 1 Box 57
West Union, WV 26456

NAME: Arden and Anne Ashcraft
ADDRESS: 102 Maxwell Ridge Road
West Union, WV 26456

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

NAME: Mary Farr Secrist
ADDRESS: Rt 1 Box 56 A
West Union, WV 26456

NAME: Charles P. Heaster, Et AL.
ADDRESS: Rt 1 Box 57
West Union, WV 26456

NAME: Arden and Anne Ashcraft
ADDRESS: 102 Maxwell Ridge Road
West Union, WV 26456

NAME: James Donley
ADDRESS: Rt 1 Box 33
West Union, WV 26456

E. CONFIRMATION FORM

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

(A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.
(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.
(C) PUBLICATION.
(D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.
(E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT): Megan E Landfried

SIGNATURE: Megan E Landfried **DATE:** 7/10/14

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel:_____
Dated:_____

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

[] Is located in Special Flood Hazard Area.
FIRM zone designation_____
100-Year flood elevation is:_____NGVD (MSL)

[] Unavailable

[] The proposed development is located in a floodway.
FBFM Panel No._____ Dated_____

[] See section 4 for additional instructions.

SIGNED_____ **DATE**_____

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

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

[] A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

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

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

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

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

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

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

[] Other:

_____

_____

_____

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

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

SIGNED_____DATE_____

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

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

CONDITIONS:_____
_____
_____
_____

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

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

COMPLETE 1 OR 2 BELOW:

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

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

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

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

INSPECTIONS:

DATE:_____ **BY:**_____

DEFICIENCIES ? **Y/N**

COMMENTS_____

_____

_____

_____

_____

_____

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

Certificate of Compliance issued: DATE:_____ BY:_____

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

PERMIT NUMBER:_____
PERMIT DATE:_____

PURPOSE –

CONSTRUCTION LOCATION:_____

OWNER'S ADDRESS:_____

_____

_____

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

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

SIGNED_____**DATE**_____

PROFESSIONAL ENERGY CONSULTANTS
A DIVISION OF SMITH LAND SURVEYING, INC.

October 13, 2014

Mr. Bo Wriston
Floodplain Manager
Doddridge County Commission
118 East Court Street
West Union, WV 26456

Re: EQT Production Company- Henderson Freshwater Impoundment Modification

Mr. Wriston,

On behalf of EQT, Smith Land Surveying, Inc. is applying for a modification to an existing Doddridge County Floodplain Permit (No. 13-113). EQT has proposed a Centralized Impoundment and an access road to aid in the development of multiple Marcellus Shale gas wells. The site is located in Doddridge County west of Maxwell Ridge along Bluestone Creek off County Route 13. The entrance to the site is approximately 1 mile southwest of the County Route 13 and County Route 13/3 Intersection. The disturbance for the Henderson Impoundment Area is approximately 7.82 acres. The total site disturbance including access roads and stockpiles is approximately 22.66 acres.

Portions of the site are located within Flood Zone A as indicated on FEMA Panel 54017C0225C. Please see the attached maps where the limit of disturbance has been overlaid onto a FEMA Firmette. The proposed stream crossing is in the Flood Zone and was permitted to be constructed with a permanent concrete low water crossing. The original plans also included a temporary 40' long portable steel bridge with timber abutments to be constructed prior to the permanent low water crossing. The site plan has been revised to eliminate the permanent low water crossing and the 40' steel bridge is now proposed to be the permanent stream crossing. The new permanent bridge will have a minimum elevation of 930.10' providing adequate capacity to pass a 10-year storm event. The proposed improvements will also result in less than a 1-foot increase in the 100-year water surface elevation at any cross section upstream or downstream of the crossing.

All of the required regulatory permits have been applied for; the USACE application is currently under review and its approval is anticipated shortly.

P.O. Box 150, 12 Vanhorn Drive, Glenville, WV 26351
T: (304)-462-5634 F: (304)-462-5656

56065 Dilles Bottom Road, Shadyside, OH 43947
T: (740)-671-9911

Included in the attachments are the following: signed and sealed cover letter and signed and sealed floodplain analysis of Bluestone Creek, signed application, Stream Crossing "B", Hydrologic and Hydraulic Report, FEMA map with the site location, revised signed and sealed site plans dated 9/25/14, and original site plans dated 12/23/2013.

On behalf of EQT, SLS is requesting your review of the modified application and attached information to begin construction on the Henderson Centralized Impoundment Project once all the required regulatory permits are received. Please feel to contact Wes Wayne with SLS at 304-462-5634 or wwayne@slssurveys.com, or Megan Landfried with EQT at 304-841-2086 or MLandfried@eqt.com should you have any questions or comments.

Respectfully submitted,

Wes Wayne, Staff Engineer/Project Coordinator

cc: Megan Landfried/EQT Production Company, LLC.

HENDERSON FRESHWATER IMPOUNDMENT CROSSINGS IN FLOOD ZONE

Stream Crossing B (Sheet 15 of Site Plans Revised 09/25/2014)

- **Temporary Crossing:**
  - The original design (Sheet 15 of Original Site Plans dated 12/23/2013) for "Stream Crossing B" Temporary Crossing showed clean rock fill 6" of 2"-4" coarse angular rock and a 40' temporary steel bridge.
  - The revised site plans now show no temporary water crossings.
- **Permanent Crossing:**
  - The original design had a proposed permanent crossing with (4) 18" CMP culverts.
  - The first revised design shows the permanent crossing where the temporary bridge will be removed and a concrete low water ford crossing will be constructed. This low water ford will be comprised of 12" thick 4,000 PSI concrete reinforced with #4 rebar 12" each way and will have 12"-18" of rip rap. During construction, a sandbag cofferdam will be placed on the inlet and outlet sides of the stream crossing. The water will then be pumped around while the low water crossing is being constructed.
  - The second revised design shows the 40' bridge previously designated as temporary to now be a permanent.

P.O. Box 150, 12 Vanhorn Drive, Glenville, WV 26351
T: (304)-462-5634 F: (304)-462-5656

56065 Dilles Bottom Road, Shadyside, OH 43947
T: (740)-671-9911

PROFESSIONAL ENERGY CONSULTANTS

A DIVISION OF SMITH LAND SURVEYING, INC.

FILED
2014 JAN -8 PM 12:20
BETH A ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

January 2, 2014

Mr. Dan Wellings
Doddridge County Floodplain Coordinator
118 East Court Street
West Union, WV 26456

Re: Proposed EQT Production Company- OXF 157 Proposed Well Pad and Associated Pit, Henderson Centralized Freshwater Impoundment, and OXF 159 Proposed Well Pad and Associated Pit

Mr. Wellings;

On behalf of EQT Production Company, LLC., we are applying for a Doddridge County Floodplain permit.

Portions of the site are located within Flood Zone A as indicated on FEMA Panel 54017C0225C. Please see the attached maps where the limit of disturbance has been overlaid onto a flood map from the WV Flood Tool website and also a FEMA FIRM Flood Map.

Included in the attachments are the following: signed and sealed cover letter and signed and sealed floodplain analysis of Bluestone Creek, Major Stream Crossing details for streams B, C, D on the OXF 157 site, Minor Stream Crossing details for streams H, I, J on the OXF 157 site, FEMA map with the overall site location, WV Flood Hazard Tool map with the overall site location(the map says the site is not in a floodplain however, that just depends on where the cursor is when you make the map on the website and portions of this site are in a floodplain), an overview map with approximate locations of stream crossings located in the flood zone, a detailed write-up of the stream crossings, and a set of plans for each of the three sites.

The detail of all of the stream crossings that has been attached corresponds with their respective plans. For example, the first crossing on the list is called "A(157)". This means this particular crossing is located in the OXF 157 plans and is labeled Stream Crossing A; this is also the same for the Stream Crossing Details attachment.

Please feel free to contact Leslie Pierce with SLS at 304-462-5634 or lpierce@slssurveys.com, or Megan Landfried with EQT at 304-841-2086 or MLandfried@eqt.com should you have any questions or comments.

Respectfully submitted,

Gregory A. Smith

Gregory A. Smith, P.S.

GREGORY A. SMITH
LICENSED
No. 677
STATE OF
WEST VIRGINIA
PROFESSIONAL SURVEYOR

cc: Megan Landfried/EQT Production Company, LLC.

P.O. Box 150, 226 West Main Street, Glenville, WV 26351
T: (304)-462-5634 F: (304)-462-5656

56065 Dilles Bottom Road, Shadyside, OH 43947
T: (740)-671-9911

OXF 157, 159, & HENDERSON STREAM CROSSING DETAILS (In Flood Zone)

- A(157): This stream crossing can be found in the OXF 157 Site Plans. As found in the plans on sheet 20 labeled "Stream Crossing A Details", there are temporary and permanent stream crossing details. The **temporary** crossing involves a 40' long (13' wide) portable steel bridge with timber abutments by others. There are also a clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder. The **permanent** stream crossing involves the installation of 4- 18" CMP (35 LF) with 6" embedment and 8"concrete overlay, clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder, and 3,000 PSI concrete with 6"x 6", 6 gauge welded wire fabric within the concrete overlay. A pump with a sandbag cofferdam is going to be used to pump the water around the culverts until the concrete can harden and then the pump will be removed.

- B(157): This stream crossing can be found in the OXF 157 Site Plans. As found in the plans on sheet 21 labeled "Stream Crossing B Details", there are temporary and permanent stream crossing details. The **temporary** crossing involves a 40' long (13' wide) portable steel bridge with timber abutments by others. There are also a clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder. The **permanent** stream crossing involves the installation of 4- 18" CMP (40 LF) with 6" embedment and 8"concrete overlay, clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder, and 3,000 PSI concrete with 6"x 6", 6 gauge welded wire fabric within the concrete overlay. A pump with a sandbag cofferdam is going to be used to pump the water around the culverts until the concrete can harden and then the pump will be removed.

- C(157): This stream crossing can be found in the OXF 157 Site Plans. As found in the plans on sheet 22 labeled "Stream Crossing C Details", there are temporary and permanent stream crossing details. The **temporary** crossing involves a 40' long (13' wide) portable steel bridge with timber abutments by others. There are also a clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder. The **permanent** stream crossing involves the installation of 3- 18" CMP (28 LF) with 6" embedment and 8"concrete overlay, clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder, and 3,000 PSI concrete with 6"x 6", 6 gauge welded wire fabric within the concrete overlay. A pump with a sandbag cofferdam is going to be used to pump the water around the culverts until the concrete can harden and then the pump will be removed.

- D(157): This stream crossing can be found in the OXF 157 Site Plans. As found in the plans on sheet 23 labeled "Stream Crossing D Details", there are temporary and permanent stream crossing details. The **temporary** crossing involves a 40' long (13' wide) portable steel bridge with timber abutments by others. There are also a clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder. The **permanent** stream crossing involves the installation of 3- 18" CMP (32 LF) with 6" embedment and 8"concrete overlay, clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder, and 3,000 PSI concrete with 6"x 6", 6 gauge welded wire fabric within the concrete overlay. A pump with a sandbag cofferdam is going to be used to pump the water around the culverts until the concrete can harden and then the pump will be removed.

- A(159): This stream crossing can be found in the OXF 159 Site Plans. As found in the plans on sheet 19 labeled "Stream Crossing A Details", there are temporary and permanent stream crossing details. The **temporary** crossing involves a 40' long (13' wide) portable steel bridge with timber abutments by others. There are also a clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder. The **permanent** stream crossing involves the installation of 5- 18" CMP (37 LF) with 6" embedment and 8"concrete overlay, clean rock fill with 6" of 1"-3" coarse aggregate with large angular rock for the remainder, and 3,000 PSI concrete with 6"x 6", 6 gauge welded wire fabric within the concrete overlay. A pump with a sandbag cofferdam is going to be used to pump the water around the culverts until the concrete can harden and then the pump will be removed.

- M(159): This stream crossing can be found in the OXF 159 Site Plans. As found in the plans on sheet 23 labeled "Stream Crossing M Details" it is proposed that a 60" HDPE (46 LF) culvert with 8" embedment be installed and a clean rock fill 50' approach with 2"-4" coarse aggregate.

west virginia department of environmental protection

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

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

April 18, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706458, issued to EQT PRODUCTION COMPANY, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

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

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

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

James Martin
Chief

Operator's Well No: 513144
Farm Name: HENDERSON, JUSTIN L. ET AL
API Well Number: 47-1706458
Permit Type: Horizontal 6A Well
Date Issued: 04/18/2014

Promoting a healthy environment.

API Number 47 017 06458

PERMIT CONDITIONS

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

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.

2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.

8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

SLS

FILED

PROFESSIONAL ENERGY CONSULTANTS

A DIVISION OF SMITH LAND SURVEYING, INC.

October 09, 2014

2014 OCT 10 AM 11:11

[illegible] A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Mr. Bo Wriston
Floodplain Manager
Doddridge County Commission
118 East Court Street
West Union, WV 26456

Re: EQT Production Company- OXF 159 Proposed Well Pad, Associated Pit, and Access Road Modification

Mr. Wriston,

On behalf of EQT, Smith Land Surveying, Inc. is applying for a modification to an existing Doddridge County Floodplain Permit (No. 13-113). EQT has proposed to relocated a previously permitted (OXF 159) well pad, associated pit, and an access road to aid in the development of multiple Marcellus Shale gas wells. The site is located in Doddridge County west of Maxwell Ridge along Bluestone Creek off County Route 13. The entrance to the site is approximately 0.32 miles north of the County Route 13 and County Route 40/3 intersection. The total disturbance area of the site is approximately 25.8 acres. The site is located at Latitude 39.207869, Longitude -80.761896 (NAD 83)

This Revised Location is not located within a flood zone as indicated on the attached map where the limit of disturbance has been overlaid onto a FEMA Firmette (Map number 54017C0225C). The limit of disturbance outlined in white and yellow is the previously permitted OXF 159 location. The Modified location is shown in green. This site was originally included with the OXF 157 and Henderson Impoundment on the previously issued permit. Since then, a modification to the permit for the OXF 157 site has applied for. The limits of disturbance outlined in red on the map shows the original location of the sites as used for the initial application.

Included in the attachments are the following: cover letter, FEMA map with the site location, vicinity map, and revised site plans dated 5/1/2014.

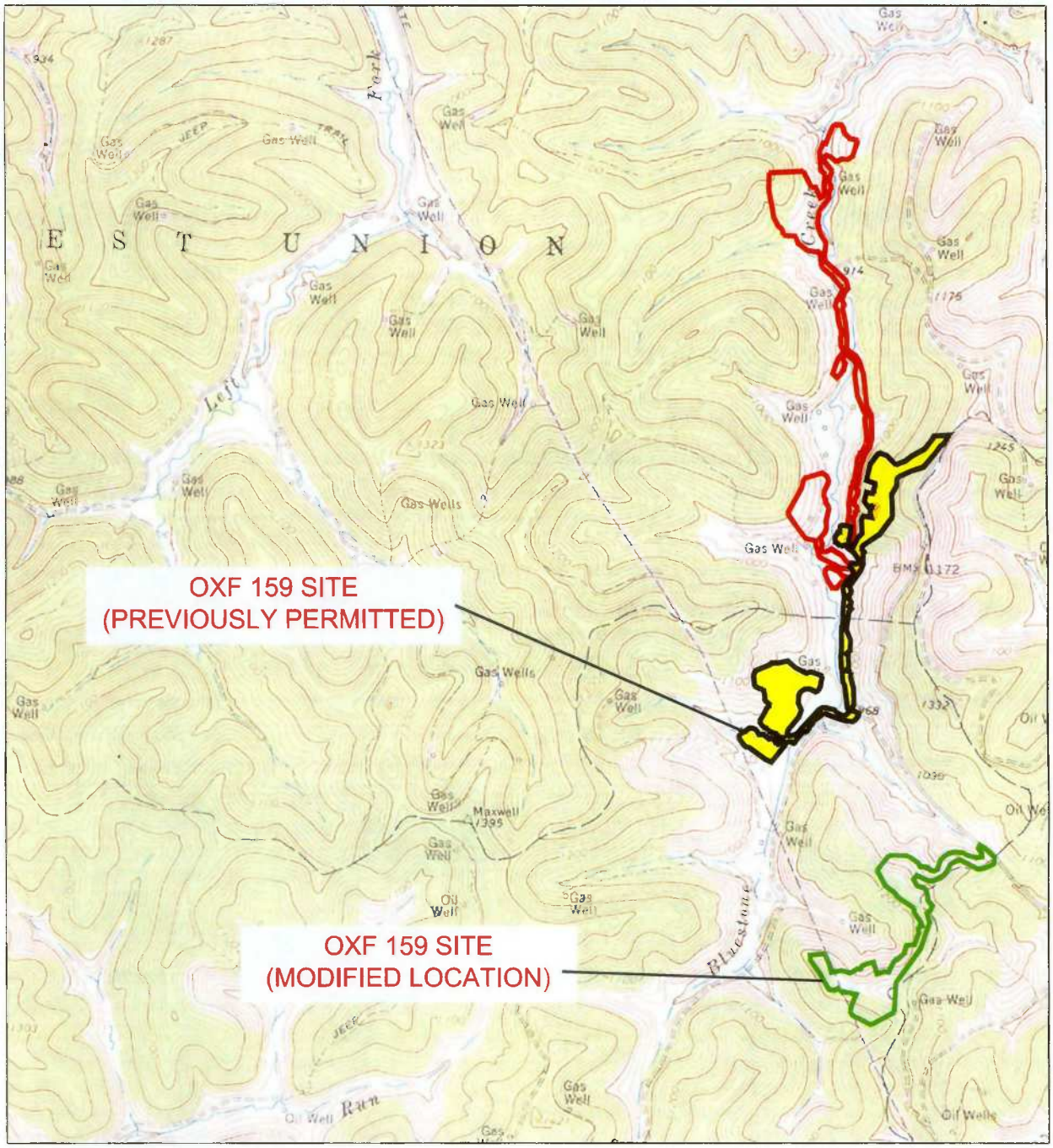
On behalf of EQT, SLS is requesting your review of the modified application and attached information to begin construction on the OXF 159 Project once all the required regulatory permits are received. Please feel to contact Wes Wayne (Design Coordinator) with SLS at 304-462-5634 or wwayne@slssurveys.com, or Megan Landfried with EQT at 304-841-2086 or MLandfried@eqt.com should you have any questions or comments.

Respectfully submitted,

Wes Wayne

cc: Megan Landfried/EQT Production Company, LLC.

OXF 159 VICINITY MAP



NOTES

USGS OXFORD TOPO QUADRANGLE

SCALE
1 INCH = 1000-FEET

0' 2000' 4000' 6000'

SCALE: 1" = 2000'

DATE: 10-8-14

DRAWN BY: CMH

JOB #: 7889

Revised OXF 159

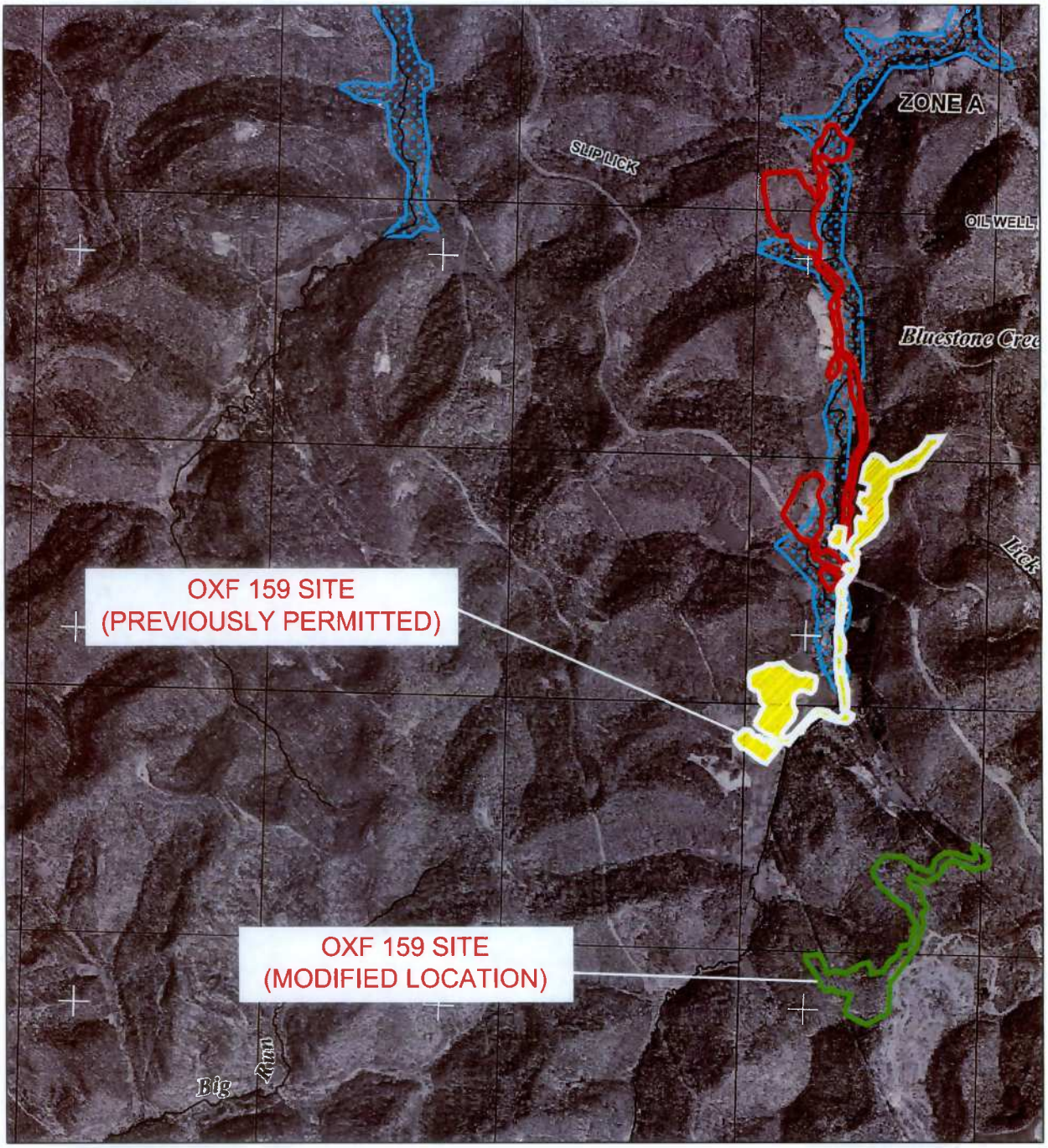
THIS DOCUMENT WAS PREPARED BY:
SMITH LAND SURVEYING, INC.
FOR: EQT

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634
WWW.SLSSURVEYS.COM

EQT
Where energy meets innovation.

CAD FILE: R:\Data\CADD\WORK 7800-7899\7889\PERMITTING\OXF 159 MODIFIED SITE 10.8.14\7889 MAPS.dwg LAYOUT: 2000 topo USER: chittel

OXF 159 FEMA MAP



NOTES
FEMA FIRM
MAP # 54017C0225C

SCALE
1 INCH = 1000-FEET
0' 2000' 4000' 6000'

SCALE: 1" = 2000'
DATE: 10-8-14
DRAWN BY: CMH
JOB #: 7889

OXF 159 FEMA

THIS DOCUMENT WAS PREPARED BY:
SMITH LAND SURVEYING, INC.
FOR: EQT

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634
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CAD FILE: R:\Data\CADD\WORK 7800-7899\7889\PERMITTING\OXF 159 MODIFIED SITE 10 8.14\7889 MAPS.dwg LAYOUT: FEMA USER: chittel

OXF 157 STREAM CROSSINGS IN FLOOD ZONE

Stream Crossing A (Sheet 21 of Site Plans Revised 6/03/2014)

- **Temporary Crossing:**
  - The original design (Sheet 20 of Original Site Plans dated 11/04/2013) for "Stream Crossing A" Temporary Crossing showed clean rock fill 6" of 2"-4" coarse aggregate with large angular rock and a 40' temporary steel bridge.
  - The revised site plans show a 40' temporary steel bridge with 12"-18" rip-rap side slopes.
- **Permanent Crossing:**
  - The original design had a proposed permanent crossing with (4) 18" CMP culverts.
  - The revised design does not show a permanent crossing because this portion of the access road leads to the pit area. After construction is completed this area is going to be reclaimed in the required amount of time. Because of this, this road will no longer be used and a permanent stream crossing is not necessary.

Stream Crossing B (Sheet 22 of Site Plans Revised 6/03/2014)

- **Temporary Crossing:**
  - The original design (Sheet 21 of Original Site Plans dated 11/04/2013) for "Stream Crossing B" Temporary Crossing showed clean rock fill 6" of 2"-4" coarse angular rock and a 40' temporary steel bridge.
  - The revised site plans show a 40' temporary steel bridge with 12"-18" rip-rap side slopes.
- **Permanent Crossing:**
  - The original design had a proposed permanent crossing with (4) 18" CMP culverts.
  - The revised design shows the permanent crossing where the temporary bridge will be removed and a concrete low water ford crossing will be constructed. This low water ford will be comprised of 12" thick 4,000 PSI concrete reinforced with #4 rebar 12" each way and will have 12"-18" of rip rap. During construction, a sandbag cofferdam will be

placed on the inlet and outlet sides of the stream crossing. The water will then be pumped around while the low water crossing is being constructed.

Stream Crossing C (Sheet 23 of Site Plans Revised 6/03/2014)

- **Temporary Crossing:**
  - The original design (Sheet 23 of Original Site Plans dated 11/04/2013) for "Stream Crossing C" Temporary Crossing showed clean rock fill 6" of 2"-4" coarse aggregate with large angular rock and a 40' temporary steel bridge.
  - The revised site plans show a 40' temporary steel bridge with 12"-18" rip-rap side slopes.
- **Permanent Crossing:**
  - The original design had a proposed permanent crossing with (3) 18" CMP culverts.
  - The revised design shows the permanent crossing where the temporary bridge will be removed and a concrete low water ford crossing will be constructed. This low water ford will be comprised of 12" thick 4,000 PSI concrete reinforced with #4 rebar 12" each way and will have 12"-18" of rip rap. During construction, a sandbag cofferdam will be placed on the inlet and outlet sides of the stream crossing. The water will then be pumped around while the low water crossing is being constructed.

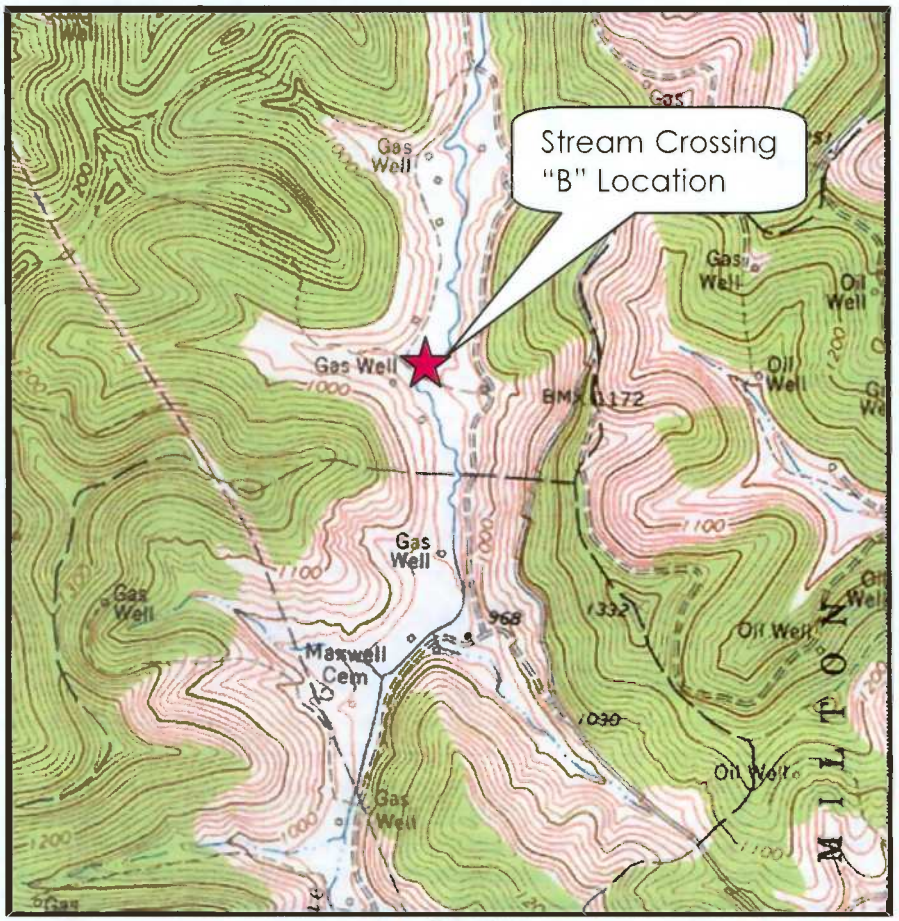
Stream Crossing D (Sheet 24 of Site Plans Revised 6/03/2014)

- **Permanent Crossing:**
  - The original design (Sheet 24 of Original Site Plans dated 11/04/2013) had a proposed permanent crossing with (3) 18" CMP culverts.
  - The revised design shows the permanent crossing where the temporary bridge will be removed and a concrete low water ford crossing will be constructed. This low water ford will be comprised of 12" thick 4,000 PSI concrete reinforced with #4 rebar 12" each way and will have 12"-18" of rip rap. During construction, a sandbag cofferdam will be placed on the inlet and outlet sides of the stream crossing. The water will then be pumped around while the low water crossing is being constructed.

Henderson Centralized Freshwater Impoundment

Stream Crossing "B" – Bluestone Creek

Hydrologic and Hydraulic Report



Location Map
1" = 2,000
(West Union, WV USGS Quad; West Union District, Doddridge County)

Prepared For/Operator:

EQT Production Company
Operator # 306686
115 Professional Place
Bridgeport, WV 26330
(304) 348-3870

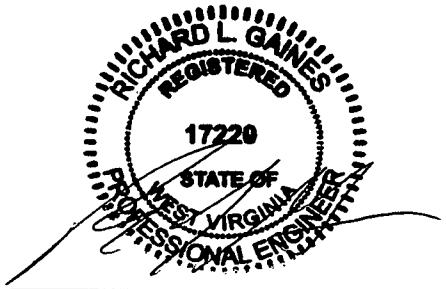
Prepared By:

Stantec
111 Elkins Street
Fairmont, WV 26554

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634
WWW.SLSSURVEYS.COM

Prepared: August 2014

CERTIFICATION OF THE ENGINEER



Signature

8/28/2014
Date

Printed Name: Richard L. Gaines, PE
Company: Stantec Consulting, Inc.
Address: 111 Elkins Street
Fairmont, WV 26554
Phone: (304) 367-9401

TABLE OF CONTENTS

OVERVIEW

This project involves the construction of a gravel road to provide access to a natural gas centralized impoundment site. The gravel road crosses Bluestone Creek which has been classified as a perennial stream as per the wetland and stream delineation report completed by Potesta & Associates, Inc. dated May 29, 2013. In order to maintain base flow in the creek and also pass the 10-year storm event, a bridge is proposed.

DRAINAGE NARRATIVE

The hydrologic information for the site was determined by Navitus Energy Engineering and outlined in "Floodplain Analysis of Bluestone Creek, OXF 157 Well Pad, Henderson Centralized Freshwater Impoundment" dated June 2014 and "Stream Crossing "B" Stormwater Computations, Henderson Centralized Freshwater Impoundment" dated December, 2013. Peak flow analysis for the 1-, 10- and 100- year storms were performed using the US Army Corp of Engineers Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS). Additionally, stream base-flow discharge was determined using estimated flow depth measurements witnessed by Navitus staff during a site visit. In an effort to maintain consistency of design of the structures within the Bluestone Creek within the area, the hydrologic information prepared for the Floodplain Analysis of Bluestone Creek was utilized for design of Stream Crossing "B" discussed in this report. Stantec assumes no responsibility for the computations and data contained within the "Floodplain Analysis of Bluestone Creek, OXF 157 Well Pad, Henderson Centralized Freshwater Impoundment" dated June 2014.

Navitus determined the drainage area to be 1066.88 acres or 1.667 square miles at the crossing site and consists mostly of forested area. The crossing is located within a FEMA Floodplain Zone A. Refer to the Floodplain Analysis Report by Navitus for additional information.

Navitus performed a floodplain analysis utilizing the US Army Corp of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS). Bluestone Creek is approximately 25 feet wide at the proposed site and up and downstream of the site. The overbank slopes (looking downstream) are sloped approximately 2:1 to 3:1. The main stream channel can be described as a stony bottom with some weeds. A Mannings 'n' value of 0.035 was used for the main stream channel. The overbank areas are described as vegetated with trees and underbrush. A Mannings 'n' value ranging from 0.035 to 0.06 was used for the overbank areas.

Both the existing conditions and proposed conditions were modeled for the stream crossing location. Supporting background information for the proposed HEC-RAS model can be found in Appendix A.

Existing Conditions Model

Navitus modeled Bluestone Creek utilizing existing conditions to establish a baseline in which to compare the proposed scenario with a temporary stream crossing and a permanent stream crossing installed at separate times. The model assumes the temporary crossing will be removed before the permanent crossing is installed. Refer to the Floodplain Analysis by Navitus for additional information. Since the model contained a large section of Bluestone Creek, fifteen cross sections in the area upstream and downstream of Crossing B were compared for the analysis. The following is a list of the key information necessary for the HEC-RAS analysis:

- River name = Bluestone Creek
- Reach name = Middle (Crossing B is located near the upstream end of this reach and therefore the Upper reach was also utilized for the analysis)
- Plan names = Existing Revised and Proposed Temp Bridge Revised
- Profiles = the existing plan contains only the 100-year profile and is labeled PF1. The proposed plan contains the 1-yr, 10-yr and 100-yr profiles and they are labeled as such.

Proposed Conditions Model with Permanent Bridge

The proposed model consists of constructing a 40' long and 13' wide bridge with a bottom of beam elevation of 928.00. This assumes that the bridge deck will have a minimum elevation of 930.10. This structure provides adequate capacity to pass the computed 10-year storm event. In comparing the proposed model to the existing model (see Table 1 below), the proposed improvements result in less than a 1-foot increase in the 100-yr water surface elevation at any cross section upstream or downstream of the crossing. See Appendix A for the proposed conditions permanent structure HEC-RAS model.

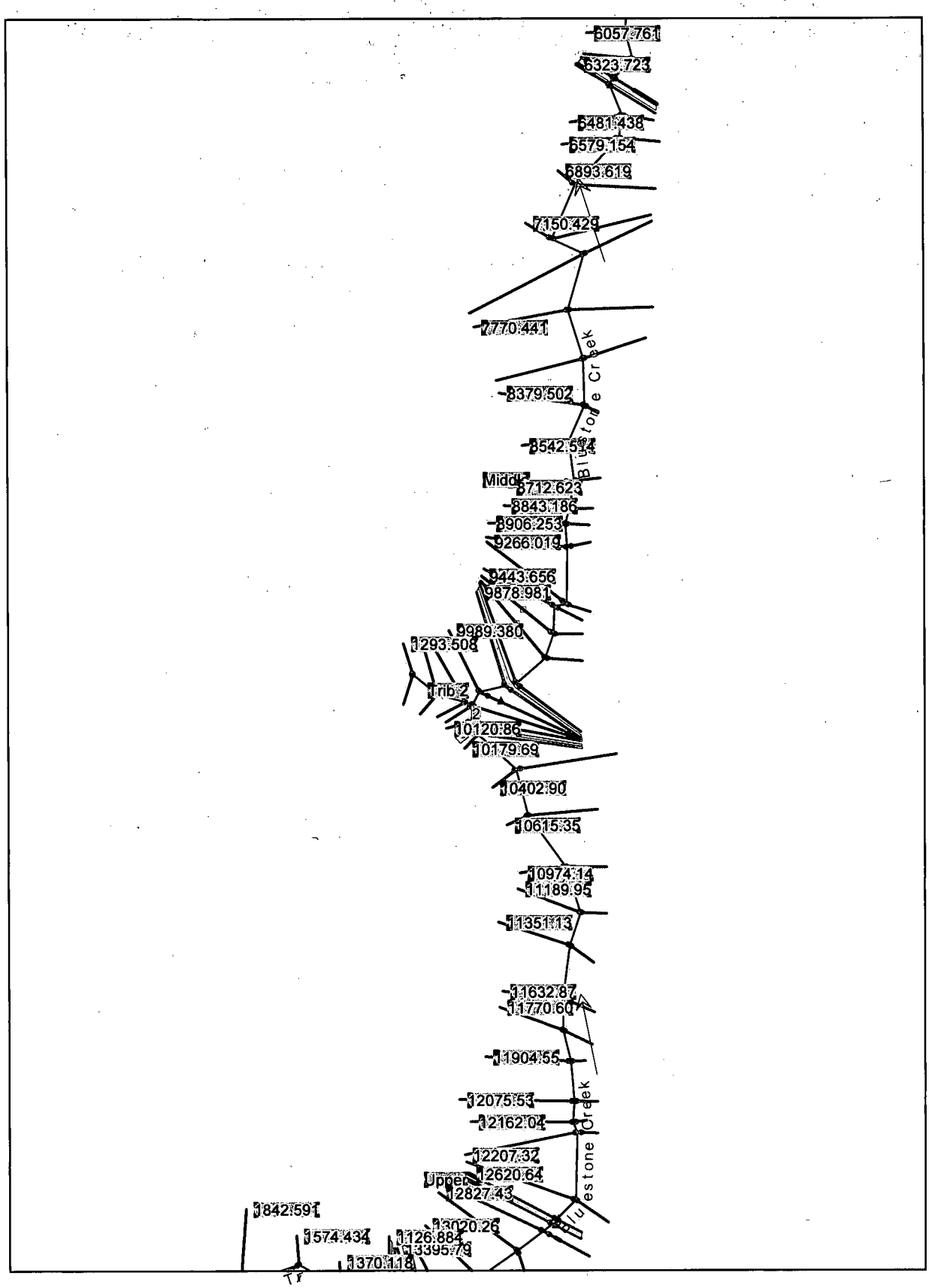
TABLE 1

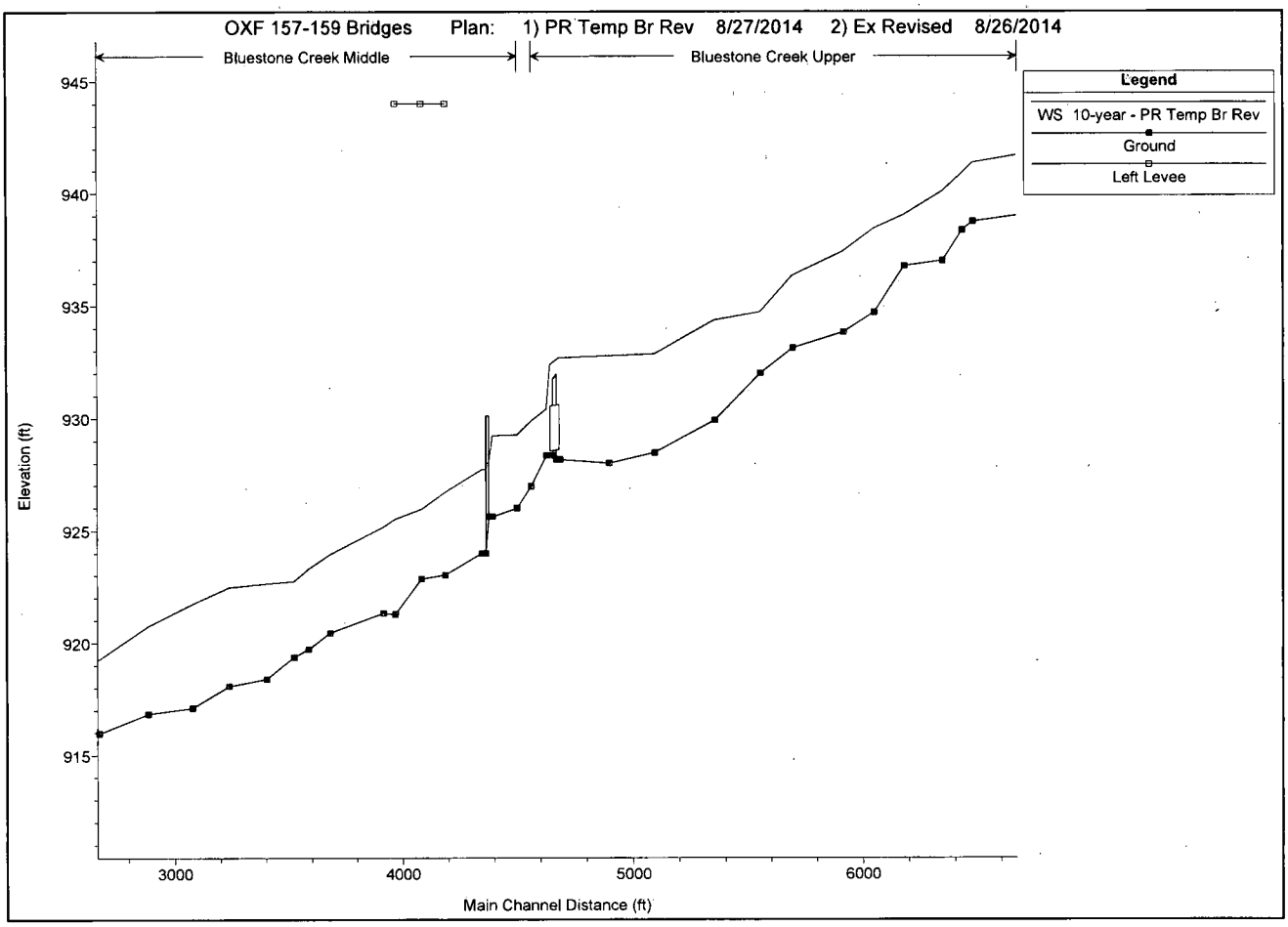
HEC-RAS CROSS SECTION	EXISTING 100-YR WSEL	PROPOSED 100-YR WSEL	INCREASE IN 100-YR WSEL
11189.95	935.89	935.89	0.00
10974.14	935.73	935.73	0.00
10615.35	933.87	933.87	0.00
10402.90	933.31	933.32	0.01
10179.69	933.17	933.18	0.01
10120.86	931.29	931.33	0.04
10055.03	930.91	931.19	0.28
9989.380	930.35	931.22	0.87
9878.981		931.21	
9831.906		928.51	
9559.249	927.72	927.72	0.00
9443.656	926.94	926.88	-0.06
9322.807	926.85	926.85	0.00
9266.019	925.74	925.74	0.00
9003.470	924.51	924.51	0.00

CONCLUSIONS

By installing a 40' long by 13' wide bridge, the access road will not only be able to traverse Bluestone Creek, it will pass the 10-year design storm and keep any increases to the 100-year storm to less than 1-foot.

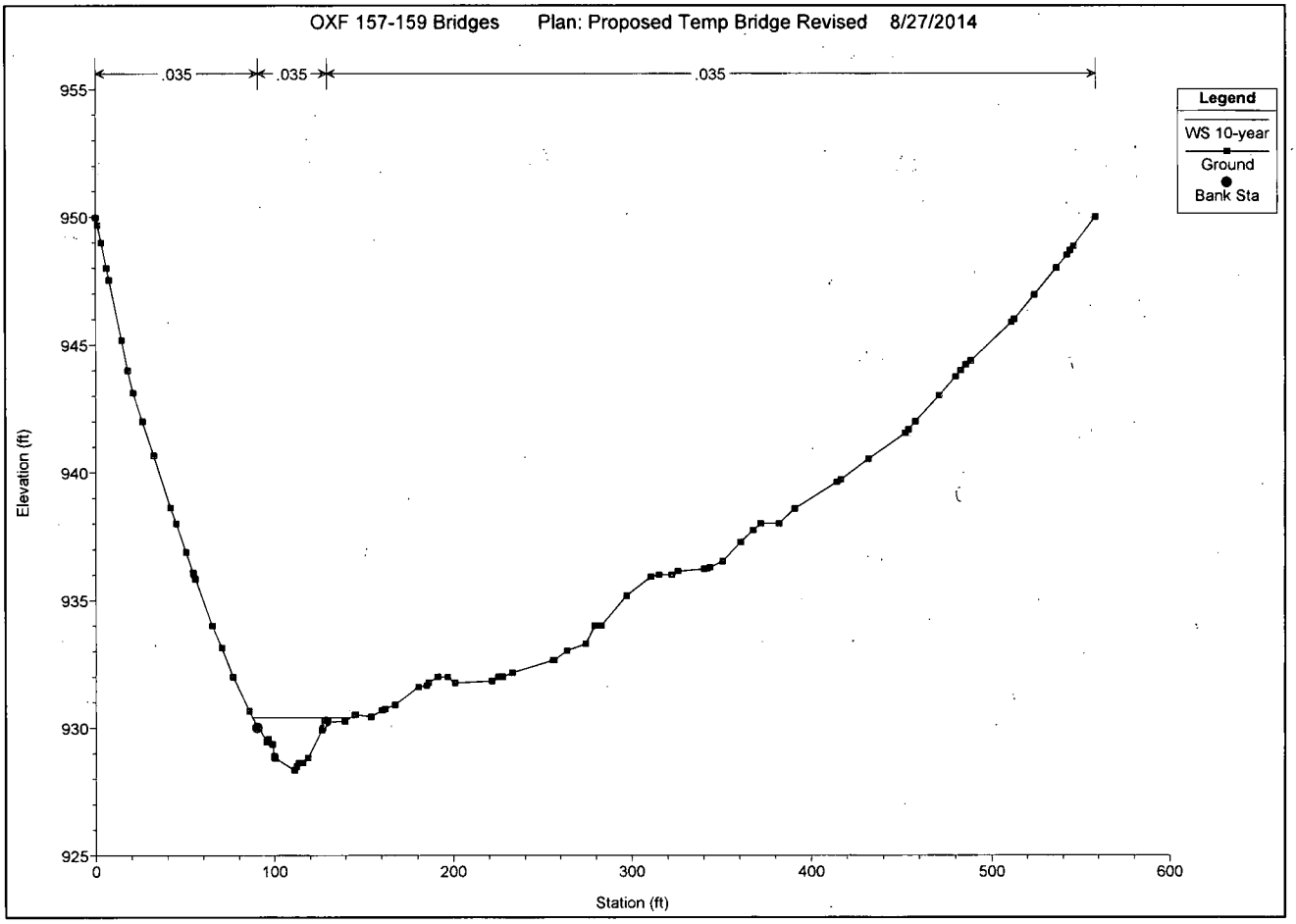
Appendix A


6057.761
6323.723
6481.438
6579.154
6893.619
7150.429
7770.441
Bluestone Creek
8379.502
8542.514
Middle
8712.623
8843.186
8906.253
9266.019
9443.656
9878.981
9989.380
10293.508
Trib 2
10120.86
10179.69
10402.90
10615.35
10974.14
11189.95
11351.13
11632.87
11770.60
11904.55
Bluestone Creek
12075.53
12162.04
12207.32
Upper
12620.64
12827.43
13020.26
13126.884
13395.79
13842.591
14574.434
15370.118


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
Bluestone Creek Middle
Bluestone Creek Upper
Legend
WS 10-year - PR Temp Br Rev
Ground
Left Levee
945
940
935
930
925
920
915
Elevation (ft)
3000
4000
5000
6000
Main Channel Distance (ft)

HEC-RAS Plan: PR Temp Br Rev Profile: 10-year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	13395.79	10-year	208.90	946.00	950.73	948.93	950.75	0.000350	1.64	187.15	111.27	0.16
Upper	13372.57		Culvert									
Upper	13353.48	10-year	208.90	946.00	949.72		949.81	0.000834	2.42	94.24	45.12	0.25
Upper	13212.39	10-year	208.90	945.36	948.99	948.99	949.57	0.009616	6.71	40.07	36.71	0.78
Upper	13020.26	10-year	208.90	943.98	947.69		948.10	0.004748	5.50	49.29	37.37	0.54
Upper	12827.43	10-year	208.90	942.44	945.90	945.90	946.67	0.013321	7.11	31.03	25.46	0.90
Upper	12694.78	10-year	208.90	940.76	944.09	943.39	944.41	0.006011	4.56	45.84	26.59	0.61
Upper	12504.92	10-year	208.90	939.14	941.85	941.73	942.66	0.015093	7.25	28.82	15.20	0.93
Upper	12207.32	10-year	208.90	938.75	941.36		941.45	0.001936	2.84	106.69	133.01	0.35
Upper	12162.04	10-year	208.90	938.37	940.89	940.89	941.16	0.008124	5.05	64.82	111.67	0.70
Upper	12075.53	10-year	208.90	937.01	940.09	939.52	940.46	0.006119	5.14	54.97	118.30	0.62
Upper	11904.55	10-year	259.40	936.77	939.04	939.02	939.31	0.006654	5.05	84.96	151.20	0.63
Upper	11770.60	10-year	259.40	934.71	938.43		938.56	0.002900	3.90	130.41	216.31	0.42
Upper	11632.87	10-year	259.40	933.83	937.43	936.75	938.01	0.007214	6.14	42.46	21.92	0.67
Upper	11351.13	10-year	259.40	933.12	936.35	936.35	936.64	0.004475	5.04	114.69	210.11	0.54
Upper	11189.95	10-year	259.40	932.00	934.71		934.99	0.009401	5.99	108.47	176.19	0.74
Upper	10974.14	10-year	259.40	929.91	934.36		934.49	0.001498	3.35	151.72	158.56	0.31
Upper	10615.35	10-year	259.40	928.47	932.86	932.79	933.64	0.010165	7.52	40.71	28.12	0.79
Upper	10402.90	10-year	259.40	928.00	932.76		932.89	0.001311	3.11	104.65	59.83	0.30
Upper	10179.69	10-year	259.40	928.17	932.68	931.30	932.72	0.000455	2.02	210.07	162.65	0.19
Upper	10155.71		Culvert									
Upper	10120.86	10-year	259.40	928.34	930.41	930.22	930.80	0.010275	5.09	52.80	55.25	0.79
Upper	10055.03	10-year	259.40	926.98	929.88		930.32	0.006035	5.55	54.57	44.23	0.64
Middle	9989.380	10-year	326.80	926.00	929.26		929.77	0.011983	5.74	56.95	39.40	0.84
Middle	9878.981	10-year	326.80	925.63	929.22	927.59	929.35	0.001199	2.97	118.84	270.84	0.30
Middle	9855.351		Bridge									
Middle	9831.906	10-year	326.80	924.00	927.72		928.11	0.005722	5.23	79.63	67.57	0.62
Middle	9559.249	10-year	326.80	923.03	926.72	926.16	927.18	0.005159	5.96	80.28	78.22	0.60
Middle	9443.656	10-year	326.80	922.86	925.94	925.94	926.52	0.008342	6.35	62.23	73.41	0.74
Middle	9322.807	10-year	326.80	921.28	925.51	923.81	925.64	0.001207	3.16	175.35	113.31	0.30
Middle	9266.019	10-year	326.80	921.33	925.16		925.51	0.004792	4.75	75.75	58.89	0.56
Middle	9003.470	10-year	326.80	920.45	923.95		924.29	0.007485	5.45	88.89	133.52	0.70
Middle	8906.253	10-year	326.80	919.73	923.30		923.67	0.007325	6.27	99.98	126.10	0.65
Middle	8843.186	10-year	326.80	919.37	922.75	922.75	923.13	0.006989	6.25	94.30	108.39	0.65
Middle	8712.623	10-year	326.80	918.40	922.64		922.74	0.000995	2.66	137.40	83.14	0.27
Middle	8542.514	10-year	326.80	918.08	922.49		922.56	0.001041	2.89	189.95	146.82	0.27
Middle	8379.502	10-year	326.80	917.10	921.73		922.16	0.004904	5.71	84.82	121.98	0.57
Middle	8109.907	10-year	326.80	916.84	920.75	920.75	921.04	0.005569	5.53	108.16	176.68	0.57
Middle	7770.441	10-year	326.80	915.97	919.26	919.26	919.58	0.007388	5.79	92.60	135.38	0.65
Middle	7438.793	10-year	326.80	915.16	918.63		918.69	0.001430	2.81	181.06	168.07	0.30
Middle	7150.429	10-year	326.80	914.24	917.10	917.03	917.85	0.010428	7.17	56.22	43.63	0.82
Middle	6893.619	10-year	326.80	913.16	916.14		916.37	0.003783	4.38	115.67	168.83	0.50
Middle	6579.154	10-year	326.80	910.57	913.48	913.48	914.55	0.015755	8.29	39.60	21.59	0.99
Middle	6481.438	10-year	371.50	909.95	913.28		913.53	0.004714	5.15	114.79	127.52	0.55
Middle	6323.723	10-year	371.50	908.41	912.66	911.36	912.94	0.003187	5.53	123.00	161.86	0.51
Middle	6303.783		Bridge									
Middle	6289.579	10-year	371.50	908.07	911.13	911.13	911.71	0.011582	7.18	66.49	79.80	0.87
Middle	6179.412	10-year	369.70	907.00	910.97		911.17	0.002313	4.39	137.61	104.22	0.42
Middle	6057.761	10-year	369.70	906.51	910.32	910.32	910.77	0.005286	6.26	109.65	111.76	0.61
Middle	5898.334	10-year	369.70	905.89	909.32		909.51	0.002841	4.24	122.74	93.33	0.46
Middle	5722.175	10-year	369.70	904.46	907.84	907.84	908.64	0.009382	7.91	74.89	57.31	0.83
Middle	5588.448	10-year	369.70	903.47	906.49	906.49	907.18	0.009076	7.08	62.67	46.80	0.80
Middle	5493.950	10-year	375.80	902.84	906.62		906.77	0.001186	3.12	121.81	41.72	0.30
Middle	5409.687	10-year	375.80	902.42	906.59	905.01	906.69	0.000928	3.12	204.21	132.13	0.28
Middle	5395.595		Bridge									
Middle	5379.960	10-year	375.80	902.28	905.64		905.79	0.001598	3.68	139.39	115.85	0.36
Middle	5291.039	10-year	375.80	901.85	904.71	904.71	905.45	0.009840	7.71	76.06	62.62	0.84
Middle	5071.499	10-year	375.80	899.36	902.82	902.82	903.43	0.008578	6.67	97.71	110.15	0.76
Middle	4871.481	10-year	375.80	896.82	900.00	899.64	900.75	0.008901	6.95	56.12	40.50	0.78
Middle	4704.612	10-year	375.80	895.82	900.19		900.29	0.000697	2.67	243.98	192.99	0.24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Ground
Bank Sta
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Station (ft)
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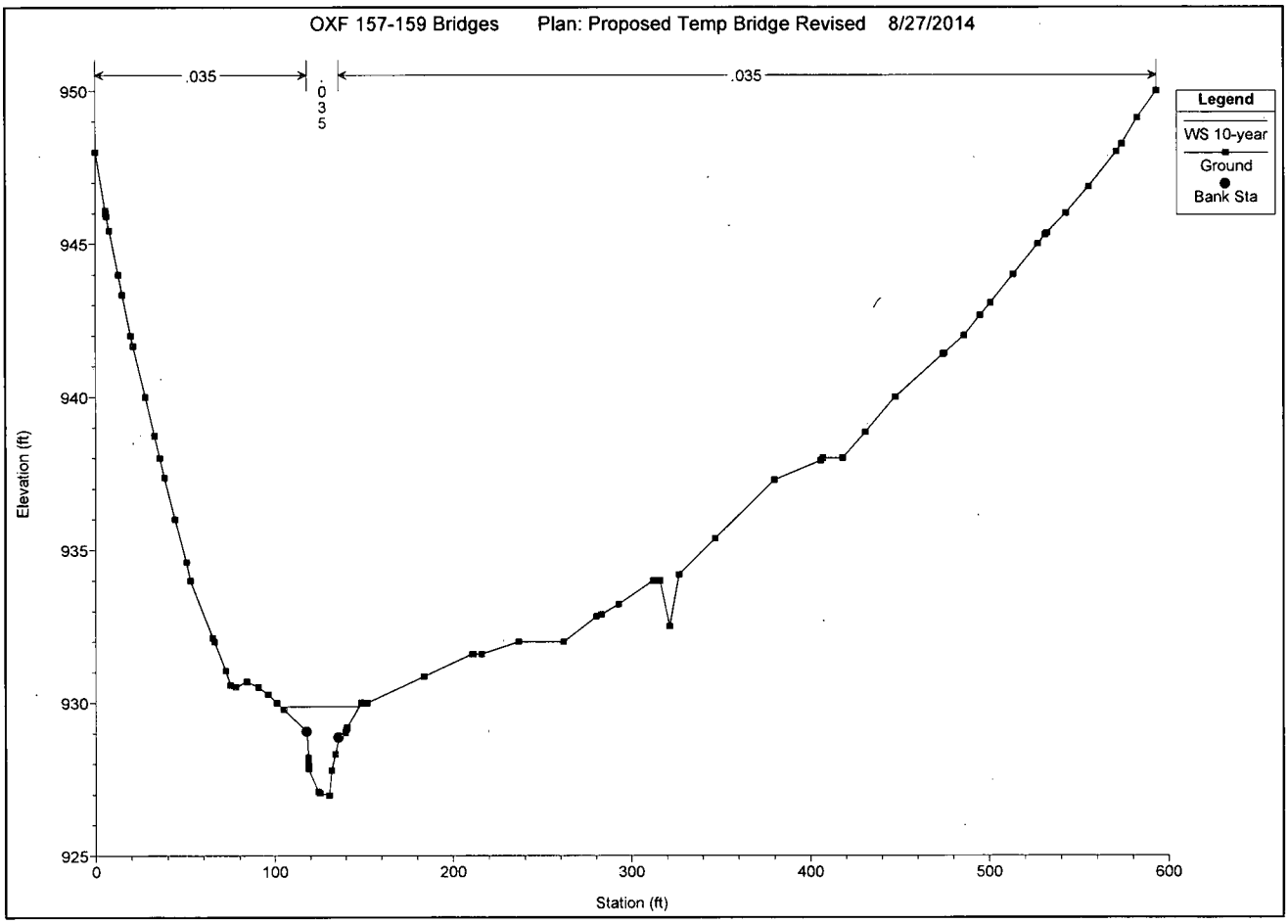
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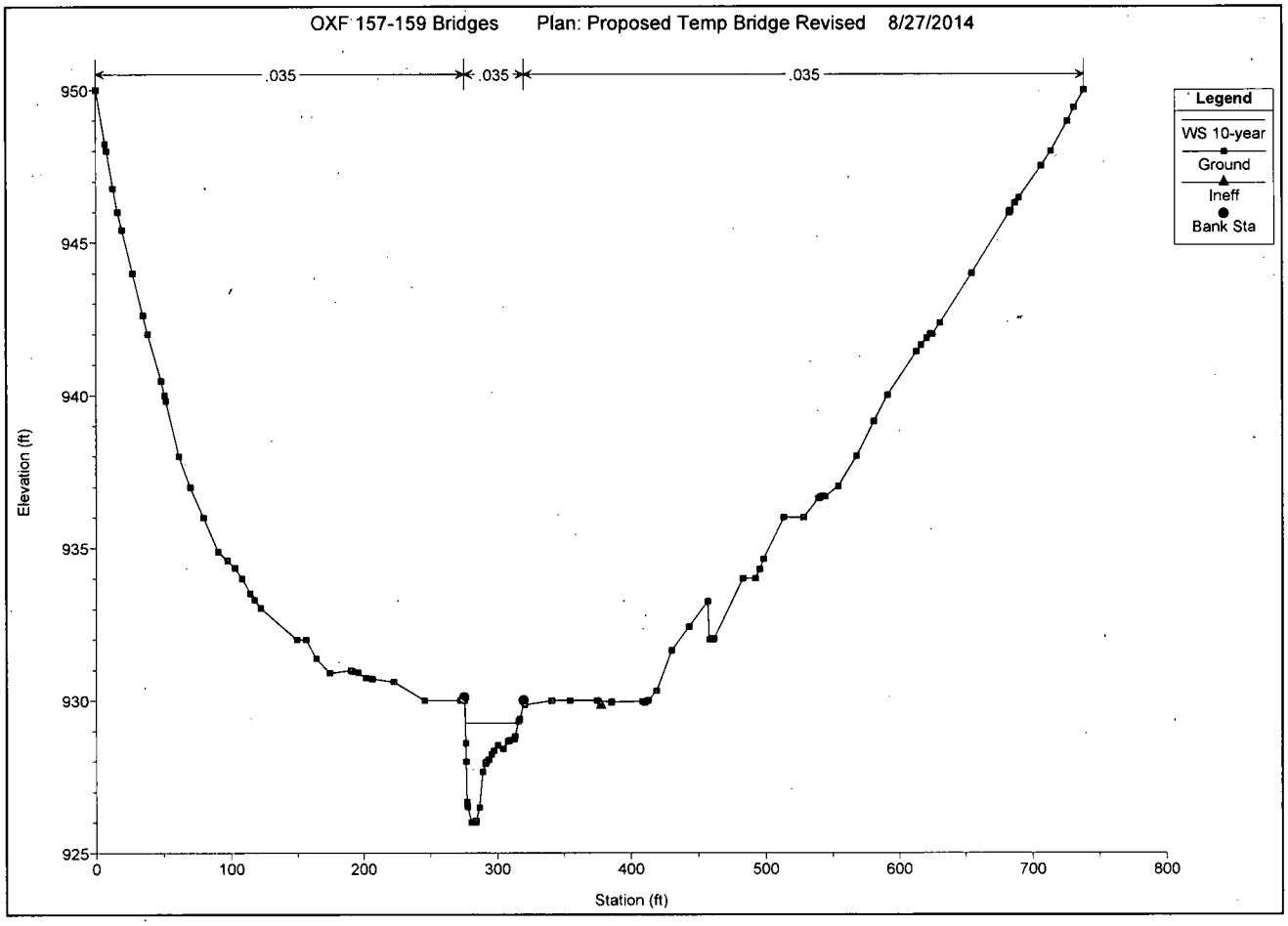
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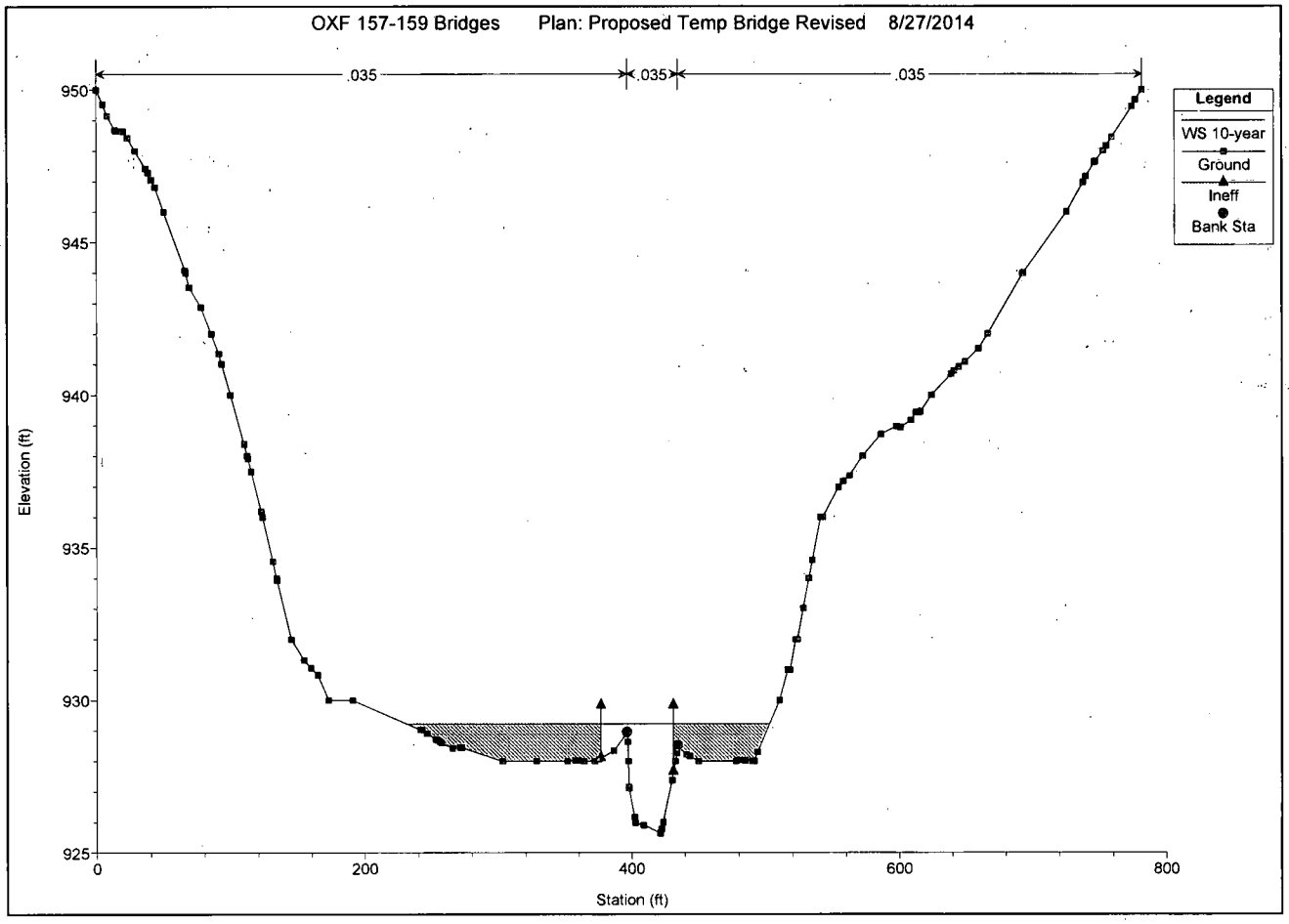
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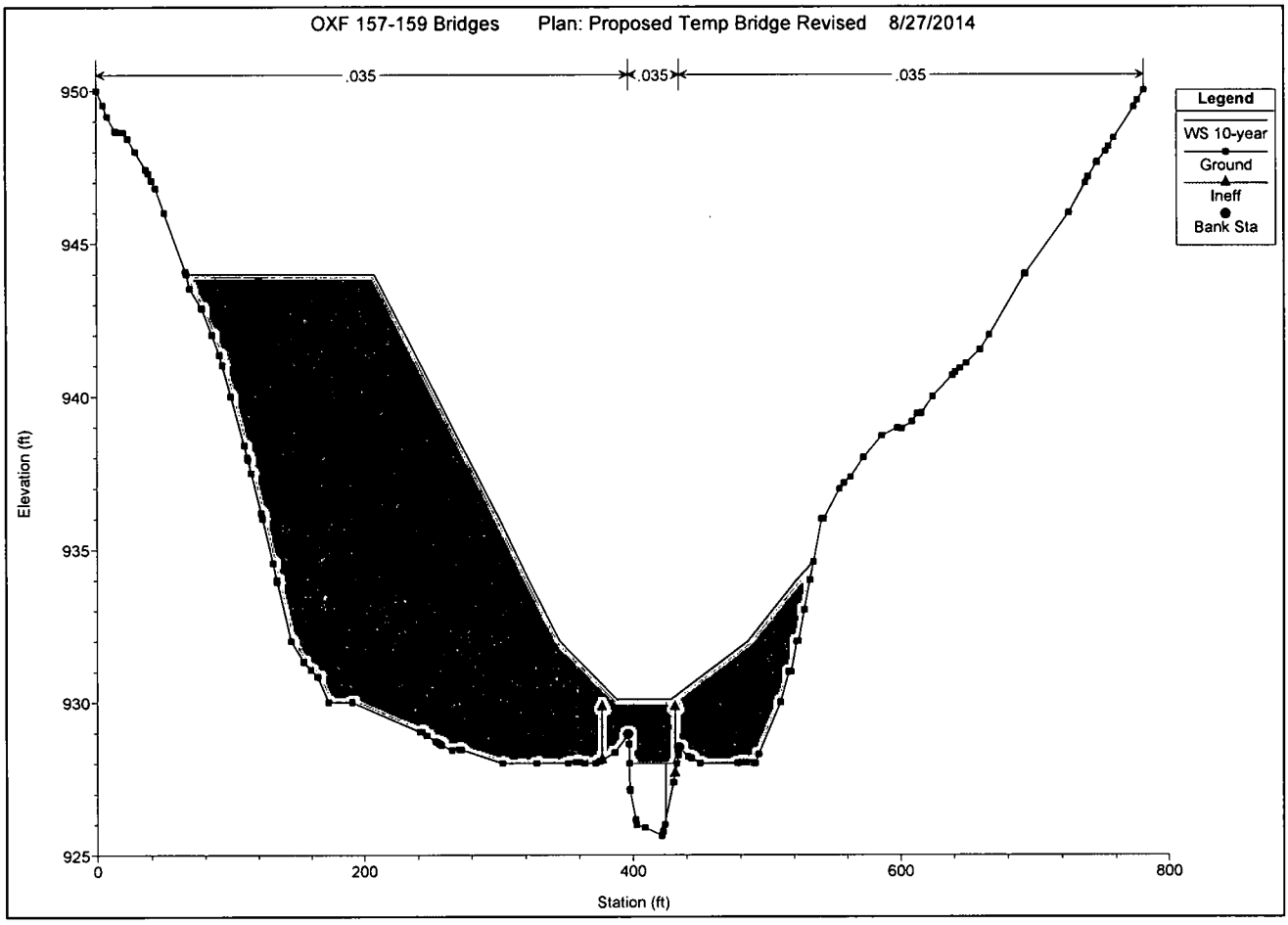
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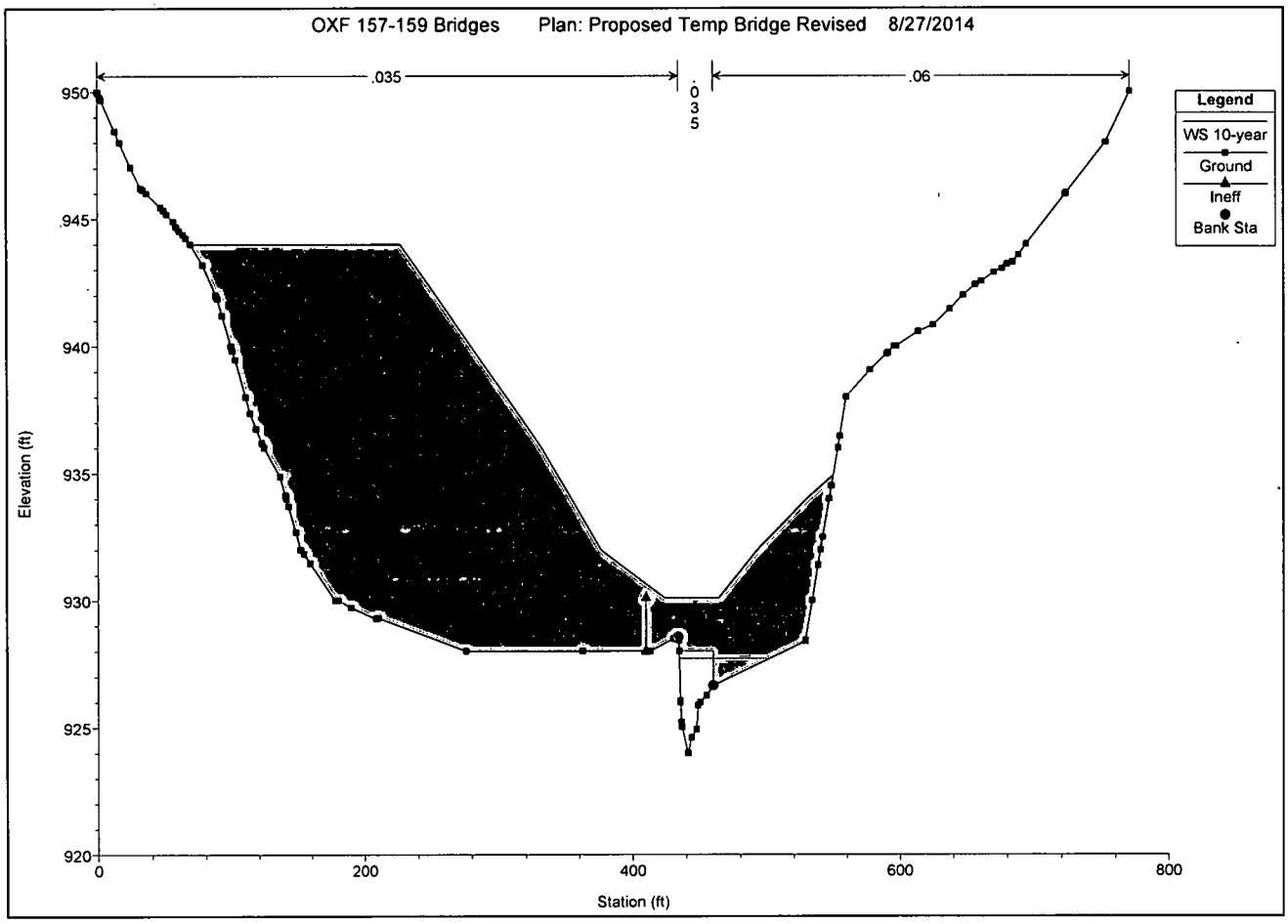
Station (ft)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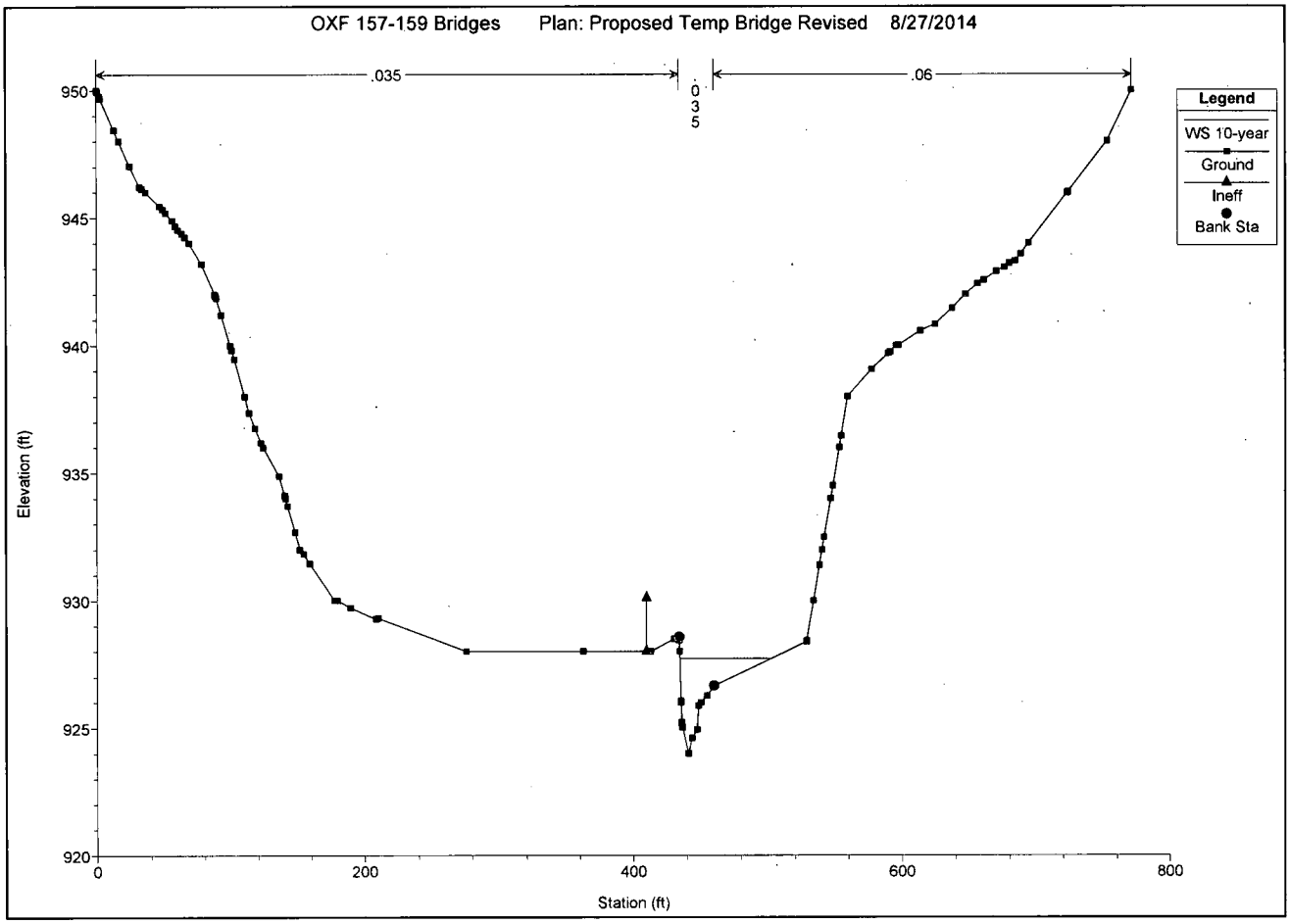
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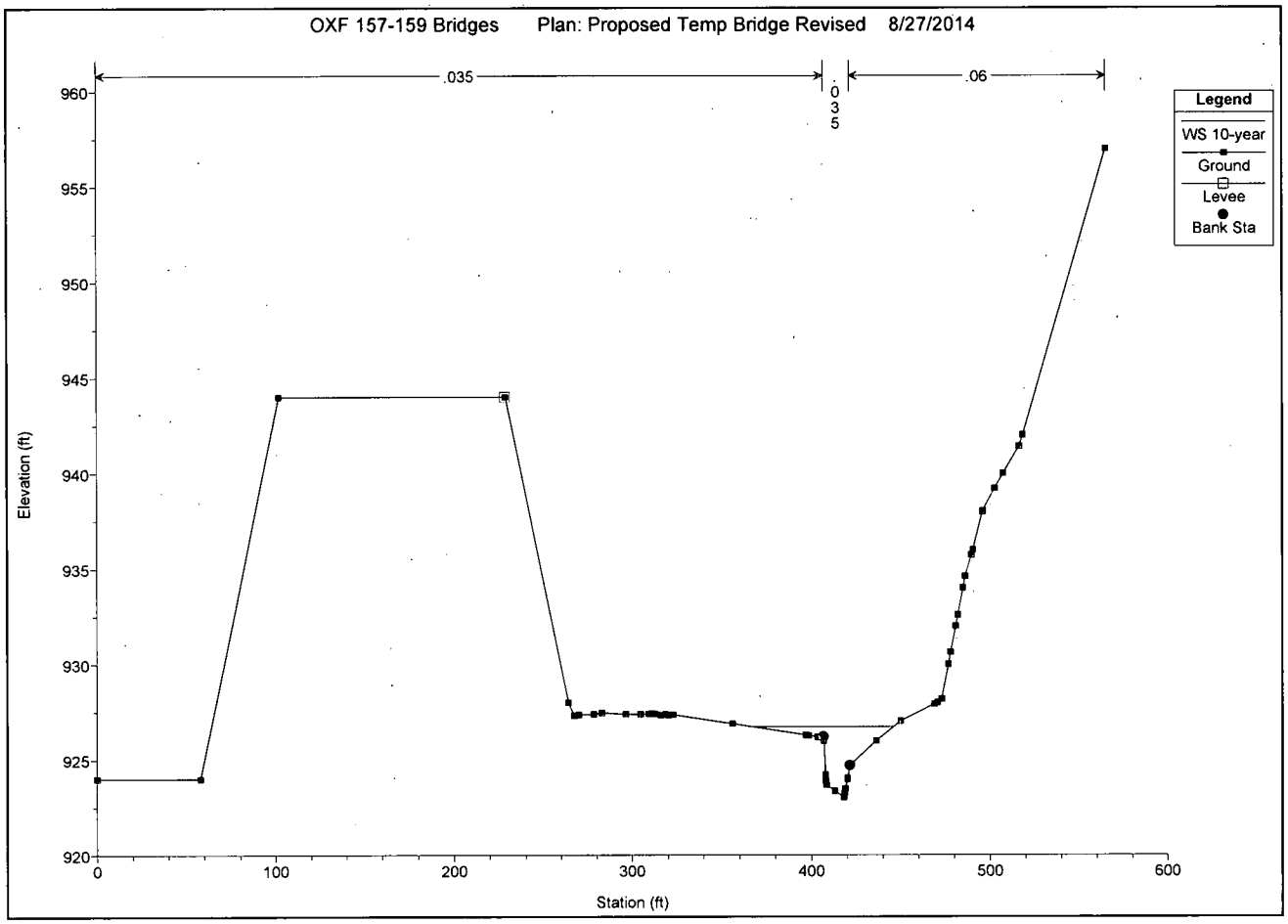
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Ground
Levee
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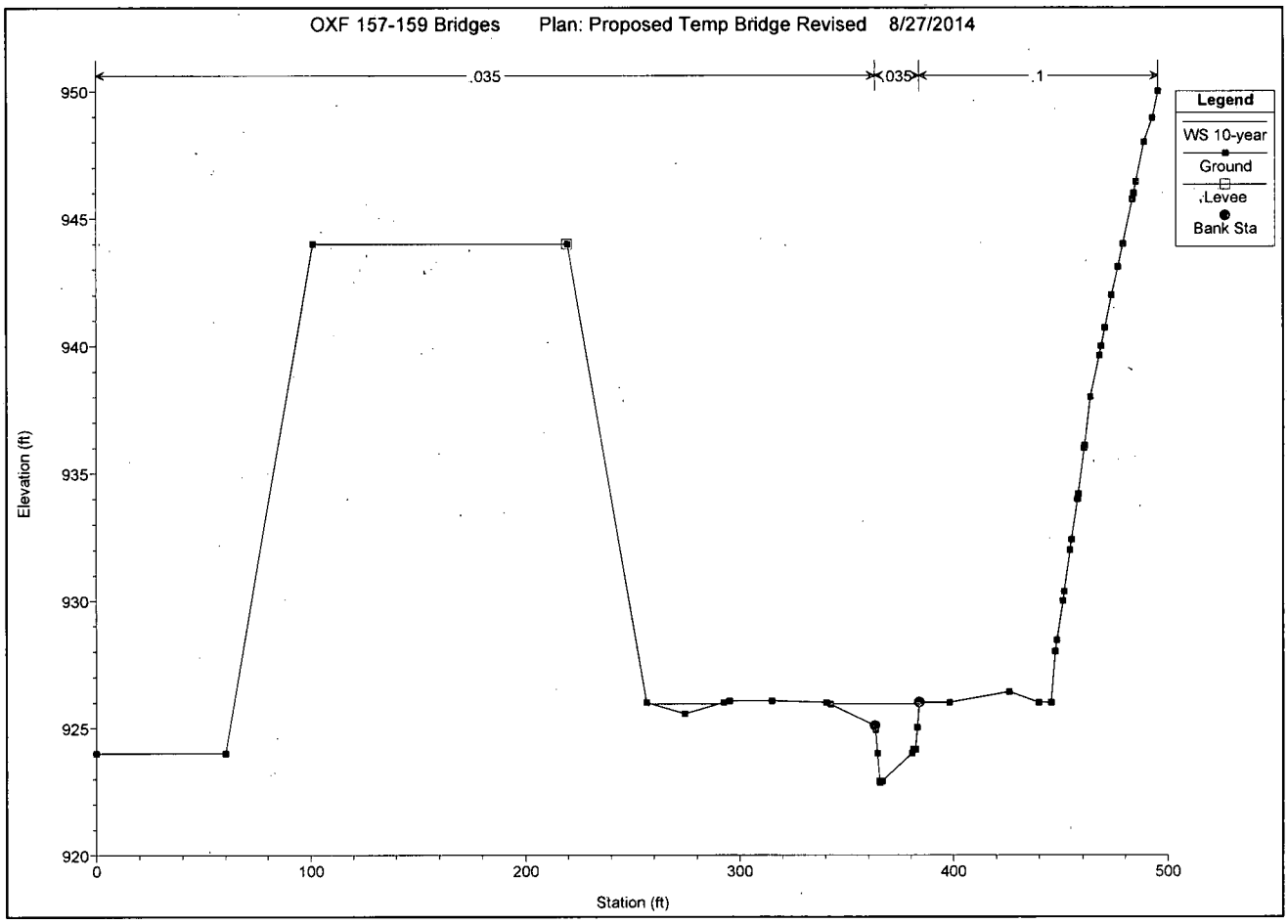
Station (ft)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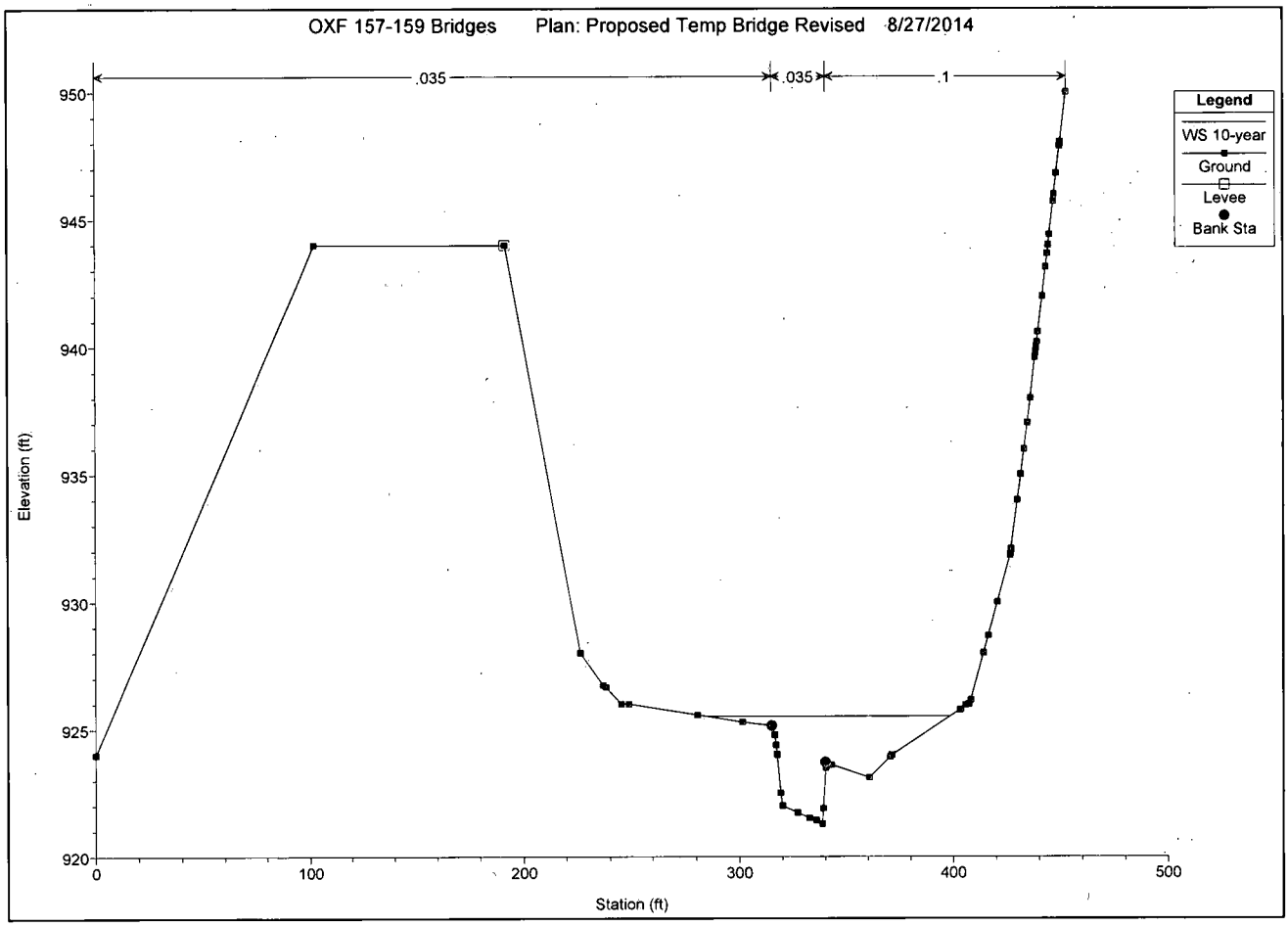
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Elevation (ft)
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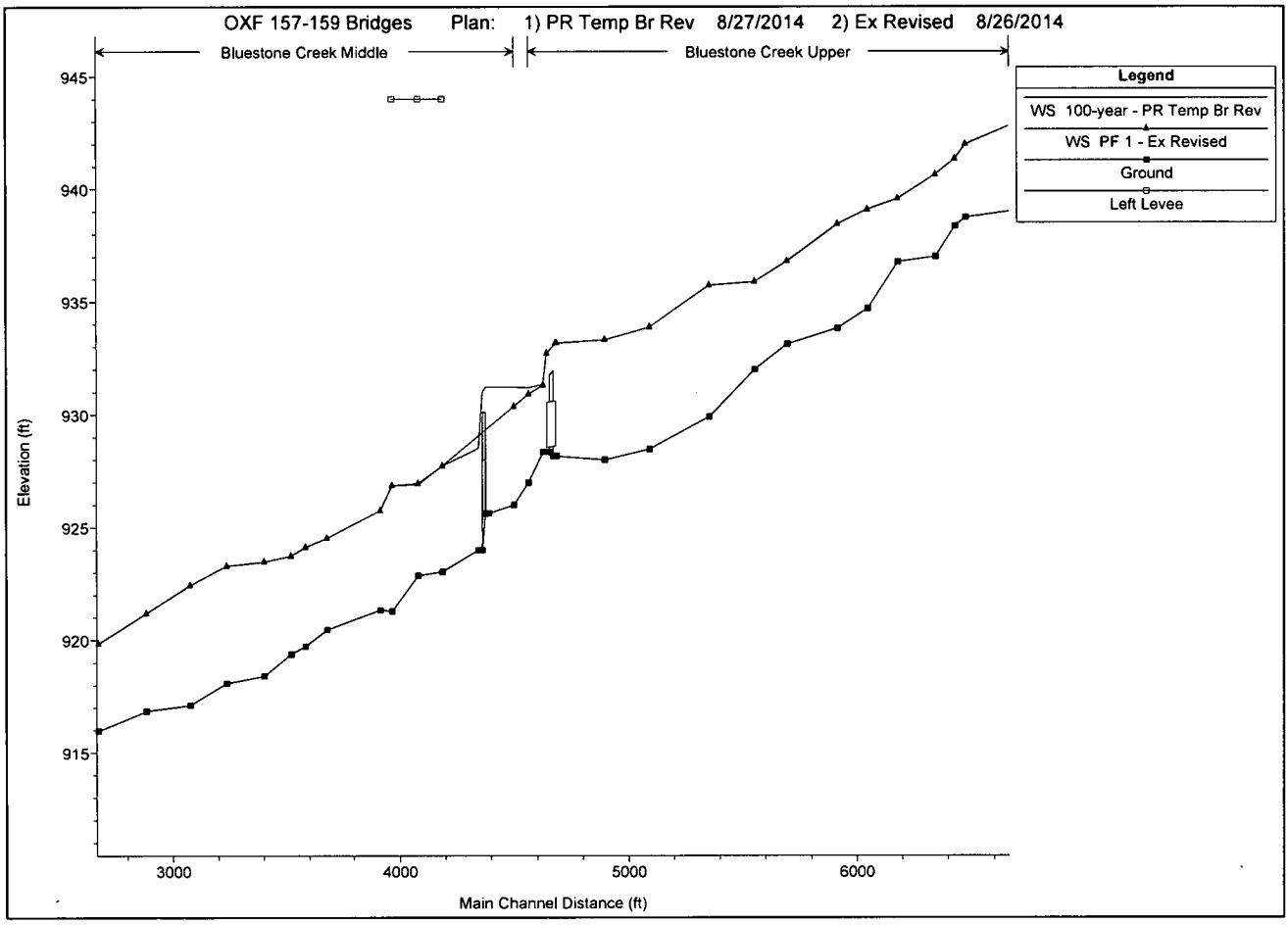
Station (ft)

Plan: PR Temp Br Rev Bluestone Creek Middle RS: 9855.351 Profile: 100-year

E.G. US. (ft)	931.25	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	931.21	E.G. Elev (ft)	931.25	931.25
Q Total (cfs)	763.60	W.S. Elev (ft)	931.21	930.98
Q Bridge (cfs)	567.48	Crit W.S. (ft)	931.12	930.98
Q Weir (cfs)	196.12	Max Chl Dpth (ft)	5.58	6.98
Weir Sta Lft (ft)	362.25	Vel Total (ft/s)	5.70	5.60
Weir Sta Rgt (ft)	462.58	Flow Area (sq ft)	133.88	136.47
Weir Submerg	0.00	Froude # Chl	0.44	0.44
Weir Max Depth (ft)	1.15	Specif Force (cu ft)	405.92	468.49
Min El Weir Flow (ft)	930.11	Hydr Depth (ft)	1.36	1.82
Min El Prs (ft)	928.00	W.P. Total (ft)	154.31	129.74
Delta EG (ft)	2.00	Conv. Total (cfs)		
Delta WS (ft)	2.70	Top Width (ft)	98.43	75.07
BR Open Area (sq ft)	53.43	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.62	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)		
Br Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: PR Temp Br Rev Bluestone Creek Middle RS: 9855.351 Profile: 10-year

E.G. US. (ft)	929.35	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	929.22	E.G. Elev (ft)	929.35	928.11
Q Total (cfs)	326.80	W.S. Elev (ft)	928.00	927.72
Q Bridge (cfs)	326.80	Crit W.S. (ft)	927.65	927.19
Q Weir (cfs)		Max Chl Dpth (ft)	2.37	3.72
Weir Sta Lft (ft)		Vel Total (ft/s)	6.12	5.72
Weir Sta Rgt (ft)		Flow Area (sq ft)	53.43	57.11
Weir Submerg		Froude # Chl	0.70	0.52
Weir Max Depth (ft)		Specif Force (cu ft)	117.73	132.28
Min El Weir Flow (ft)	930.11	Hydr Depth (ft)	53052.75	2.25
Min El Prs (ft)	928.00	W.P. Total (ft)	55.35	28.50
Delta EG (ft)	1.24	Conv. Total (cfs)	2215.5	3853.6
Delta WS (ft)	1.50	Top Width (ft)		25.38
BR Open Area (sq ft)	53.43	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.12	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	1.31	0.90
Br Sel Method	Press Only	Power Total (lb/ft s)	8.02	5.15

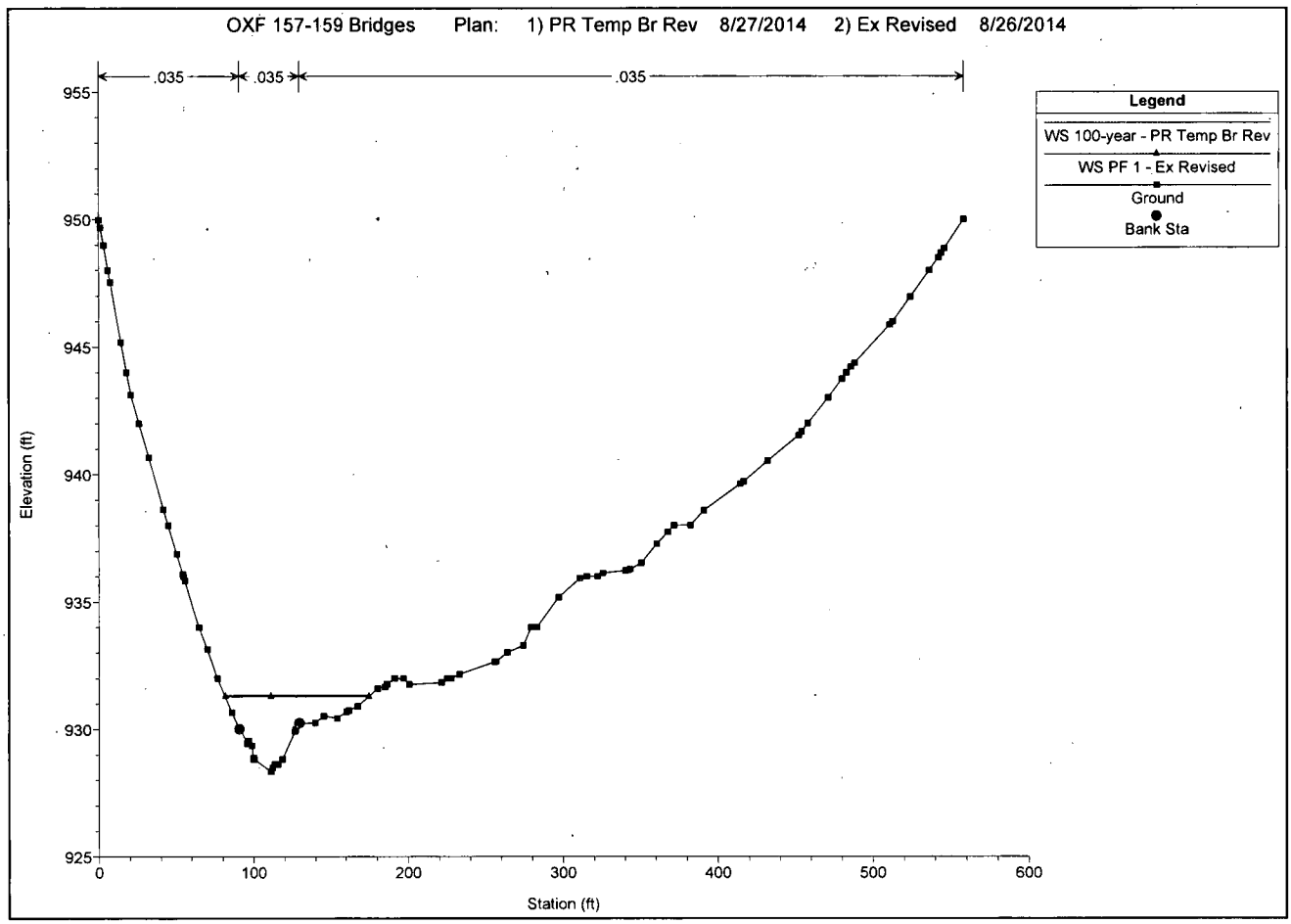

OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
Bluestone Creek Middle
Bluestone Creek Upper
Legend
WS 100-year - PR Temp Br Rev
WS PF 1 - Ex Revised
Ground
Left Levee
945
940
935
930
925
920
915
Elevation (ft)
3000
4000
5000
6000
Main Channel Distance (ft)

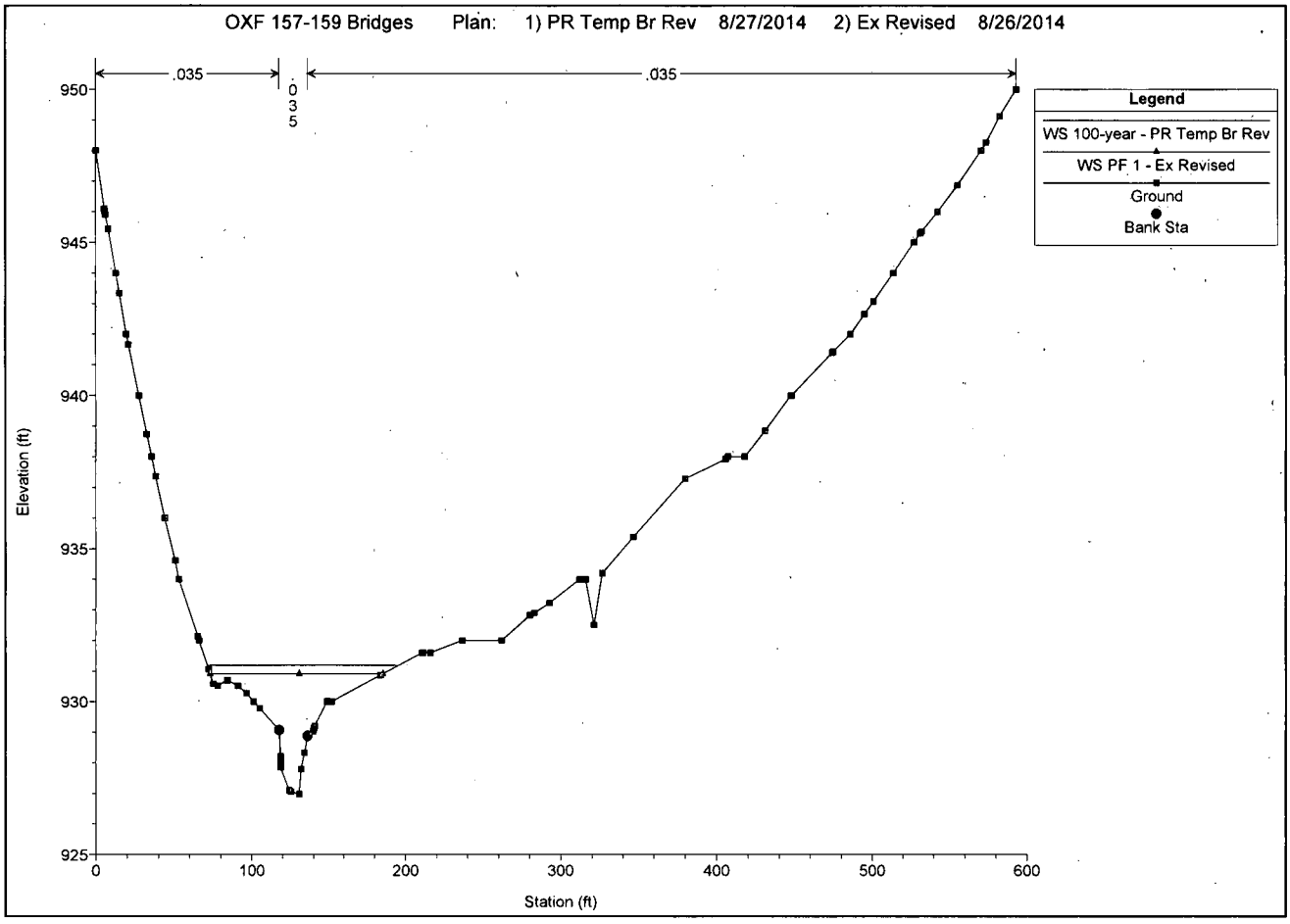
HEC-RAS Profile: 100-year

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	13395.79	100-year	PR Temp Br Rev	482.70	946.00	951.35	949.60	951.42	0.000811	2.81	260.44	125.42	0.25
Upper	13395.79	PF 1	Ex Revised	482.70	946.00	951.35	949.60	951.42	0.000811	2.81	260.44	125.42	0.25
Upper	13372.57			Culvert									
Upper	13353.46	100-year	PR Temp Br Rev	482.70	946.00	950.77		950.98	0.001375	3.84	153.59	70.31	0.34
Upper	13353.46	PF 1	Ex Revised	482.70	946.00	950.77		950.98	0.001375	3.84	153.59	70.31	0.34
Upper	13212.39	100-year	PR Temp Br Rev	482.70	945.36	949.90	949.90	950.67	0.009710	8.41	81.19	53.28	0.82
Upper	13212.39	PF 1	Ex Revised	482.70	945.36	949.90	949.90	950.67	0.009710	8.41	81.19	53.28	0.82
Upper	13020.26	100-year	PR Temp Br Rev	482.70	943.98	948.52	948.52	949.25	0.007459	8.04	94.07	73.42	0.70
Upper	13020.26	PF 1	Ex Revised	482.70	943.98	948.52	948.52	949.25	0.007459	8.04	94.07	73.42	0.70
Upper	12827.43	100-year	PR Temp Br Rev	482.70	942.44	946.78	946.78	947.26	0.008422	6.74	109.42	120.53	0.75
Upper	12827.43	PF 1	Ex Revised	482.70	942.44	946.78	946.78	947.26	0.008422	6.74	109.42	120.53	0.75
Upper	12694.78	100-year	PR Temp Br Rev	482.70	940.76	945.55		945.77	0.003110	4.19	161.02	194.30	0.47
Upper	12694.78	PF 1	Ex Revised	482.70	940.76	945.55		945.77	0.003110	4.19	161.02	194.30	0.47
Upper	12504.92	100-year	PR Temp Br Rev	482.70	939.14	943.19	943.19	944.58	0.015037	9.49	51.79	21.68	0.97
Upper	12504.92	PF 1	Ex Revised	482.70	939.14	943.19	943.19	944.58	0.015037	9.49	51.79	21.68	0.97
Upper	12207.32	100-year	PR Temp Br Rev	482.70	938.75	941.99		942.10	0.002164	3.43	200.15	166.63	0.39
Upper	12207.32	PF 1	Ex Revised	482.70	938.75	941.99		942.10	0.002164	3.43	200.15	166.63	0.39
Upper	12162.04	100-year	PR Temp Br Rev	482.70	938.37	941.34		941.70	0.009218	6.34	120.25	137.21	0.78
Upper	12162.04	PF 1	Ex Revised	482.70	938.37	941.34		941.70	0.009218	6.34	120.25	137.21	0.78
Upper	12075.53	100-year	PR Temp Br Rev	482.70	937.01	940.64	940.62	940.97	0.006381	5.79	134.26	164.13	0.65
Upper	12075.53	PF 1	Ex Revised	482.70	937.01	940.64	940.62	940.97	0.006381	5.79	134.26	164.13	0.65
Upper	11904.55	100-year	PR Temp Br Rev	601.90	936.77	939.57		939.80	0.005835	5.36	183.43	205.30	0.60
Upper	11904.55	PF 1	Ex Revised	601.90	936.77	939.57		939.80	0.005835	5.36	183.43	205.30	0.60
Upper	11770.60	100-year	PR Temp Br Rev	601.90	934.71	939.09		939.19	0.001889	3.66	277.46	228.60	0.36
Upper	11770.60	PF 1	Ex Revised	601.90	934.71	939.09		939.19	0.001889	3.66	277.46	228.60	0.36
Upper	11632.87	100-year	PR Temp Br Rev	601.90	933.83	938.44	938.44	938.87	0.005172	6.43	159.73	172.02	0.60
Upper	11632.87	PF 1	Ex Revised	601.90	933.83	938.44	938.44	938.87	0.005172	6.43	159.73	172.02	0.60
Upper	11351.13	100-year	PR Temp Br Rev	601.90	933.12	936.79	936.79	937.20	0.006854	6.91	209.33	214.01	0.69
Upper	11351.13	PF 1	Ex Revised	601.90	933.12	936.79	936.79	937.20	0.006854	6.91	209.33	214.01	0.69
Upper	11189.95	100-year	PR Temp Br Rev	601.90	932.00	935.89		935.97	0.002088	3.78	354.02	220.63	0.37
Upper	11189.95	PF 1	Ex Revised	601.90	932.00	935.89		935.97	0.002088	3.78	354.03	220.63	0.37
Upper	10974.14	100-year	PR Temp Br Rev	601.90	929.91	935.73		935.81	0.000924	3.25	379.06	173.54	0.25
Upper	10974.14	PF 1	Ex Revised	601.90	929.91	935.73		935.81	0.000924	3.25	379.07	173.54	0.25
Upper	10815.35	100-year	PR Temp Br Rev	601.90	928.47	933.87	933.87	935.14	0.012784	10.35	79.35	50.78	0.93
Upper	10815.35	PF 1	Ex Revised	601.90	928.47	933.87	933.87	935.14	0.012784	10.35	79.35	50.78	0.93
Upper	10402.90	100-year	PR Temp Br Rev	601.90	928.00	933.32		933.66	0.003509	5.32	139.82	66.70	0.49
Upper	10402.90	PF 1	Ex Revised	601.90	928.00	933.31		933.66	0.003531	5.33	139.41	66.59	0.50
Upper	10179.69	100-year	PR Temp Br Rev	601.90	928.17	933.18	932.32	933.27	0.000987	3.24	293.09	173.49	0.28
Upper	10179.69	PF 1	Ex Revised	601.90	928.17	933.17	932.32	933.26	0.001003	3.26	291.40	173.28	0.28
Upper	10155.71			Culvert									
Upper	10120.86	100-year	PR Temp Br Rev	601.90	928.34	931.33		931.76	0.006228	5.68	127.20	94.49	0.67
Upper	10120.86	PF 1	Ex Revised	601.90	928.34	931.29		931.75	0.006719	5.83	123.57	93.51	0.70
Upper	10055.03	100-year	PR Temp Br Rev	601.90	926.98	931.19		931.51	0.003298	5.54	166.50	124.52	0.51
Upper	10055.03	PF 1	Ex Revised	601.90	926.98	930.91		931.43	0.005474	6.76	133.23	112.44	0.65
Middle	9989.380	100-year	PR Temp Br Rev	763.60	926.00	931.22		931.33	0.001286	3.18	346.57	259.03	0.31
Middle	9989.380	PF 1	Ex Revised	763.60	926.00	930.35	930.35	930.82	0.016547	5.61	153.00	194.37	0.96
Middle	9878.981	100-year	PR Temp Br Rev	763.60	925.63	931.21	928.82	931.25	0.000302	2.00	624.47	362.79	0.16
Middle	9855.351			Bridge									
Middle	9831.906	100-year	PR Temp Br Rev	763.60	924.00	928.51		929.25	0.008662	7.71	151.70	276.18	0.79
Middle	9559.249	100-year	PR Temp Br Rev	763.60	923.03	927.72	927.72	928.16	0.004764	6.91	216.68	199.45	0.60
Middle	9559.249	PF 1	Ex Revised	763.60	923.03	927.72	927.72	928.15	0.004765	6.91	226.05	234.63	0.60
Middle	9443.656	100-year	PR Temp Br Rev	763.60	922.86	926.88	926.74	927.23	0.004726	6.00	222.79	191.67	0.59
Middle	9443.656	PF 1	Ex Revised	763.60	922.86	926.94		927.16	0.003103	4.93	275.07	227.99	0.48
Middle	9322.807	100-year	PR Temp Br Rev	763.60	921.28	926.85	925.06	927.00	0.001147	3.84	385.75	174.57	0.31
Middle	9322.807	PF 1	Ex Revised	763.60	921.28	926.85		927.00	0.001154	3.85	385.79	176.71	0.31
Middle	9266.019	100-year	PR Temp Br Rev	763.60	921.33	925.74	925.74	926.76	0.010857	8.35	120.04	95.05	0.88
Middle	9266.019	PF 1	Ex Revised	763.60	921.33	925.74	925.74	926.76	0.010857	8.35	120.04	95.05	0.88

HEC-RAS Profile: 100-year (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Middle	9003.470	100-year	PR Temp Br Rev	763.60	920.45	924.51		924.92	0.007602	6.53	171.73	151.90	0.73
Middle	9003.470	PF 1	Ex Revised	763.60	920.45	924.51		924.92	0.007602	6.53	171.73	151.90	0.73
Middle	8906.253	100-year	PR Temp Br Rev	763.60	919.73	924.13		924.42	0.005342	6.34	222.35	175.32	0.58
Middle	8906.253	PF 1	Ex Revised	763.60	919.73	924.13		924.42	0.005342	6.34	222.35	175.32	0.58
Middle	8843.186	100-year	PR Temp Br Rev	763.60	919.37	923.73		924.01	0.004390	6.03	223.33	154.62	0.54
Middle	8843.186	PF 1	Ex Revised	763.60	919.37	923.73		924.01	0.004390	6.03	223.33	154.62	0.54
Middle	8712.623	100-year	PR Temp Br Rev	763.60	918.40	923.47		923.72	0.001869	4.31	216.95	107.50	0.39
Middle	8712.623	PF 1	Ex Revised	763.60	918.40	923.47		923.72	0.001869	4.31	216.95	107.50	0.39
Middle	8542.514	100-year	PR Temp Br Rev	763.60	918.08	923.28		923.40	0.001383	3.80	310.49	156.64	0.32
Middle	8542.514	PF 1	Ex Revised	763.60	918.08	923.28		923.40	0.001383	3.80	310.49	156.64	0.32
Middle	8379.502	100-year	PR Temp Br Rev	763.60	917.10	922.42		922.87	0.005537	6.93	198.01	182.80	0.62
Middle	8379.502	PF 1	Ex Revised	763.60	917.10	922.42		922.87	0.005537	6.93	198.01	182.80	0.62
Middle	8109.907	100-year	PR Temp Br Rev	763.60	916.84	921.19	921.19	921.56	0.007440	7.01	193.44	202.36	0.67
Middle	8109.907	PF 1	Ex Revised	763.60	916.84	921.19	921.19	921.56	0.007440	7.01	193.44	202.36	0.67
Middle	7770.441	100-year	PR Temp Br Rev	763.60	915.97	919.84		920.16	0.007284	6.62	206.79	233.12	0.67
Middle	7770.441	PF 1	Ex Revised	763.60	915.97	919.84		920.16	0.007284	6.62	206.79	233.12	0.67
Middle	7438.793	100-year	PR Temp Br Rev	763.60	915.16	919.36		919.47	0.001559	3.44	310.95	188.28	0.33
Middle	7438.793	PF 1	Ex Revised	763.60	915.16	919.36		919.47	0.001559	3.44	310.95	188.28	0.33
Middle	7150.429	100-year	PR Temp Br Rev	763.60	914.24	918.37	918.37	918.77	0.004994	6.53	232.20	255.89	0.61
Middle	7150.429	PF 1	Ex Revised	763.60	914.24	918.37	918.37	918.77	0.004994	6.53	232.20	255.89	0.61
Middle	6893.619	100-year	PR Temp Br Rev	763.60	913.16	916.45		916.95	0.008375	7.02	169.07	174.57	0.76
Middle	6893.619	PF 1	Ex Revised	763.60	913.16	916.45		916.95	0.008375	7.02	169.07	174.57	0.76
Middle	6579.154	100-year	PR Temp Br Rev	763.60	910.57	914.87	914.87	915.39	0.008050	7.05	172.60	153.70	0.66
Middle	6579.154	PF 1	Ex Revised	763.60	910.57	914.87	914.87	915.39	0.008050	7.05	172.60	153.70	0.66
Middle	6481.438	100-year	PR Temp Br Rev	855.60	909.95	913.94		914.28	0.005382	6.37	212.47	165.31	0.61
Middle	6481.438	PF 1	Ex Revised	855.60	909.95	913.72	913.72	914.23	0.008636	7.70	177.43	155.46	0.77
Middle	6323.723	100-year	PR Temp Br Rev	855.60	908.41	913.37	913.16	913.70	0.003504	6.51	258.57	223.20	0.55
Middle	6303.783			Bridge									
Middle	6289.579	100-year	PR Temp Br Rev	855.60	908.07	911.97	911.97	912.94	0.012094	9.15	111.55	112.70	0.94
Middle	6179.412	100-year	PR Temp Br Rev	853.60	907.00	911.86		912.17	0.003149	5.98	247.61	143.46	0.51
Middle	6179.412	PF 1	Ex Revised	855.60	907.00	911.86		912.17	0.003150	5.98	248.05	143.59	0.51
Middle	6057.761	100-year	PR Temp Br Rev	853.60	906.51	910.99	910.99	911.64	0.007518	8.44	185.58	117.85	0.75
Middle	6057.761	PF 1	Ex Revised	855.60	906.51	910.99	910.99	911.64	0.007526	8.44	185.83	117.87	0.75
Middle	5898.334	100-year	PR Temp Br Rev	853.60	905.89	910.34		910.59	0.002715	5.14	231.69	115.19	0.47
Middle	5898.334	PF 1	Ex Revised	855.60	905.89	910.34		910.60	0.002715	5.14	232.06	115.21	0.47
Middle	5722.175	100-year	PR Temp Br Rev	853.60	904.46	909.09	909.09	909.85	0.007239	8.86	181.41	109.96	0.77
Middle	5722.175	PF 1	Ex Revised	855.60	904.46	909.10	909.10	909.85	0.007241	8.86	181.74	110.08	0.77
Middle	5588.448	100-year	PR Temp Br Rev	853.60	903.47	907.57	907.57	908.57	0.009197	9.09	120.32	60.87	0.85
Middle	5588.448	PF 1	Ex Revised	855.60	903.47	907.57	907.57	908.57	0.009193	9.10	120.57	60.92	0.85
Middle	5493.950	100-year	PR Temp Br Rev	865.00	902.84	907.35		907.87	0.003156	5.81	154.81	48.73	0.51
Middle	5493.950	PF 1	Ex Revised	865.00	902.84	907.40		907.90	0.003031	5.74	157.11	49.35	0.50
Middle	5409.887	100-year	PR Temp Br Rev	865.00	902.42	907.46	906.44	907.63	0.001404	4.40	326.68	148.84	0.36
Middle	5395.595			Bridge									
Middle	5379.960	100-year	PR Temp Br Rev	865.00	902.28	906.98		907.14	0.001477	4.46	313.88	157.64	0.37
Middle	5291.039	100-year	PR Temp Br Rev	865.00	901.85	905.81	905.81	906.79	0.009915	9.78	167.91	103.57	0.89
Middle	5291.039	PF 1	Ex Revised	865.00	901.85	905.81	905.81	906.79	0.009915	9.78	167.91	103.57	0.89
Middle	5071.499	100-year	PR Temp Br Rev	865.00	899.36	903.75	903.75	904.62	0.009742	8.84	206.42	125.31	0.86
Middle	5071.499	PF 1	Ex Revised	865.00	899.36	903.75	903.75	904.62	0.009742	8.84	206.42	125.31	0.86
Middle	4871.481	100-year	PR Temp Br Rev	865.00	896.82	901.33	901.33	902.51	0.008978	9.19	139.66	80.74	0.84
Middle	4871.481	PF 1	Ex Revised	865.00	896.82	901.33	901.33	902.51	0.008978	9.19	139.66	80.74	0.84
Middle	4704.612	100-year	PR Temp Br Rev	865.00	895.82	901.38		901.53	0.000948	3.72	524.62	273.22	0.29
Middle	4704.612	PF 1	Ex Revised	865.00	895.82	901.14		901.29	0.001023	3.74	513.44	263.59	0.30


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
.035
.035
.035
Legend
WS 100-year - PR Temp Br Rev
WS PF 1 - Ex Revised
Ground
Bank Sta
Elevation (ft)
955
950
945
940
935
930
925
0
100
200
300
400
500
600
Station (ft)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.035
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Legend
WS 100-year - PR Temp Br Rev
WS PF 1 - Ex Revised
Ground
Bank Sta
Elevation (ft)
950
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100
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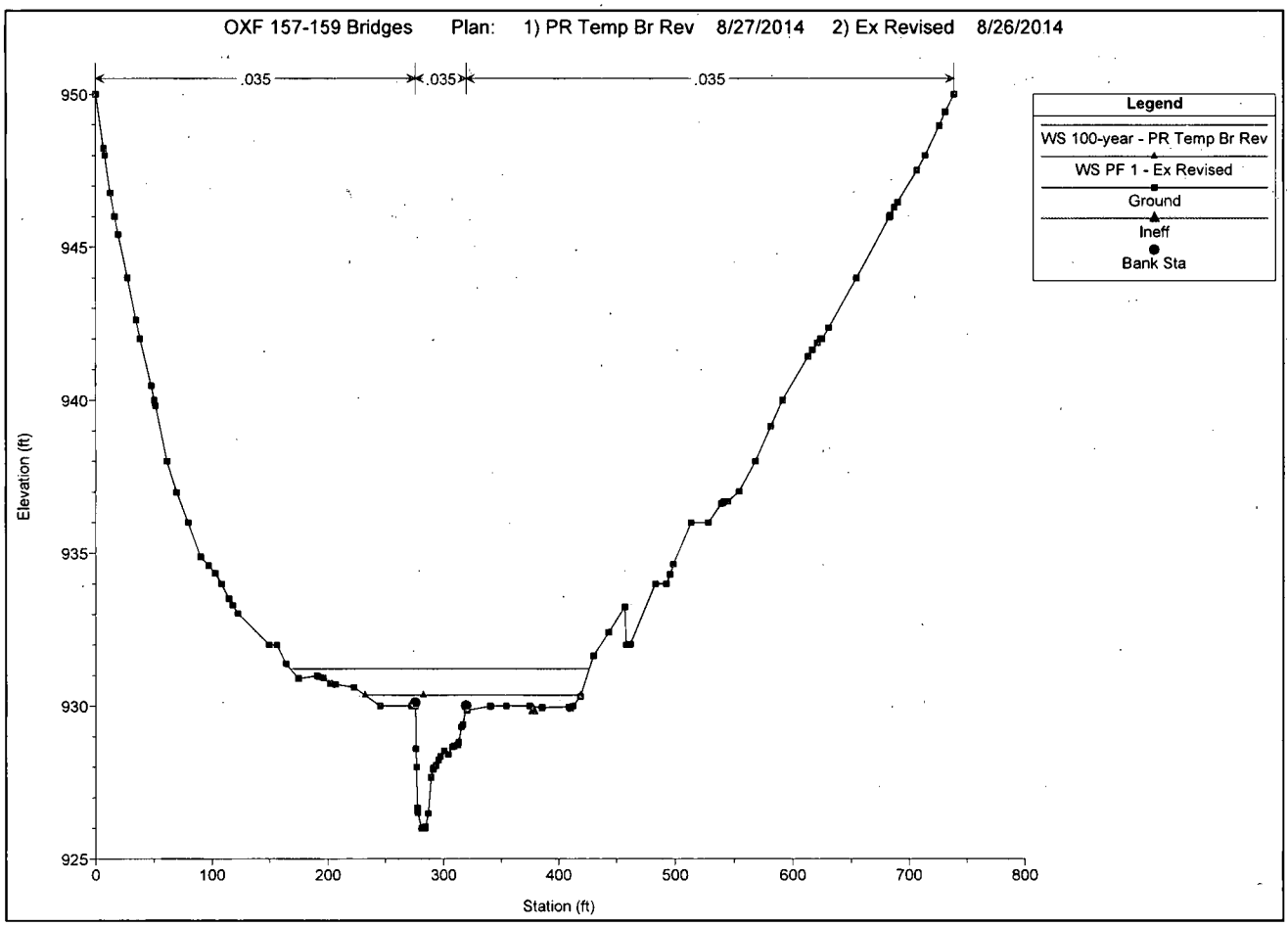
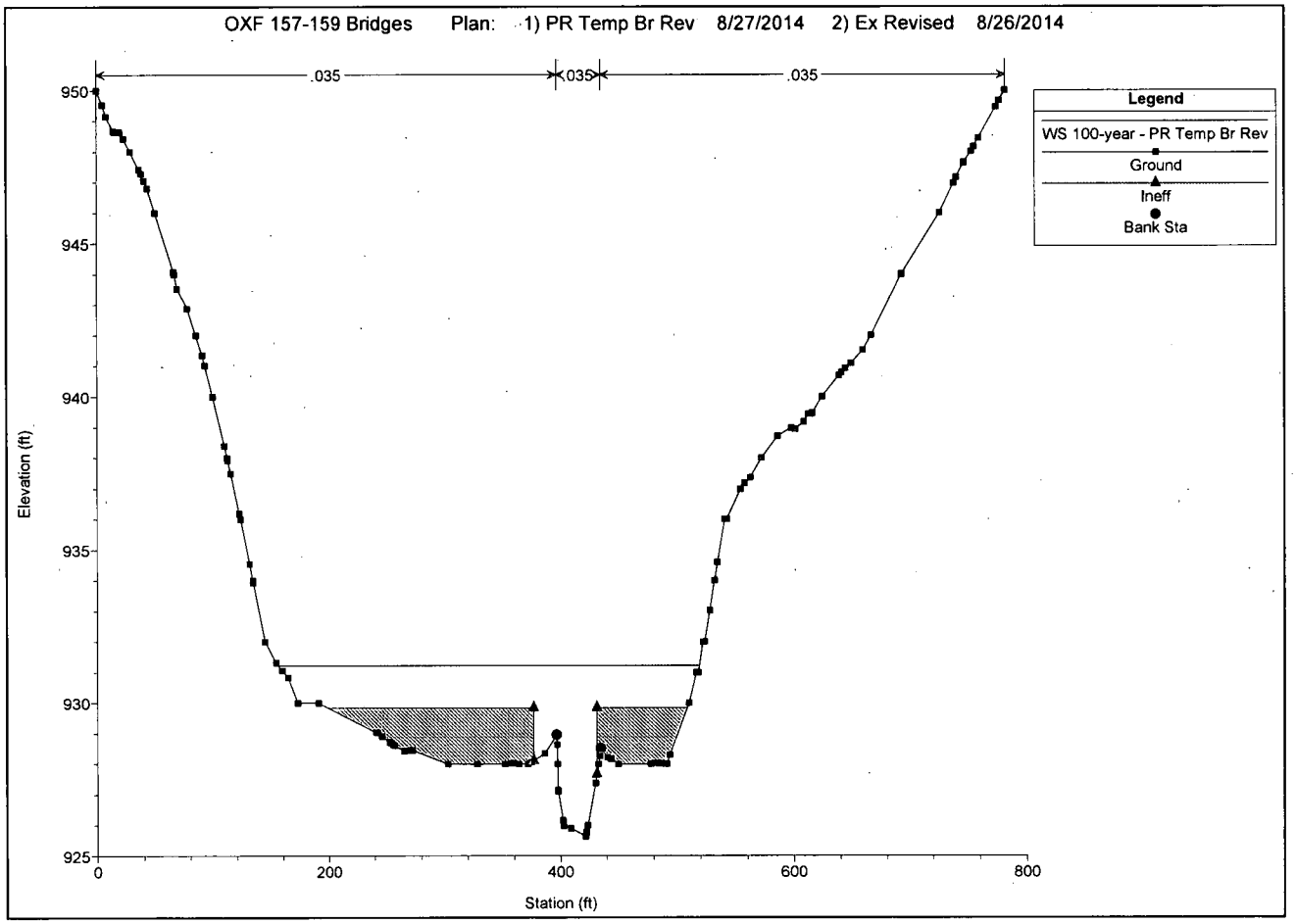
Station (ft)


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
.035
.035
.035
950
945
940
935
930
925
Elevation (ft)
0
100
200
300
400
500
600
700
800
Station (ft)
Legend
WS 100-year - PR Temp Br Rev
WS PF 1 - Ex Revised
Ground
Ineff
Bank Sta


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
.035
.035
.035
Legend
WS 100-year - PR Temp Br Rev
Ground
Ineff
Bank Sta
Elevation (ft)
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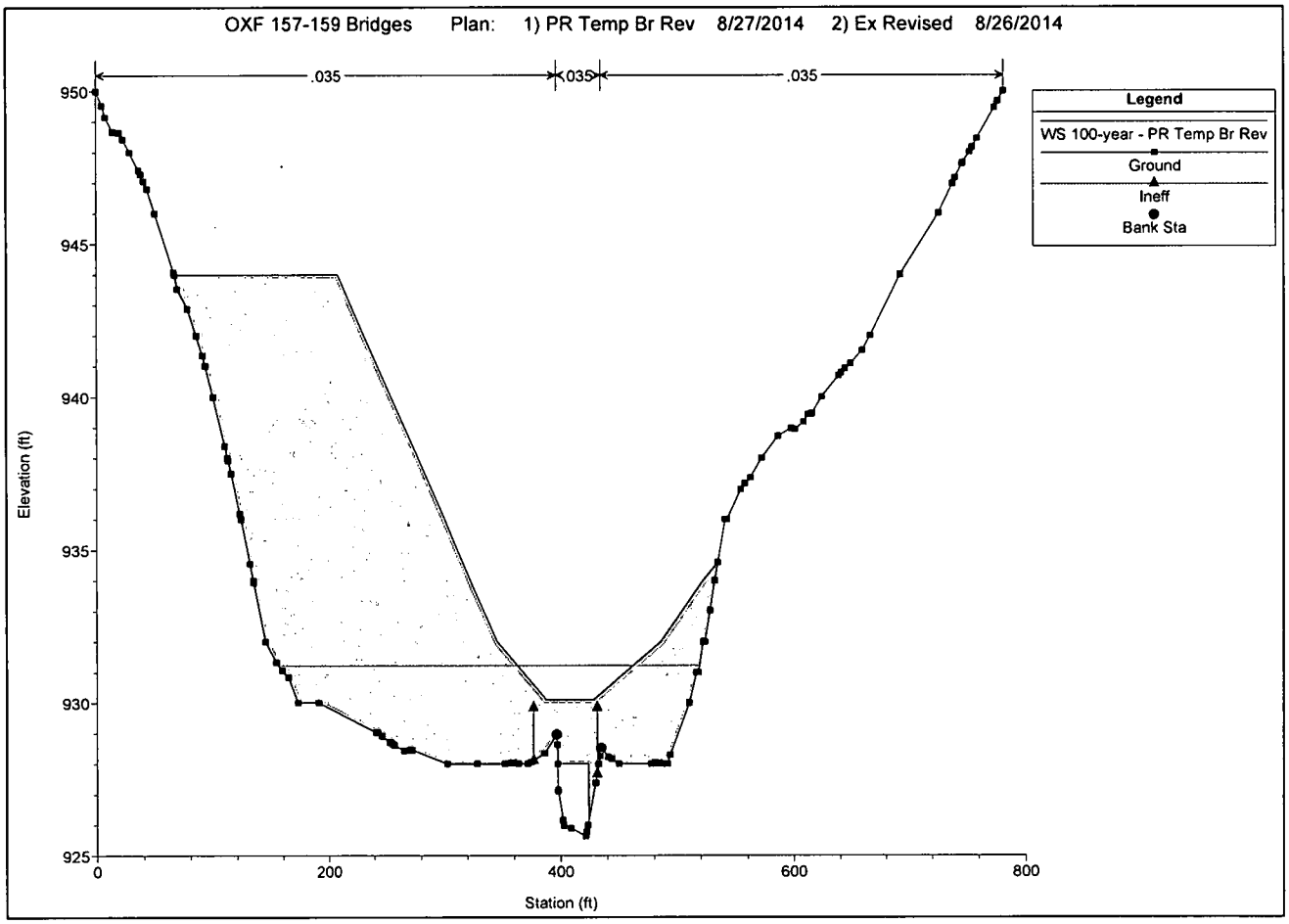
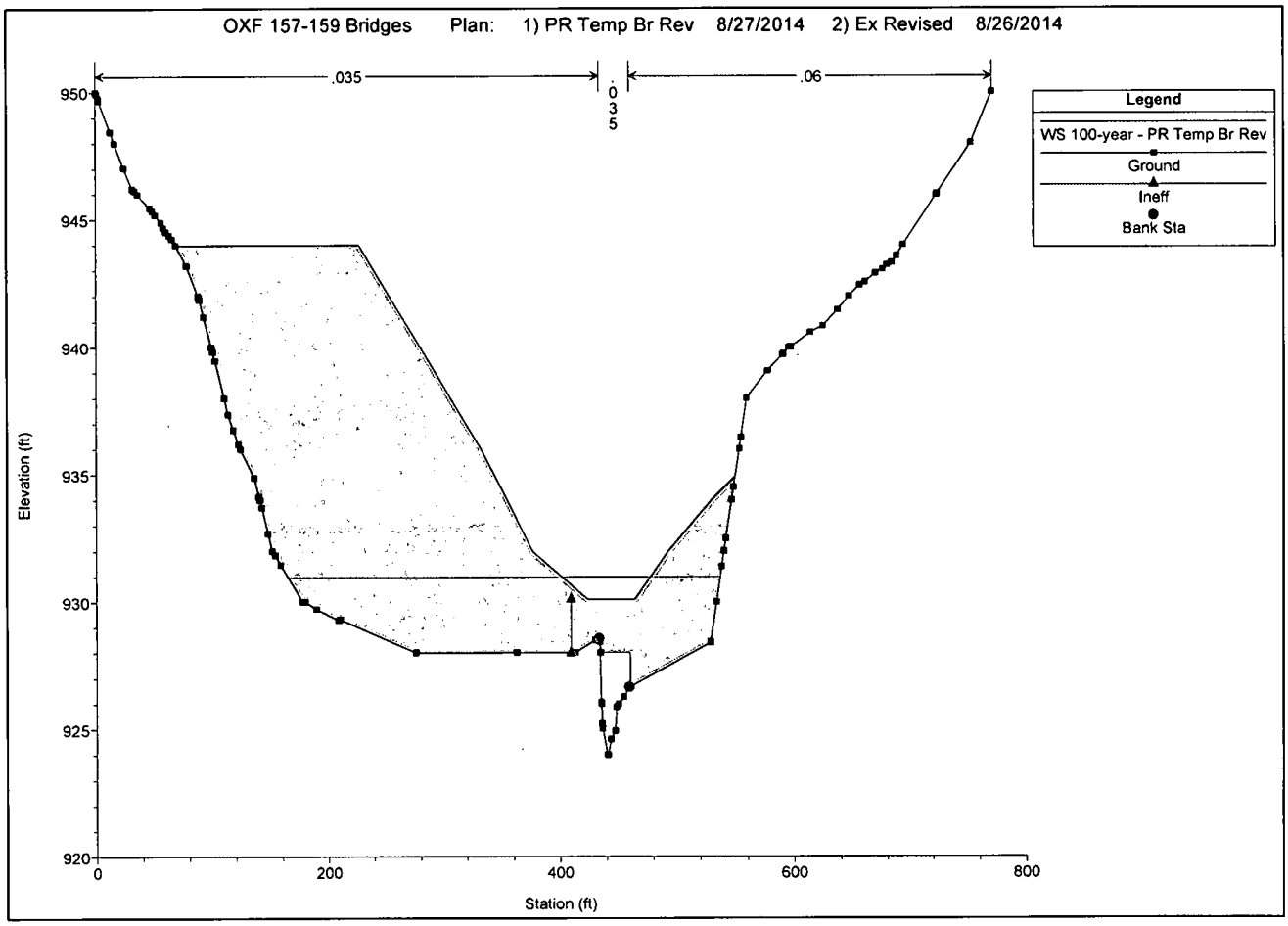
200
400
600
800
Station (ft)


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
.035
.035
.035
Legend
WS 100-year - PR Temp Br Rev
Ground
Ineff
Bank Sta
Elevation (ft)
950
945
940
935
930
925
0
200
400
600
800
Station (ft)


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
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.035
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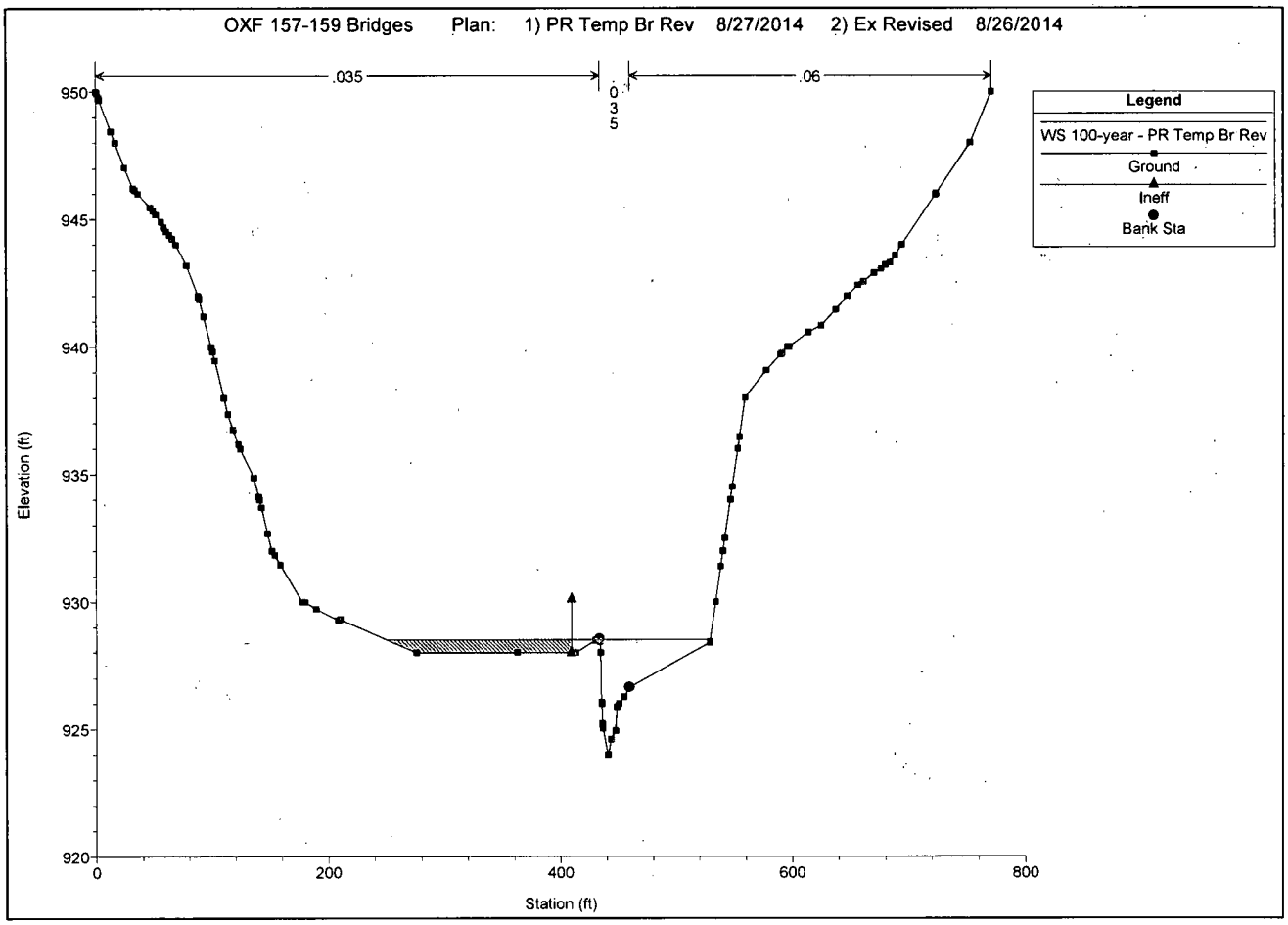
Legend
WS 100-year - PR Temp Br Rev
Ground
Ineff
Bank Sta
Elevation (ft)
950
945
940
935
930
925
920
0
200
400
600
800
Station (ft)


OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
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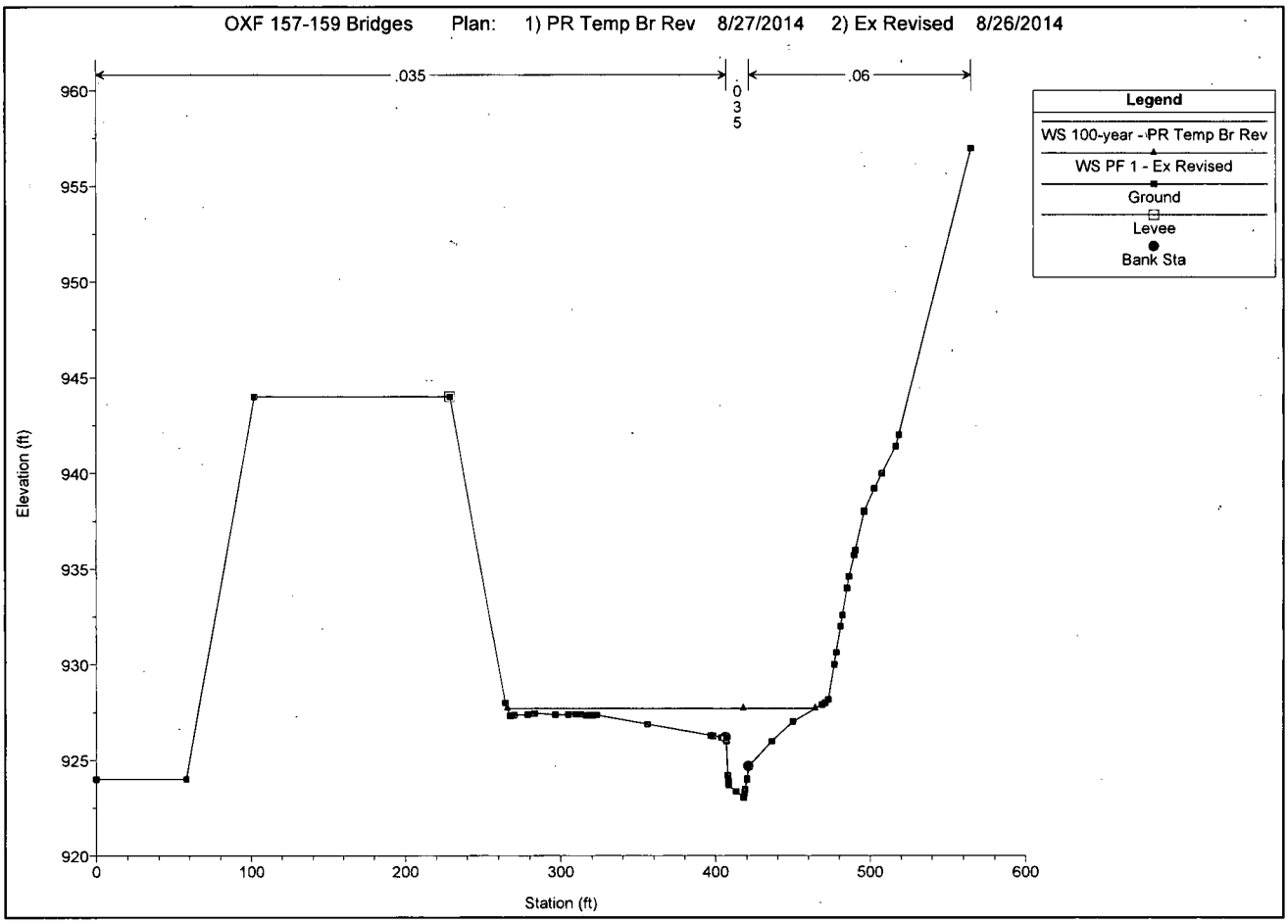
OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
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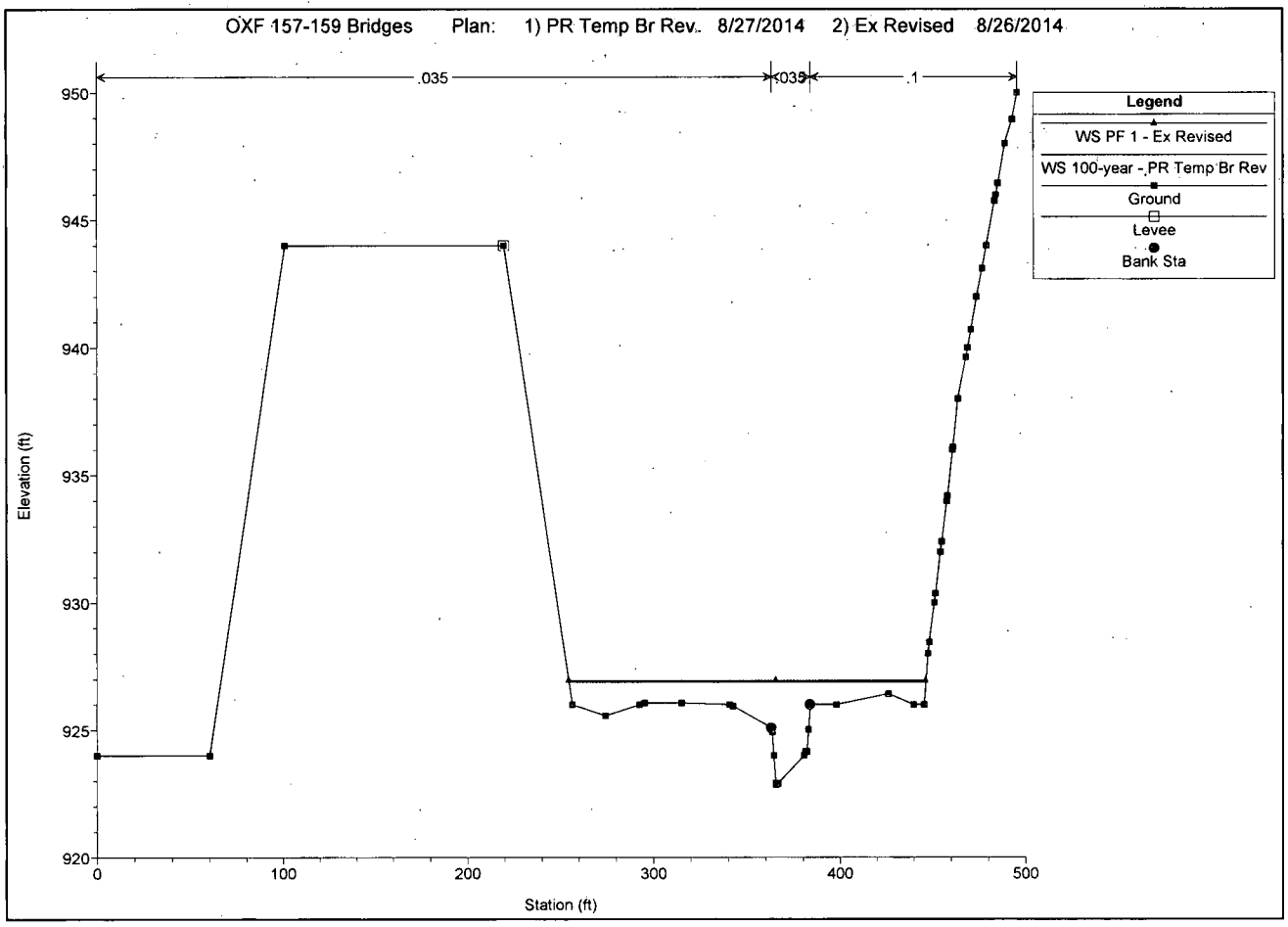
OXF 157-159 Bridges Plan: 1) PR Temp Br Rev. 8/27/2014 2) Ex Revised 8/26/2014
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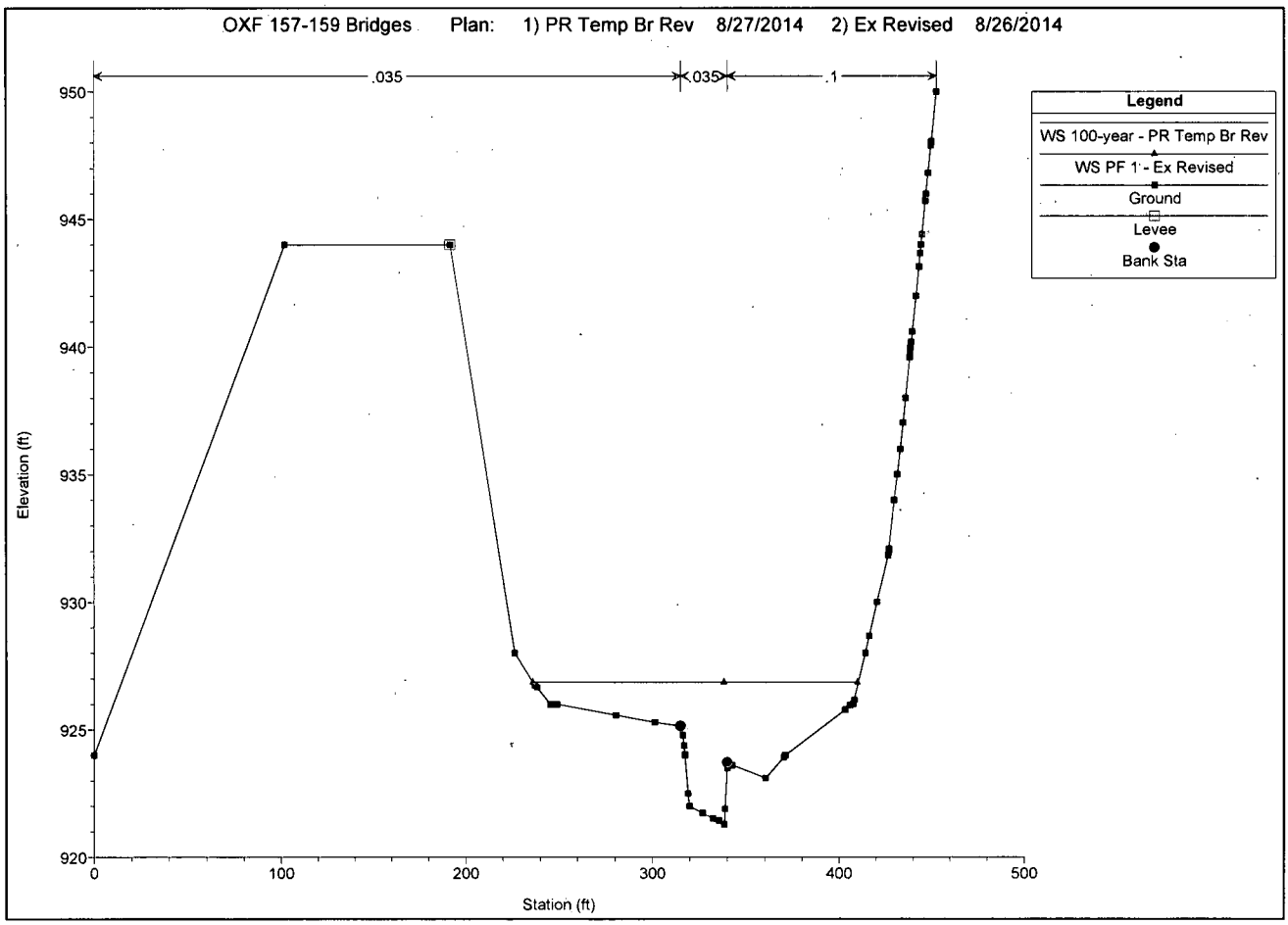
OXF 157-159 Bridges Plan: 1) PR Temp Br Rev 8/27/2014 2) Ex Revised 8/26/2014
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PERMIT NO. 13-113

DODDRIDGE COUNTY

FLOODPLAIN DEVELOPMENT

PERMIT

EQT OXFORD 157

EQT OXFORD 159

PURPOSE FOR PERMIT: CREEK CROSSING

ISSUED TO: EQT Henderson Freshwater Impoundment

ADDRESS: 115 Professional Place PO Box 280 Bridgeport, WV 26330

PROJECT ADDRESS: BLUESTONE

ISSUED BY: Dan Wellings

DATE: 02/03/2014

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

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

#13-113
EQT-OXF 157 & 159
Proposed Well Pad and Associated Pi
Henderson Centralized Freshwa
Impoundment

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

FILED
2014 JAN -8 PM 12:22
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

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 Megan E Jarrett

DATE 1-3-14

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

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

APPLICANT'S NAME: EQT Production Company
ADDRESS: 115 Professional Place P.O. Box 280 Bridgeport WV 26330
TELEPHONE NUMBER: 304-848-0076

BUILDER'S NAME: EQT Production Company

PERMIT NO. 13-113

DODDRIDGE COUNTY

FLOODPLAIN DEVELOPMENT

PERMIT

EQT OXFORD 157

EQT OXFORD 159

PURPOSE FOR PERMIT: CREEK CROSSING Henderson Freshwater Impoundment

ISSUED TO: EQT

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PROJECT ADDRESS: BLUESTONE

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DATE: 02/03/2014

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 230

Dated: 10/04/2011

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

[X] Is located in Special Flood Hazard Area.

FIRM zone designation A

100-Year flood elevation is: N/A NGVD (MSL)

[] Unavailable

[] The proposed development is located in a floodway.

FBFM Panel No._____ Dated_____

[] See section 4 for additional instructions.

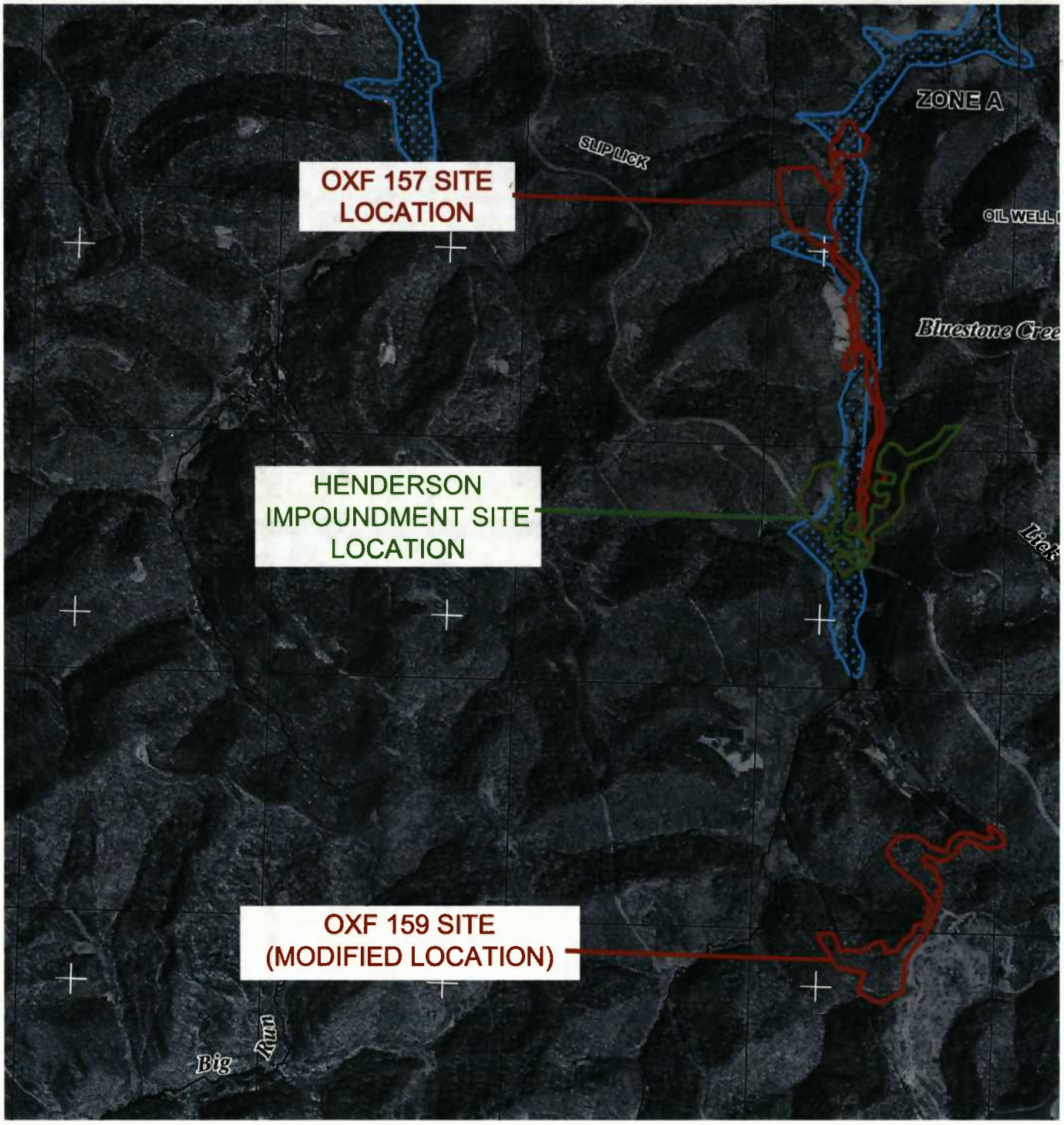
SIGNED Dan Weltman DATE 02/03/2014

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

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

[] A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

HENDERSON IMPOUNDMENT FEMA MAP



NOTES
FEMA FIRM
MAP # 54017C0225C

SCALE
1 INCH = 1000-FEET

0' 2000' 4000' 6000'

SCALE: 1" = 2000'
DATE: 10-28-14
DRAWN BY: CMH
JOB #: 7889

HENDERSON FEMA

THIS DOCUMENT WAS PREPARED BY:
SMITH LAND SURVEYING, INC.
FOR: EQT

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634
WWW.SLSSURVEYS.COM

EQT
Where energy meets innovation.

PROFESSIONAL ENERGY CONSULTANTS
A DIVISION OF SMITH LAND SURVEYING, INC.

October 28, 2014

Mr. Bo Wriston
Floodplain Manager
Doddridge County Commission
118 East Court Street
West Union, WV 26456

Re: EQT Production Company- Henderson Freshwater Impoundment Modification

Mr. Wriston,

On behalf of EQT, Smith Land Surveying, Inc. is applying for a modification to an existing Doddridge County Floodplain Permit (No. 13-113). EQT has proposed a Centralized Impoundment and an access road to aid in the development of multiple Marcellus Shale gas wells. The site is located in Doddridge County west of Maxwell Ridge along Bluestone Creek off County Route 13. The entrance to the site is approximately 1 mile southwest of the County Route 13 and County Route 13/3 Intersection. The disturbance for the Henderson Impoundment Area is approximately 7.82 acres. The total site disturbance including access roads and stockpiles is approximately 22.66 acres.

Portions of the site are located within Flood Zone A as indicated on FEMA Panel 54017C0225C. Please see the attached maps where the limit of disturbance, labeled as 'Henderson Impoundment Site Location' in green, has been overlaid onto a FEMA Firmette. The proposed stream crossing is in the Flood Zone and was permitted to be constructed with a permanent concrete low water crossing. The original plans also included a temporary 40' long portable steel bridge with timber abutments to be constructed prior to the permanent low water crossing. The site plan has been revised to eliminate the permanent low water crossing and the 40' steel bridge is now proposed to be the permanent stream crossing. The new permanent bridge will have a minimum elevation of 930.10' providing adequate capacity to pass a 10-year storm event. The proposed improvements will also result in less than a 1-foot increase in the 100-year water surface elevation at any cross section upstream or downstream of the crossing.

All of the required regulatory permits have been applied for; the USACE application is currently under review and its approval is anticipated shortly.

Included in the attachments are the following: cover letter, Stream Crossing B Details, FEMA map and Topographic map with the site location, revised site plans dated 9/25/14

Again, on behalf of EQT, SLS is requesting your review of the modified application and attached information to begin construction on the Henderson Centralized Impoundment Project once all the required regulatory permits are received. Please feel to contact Wes Wayne with SLS at 304-462-5634 or wwayne@slssurveys.com, or Megan Landfried with EQT at 304-841-2086 or MLandfried@eqt.com should you have any questions or comments.

Respectfully submitted,

Wes Wayne, Staff Engineer/Project Coordinator

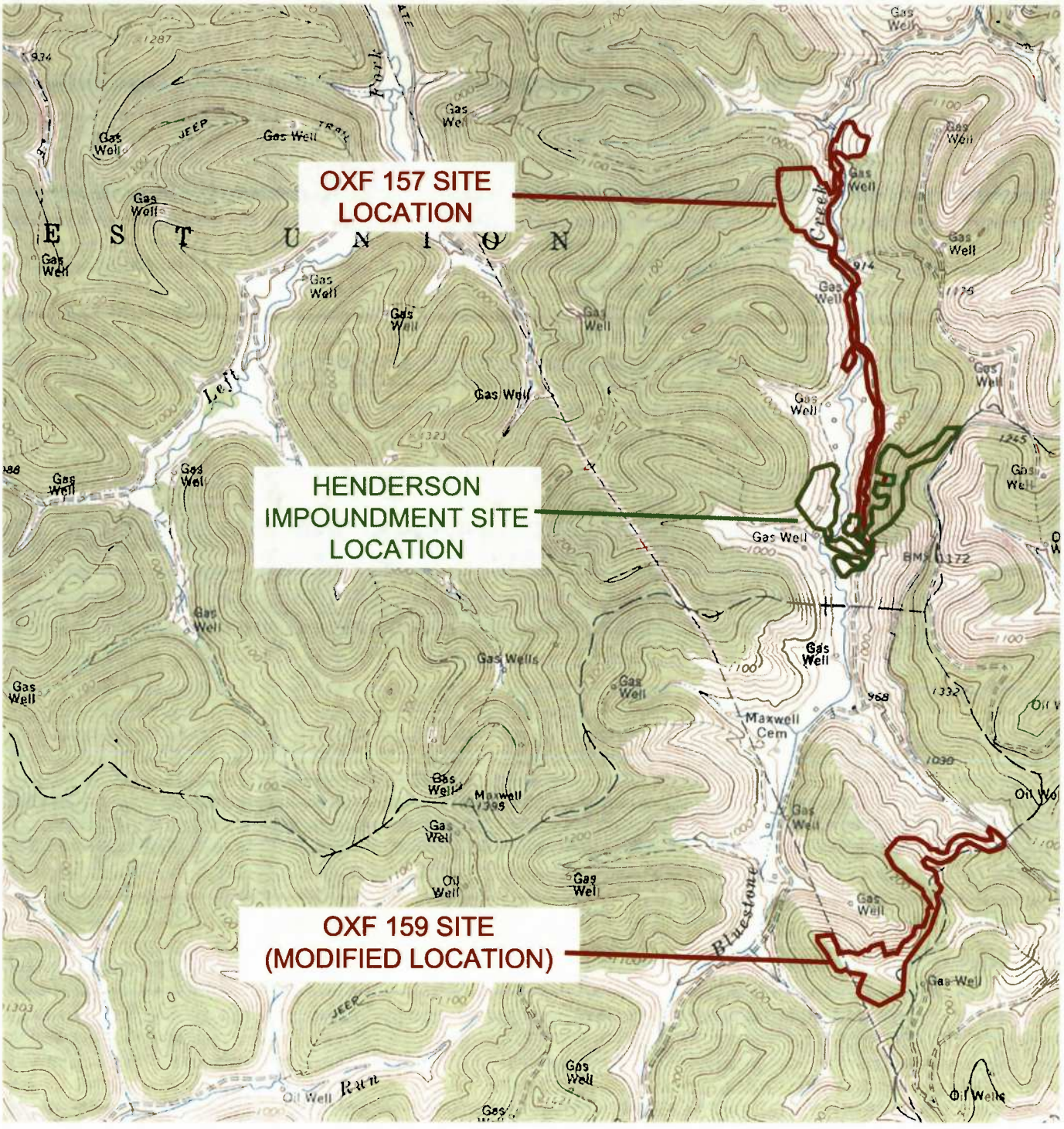
cc: Megan Landfried/EQT Production Company, LLC.

HENDERSON FRESHWATER IMPOUNDMENT CROSSINGS IN FLOOD ZONE

Stream Crossing B (Sheet 15 of Site Plans Revised 09/25/2014)

- **Temporary Crossing:**
  - The original design (Sheet 15 of Original Site Plans dated 12/23/2013) for "Stream Crossing B" Temporary Crossing showed clean rock fill 6" of 2"-4" coarse angular rock and a 40' temporary steel bridge.
  - The revised site plans now show no temporary water crossings.
- **Permanent Crossing:**
  - The original design had a proposed permanent crossing with (4) 18" CMP culverts.
  - The first revised design shows the permanent crossing where the temporary bridge will be removed and a concrete low water ford crossing will be constructed. This low water ford will be comprised of 12" thick 4,000 PSI concrete reinforced with #4 rebar 12" each way and will have 12"-18" of rip rap. During construction, a sandbag cofferdam will be placed on the inlet and outlet sides of the stream crossing. The water will then be pumped around while the low water crossing is being constructed.
  - The second revised design shows the 40' bridge previously designated as temporary to now be a permanent.

HENDERSON IMPOUNDMENT VICINITY MAP



SCALE
1 INCH = 1000-FEET

0' 2000' 4000' 6000'

NOTES
USGS OXFORD TOPO QUADRANGLE

JOB #: 7889	HENDERSON IMP.
DRAWN BY: CMH	THIS DOCUMENT WAS PREPARED BY: SMITH LAND SURVEYING, INC. FOR: EQT
DATE: 10-28-14	
SCALE: 1" = 2000'	

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING INC
SLS
SURVEYORS ENGINEERS ENVIRONMENTAL PROJECT MGMT.
(304) 462-5634 WWW.SLSSURVEYS.COM

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CAD FILE: R:\Data\CADD\WORK 7800-7899\7889\PERMITTING\HENDERSON MODIFIED SITE 10-28-14\7889 MAPS.dwg LAYOUT: 2000 topo USER: chittel

HENDERSON CENTRALIZED IMPOUNDMENT
SITE PLAN
EQT PRODUCTION COMPANY

SITUATE ON THE WATERS OF BLUESTONE CREEK IN
WEST UNION DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA.

PROJECT INFORMATION

PROJECT NAME: HENDERSON CENTRALIZED IMPOUNDMENT

TAX PARCEL:
WEST UNION DISTRICT
MAP 6-1

SURFACE OWNER:
JUSTIN L. HENDERSON
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV
TOTAL PROPERTY AREA: 1,602.9 ± ACRES

OIL AND GAS ROYALTY OWNER:
LEEMAN MAXWELL HRS
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV
TOTAL PROPERTY AREA: 2,164 ± ACRES

SITE LOCATION:
THE HENDERSON CENTRALIZED IMPOUNDMENT SITE IS WEST OF MAXWELL RIDGE ALONG BLUESTONE CREEK OFF COUNTY ROUTE 13. THE ENTRANCE TO THE SITE IS APPROXIMATELY 1 MILE SOUTHWEST OF THE CO. RT. 13 AND CO. RT. 13/3 INTERSECTION.

LOCATION COORDINATES

HENDERSON CENTRALIZED IMPOUNDMENT ENTRANCE
LATITUDE: 39.227701 LONGITUDE: -80.758964 (NAD 83)

HENDERSON CENTRALIZED IMPOUNDMENT
LATITUDE: 39.224948 LONGITUDE: -80.765453 (NAD 83)

SITE DISTURBANCE COMPUTATIONS

ROAD A PHASE 1 & 2= 13.42 ± ACRES (ROAD A PHASE I, II & STOCKPILES A-D)
HENDERSON CENTRALIZED IMPOUNDMENT AREA = 7.82 ± ACRES*
ACCESS ROAD "B"= 1.42 ± ACRES
TOTAL SITE DISTURBANCE = 22.66 ± ACRES
*INCLUDES AREA OF THE HENDERSON CENTRALIZED IMPOUNDMENT & STOCKPILES

ENTRANCE PERMIT

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

MISS UTILITY STATEMENT

MISS UTILITY OF WEST VIRGINIA WAS NOTIFIED FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1328176253. IN ADDITION, MISS UTILITY WILL BE CONTACTED PRIOR TO START OF THE PROJECT.

FLOODPLAIN NOTE

THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT IS LOCATED IN FEMA FLOOD ZONE X AND A, PER THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 54017C0225C, DATED OCTOBER 4, 2011.

FOR A DETAILED ANALYSIS OF THE DEVELOPMENT WITHIN THE FEMA FLOOD ZONE "A", SEE THE REPORT BY NAVITUS ENGINEERING ENTITLED "FLOODPLAIN ANALYSIS OF BLUESTONE CREEK" DATED DECEMBER 4, 2013.

ENVIRONMENTAL NOTES

A WETLAND DELINEATION WAS PERFORMED ON APRIL 25-26, 2013 BY POTESTA AND ASSOCIATES, INC. 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 MAY 29, 2013 REPORT PROJECT # 0101-11-147-15701 WAS PREPARED BY POTESTA AND ASSOCIATES, INC. SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE REPORT 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. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION DESCRIBED BY THIS REPORT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

GENERAL DESCRIPTION

THE HENDERSON CENTRALIZED IMPOUNDMENT IS BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

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

OXFORD QUAD NEW MILTON QUAD

2000 0 2000
SCALE: 1" = 2000'

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!!

LIST OF DRAWINGS

LEGEND

EX. INDEX CONTOUR	PROP. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PROP. INTERMEDIATE CONTOUR
EX. BOUNDARY LINE	PROP. GRADING LIMITS
EX. ROAD EDGE OF GRAVEL/DIRT	PROP. LIMITS OF DISTURBANCE
EX. ROAD EDGE OF PAVEMENT	PROP. WELL PAD
EX. ROAD CENTERLINE	PROP. WELL HEAD
EX. DITCHLINE	PROP. 4" PVC DRAIN PIPE
EX. CULVERT	PROP. SUMP DRAIN
EX. GUARDRAIL	PROP. CONTAINMENT BERM
EX. FENCELINE	PROP. PIT/IMPOUNDMENT CL
EX. GATE	PROP. PERIMETER SAFETY FENCE
EX. OVERHEAD UTILITY	PROP. ACCESS GATE WITH EMERGENCY LIFELINE
EX. OVERHEAD UTILITY R/W	
EX. POWER POLE	
EX. GUY WIRE	
EX. TELEPHONE LINE	
EX. GASLINE	
EX. GASLINE R/W	PROP. ROCK CONSTRUCTION ENTRANCE
EX. WATERLINE	
EX. WATER WELL	
EX. GAS WELL	
EX. TREELINE	
EX. REFERENCE TREE	PROP. ROAD EDGE OF GRAVEL
EX. DELINEATED STREAM	PROP. ROAD CENTERLINE
EX. DELINEATED WETLAND	PROP. V-DITCH W/ CHECK DAMS
EX. BUILDING	PROP. DITCH RELIEF CULVERT (DRC)
EX. BRIDGE	PROP. RIP-RAP OUTLET PROTECTION
100' WETLAND/STREAM BUFFER	PROP. GUARDRAIL
	PROP. ROCK LEVEL SPREADER
	PROP. EARTHEN DIVERSION BERM
	PROP. ORANGE SAFETY FENCE
	PROP. SUPER SILT FENCE
	PROP. COMPOST FILTER SOCK
	PROP. COMPOST SOCK DIVERSION
	PROP. GROUNDWATER DEWATERING TRENCH
	PROP. GROUNDWATER DEWATERING PIPE
	SECTION LINE
	MATCHLINE
	X-SECTION GRID INDEX
	X-SECTION GRID INTERMEDIATE
	X-SECTION PROPOSED GRADE
	X-SECTION EXISTING GRADE
	X-SECTION WATER SURFACE
	SPOT ELEVATION
	CENTER OF PAD

OPERATOR

EQT PRODUCTION COMPANY
OPERATOR ID: 306686
115 PROFESSIONAL PLACE
P.O. BOX 280
BRIDGEPORT, WV 26330
PHONE: (304) 348-3870

ENGINEER/SURVEYOR

SMITH LAND SURVEYING, INC.
12 VANHORN DRIVE
P.O. BOX 150
GLENVILLE, WV 26351
PHONE: (304) 462-5634

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WWW.SLSSURVEYS.COM

KIP R. HALL
REGISTERED
15176
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

THIS DOCUMENT WAS PREPARED BY:

FOR: EQT PRODUCTION COMPANY

COVER SHEET
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE:	12/23/2013
SCALE:	1" = 2000'
DESIGNED BY:	
FILE NO.	7889
SHEET	1 OF 21
REV:	09/25/2014

CONSTRUCTION NOTES:

1. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WVDEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS.

2. MEASURES TO CONTROL EROSION AND SILTATION, INCLUDING DETENTION PONDS SERVING AS SILT BASINS DURING CONSTRUCTION, MUST BE PROVIDED PRIOR TO ISSUANCE OF THE SITE DEVELOPMENT PERMIT. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WVDEP 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. NOTIFICATION SHALL BE GIVEN TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPE LINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.

6. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS. 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.

7. THE DEVELOPER WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS TO 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 IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND NOTIFY SMITH LAND SURVEYING AT (304) 462-5634 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN.

12. CONTRACTORS 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.

13. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.

14. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR DAILY AND CHECKED AFTER EVERY RAINFALL. ALL DRAIN INLETS SHALL BE FREE OF SILTATION AND DEBRIS. INEFFECTIVE MEASURES SHALL BE REPLACED, AS NECESSARY.

15. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR, 2 DAYS PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION SEQUENCE

THE BMP'S SHALL BE IMPLEMENTED, MAINTAINED, AND OPERATED IN THE FOLLOWING GENERAL SEQUENCE OF CONSTRUCTION TO MITIGATE THE HAZARD OF ACCELERATED EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S FOREMAN AS NEEDED TO ELIMINATE ANY POTENTIAL EROSIVE CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WVDEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

1) STAKE THE LIMITS OF CONSTRUCTION.

2) INSTALL THE ROCK CONSTRUCTION ENTRANCE AS SHOWN ON THE PLANS.

3) INSTALL ALL ORANGE SAFETY FENCE AS SHOWN AROUND ANY DELINEATED STREAMS AND WETLANDS TO CLEARLY IDENTIFY THOSE AREAS THAT ARE NOT TO BE DISTURBED.

4) INSTALL ALL BMP'S (SUPER SILT FENCE, REINFORCED SILT FENCE, SEDIMENT TRAPS, ETC) AS SHOWN ON THE PLANS AND DETAILS.

5) CLEAR AND GRUB THE ACCESS ROAD AND IMPOUNDMENT AREA. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, BOULDERS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY SEDIMENT CONTROLS. TREES SIX INCHES IN DIAMETER AND LARGER SHALL BE CUT AND LOGS STACKED. SMALLER TREES, BRUSH, & STUMPS SHALL BE CUT AND OR GRUBBED AND WINDROWED IN APPROPRIATE AREAS FOR USE AS SEDIMENT BARRIERS AT WATER DRAINAGE OUTLETS, WINDROWED BELOW THE WELL SITE, USED FOR WILDLIFE HABITAT, BURNED (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY OTHER METHODS APPROVED BY DEP.

6) INSTALL ANY WETLAND OR STREAM CROSSINGS AS SHOWN ON THE PLANS.

7) CONVEY UPSLOPE DRAINAGE AROUND THE ACCESS ROAD AND IMPOUNDMENT AREA BY CONSTRUCTING ALL DIVERSION BERM(S) AS SHOWN ON THE PLANS.

8) CONSTRUCT THE ACCESS ROAD. DITCH RELIEF CULVERTS SHALL BE INSTALLED AT A GRADE OF 1-8% TO MINIMIZE OUTLET VELOCITIES TO THE EXTENT POSSIBLE. INSTALL OUTLET PROTECTION AS SHOWN ON PLANS. STABILIZE THE ROAD WITH STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. STOCKPILE AND STABILIZE TOPSOIL ALONG THE ACCESS ROAD, AS NEEDED.

9) STRIP THE TOPSOIL FROM THE IMPOUNDMENT AREA. TOPSOIL SHALL BE STOCKPILED AND IMMEDIATELY STABILIZED.

10) GRADE THE IMPOUNDMENT AREA AS SHOWN ON THE PLAN. IMMEDIATELY STABILIZE THE OUTER AREAS OF THE IMPOUNDMENT, AS WELL AS THE WELL PAD AND ANY TURNAROUND AREAS WITH STONE AND THE SIDE SLOPES WITH EROSION CONTROL BLANKETING WHEN SLOPES ARE 3:1 OR GREATER. APPLY SEED AND MULCH ALL DISTURBED 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 RE-DISTURBED BEFORE SITE RECLAMATION BEGINS.

11) INSTALL THE IMPOUNDMENT LINER SYSTEM AND PERIMETER SAFETY FENCE W/GATE AND EMERGENCY LIFE LINE AS SHOWN ON THE PLANS.

12) PREVIOUSLY DISTURBED AREAS AND IMMEDIATE DOWN SLOPE AREAS SHALL BE INSPECTED AFTER EACH RAINFALL STORM EVENT AND MONITORED WEEKLY FOR SIGNS OF ACCELERATED EROSION. IMPLEMENT ADDITIONAL BMP'S AS DEEMED NECESSARY. THESE INSPECTIONS SHALL CONTINUE DURING THE DURATION OF THE PROJECT AND SUBSEQUENT SITE RECLAMATION.

13) ONCE THE IMPOUNDMENT HAS BEEN COMPLETED, SUBMIT THE AS-BUILT CERTIFICATION FOR THE IMPOUNDMENT FACILITY TO THE WVDEP OFFICE OF OIL AND GAS, PRIOR TO PLACING FLUIDS IN THE STRUCTURE.

14) COMMENCE USE OF THE CENTRALIZED FRESHWATER IMPOUNDMENT FACILITY. THE CENTRALIZED FRESHWATER IMPOUNDMENT SHALL BE MONITORED CONTINUOUSLY DURING THE INITIAL FILLING OPERATION.

15) ONCE DISTURBED AREAS HAVE BEEN RE-VEGETATED AND STABILIZED FOLLOWING RECLAMATION, THE TEMPORARY BMP'S IN THOSE AREAS MAY BE REMOVED. CONTINUE TO MONITOR THESE AREAS TO ENSURE A UNIFORM RATE OF 70% VEGETATIVE COVERAGE IS MAINTAINED. ANY AREAS FOUND TO BE DEFICIENT SHALL BE RE-SEEDED AND MULCHED.

SITE CLEANUP & RECYCLE PROGRAM

1. 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.

2. OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.

3. ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.

4. ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDED AND MULCHED, AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.

MAINTENANCE PROGRAM

1. BMP'S WILL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH MEASURABLE RAINFALL EVENT DURING THE ACTIVE CONSTRUCTION PHASE OF THE PROJECT.

2. ALL REVEGETATED ACCESS ROADS AND FACILITIES ARE TO BE MAINTAINED THROUGHOUT THE LIFE OF EACH STRUCTURE.

3. CULVERTS, ROAD DITCHES, BROAD-BASED DIPS, DIVERSION DITCHES, AND ROCK CHECK DAMS MUST BE MAINTAINED IN PROPER WORKING ORDER AND WILL BE CLEANED OUT, REPAIRED, OR REPLACED AS NECESSARY.

4. FILTER STRIPS AND/OR SILT FENCE WILL BE MAINTAINED.

5. ALL AREAS OF EARTH DISTURBANCE WILL BE REPAIRED WHERE SIGNS OF ACCELERATED EROSION ARE DETECTED.

6. SEEDING AND MULCHING WILL BE REPEATED IN THOSE AREAS THAT APPEAR TO BE FAILING OR HAVE FAILED.

CENTRALIZED IMPOUNDMENT CONSTRUCTION STANDARDS NOTES

THE DESIGN, CONSTRUCTION, AND REMOVAL OF EMBANKMENTS ASSOCIATED WITH CENTRALIZED IMPOUNDMENTS FOR OIL AND GAS WELLS 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 IMPOUNDMENT EMBANKMENTS SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO BE STRUCTURALLY SOUND AND REASONABLY PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES.

1. THE FOUNDATION FOR A CENTRALIZED IMPOUNDMENT EMBANKMENT MUST BE STRIPPED AND GRUBBED TO A MINIMUM DEPTH OF 2 FEET PRIOR TO PLACEMENT AND COMPACTION OF EARTHEN FILL MATERIAL. NO EMBANKMENT FILL SHALL BE PLACED ON FROZEN MATERIAL.

2. ANY SPRINGS ENCOUNTERED WITHIN THE FOUNDATION AREA SHALL BE DRAINED TO THE OUTSIDE/DOWNSTREAM TOE OF EMBANKMENT. CONSTRUCTED DRAIN SECTION SHALL BE AN EXCAVATED 2' x 2' TRENCH AND BACK FILLED WITH TYPE A SAND, COMPACTED BY HAND TAMPER. NO GEOTEXTILES SHALL BE USED TO LINE TRENCH. THE LAST 3' OF DRAIN AT THE DOWNSTREAM END SHALL BE CONSTRUCTED WITH AASHTO #8 MATERIAL.

3. SOILS FOR EARTHEN EMBANKMENT CONSTRUCTION SHALL BE LIMITED TO TYPES GC, GM, SC, SM, CL, OR ML (ASTMD-2487 - UNIFIED SOILS CLASSIFICATION). SOILS MUST CONTAIN A MINIMUM OF 20% OF PLUS NO. 200 SIEVE AND BE "WELL GRADED" MATERIAL WITH NO COBBLES OR BOULDER SIZE MATERIAL MIXED WITH THE CLAY. A MINIMUM OF THREE SAMPLES SHALL BE CLASSIFIED.

4. THE EARTHEN EMBANKMENT SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER. THE LIFTS MUST BE IN HORIZONTAL LAYERS WITH A MAXIMUM LOOSE LIFT THICKNESS 12" AND MAXIMUM PARTICLE SIZE LESS THAN 6".

5. THE PLACEMENT OF ALL FILL MATERIAL SHALL BE FREE OF WOOD, STUMPS AND ROOTS, LARGE ROCKS AND BOULDERS, AND ANY OTHER NONCOMPACTABLE SOIL MATERIAL. THE EMBANKMENT SHALL BE COMPACTED TO A MINIMUM OF VISIBLE NON-MOVEMENT. HOWEVER, THE COMPACTION EFFORT SHALL NOT EXCEED THE OPTIMUM MOISTURE LIMITS.

6. THE EMBANKMENT TOP SHALL BE A MINIMUM OF 12' IN WIDTH.

7. THE MINIMUM INSIDE AND OUTSIDE SIDESLOPES SHALL BE 2H:1V, UNLESS OTHERWISE SPECIFIED.

8. ALL EXPOSED EMBANKMENT SLOPES, NOT COVERED BY COMPACTED ROCKFILL OR RIPRAP SHALL BE LIMED, FERTILIZED, SEEDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVER IN COMPLIANCE WITH THE WVDEP EROSION AND SEDIMENT CONTROL FIELD MANUAL MUST BE ESTABLISHED UPON THE COMPLETION OF THE IMPOUNDMENT/PIT CONSTRUCTION. EMBANKMENTS SHALL BE MAINTAINED WITH A GRASSY VEGETATIVE COVER AND FREE OF BRUSH AND/OR TREES.

9. A MINIMUM OF 2' OF FREEBOARD SHALL BE MAINTAINED AT ALL TIMES DURING THE OPERATION OF THE IMPOUNDMENT.

10. ALL EMBANKMENT CONSTRUCTION AND COMPACTION TESTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CENTRALIZED IMPOUNDMENT LINER SYSTEM NOTES:

THE DESIGNED IMPOUNDMENT FACILITY SHALL BE FULLY LINED WITH A GEOSYNTHETIC LINER SYSTEM. LINERS SHALL BE INSTALLED IN ACCORDANCE TO MANUFACTURER'S SPECIFICATIONS.

1. THE SUB-BASE SHALL BEAR THE WEIGHT OF THE LINER SYSTEM, WATER, AND EQUIPMENT OPERATING ON THE IMPOUNDMENT WITHOUT CAUSING OR ALLOWING A FAILURE OF THE LINER SYSTEM.

2. THE SUB-BASE SHALL BE COMPACTED TO ACCOMMODATE POTENTIAL SETTLEMENT WITHOUT DAMAGE TO THE LINER SYSTEM.

3. THE UPPER 6" OF THE SUB-BASE SHALL BE COMPACTED TO A STANDARD PROCTOR DENSITY OF AT LEAST 95%.

4. THE SUB-BASE SHALL BE HARD, UNIFORM, SMOOTH AND FREE OF DEBRIS, ROCK FRAGMENTS, PLANT MATERIAL AND OTHER FOREIGN MATERIAL.

5. THE SUB-BASE SHALL BE COVERED WITH NON-WOVEN GEOTEXTILE FABRIC TO CUSHION THE PRIMARY LINER AND ALLOW FOR ADEQUATE VENTING BETWEEN THE PRIMARY LINER AND THE SUB-BASE TO PREVENT THE ENTRAPMENT OF GASES BENEATH THE LINER SYSTEM.

6. THE IMPOUNDMENT AREA SHALL BE DRAINED AND COMPLETELY DRY PRIOR TO THE PLACEMENT OF THE PRIMARY LINER. THE PRIMARY LINER SHALL MEET ALL WV DEP GUIDELINES FOR MINIMUM THICKNESS AND SHALL PREVENT THE MIGRATION OF WATER THROUGH THE LINER TO THE GREATEST DEGREE THAT IS TECHNOLOGICALLY POSSIBLE.

7. THE PRIMARY LINER SHALL FULLY COVER THE BOTTOM AND SIDEWALLS OF THE IMPOUNDMENT.

8. AN ANCHOR TRENCH SHALL BE EXCAVATED COMPLETELY AROUND THE PERIMETER OF THE IMPOUNDMENT/PIT AREA AT THE PLANNED ELEVATION OF THE TOP OF THE LINING. THE TRENCH SHALL BE A MINIMUM 36 INCHES DEEP AND 24 INCHES WIDE.

9. ALL ELEMENTS OF THE LINER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS. ALL SEAMS AND SEALS AROUND ANY PROJECTIONS SHALL BE SEALED AND TESTED IN A METHOD APPROVED BY THE MANUFACTURER.

10. GAS RELIEF VENTS SHALL BE PROVIDED ALONG THE TOP OF THE LINER AND WITHIN ONE FOOT OF THE PERIMETER OF THE IMPOUNDMENT TO ALLOW GASES TO ESCAPE FROM UNDER THE GEOMEMBRANE. MAXIMUM SPACING FOR VENTS SHALL BE 30 FEET.

11. WATER LEVEL MARKINGS SHALL BE CLEARLY PAINTED (1' INCREMENTS) ON THE LINER SYSTEM TO IDENTIFY THE WATER SURFACE ELEVATION.

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FOR: EQT PRODUCTION COMPANY

NOTES
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013

SCALE: N/A

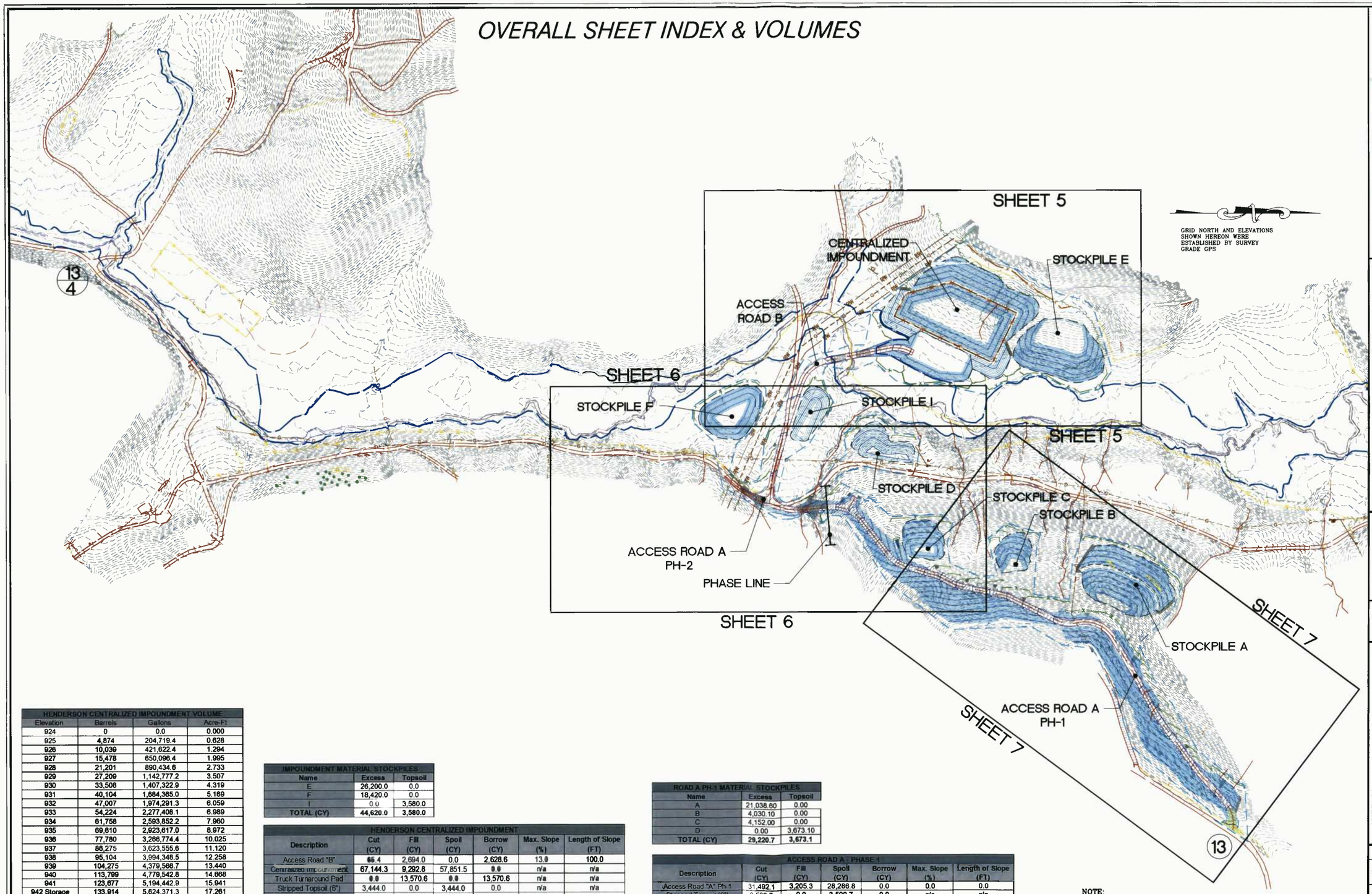
DESIGNED BY:

FILE NO. 7889

SHEET 2 OF 21

REV: 09/25/2014

OVERALL SHEET INDEX & VOLUMES



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

HENDERSON CENTRALIZED IMPOUNDMENT VOLUME			
Elevation	Barrels	Gallons	Acre-Ft
924	0	0.0	0.000
925	4,874	204,719.4	0.628
926	10,039	421,622.4	1.294
927	15,478	650,096.4	1.995
928	21,201	890,434.6	2.733
929	27,209	1,142,777.2	3.507
930	33,508	1,407,322.9	4.319
931	40,104	1,684,385.0	5.169
932	47,007	1,974,291.3	6.059
933	54,224	2,277,408.1	6.989
934	61,758	2,593,852.2	7.960
935	69,610	2,923,617.0	8.972
936	77,780	3,266,774.4	10.025
937	86,275	3,623,555.6	11.120
938	95,104	3,994,348.5	12.258
939	104,275	4,379,566.7	13.440
940	113,799	4,779,542.8	14.668
941	123,677	5,194,442.9	15.941
942 Storage	133,914	5,624,371.3	17.261
943	144,876	6,084,786.3	18.674
944	155,530	6,532,266.2	20.047

Incised Elev.= 930.0

IMPOUNDMENT MATERIAL STOCKPILES		
Name	Excess	Topsoil
E	26,200.0	0.0
F	18,420.0	0.0
I	0.0	3,580.0
TOTAL (CY)	44,620.0	3,580.0

HENDERSON CENTRALIZED IMPOUNDMENT						
Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	Length of Slope (FT)
Access Road "B"	65.4	2,694.0	0.0	2,628.6	13.0	100.0
Centralized Impoundment	67,144.3	9,292.8	57,851.5	0.0	n/a	n/a
Truck Turnaround Pad	0.0	13,570.6	0.0	13,570.6	n/a	n/a
Stripped Topsoil (6")	3,444.0	0.0	3,444.0	0.0	n/a	n/a
Material Stockpiles	0.0	48,200.0	0.0	48,200.0	n/a	n/a
Totals	70,653.7	73,757.4	61,295.5	64,399.2	n/a	n/a
	TOTAL SPOIL (CY) =		-3,103.7			

ROAD A PH-1 MATERIAL STOCKPILES		
Name	Excess	Topsoil
A	21,038.60	0.00
B	4,030.10	0.00
C	4,152.00	0.00
D	0.00	3,673.10
TOTAL (CY)	29,220.7	3,673.1

ACCESS ROAD A - PHASE 1						
Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	Length of Slope (FT)
Access Road "A" Ph-1	31,492.1	3,205.3	28,286.8	0.0	0.0	0.0
Stripped Topsoil (6")	3,500.7	0.0	3,500.7	0.0	n/a	n/a
Material Stockpiles	0.0	32,893.8	0.0	32,893.8	n/a	n/a
Totals	34,992.8	36,099.1	31,787.5	32,893.8	n/a	n/a
	TOTAL SPOIL (CY) =		-1,106.3			

NOTE:
ALL EARTHWORK VOLUMES WERE CALCULATED USING A CUT SWELL FACTOR OF 1.0 AND A FILL SHRINK FACTOR OF 1.0

150 0 150
GRAPHIC SCALE

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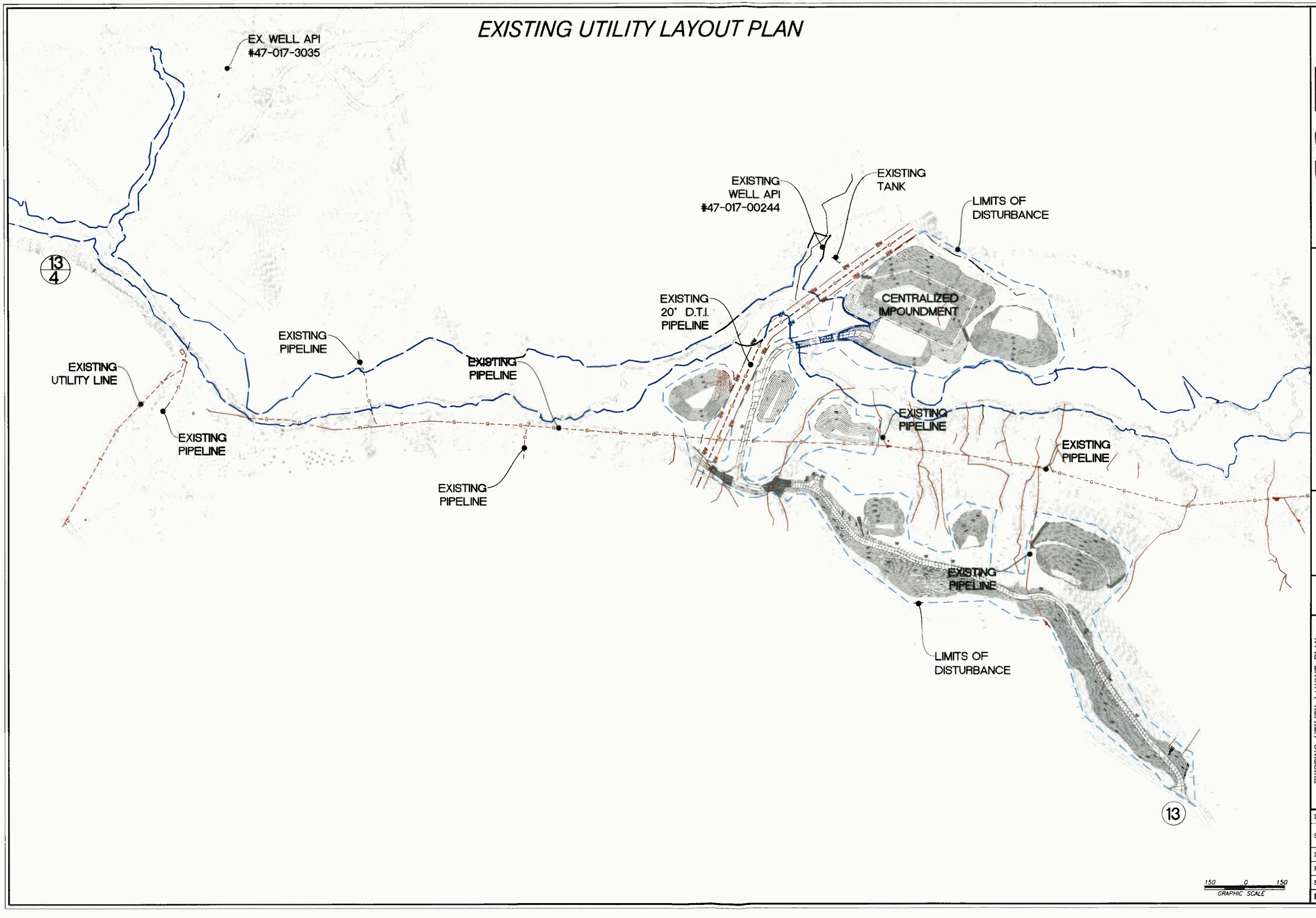
OVERALL SHEET INDEX & VOLUMES

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: 1" = 150'
DESIGNED BY:
FILE NO. 7869
SHEET 3 OF 21
REV: 09/25/2014

EXISTING UTILITY LAYOUT PLAN



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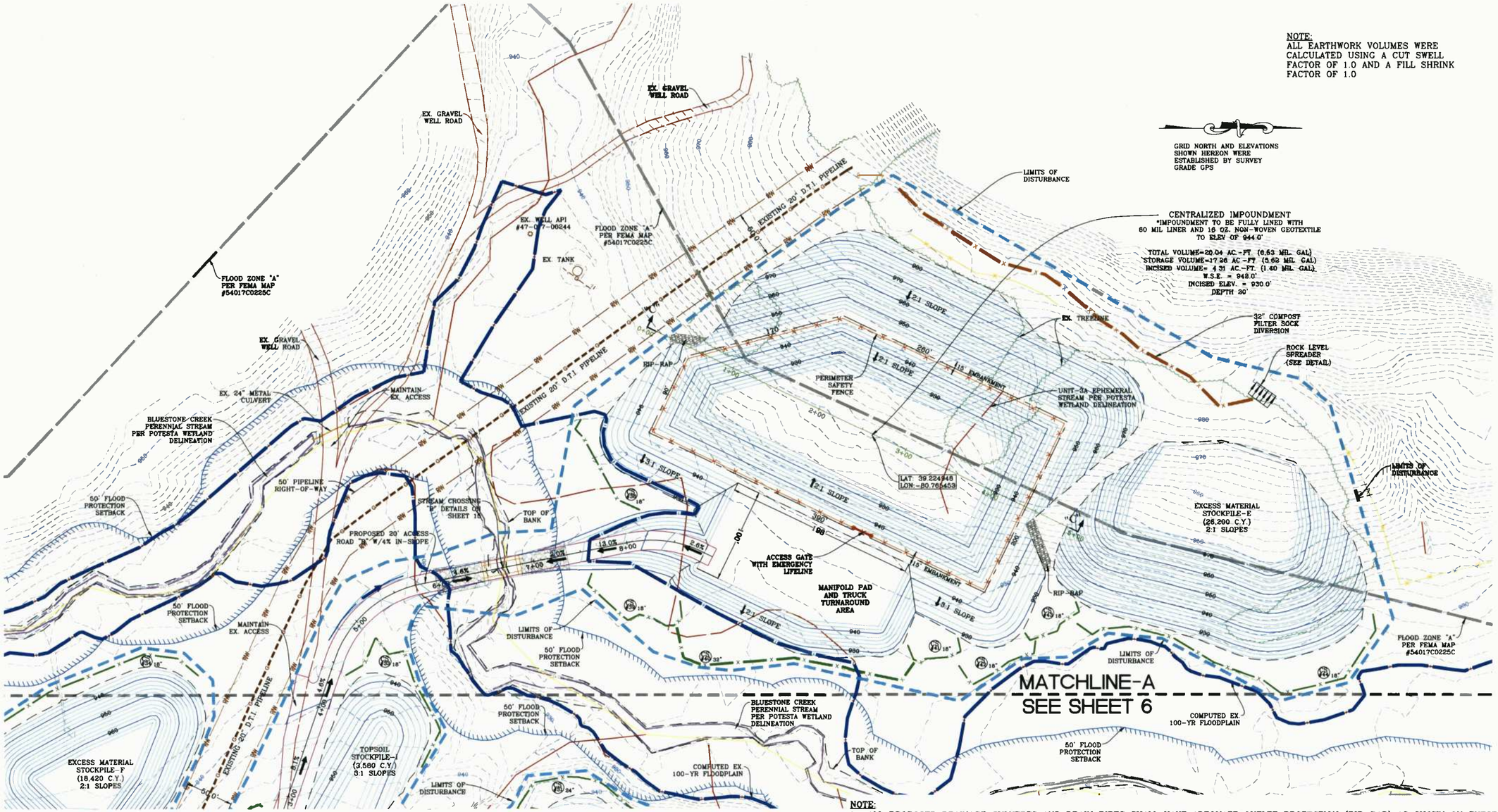
EXISTING UTILITY LAYOUT PLAN

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: 1" = 150'
DESIGNED BY:
FILE NO. 7889
SHEET 4 OF 21
REV: 09/25/2014

HENDERSON CENTRALIZED IMPOUNDMENT DETAILS



50 25 0 50 100

SCALE: 1" = 50'

NOTE:

1. ALL PROPOSED DRAINAGE CULVERTS AND DRAIN PIPES SHALL HAVE ADEQUATE OUTLET PROTECTION (RIP-RAP) AS SHOWN ON THESE PLANS.
2. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN 12" LIFTS (9" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTER.
3. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS PRIOR TO CONSTRUCTING STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED TOPSOIL IS TO BE REAPPLIED AT A DEPTH OF 6". SLOPES SHALL BE TRACKED BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR.
4. ALL ACCESS ROAD IMPROVEMENTS SHALL BE KEPT WITHIN THE LIMITS OF THE EXISTING ACCESS ROAD.
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HENDERSON CENTRALIZED IMPOUNDMENT DETAILS

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013

SCALE: 1" = 50'

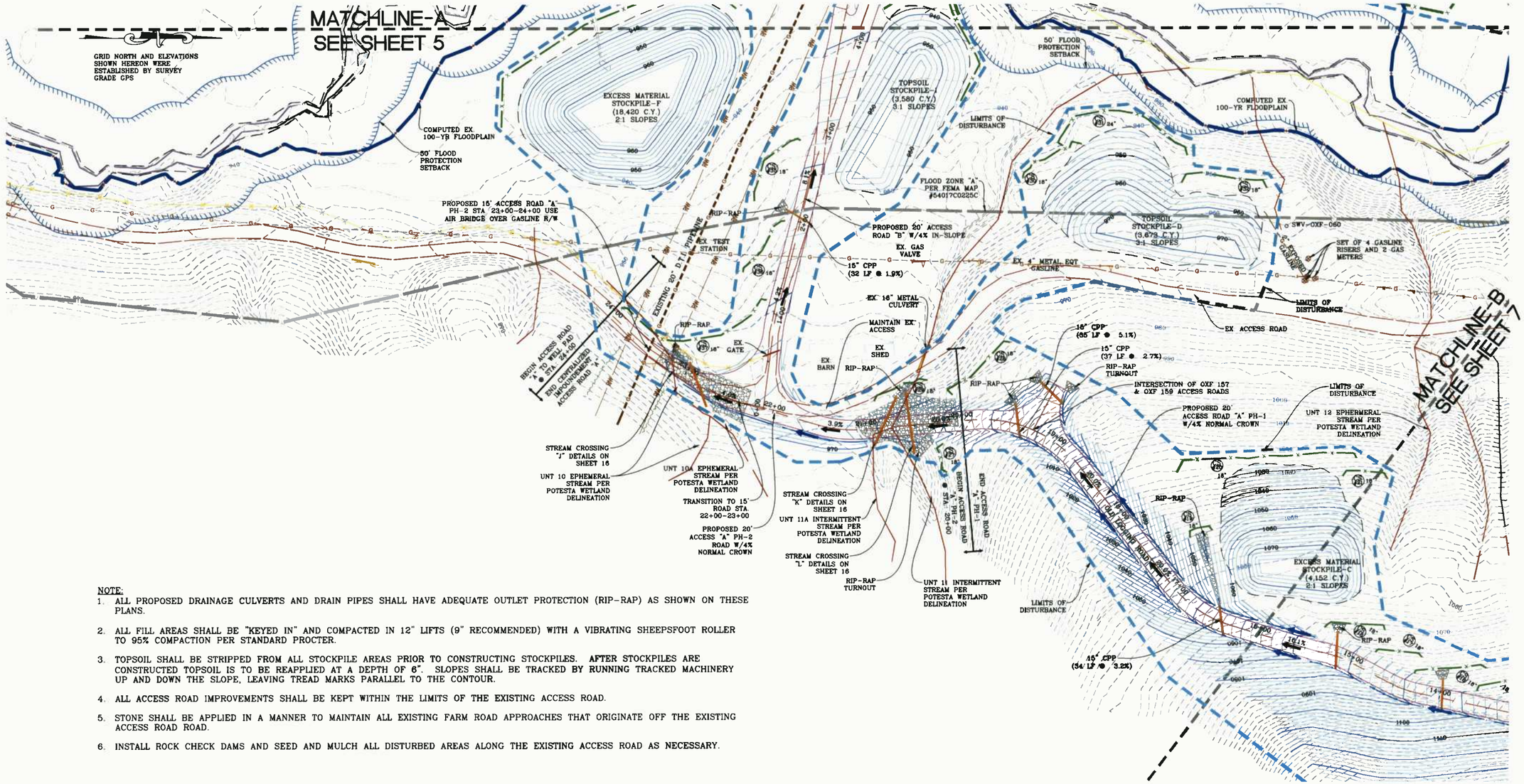
DESIGNED BY:

FILE NO. 7889

SHEET 5 OF 21

REV: 09/25/2014

ACCESS ROAD DETAILS



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NOTE:
ALL EARTHWORK VOLUMES WERE CALCULATED USING A CUT SWELL FACTOR OF 1.0 AND A FILL SHRINK FACTOR OF 1.0

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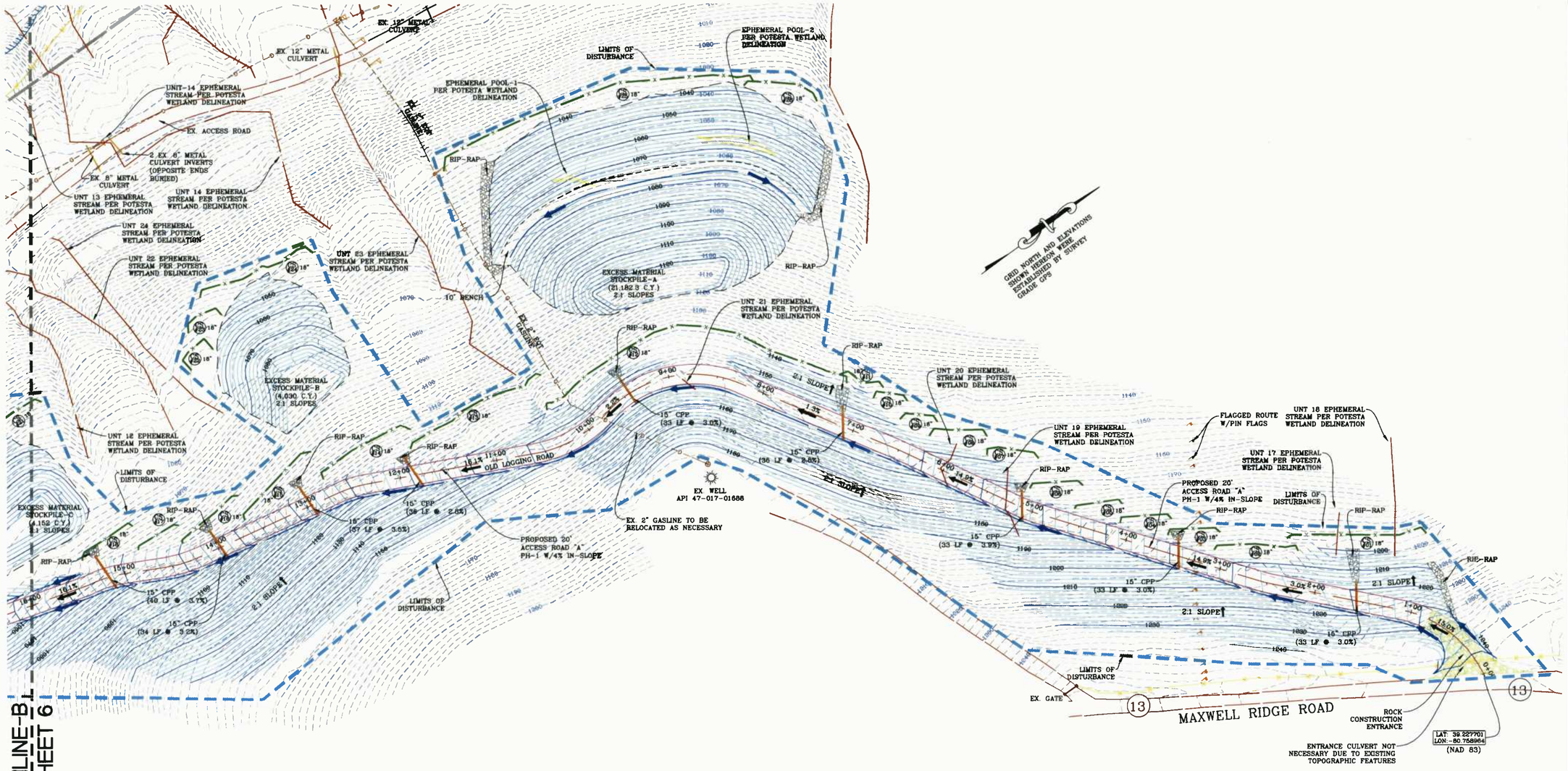
ACCESS ROAD DETAILS
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: 1" = 50'
DESIGNED BY:
FILE NO. 7889
SHEET 6 OF 21
REV: 09/25/2014

ACCESS ROAD DETAILS



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50 25 0 50 100
SCALE: 1" = 50'

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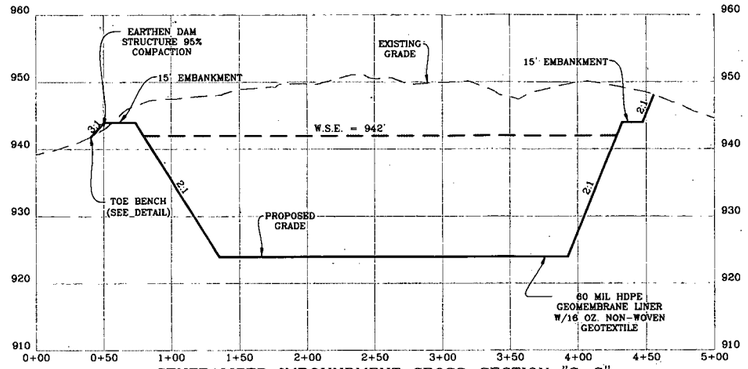
ACCESS ROAD DETAILS
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

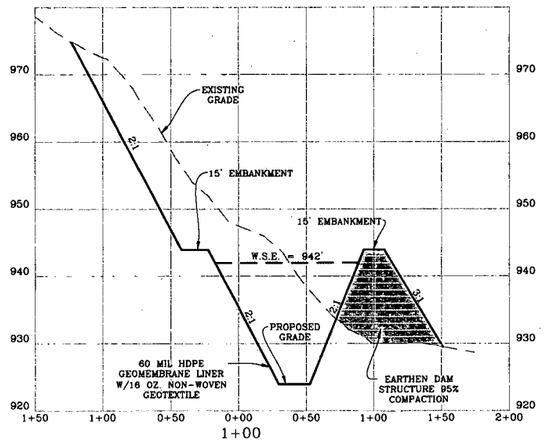
DATE:	12/23/2013
SCALE:	1" = 50'
DESIGNED BY:	
FILE NO.	7889
SHEET	7 OF 21
REV:	09/25/2014

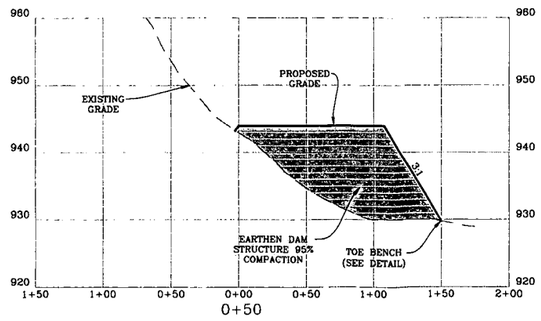
HENDERSON CENTRALIZED IMPOUNDMENT SECTIONS



CENTRALIZED IMPOUNDMENT CROSS-SECTION "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'





CENTRALIZED IMPOUNDMENT CROSS-SECTIONS ALONG BASELINE "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTE:
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HENDERSON CENTRALIZED IMPOUNDMENT SECTIONS

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE 12/23/2013

SCALE: AS SHOWN

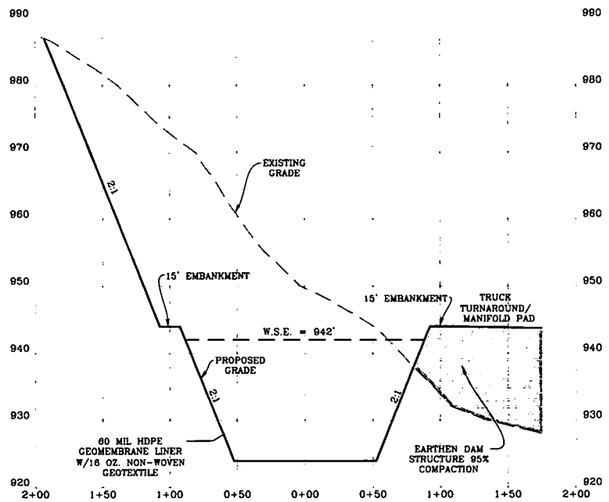
DESIGNED BY:

FILE NO. 7889

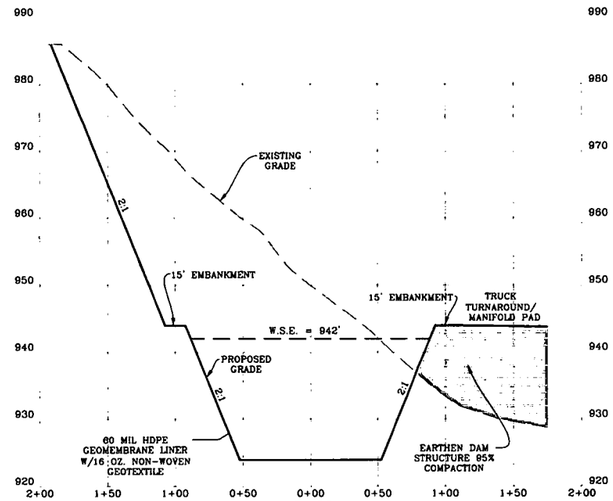
SHEET 8 OF 21

REV: 09/25/2014

HENDERSON CENTRALIZED IMPOUNDMENT SECTIONS



2+00



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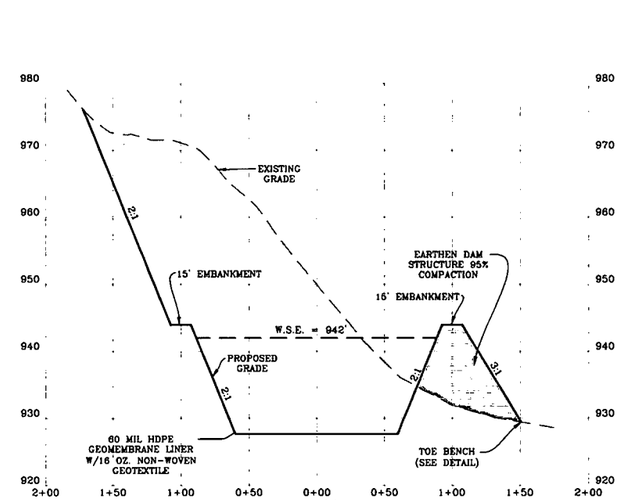

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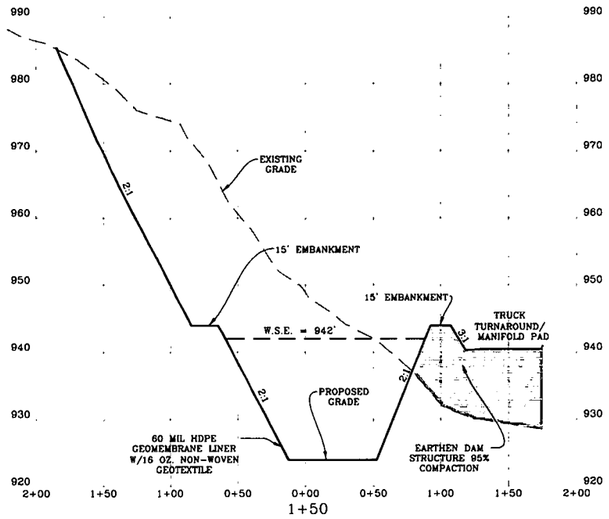
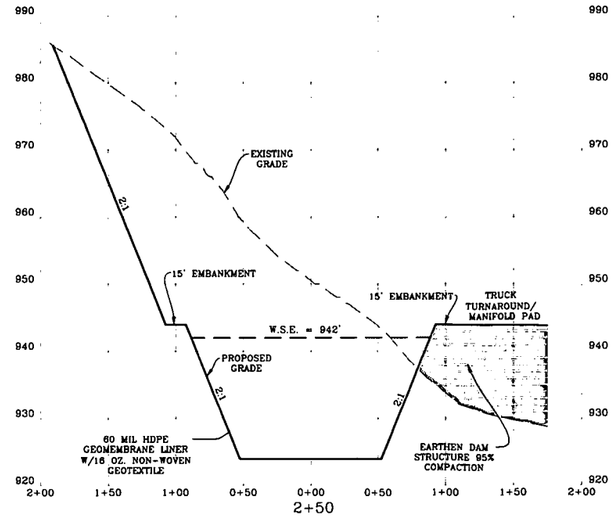


1+50



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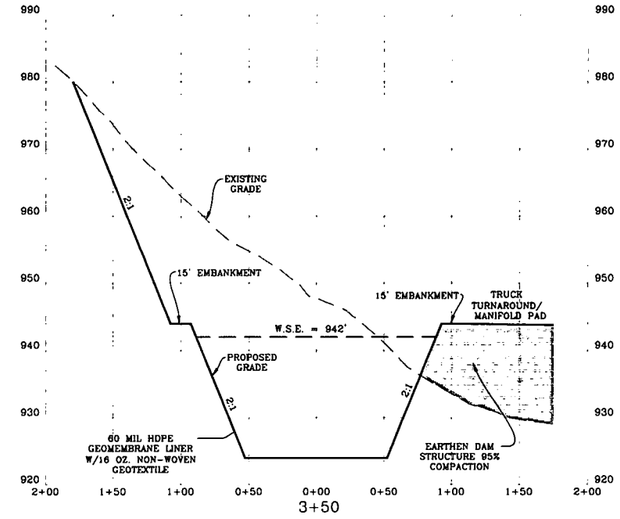

3+50

CENTRALIZED IMPOUNDMENT CROSS-SECTIONS ALONG BASELINE "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTE:
1. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN 12" LIFTS (9" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTER.

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FOR: EQT PRODUCTION COMPANY

HENDERSON CENTRALIZED IMPOUNDMENT SECTIONS

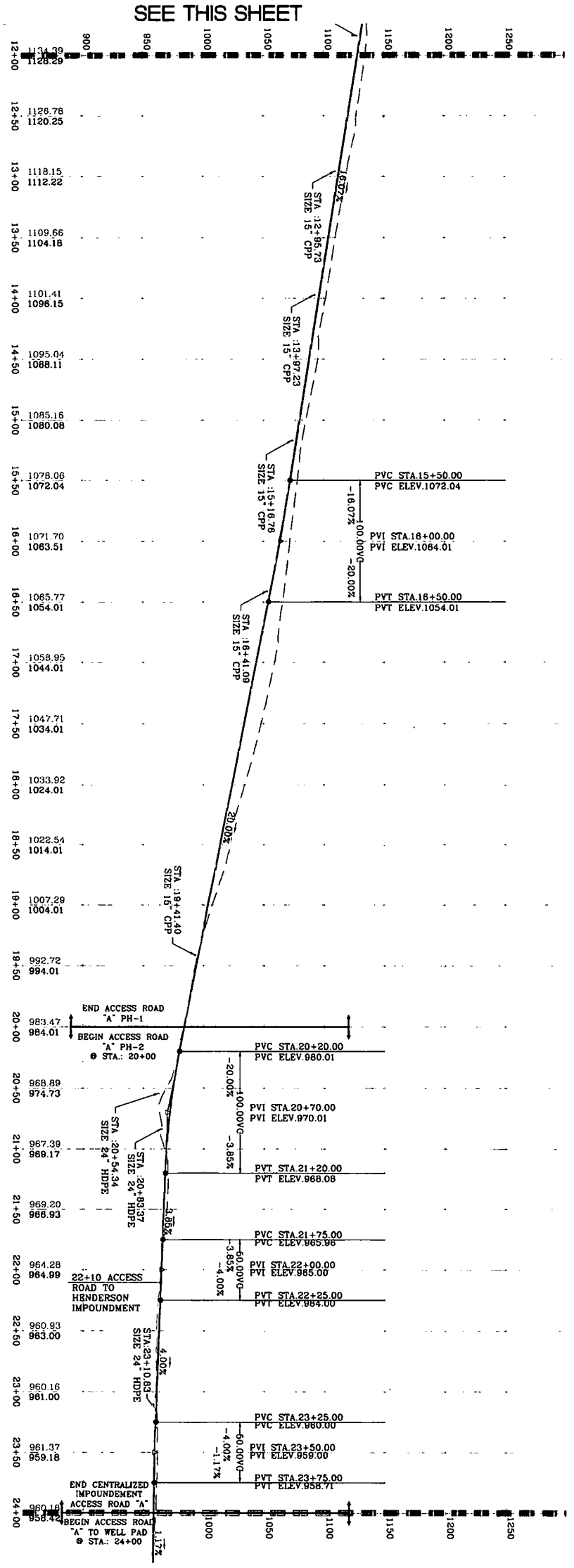
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE:	12/23/2013
SCALE:	AS SHOWN
DESIGNED BY:	
FILE NO.	7889
SHEET	9 OF 21
REV:	09/25/2014

ACCESS ROAD "A" PH-1 & PH-2 PROFILE

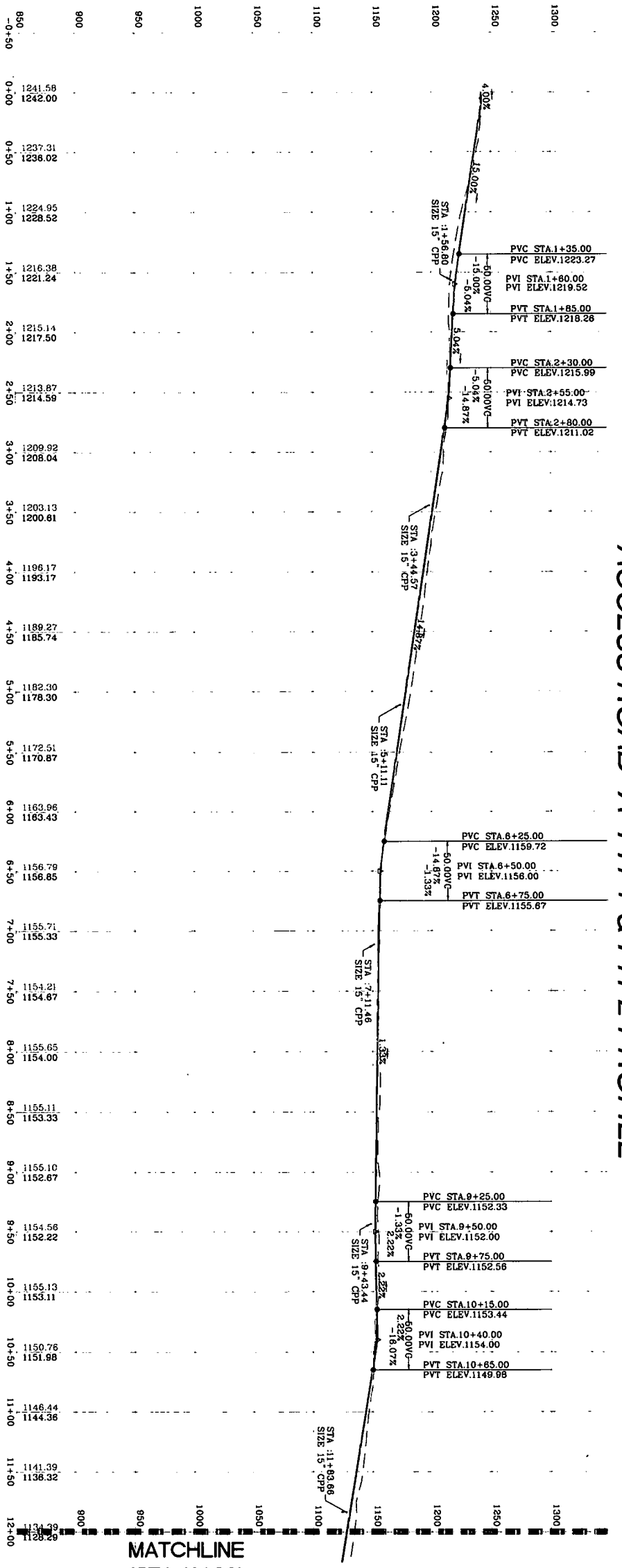
ACCESS ROAD "A" PH-1 PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'



ACCESS ROAD "A" PH-2 PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'



SCALE: 1" = 50'

REV: 09/25/2014	ACCESS ROAD "A" PH-1 & PH-2 PROFILE
SHEET 10 OF 21	HENDERSON
FILE NO. 7889	CENTRALIZED IMPOUNDMENT
DESIGNED BY:	WEST UNION DISTRICT
SCALE: AS SHOWN	DODDRIDGE COUNTY, WV
DATE: 12/23/2013	

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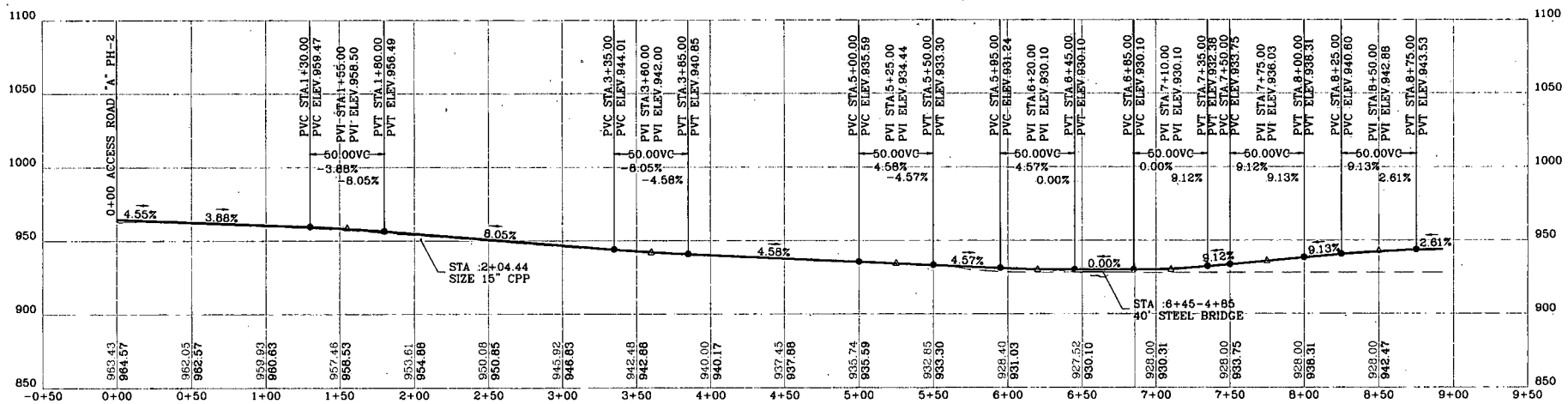
ACCESS ROAD "B" PROFILE



ACCESS ROAD "B" PROFILE
SCALE: HORIZ. 1" = 50' VERT. 1" = 50'

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ACCESS ROAD "B" PROFILE
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: AS SHOWN
DESIGNED BY:
FILE NO. 7889
SHEET 11 OF 21
REV: 09/25/2014

ROAD SECTIONS

ACCESS ROAD "A" PH-1 CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

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ROAD SECTIONS

HENDERSON

CENTRALIZED IMPOUNDMENT

WEST UNION DISTRICT

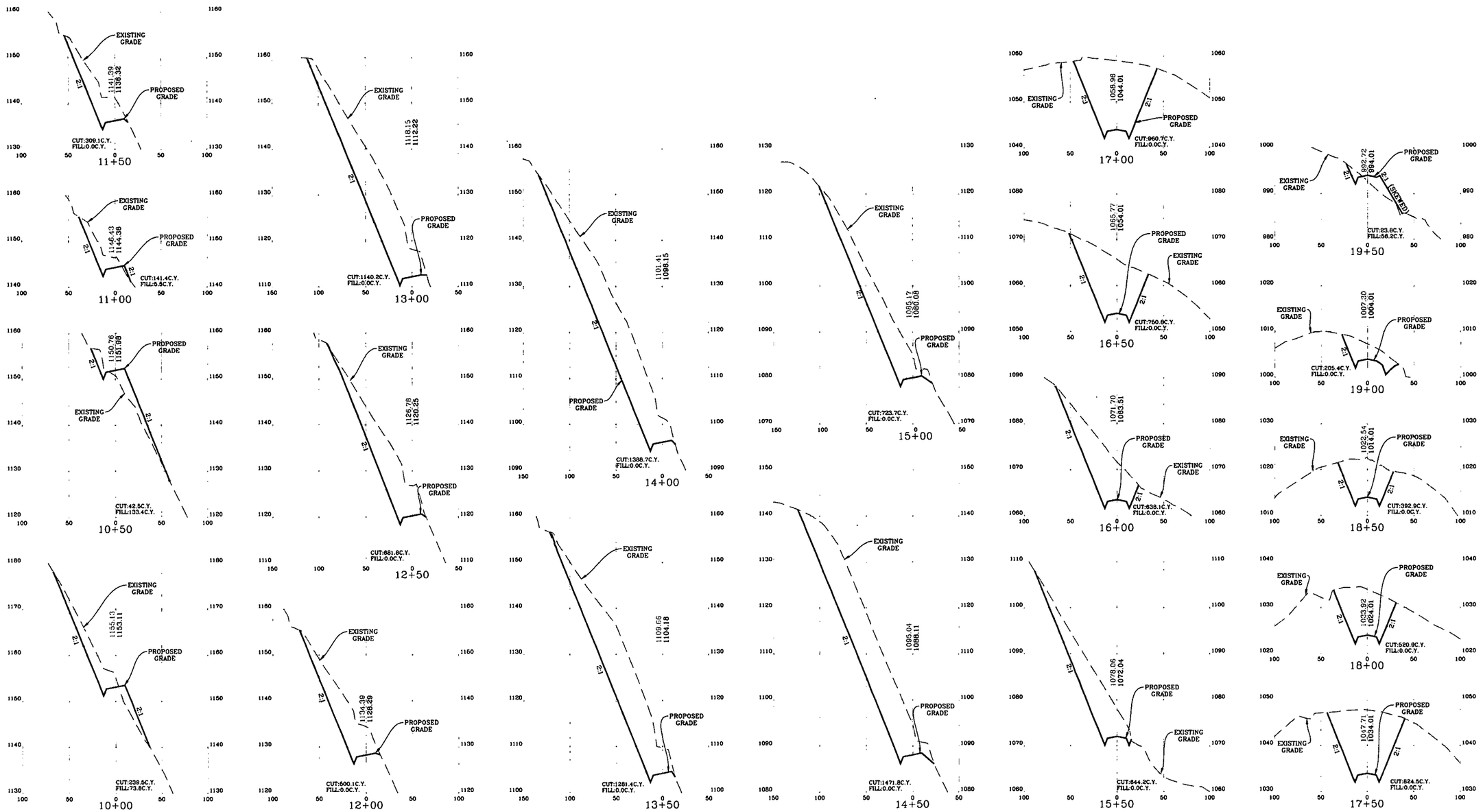
DODDRIDGE COUNTY, WV

DATE:	12/23/2013
SCALE:	AS SHOWN
DESIGNED BY:	
FILE NO.	7889
SHEET	12 OF 21
REV:	09/25/2014

ROAD SECTIONS

ACCESS ROAD "A" PH-1 CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



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ROAD SECTIONS

HENDERSON

CENTRALIZED IMPOUNDMENT

WEST UNION DISTRICT

DODDRIDGE COUNTY, WV

DATE: 12/23/2013

SCALE: AS SHOWN

DESIGNED BY:

FILE NO. 7889

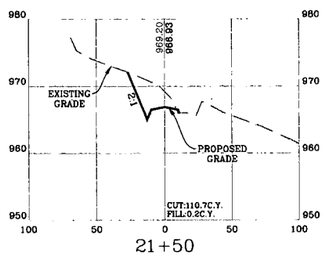
SHEET 13 OF 21

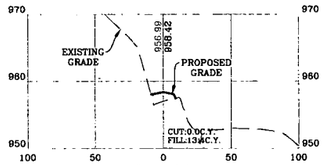
REV: 09/25/2014

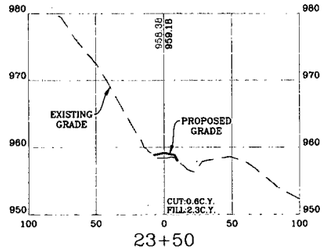
ROAD SECTIONS

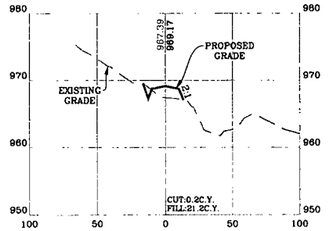
ACCESS ROAD "A" PH-2 CROSS-SECTIONS

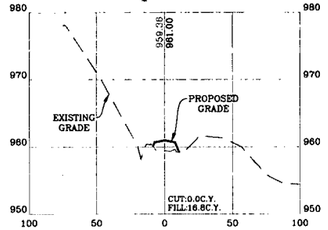
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

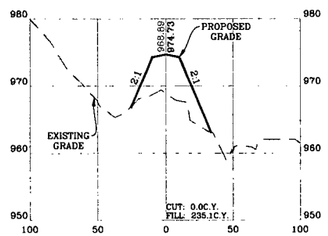


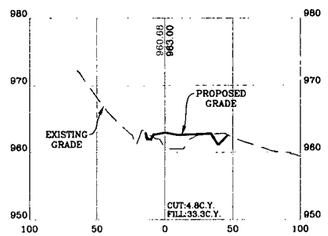


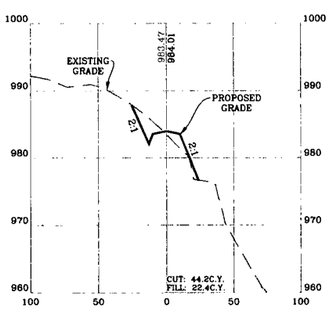


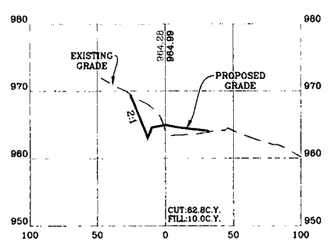






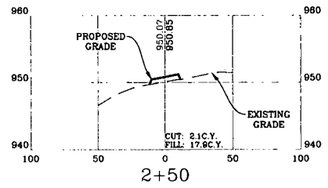


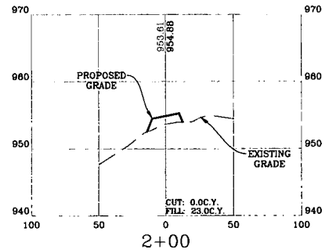


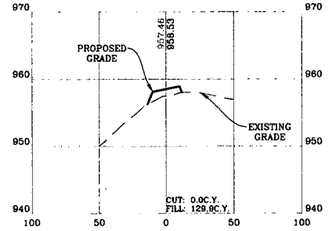


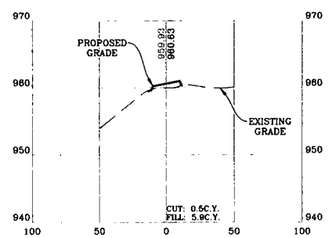
ACCESS ROAD "B" CROSS-SECTIONS

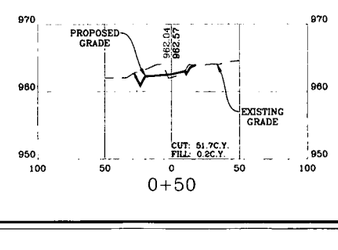
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

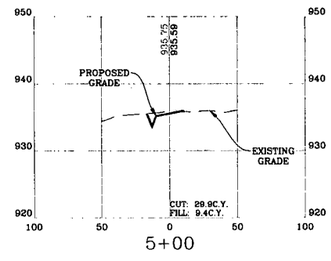


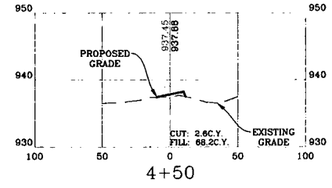


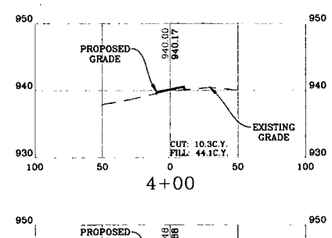


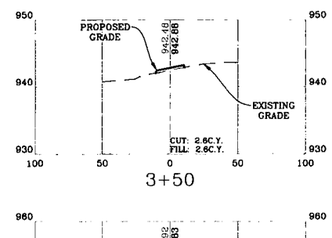


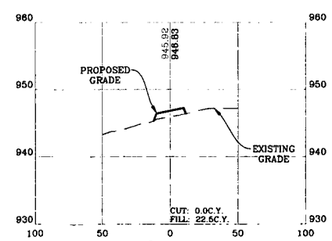


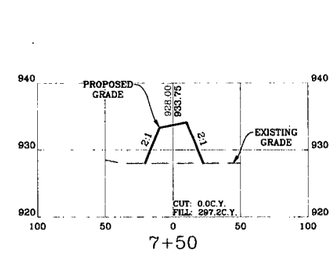


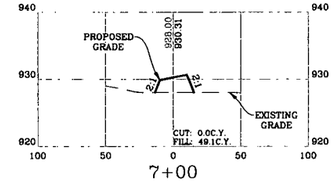


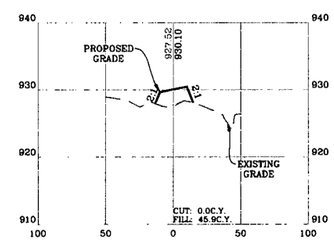


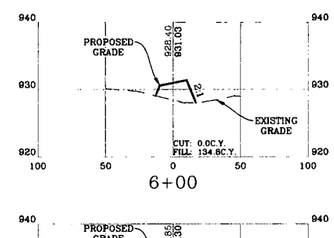


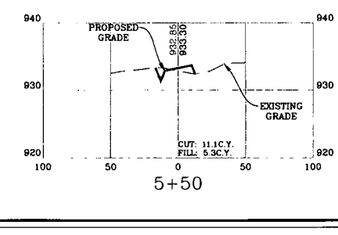


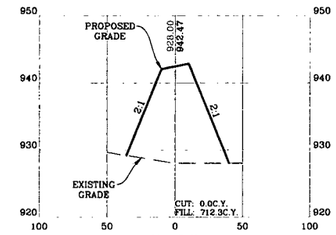


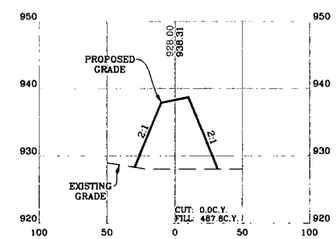












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ROAD SECTIONS

HENDERSON

CENTRALIZED IMPOUNDMENT

WEST UNION DISTRICT

DODDRIDGE COUNTY, WV

DATE: 12/23/2013

SCALE: AS SHOWN

DESIGNED BY:

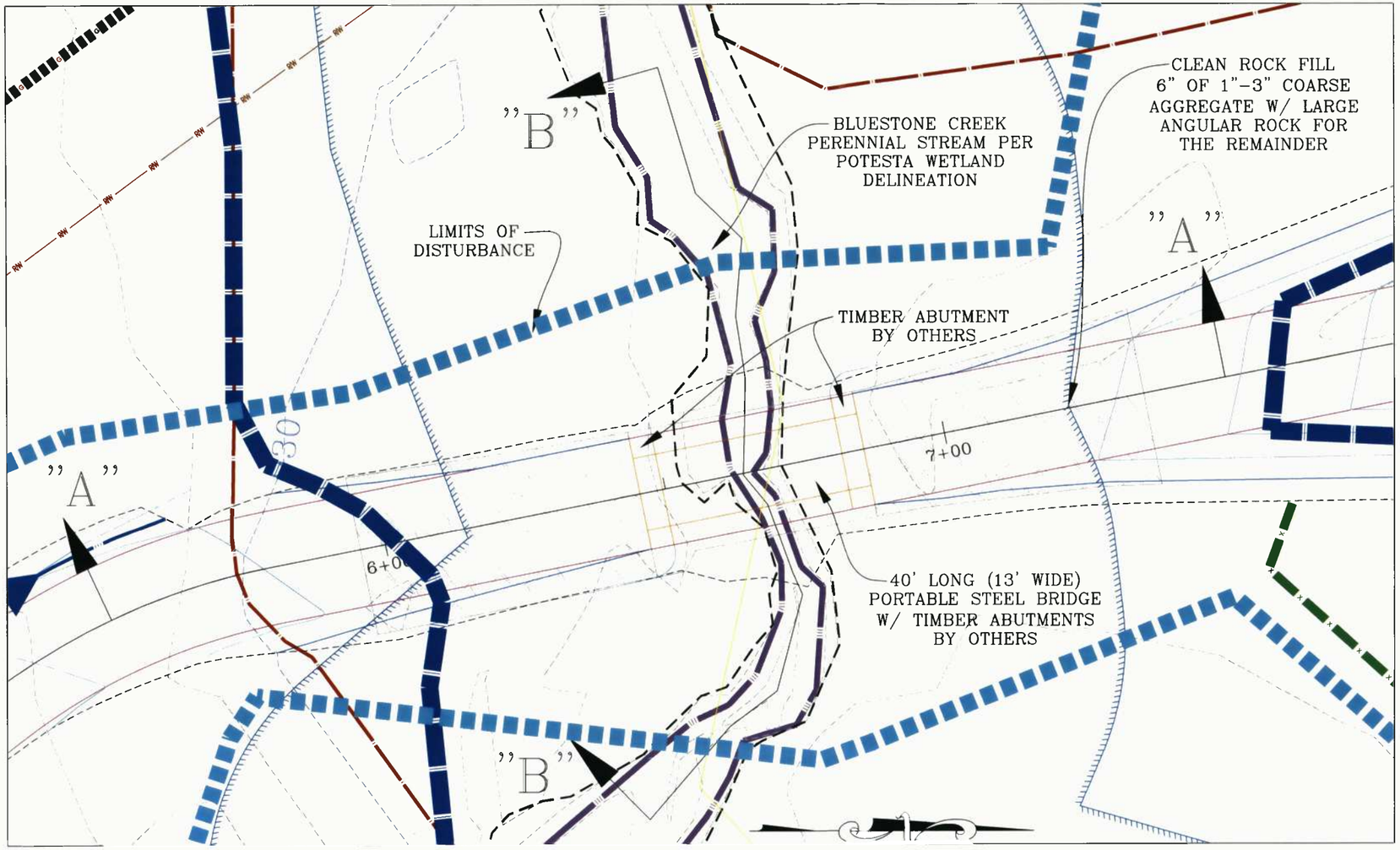
FILE NO. 7889

SHEET 14 OF 21

REV: 09/25/2014

PERMANENT STREAM CROSSING DETAILS

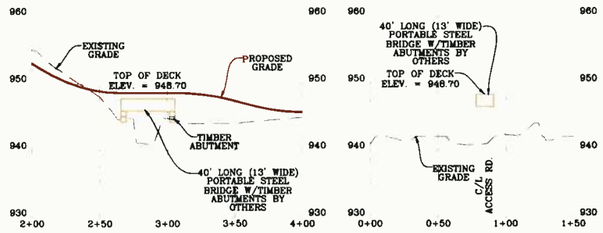
STREAM CROSSING "B" DETAILS



GENERAL PERMANENT STREAM CROSSING NOTES:

1) 1" TO 3" COARSE AGGREGATE OR LARGER SHALL BE USED TO FORM THE FIRST 6" OF FILL FOR THE CROSSING. THE REMAINDER OF MATERIAL SHALL BE ONLY LARGE ANGULAR DURABLE ROCK. "DO NOT USE ERODIBLE MATERIAL FOR CONSTRUCTION OF THE CROSSING."
2) CLEARING AND EXCAVATION OF THE STREAM BANKS SHALL BE KEPT TO A MINIMUM.
3) APPROPRIATE PERIMETER CONTROLS SUCH AS COMPOST FILTER SOCK, SUPER SILT FENCE AND/OR SEDIMENT TRAPS SHALL BE EMPLOYED ALONG THE BANKS AND PARALLEL TO THE STREAMBED.
4) TIMBER ABUTMENTS FOR THE BRIDGE INSTALLATION SHALL BE INSTALLED TO REDUCE STRUCTURAL DAMAGE DURING HIGH VELOCITY WATER OVERFLOW PERIODS.
5) STREAMBED MATERIAL IS NOT TO BE USED AS FILL.
6) DURING ROUTINE MAINTENANCE DO NOT GRADE MUD AND DEBRIS OVER THE SIDES OF THE CROSSING INTO THE STREAM.
7) THE BRIDGE SHALL BE ANCHORED AS REQUIRED PER THE DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

STREAM CROSSING "B" SECTIONS



CROSS SECTION "A-A"
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

CROSS SECTION "B-B"
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

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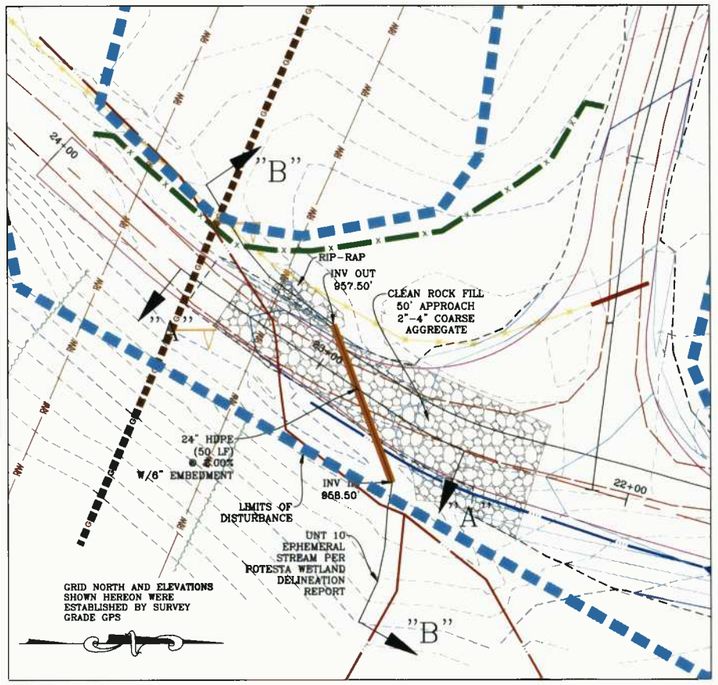
MAJOR STREAM CROSSING DETAILS

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: AS SHOWN
DESIGNED BY:
FILE NO. 7889
SHEET 15 OF 21
REV: 09/25/2014

STREAM CROSSING DETAILS

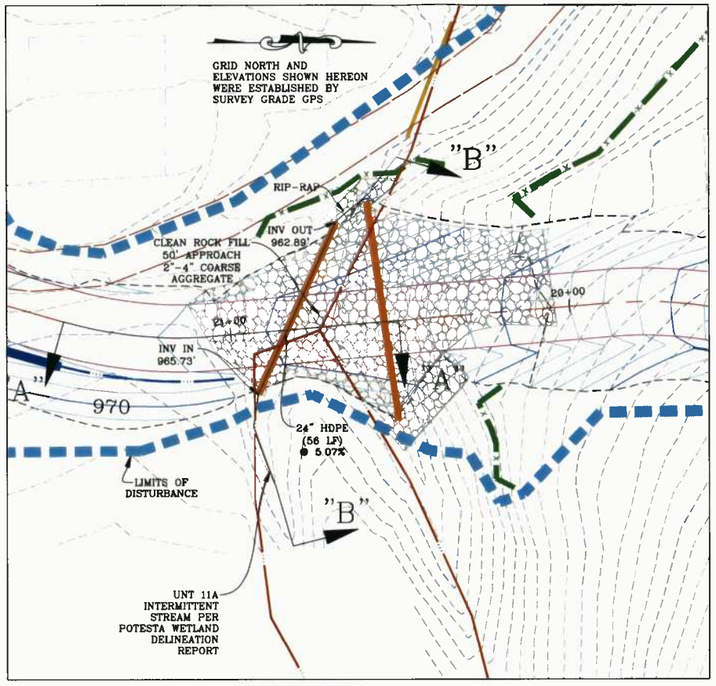
STREAM CROSSING "J" DETAILS



20 10 0 20 40

SCALE: 1" = 20'

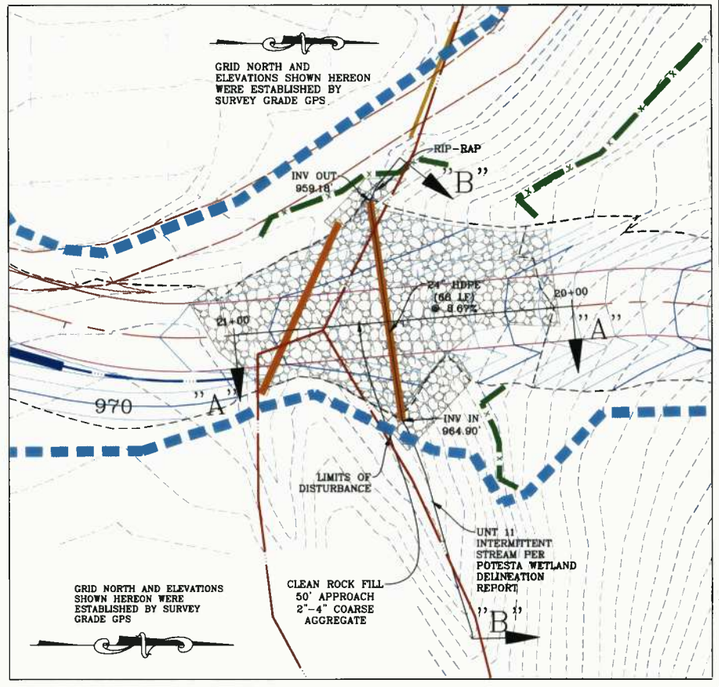
STREAM CROSSINGS "K" DETAILS



20 10 0 20 40

SCALE: 1" = 20'

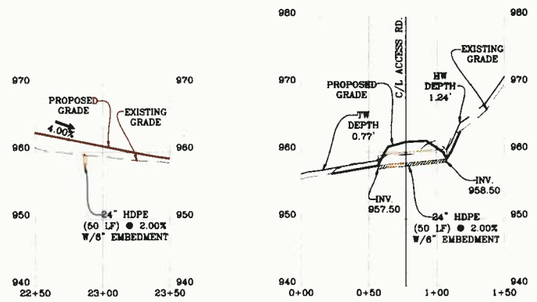
STREAM CROSSINGS "L" DETAILS



20 10 0 20 40

SCALE: 1" = 20'

STREAM CROSSING "J" SECTIONS



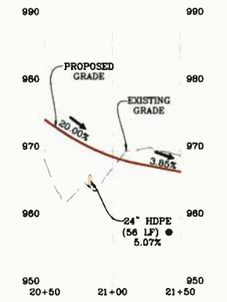
CROSS SECTION "A-A"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

CROSS SECTION "B-B"

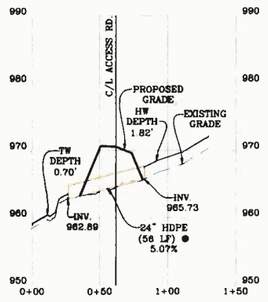
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

STREAM CROSSING "K" SECTIONS



CROSS SECTION "A-A"

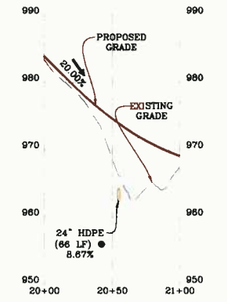
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



CROSS SECTION "B-B"

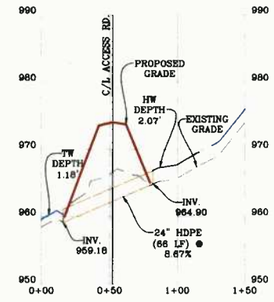
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

STREAM CROSSING "L" SECTIONS



CROSS SECTION "A-A"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



CROSS SECTION "B-B"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

GENERAL STREAM CROSSING NOTES:

1) 2" TO 4" COARSE AGGREGATE OR LARGER SHALL BE USED TO FORM THE FIRST 6" OF FILL FOR THE CROSSING, THE REMAINDER OF MATERIAL SHALL BE ONLY LARGE ANGULAR DURABLE ROCK. "DO NOT USE ERODIBLE MATERIAL FOR CONSTRUCTION OF THE CROSSING."
2) DEPTH OF STONE COVER OVER THE CULVERTS SHALL BE EQUAL TO ONE-HALF THE CULVERT DIAMETER OR 12 INCHES, WHICHEVER IS GREATER.
3) IF MULTIPLE CULVERTS ARE USED, THEY SHALL BE SEPARATED BY AT LEAST 12 INCHES OF COMPACTED AGGREGATE FILL.
4) CLEARING AND EXCAVATION OF THE STREAMBED AND BANKS SHALL BE KEPT TO A MINIMUM.
5) FILTER CLOTH SHALL BE PLACED ON THE STREAMBED AND STREAMBANKS PRIOR TO PLACEMENT OF THE PIPE CULVERTS AND AGGREGATE. THE FILTER CLOTH SHALL COVER THE STREAMBED AND EXTEND A MINIMUM OF SIX INCHES AND A MAXIMUM OF ONE FOOT BEYOND THE END OF THE CULVERTS AND BEDDING MATERIAL.
6) A WATER DIVERTING SWALE SHALL BE CONSTRUCTED ACROSS THE ROADWAY ON EITHER SIDE OF THE STREAM CROSSING.
7) APPROPRIATE PERIMETER CONTROLS SUCH AS COMPOST FILTER SOCK, SUPER SILT FENCE AND/OR SEDIMENT TRAPS SHALL BE EMPLOYED ALONG THE BANKS AND PARALLEL TO THE STREAMBED.
8) CROSS CRIBBING OF THE DOWNSTREAM SIDE OF THE CULVERT INSTALLATIONS MAY BE NEEDED TO AID IN REDUCING STRUCTURAL DAMAGE DURING HIGH VELOCITY WATER OVERFLOW PERIODS.
9) STREAMBED MATERIAL IS NOT TO BE USED AS FILL.
10) GREEN CONCRETE SHALL NOT BE PLACED IN CONTACT WITH FLOWING WATER.
11) WHEN THE CROSSING HAS SERVED ITS PURPOSE, ALL STRUCTURES INCLUDING CULVERTS, BEDDING, AND FILTER CLOTH SHALL BE REMOVED. REMOVAL OF THE STRUCTURE AND CLEAN UP OF THE AREA SHOULD BE ACCOMPLISHED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE WATERWAY CHANNEL. UPON REMOVAL OF THE STRUCTURE, THE STREAM BANK SHALL IMMEDIATELY BE STABILIZED.
12) DURING ROUTINE MAINTENANCE DO NOT GRADE MUD AND DEBRIS OVER THE SIDES OF THE CROSSING INTO THE STREAM.
13) THE CROSSING MUST BE INSPECTED AFTER EVERY RAIN EVENT OF 0.5 INCHES OR MORE AND ONCE A WEEK TO ENSURE THAT THE CULVERTS, STREAMBED, AND STREAM BANKS ARE MAINTAINED AND NOT DAMAGED. NEVER ALLOW THE CULVERTS TO BECOME CLOGGED WITH DEBRIS AND REMOVE ANY OBSTRUCTIONS IMMEDIATELY.
14) FLUSHING IS NOT AN APPROVED METHOD TO BE UTILIZED FOR CULVERT CLEANOUT.

NOTE:
1) SEE STREAM CROSSING REPORT BY NAVITUS ENGINEERING FOR CULVERT AND DRAINAGE COMPUTATATIONS.
2) EQT SHALL OBTAIN A STREAM ACTIVITY PERMIT THROUGH THE PUBLIC LAND CORPORATION OFFICE OF LAND AND STREAMS FOR STREAM CROSSING "J", "K" & "L".

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MINOR STREAM CROSSING DETAILS

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013

SCALE: AS SHOWN

DESIGNED BY:

FILE NO. 7889

SHEET 16 OF 21

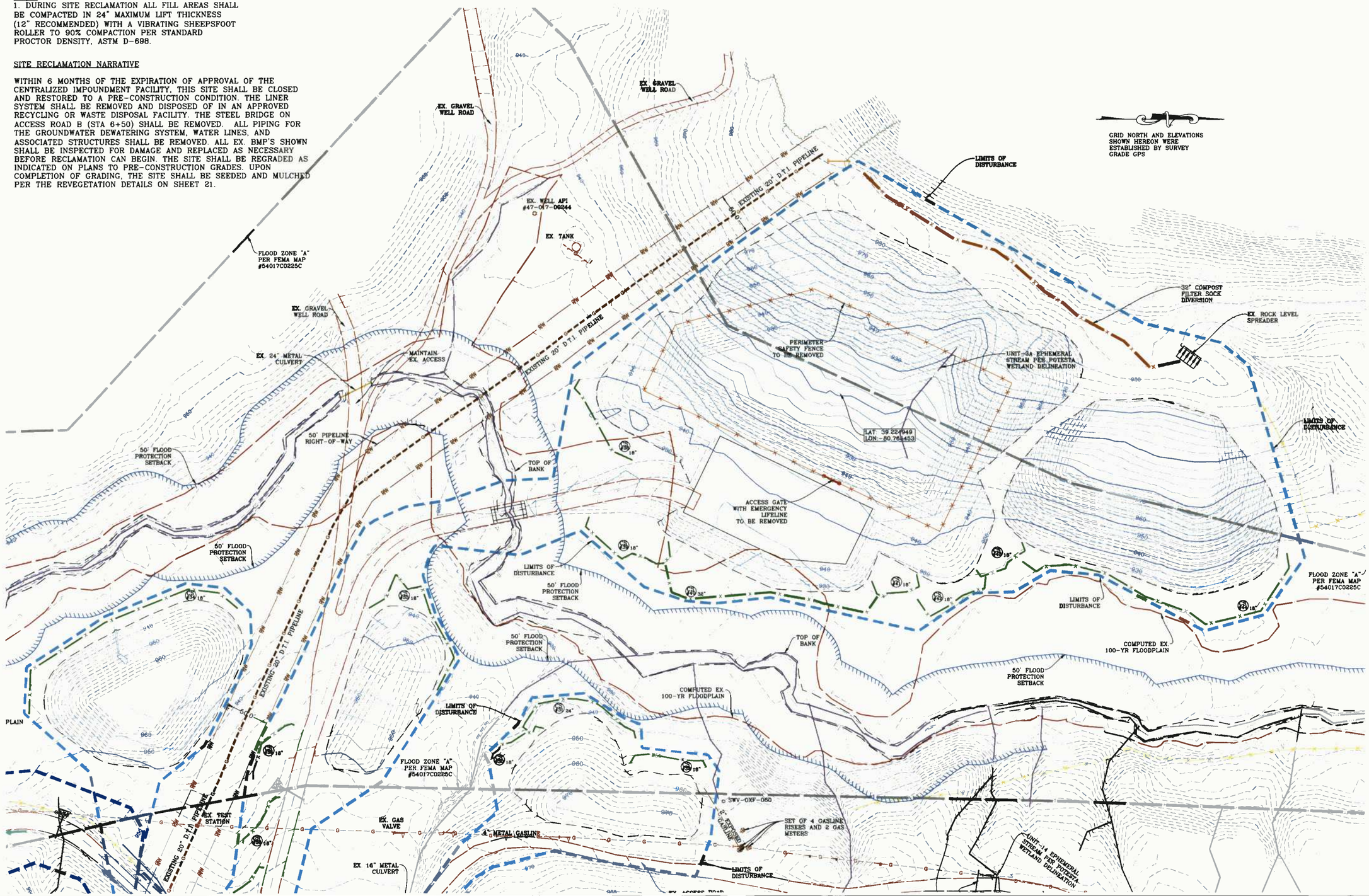
REV: 09/25/2014

HENDERSON CENTRALIZED IMPOUNDMENT RECLAMATION PLAN

NOTE:
1. DURING SITE RECLAMATION ALL FILL AREAS SHALL BE COMPACTED IN 24" MAXIMUM LIFT THICKNESS (12" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 90% COMPACTION PER STANDARD PROCTOR DENSITY, ASTM D-698.

SITE RECLAMATION NARRATIVE

WITHIN 6 MONTHS OF THE EXPIRATION OF APPROVAL OF THE CENTRALIZED IMPOUNDMENT FACILITY, THIS SITE SHALL BE CLOSED AND RESTORED TO A PRE-CONSTRUCTION CONDITION. THE LINER SYSTEM SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED RECYCLING OR WASTE DISPOSAL FACILITY. THE STEEL BRIDGE ON ACCESS ROAD B (STA 6+50) SHALL BE REMOVED. ALL PIPING FOR THE GROUNDWATER DEWATERING SYSTEM, WATER LINES, AND ASSOCIATED STRUCTURES SHALL BE REMOVED. ALL EX. BMP'S SHOWN SHALL BE INSPECTED FOR DAMAGE AND REPLACED AS NECESSARY BEFORE RECLAMATION CAN BEGIN. THE SITE SHALL BE REGRADED AS INDICATED ON PLANS TO PRE-CONSTRUCTION GRADES. UPON COMPLETION OF GRADING, THE SITE SHALL BE SEEDED AND MULCHED PER THE REVEGETATION DETAILS ON SHEET 21.



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FOR: EQT PRODUCTION COMPANY

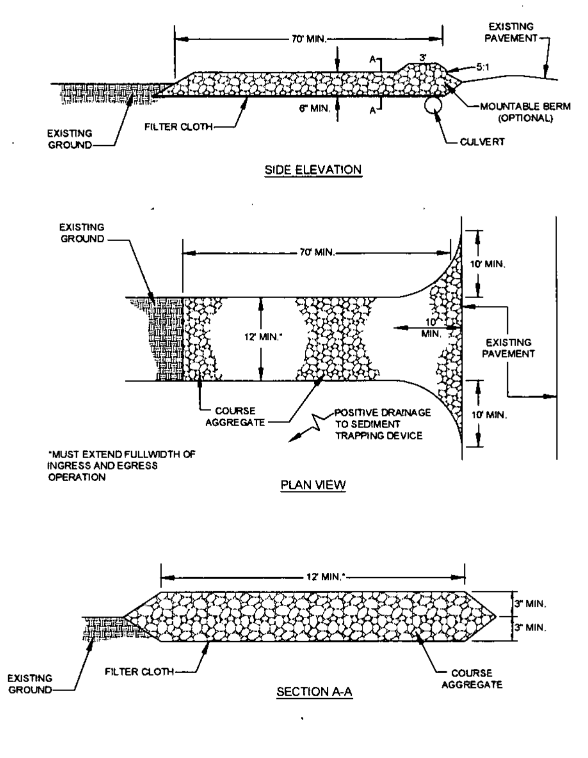
HENDERSON CENTRALIZED IMPOUNDMENT RECLAMATION PLAN

HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE:	12/23/2013
SCALE:	N/A
DESIGNED BY:	
FILE NO.	7889
SHEET	17 OF 21
REV:	09/25/2014

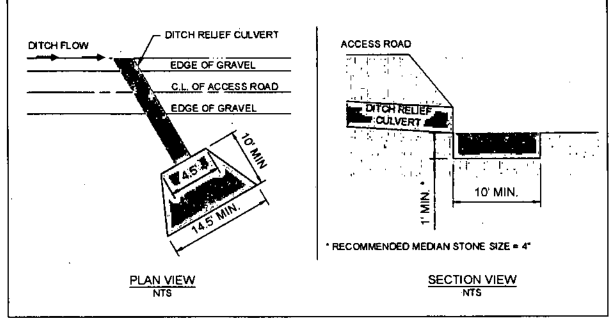
FIGURE 3.02.1

STONE CONSTRUCTION ENTRANCE



SOURCE: ADAPTED from the 1983 Maryland Standards for Soil Erosion and Sediment Control and Va. DSWC

TYPICAL DITCH RELIEF CULVERT OUTLET TREATMENT



NOTE:
ALL DITCH LINE PROTECTION SHALL BE INSTALLED AS RECOMMENDED IN THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL. DITCH LINE PROTECTION SHALL BE BASED ON THE FOLLOWING GRADES:

1. LESS THAN 3% – GRASSED
2. 3–9% – GRASS WITH ROLLED EROSION CONTROL PRODUCTS (RECP)
3. GREATER THAN 9% – RIPRAP OR EQUIVALENT GEOTEXTILE

IF HIGH EROSIVE SOILS ARE ENCOUNTERED DURING CONSTRUCTION, THE ENGINEER SHOULD BE CONTACTED FOR FURTHER EVALUATION.

Modified Figure 3.1 – Typical Roadside Ditch Section Sump at Ditch Relief Culvert

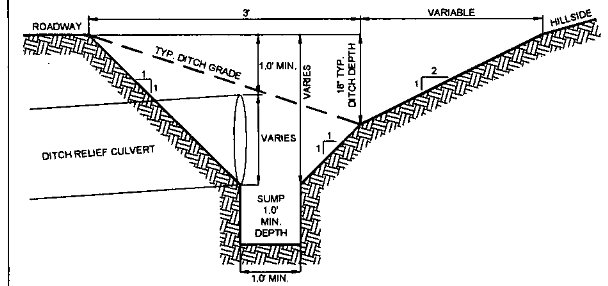
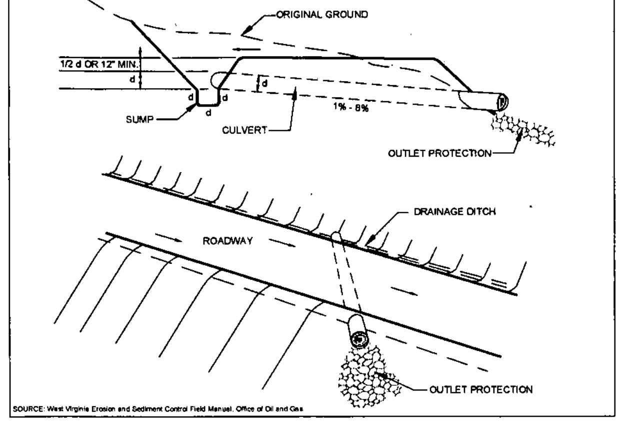


FIGURE II-4

DITCH RELIEF CULVERT



SOURCE: West Virginia Erosion and Sediment Control Field Manual, Office of Oil and Gas

Table II-5

Pipe Sizes for Culverts Across Roads		
Drainage Area (Ac)	Pipe Diameter (In)	Pipe Capacity (Cfs)
10	15	5
20	18	9
30	21	12
50	24	18
80	27	24
100	30	29
300	36	60
500	42	85

Table II-6

Spacing of Culverts	
Road Grade %	Distance (Ft)
2-5	500-300
6-10	300-200
11-15	200-100
16-20	100

FIGURE 3.05.1

ROCK CHECK DAM

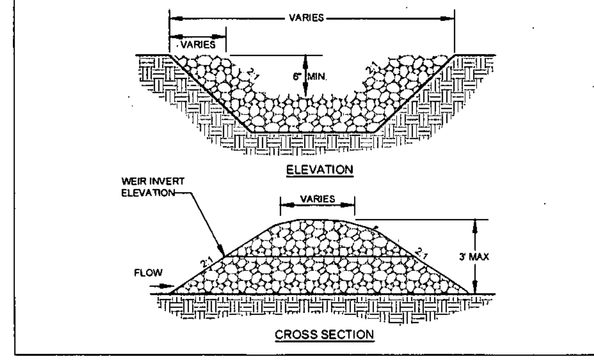
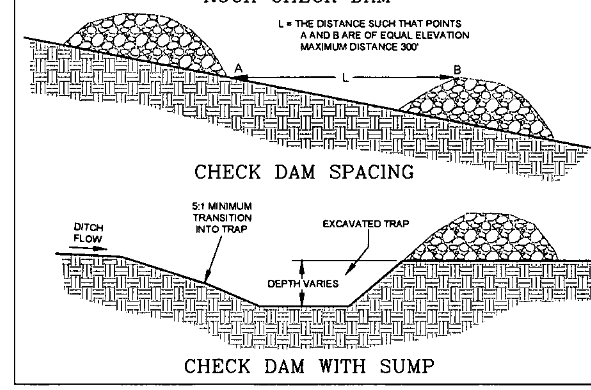
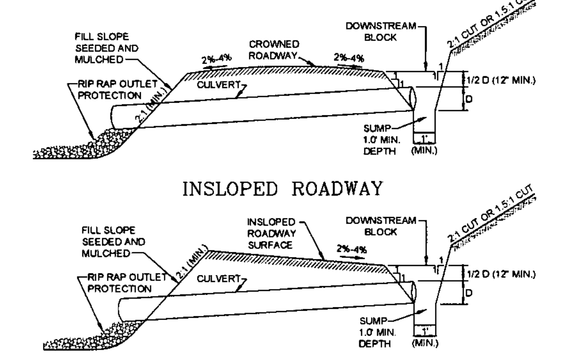


FIGURE 3.05.2

ROCK CHECK DAM



CROWNED ROADWAY



Cut and fill slopes shall be stabilized immediately upon completion of roadway grading. These areas shall be blanketed wherever they are located within 50 feet of a surface water or within 100 feet of a surface water where a suitable vegetative filter strip does not exist.

A durable top dressing shall be provided for soils having low strength.

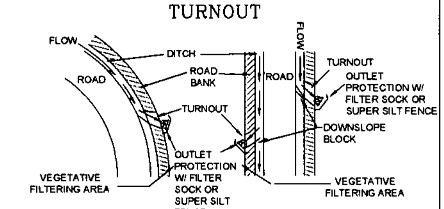
Roadside ditches shall be provided with adequate protective lining.

Adequately sized culverts or other suitable cross drains shall be provided at all seeps, springs, and drainageways.

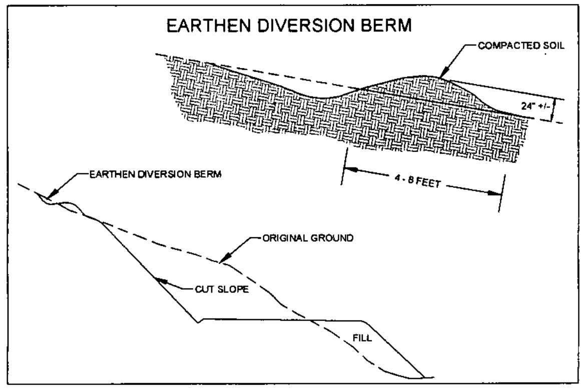
Roadway shall be inspected weekly and after each runoff event. Damaged roadways, ditches, or cross drains shall be repaired immediately.

SOURCE: PA DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF OIL AND GAS MANAGEMENT 5500-FM-OG0111 APPENDIX A BMP CONSTRUCTION DETAILS (MODIFIED)

TURNOUT



EARTHEN DIVERSION BERM



TOE BENCH DETAIL

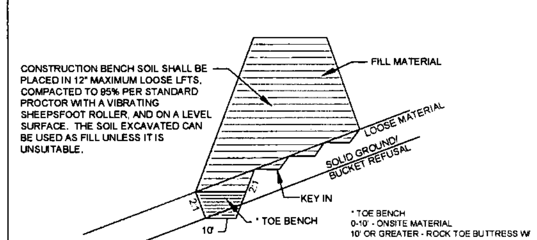
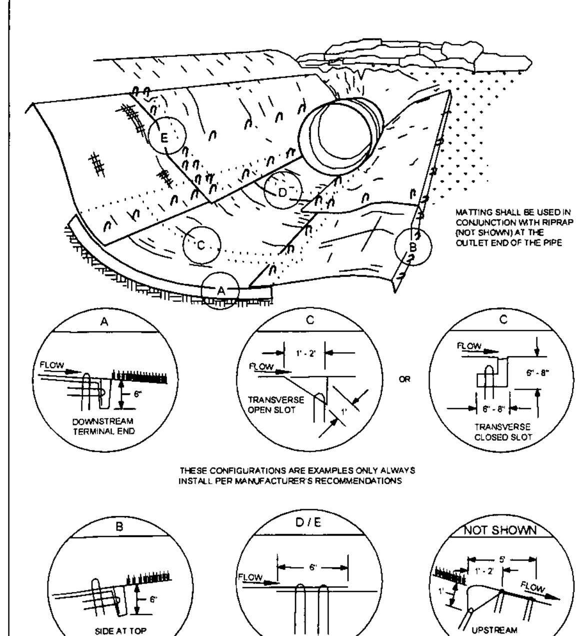


FIGURE 3.13.1

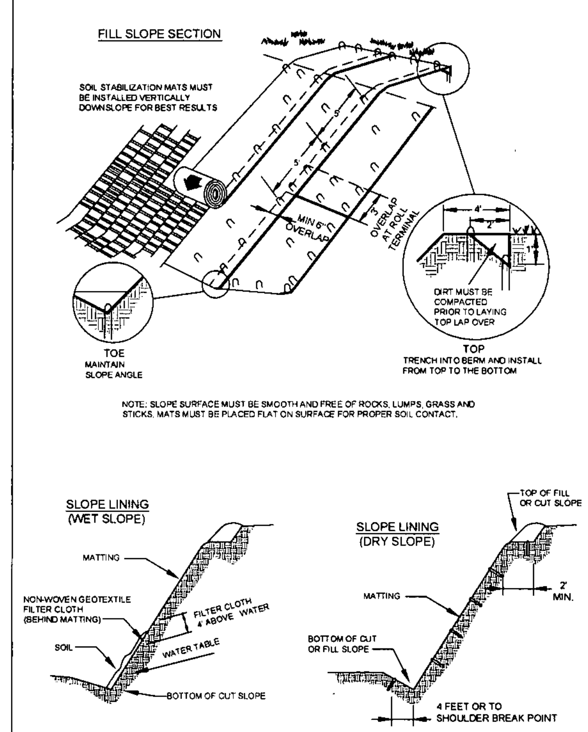
TYPICAL RECP CHANNEL INSTALLATION



SOURCE: VA DCR-DSWC AND NORTH AMERICAN GREEN

FIGURE 3.13.2

ROLLED EROSION CONTROL PRODUCTS



SOURCE: VDOT STANDARDS AND VA DCR-DSWC

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FOR: EQT PRODUCTION COMPANY

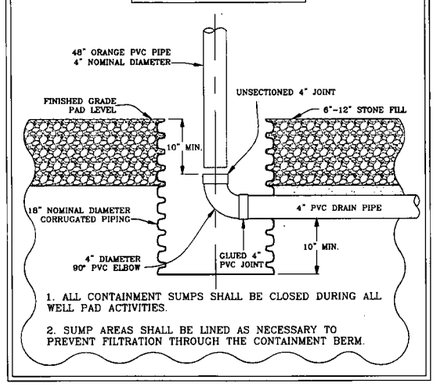
CONSTRUCTION DETAILS
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: N/A
DESIGNED BY:
FILE NO. 7889
SHEET 18 OF 21
REV: 09/25/2014

BERM TYPICAL

NOT TO SCALE

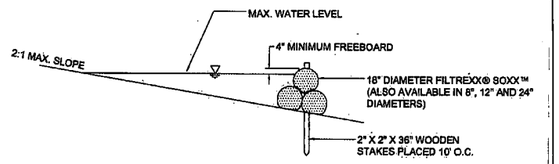
SUMP TYPICAL



1. ALL CONTAINMENT SUMPS SHALL BE CLOSED DURING ALL WELL PAD ACTIVITIES.

2. SUMP AREAS SHALL BE LINED AS NECESSARY TO PREVENT FILTRATION THROUGH THE CONTAINMENT BERM.

SINGLE INSTALLATION SECTION
NTS

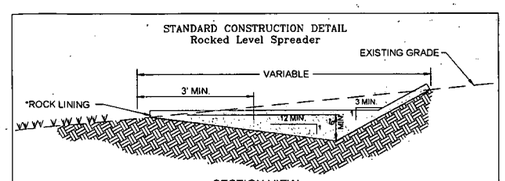


PYRAMID INSTALLATION SECTION
NTS

FILTREXX® RUNOFF DIVERSION SECTIONS

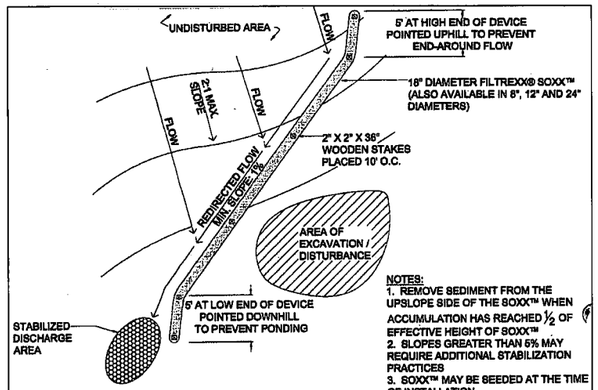
NTS

STANDARD CONSTRUCTION DETAIL
Rocked Level Spreader



SECTION VIEW
NTS

*All Level Spreader rock shall be a minimum of R4.

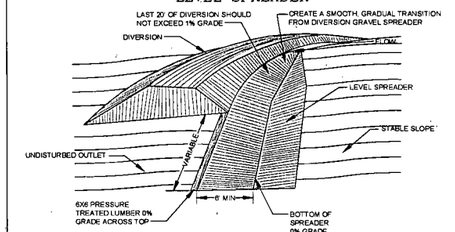


NOTES:
1. REMOVE SEDIMENT FROM THE UPSLOPE SIDE OF THE SOXX™ WHEN ACCUMULATION HAS REACHED ½ OF EFFECTIVE HEIGHT OF SOXX™
2. SLOPES GREATER THAN 6% MAY REQUIRE ADDITIONAL STABILIZATION PRACTICES
3. SOXX™ MAY BE SEEDED AT THE TIME OF INSTALLATION

FILTREXX® RUNOFF DIVERSION

FIGURE 3.02.1

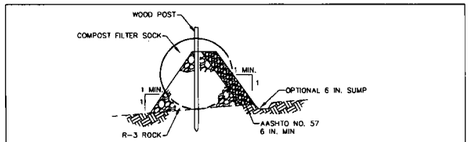
LEVEL SPREADER



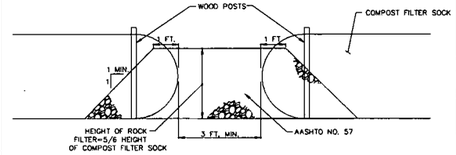
PERSPECTIVE VIEW

NOTE: ALL TEMPORARY BERMS, SWALES AND LEVEL SPREADER DITCHES MUST RECEIVE TEMPORARY SEEDING AND MULCHING AFTER INSTALLATION

SOURCE: ADAPTED FROM N.C. E&S Control Planning and Design Manual and VA DESCI



OUTLET CROSS-SECTION



UP-SLOPE FACE

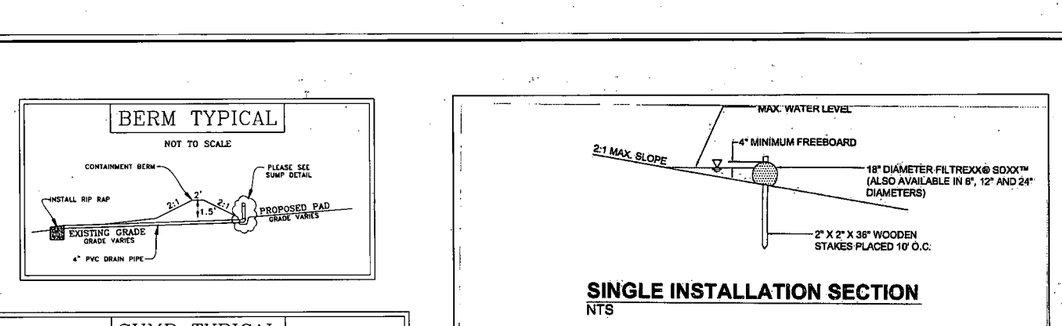
NOTES:

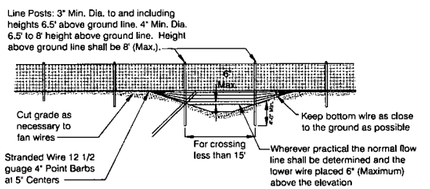
A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A COMPOST FILTER SOCK HAS OCCURRED DUE TO CONCENTRATED FLOW.

SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

ROCK FILTER OUTLET
(MODIFIED FROM PA DEP)
NOT TO SCALE

CONSTRUCTION DETAIL
TYPICAL FENCE SECTION





DETAIL SHOWING TYPICAL SECTION
AT MINOR DEPRESSIONS AND WET
WEATHER CROSSINGS

NOTES:

Posts and braces may be either round or square shaped. Dimensions shown on the plans are for round posts and braces only. When square posts are used, line posts shall be 3" square (min.);braces 4" square (min.); corner, end, pull, gate, approach, and intermediate posts 6" square (min.).
The positioning of the fence fabric and barbed wire on the posts, as shown on the "Typical Fence Section" detail, applies for level and gentle sloping terrain. For fence erected on slopes, the positioning may be adjusted to meet the slope conditions as long as the adjustment is continued from post to post in a uniform manner. Trenching on slopes may be warranted. On slopes, posts will continue to be erected vertically, unless otherwise directed, and the ends of the fencing fabric shall be cut on a skew as may be necessary for proper connection to the posts.

Dumped rock channel protection will be used at channel crossings when called for on the plans.

Install drainage structure terminal installation as called for on the plans and/or as shown on typical fence details.

Unless otherwise specified, or directed by the Engineer, the farm field fence may be installed with the fence fabric and barbed wire positioned on either side of the fence posts.

Hardware and miscellaneous fittings, not specifically designated herein as to type or dimensions, shall conform to the applicable requirements of Section 608 of the Specifications and shall be of good quality commerical design acceptable to the Engineer.

In lieu of the barbed wire detailed herein, the following additional types are acceptable, provided they retain the "4-point barb at 5-inch centers" requirement and provided they meet or exceed the strength and coating requirements for the standard, 12 1/2 gauge, barbed wire as called for in 712.10 of the Specifications.
(a) stranded, 15 1/2 gauge, high carbon steel barbed wire
(b) one strand, 12 gauge, steel barbed wire

Vehicular gate frames (and vertical braces) may be either galvanized steel pipe members as shown herein or may be triple-coated steel pipe members meeting the requirements specified on Standard Sheet F2. All other metal components of the gate shall be galvanized, with the exception of the die-cast aluminum corner fittings, or pressed steel corner fittings.

BRUSH PILE SEDIMENT BARRIER
FIGURE II-10

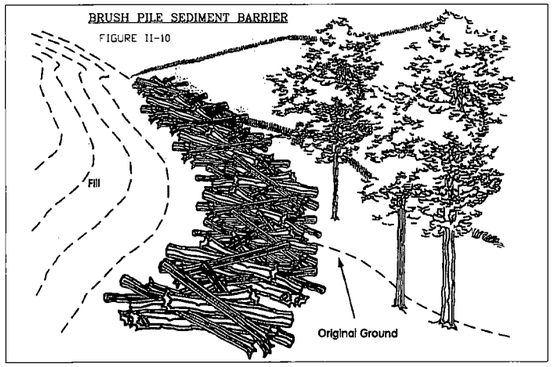
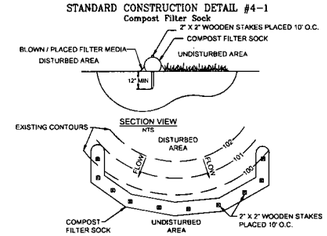


Table 4.1
Compost Sock Fabric Minimum Specifications

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Textile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply systems					
Inner Containment Netting				HDPE biaxial net	
				Continuously wound	
				Fusion-welded junctures	
				3/4" x 3/4" Max. aperture size	
Outer Filtration Mesh				Composite Polypropylene Fabric (Woven layer & non-woven fleece mechanically fused via needle punch)	
				3/16" Max. aperture size	
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

STANDARD CONSTRUCTION DETAIL #4-1
Compost Filter Sock



PLAN VIEW
NTS
Adapted from I Brave

Sock fabric shall meet standards of Table 4.1. Compost shall meet the following standards:

Organic Matter Content	80% -100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5-8.0
Moisture Content	35%-55%
Particle Size	98% pass through 1" screen
Soluble Salt Concentration	5.0 dS Maximum

Compost Filter Sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 5 feet up the slope at 45 degrees to the main sock alignment. Maximum slope length above any sock shall not exceed manufacturer's maximum permissible slope length.

Traffic shall not be permitted to cross filter socks.

Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.

Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.

In the event the ground is frozen, #5 rebar with safety caps shall be used instead of wooden stakes to anchor the filter sock. Once the ground thaws the rebar anchors shall be removed and replaced with 2" x 2" wooden stakes and installed as shown in the detail above.

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FOR: EQT PRODUCTION COMPANY

CONSTRUCTION DETAILS
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DATE: 12/23/2013

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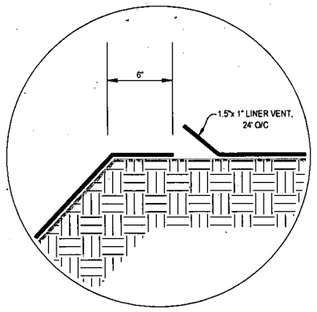
DESIGNED BY:

FILE NO. 7889

SHEET 19 OF 21

REV: 09/25/2014



TYPICAL LINER VENT DETAIL
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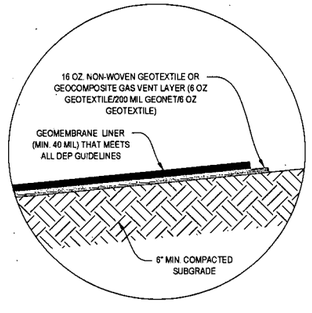
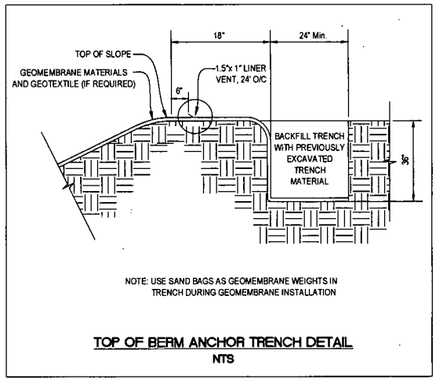
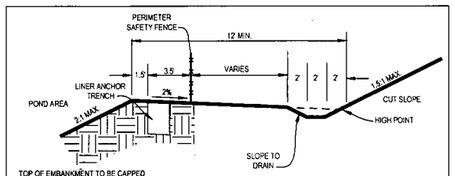


GEOMEMBRANE LINER SYSTEM
NTS

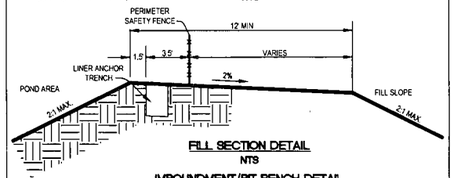


NOTE: USE SAND BAGS AS GEOMEMBRANE WEIGHTS IN TRENCH DURING GEOMEMBRANE INSTALLATION

TOP OF BERM ANCHOR TRENCH DETAIL
NTS



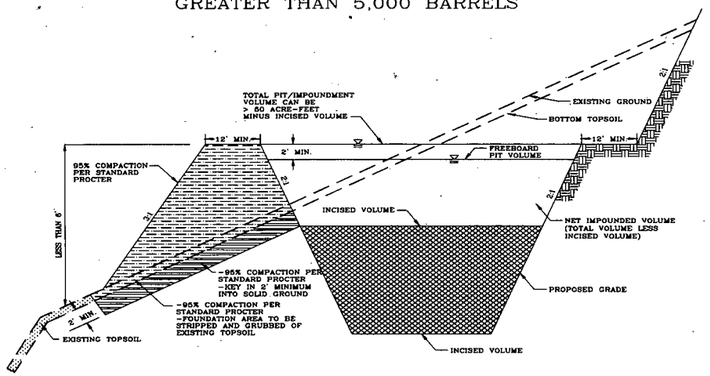
CUT SECTION DETAIL
NTS



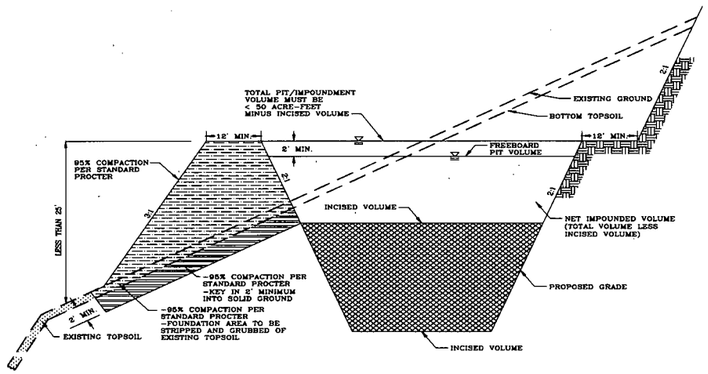
FILL SECTION DETAIL
NTS

IMPOUNDMENT/PIT BENCH DETAIL
NTS

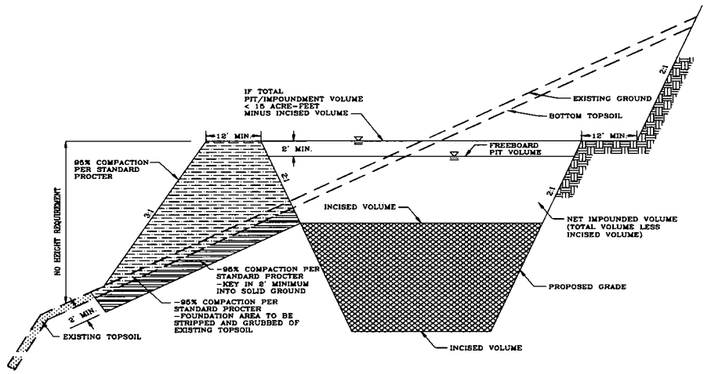
WEST VIRGINIA CODE 35 CSR 4
DESIGN AND CONSTRUCTION REQUIREMENTS FOR ASSOCIATED PITS, ASSOCIATED IMPOUNDMENTS, & CENTRALIZED IMPOUNDMENTS GREATER THAN 5,000 BARRELS



SECTION VIEW



SECTION VIEW



SECTION VIEW

NOTES:
1. ALL FILL SHOULD BE KEYED IN TO ORIGINAL GROUND EVERY 2-5 VERTICAL FEET DEPENDING ON EXISTING GROUND SLOPE

2. MINIMUM OUTSIDE AND INSIDE EMBANKMENT (FILL) SLOPES SHALL BE 2H:1V. THE INSIDE AND OUTSIDE SLOPES MUST ADD UP TO 5H:1V.

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THIS DOCUMENT WAS PREPARED BY:

FOR: EQT PRODUCTION COMPANY

CONSTRUCTION DETAILS
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: N/A
DESIGNED BY:
FILE NO. 7889
SHEET 20 OF 21
REV: 09/25/2014

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

a.General Conditions Where Practice Applies
Where exposed soil surfaces are not to be fine-graded or worked for periods longer than 21 days. Temporary vegetative cover with sediment controls must be established where runoff will go directly into a stream. Immediately upon construction of the site (site includes road and location), vegetation must be established on road bank and location slopes. A permanent vegetative cover shall be applied to areas that will be left un-worked for a period of more than six months.

b.Seed Mixtures and Planting Dates
Refer to Tables 2 through 4 for recommended dates to establish vegetative cover and the approved lists of temporary and permanent plant species, and planting rates. Table 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.

c.Seed Application
Apply seed by broadcasting, drilling, or by hydroseed according to the rates indicates in Table IV-3. Perform all planting operations at right angles to the slope. Necessary site preparation and roughening of the soil surface should be done just prior to seeding. Seedbed preparation may not be required on newly disturbed areas.

Permanent Seeding

a.General
Permanent vegetative cover will be established where no further soil disturbance is anticipated or needed. Soil fertility and pH level should be tested and adjusted according to seed 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 slopes steeper than 2:1 unless a good bonding to the sub-layer can be achieved. After proper grading and seedbed preparation, the vegetation will reestablish ground cover for the control of surface water runoff erosion.
All required seedbed preparation and loosening of soil by disking or dozer tracking should be performed just prior to seeding. If seedbed preparation is not feasible, 50% 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 mix 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, and 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.

b.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 by a certified soil test.
3. Application: For best results and maximum benefits, the lime and fertilizer are to be applied at the time of seedbed preparation.

c.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 b, Permanent Seeding Mixtures Suitable for Establishment in West Virginia.
Notes:
1. All legumes must be planted with the proper inoculants prior to seeding.
2. 'Lathco' Flatpea is potentially poisonous to some livestock.
3. Only endophyte free varieties of Tall Fescue should be used. Tall Fescue and Crownvetch are also very invasive species, non-native to WV.
4. For unprepared seedbeds or seeding outside the optimum timeframes, add 50% more seed to the specified rate. Mixtures in Table 4b are more wildlife and farm friendly; those listed in bold are suitable for use in shaded woodland settings. Mixtures in italic are suitable for use in filter strips.

d.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 no or low maintenance long-lived plants adaptable to sites which may be difficult to maintain with equipment.

Mulching

a.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 seeded 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 seeded 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 seeded as soon as weather or seasonal conditions permit. Do not use fiber mulch (cellulose-hydroseed) 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 operations 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 seeded 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.

b.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 over 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 that organic mulches have.

c.Specifications
From Table IV-6 select the type of mulch and rate of application that will best suit the conditions at the site.

d.Anchoring
Depending on the field situation, mulch may not stay in place because of wind action or rapid 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 disk is used set the disk straight and pull across slope. Mulch material should be tucked into the soil about three inches.
2. Mulch netting
Follow manufacturer's recommendation when positioning and stapling the mulch netting in the soil.

Seeding Dates Table iv-1.jpg

Table 2
Acceptable Fertilization Recommendation

Species	N (lbs/ac)	P2O5 (lbs/ac)	Example Rec.* (per acre)
Cool Season Grass	40	80	400 lbs. 10-20-20
CS-Grass & Legume	30	60	300 lbs. 10-20-20
Temporary Cover	40	40	200 lbs. 19-19-19

Table 3
Temporary Cover

Species	Seeding Rate (lbs/acre)	Optimum Seeding Dates	Drainage	pH Range
Annual Ryegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Poorly	5.5 - 7.5
Field Bromegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Mod. Well	6.0 - 7.0
Spring Oats	96	3/1 - 6/15	Well - Poorly	5.5 - 7.0
Sundangrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Winter Rye	168	8/15 - 10/15	Well - Poorly	5.5 - 7.5
Winter Wheat	180	8/15 - 11/15	Well - Mod. Well	5.5 - 7.0
Japanese Millet	30	6/15 - 8/15	Well	4.5 - 7.0
Redtop	5	3/1 - 6/15	Well	4.0 - 7.5
Annual Ryegrass	26	3/1 - 6/15	Well - Poorly	5.5 - 7.5
Spring Oats	64	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.*

Table 4a
Permanent Seeding Mixture

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
Crownvetch / Tall Fescue	10 - 15 / 30	Well - Mod. Well	5.0 - 7.5
Crownvetch / Perennial Ryegrass	10 - 15 / 20	Well - Mod. Well	5.0 - 7.5
Flatpea or Perennial Pea / Tall Fescue	**20 / 15**	**Well - Mod. Well**	**4.0 - 8.0**
Ladino Clover / Sericia Lespedeza / Tall Fescue	30 / 25 / 2	Well - Mod. Well	4.5 - 7.5
Tall Fescue / Ladino Clover / Redtop	*40 / 3 / 3*	*Well - Mod. Well*	*5.0 - 7.5*
Crownvetch / Tall Fescue / Redtop	10 / 20 / 3	Well - Mod. Well	5.0 - 7.5
Tall Fescue / Birdsfoot Trefoil / Redtop	40 / 10 / 3	Well - Mod. Well	5.0 - 7.5
Sericia Lespedeza / Tall Fescue / Redtop	25 / 30 / 3	Well - Mod. Well	4.5 - 7.5
Redtop / Tall Fescue / Creeping Red	30 / 3 / 50	Well - Mod. Well	5.0 - 7.5
Tall Fescue	*50*	*Well - Poorly*	*4.5 - 7.5*
Perennial Ryegrass / Tall Fescue / Lathco Flatpea *	**10 / 15 / 20**	**Well -Poorly**	**5.8 - 8.0**

** 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.*
Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table 4b
Wildlife and Farm Friendly Seed Mixtures

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
KY Bluegrass / Redtop / Ladino Clover or Birdsfoot Trefoil	20 / 3 / 2 / 10	Well - Mod. Well	5.5 - 7.5
Timothy / Alfalfa	5 / 12	Well - Mod. Well	6.5 - 8.0
Timothy / Birdsfoot Trefoil	5 / 8	Well - Poorly	5.5 - 7.5
Orchardgrass / Ladino Clover / Redtop	*10 / 2 / 3*	*Well - Mod. Well*	*5.5 - 7.5*
Orchardgrass / Ladino Clover	*10 / 2*	*Well - Mod. Well*	*5.5 - 7.5*
Orchardgrass / Perennial Ryegrass	*20 / 10*	*Well - Mod. Well*	*5.5 - 7.5*
Creeping Red Fescue / Perennial Ryegrass	**30 / 10**	**Well - Mod. Well**	**5.5 - 7.5**
Orchardgrass or KY Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil / Redtop / Orchardgrass	10 / 5 / 20	Well - Mod. Well	5.5 - 7.5
Lathco Flatpea */ Perennial Ryegrass	30 / 20	Well - Mod. Well	5.5 - 7.5
Lathco Flatpea */ Orchardgrass	30 / 20	Well - Mod. Well	5.5 - 7.5

** 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.*

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-5
Lime and Fertilizer Application Table

pH of Soil	Lime in Tons per Acre	Fertilizer, Lbs. per Acre (10-20-20 or Equivalent)
Above 6.0	2	500
5.0 to 6.0	3	500
Below 5.0	4	500

The pH can be determined with a portable pH testing kit or by sending the soil samples to a soil testing laboratory. When 4 tons of lime per acre are applied it must be incorporated into the soil by disking, backblading or tracking up and down the slope.

Table IV-6
Mulch Materials Rates and Uses

Material	Minimum Rates per acre	Coverage	Remarks
Hay or Straw	2 to 3 Tons 100 to 150 bales	Cover 75% to 90% of Surface	Subject to wind blowing or washing unless tied down
Wood Fiber Pulp Fiber Wood - Cellulose Recirculated Paper	1000 to 1500 lbs	Cover all Disturbed Areas	For hydroseeding

Tables IV 1-4 taken from Natural Resources Conservation Service Manual 'Critical Area Planting'

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THIS DOCUMENT WAS PREPARED BY:

FOR: EQT PRODUCTION COMPANY

CONSTRUCTION DETAILS
HENDERSON
CENTRALIZED IMPOUNDMENT
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV

DATE: 12/23/2013
SCALE: N/A
DESIGNED BY:
FILE NO. 7889
SHEET 21 OF 21
REV: 09/25/2014

OXF 159 H1-H8 SITE PLAN
EQT PRODUCTION COMPANY

(PROPOSED WELLS NO. WV 513153, WV 513154, WV 513155, WV 513700, WV 513701, WV 514095, WV 514096 & WV 514097)

SITUATE ON THE WATERS OF BLUESTONE CREEK IN NEW MILTON & SOUTHWEST DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA.

PROJECT INFORMATION

PROJECT NAME: OXF 159 H1-H8

TAX PARCEL:
WEST UNION DISTRICT
MAP 6-1

SURFACE OWNER:
JUSTIN L. HENDERSON
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV
TOTAL PROPERTY AREA: 1,602.9 ± ACRES

OIL AND GAS ROYALTY OWNER:
LEEMAN MAXWELL HRS
WEST UNION DISTRICT
DODDRIDGE COUNTY, WV
TOTAL PROPERTY AREA: 2,164 ± ACRES

SITE LOCATION:
THE OXF 159 SITE IS WEST OF MAXWELL RIDGE ALONG BLUESTONE CREEK OFF COUNTY ROUTE 13. THE ENTRANCE TO THE SITE IS APPROXIMATELY 0.32 MILES NORTH OF THE CO. RT. 13 AND CO. RT. 40/3 INTERSECTION.

LOCATION COORDINATES

OXF 159 H1-H8 WELL PAD ENTRANCE
LATITUDE: 39.213150 LONGITUDE: -80.757137 (NAD 83)

OXF 159 H1-H8 WELL PAD
LATITUDE: 39.207869 LONGITUDE: -80.761896 (NAD 83)

OXF 159 ASSOCIATED PIT
LATITUDE: 39.211979 LONGITUDE: -80.761002 (NAD 83)

SITE DISTURBANCE COMPUTATIONS

ROAD A = 10.60 ± ACRES
WELL PAD AREA = 11.90 ± ACRES (PAD & STOCKPILES B & C)
ASSOCIATED PIT AREA = 3.3 ± ACRES (PIT, MANIFOLD PAD & STOCKPILES A)
TOTAL SITE DISTURBANCE = 25.80 ± ACRES

ENTRANCE PERMIT

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

MISS UTILITY STATEMENT

MISS UTILITY OF WEST VIRGINIA WAS NOTIFIED FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1328176253. IN ADDITION, MISS UTILITY WILL BE CONTACTED PRIOR TO START OF THE PROJECT.

FLOODPLAIN NOTE

THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT IS LOCATED IN FEMA FLOOD ZONE X PER THE FLOOD INSURANCE RATE MAP (FIRM) NUMBER 54017C0225C, DATED OCTOBER 4, 2011.

ENVIRONMENTAL NOTES

A WETLAND DELINEATION WAS PERFORMED ON MARCH 26, 2014 AND MARCH 28, 2014 BY POTESTA AND ASSOCIATES, INC. 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 APRIL 8, 2014 REPORT PROJECT # 0101-11-0147-15901 WAS PREPARED BY POTESTA AND ASSOCIATES, INC. SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE REPORT 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. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION DESCRIBED BY THIS REPORT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

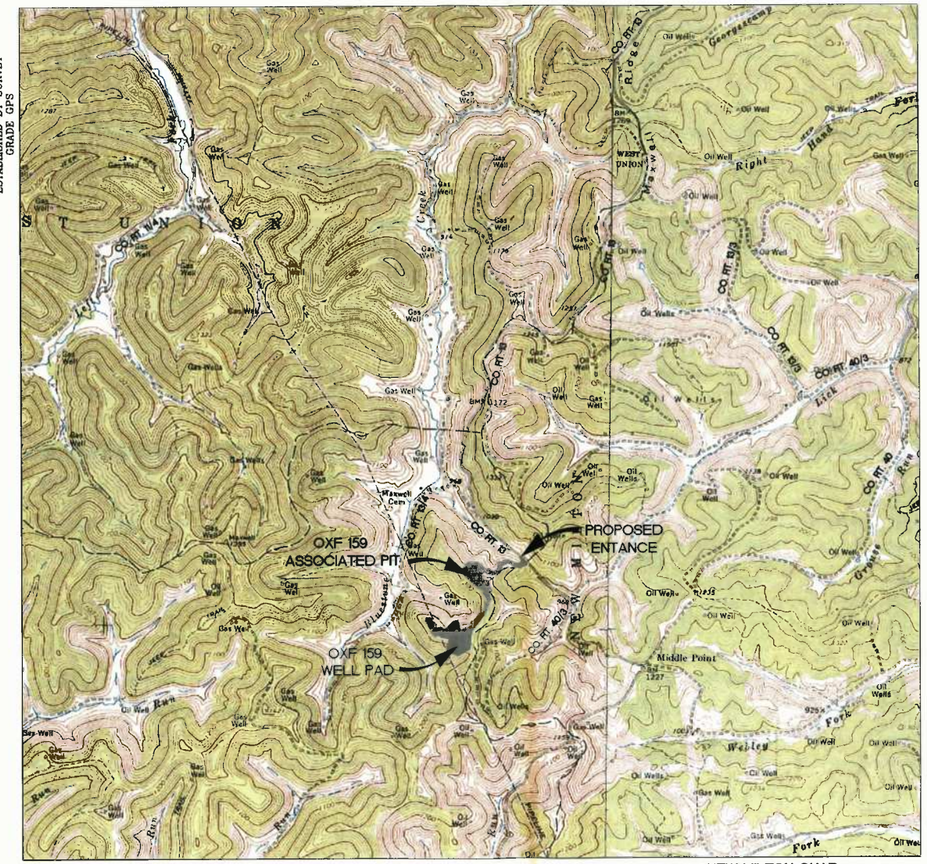
GENERAL DESCRIPTION

THE WELL PAD & ASSOCIATED PIT ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAMS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE PAD AND LOD. THERE ARE WETLANDS WITHIN 100 FEET OF THE PAD AND LOD, AND A WAIVER FROM THE WVDEP WILL BE APPLIED FOR THROUGH THE ARMY CORPS OF ENGINEERS.
2. THERE IS NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE PAD AND LOD.
4. THERE ARE NO EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE PAD.

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



OXFORD QUAD NEW MILTON QUAD

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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.
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2000 0 2000
SCALE: 1" = 2000'

LIST OF DRAWINGS

LEGEND

EX. INDEX CONTOUR	PROP. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PROP. INTERMEDIATE CONTOUR
EX. BOUNDARY LINE	PROP. GRADING LIMITS
EX. ROAD EDGE OF GRAVEL/DIRT	PROP. LIMITS OF DISTURBANCE
EX. ROAD EDGE OF PAVEMENT	PROP. WELL PAD
EX. ROAD CENTERLINE	PROP. WELL HEAD
EX. DITCHLINE	PROP. 4" PVC DRAIN PIPE
EX. CULVERT	PROP. SUMP DRAIN
EX. GUARDRAIL	PROP. CONTAINMENT BERM
EX. FENCELINE	PROP. PIT/IMPOUNDMENT CL
EX. GATE	PROP. PERIMETER SAFETY FENCE
EX. OVERHEAD UTILITY	PROP. ACCESS GATE WITH EMERGENCY LIFELINE
EX. OVERHEAD UTILITY R/W	
EX. POWER POLE	
EX. GUY WIRE	
EX. TELEPHONE LINE	
EX. GASLINE	PROP. ROCK CONSTRUCTION ENTRANCE
EX. GASLINE R/W	
EX. WATERLINE	PROP. ROAD EDGE OF GRAVEL
EX. WATER WELL	PROP. ROAD CENTERLINE
EX. GAS WELL	PROP. V-DITCH W/ CHECK DAMS
EX. TREELINE	PROP. DITCH RELIEF CULVERT (DRC)
EX. REFERENCE TREE	PROP. RIP-RAP OUTLET PROTECTION
EX. DELINEATED STREAM	PROP. GUARDRAIL
EX. DELINEATED WETLAND	PROP. ROCK LEVEL SPREADER
EX. BUILDING	PROP. EARTHEN DIVERSION BERM
EX. BRIDGE	PROP. ORANGE SAFETY FENCE
100' WETLAND/STREAM BUFFER	PROP. SUPER SILT FENCE
	PROP. COMPOST FILTER SOCK
	PROP. COMPOST SOCK DIVERSION
	PROP. GROUNDWATER DEWATERING TRENCH
	PROP. GROUNDWATER DEWATERING PIPE
	SECTION LINE
	MATCHLINE
	X-SECTION GRID INDEX
	X-SECTION GRID INTERMEDIATE
	X-SECTION PROPOSED GRADE
	X-SECTION EXISTING GRADE
	X-SECTION WATER SURFACE
	SPOT ELEVATION
	CENTER OF PAD

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SMITH LAND SURVEYING, INC.
226 WEST MAIN STREET
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(304) 462-5634

CYRUS S. KUHN REGISTERED PROFESSIONAL ENGINEER STATE OF WEST VIRGINIA

THIS DOCUMENT WAS PREPARED BY:
NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

COVER SHEET
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: 1" = 2000'
DESIGNED BY: CSK
FILE NO. 7889
SHEET 1 OF 21
REV: 05/01/2014

CONSTRUCTION NOTES:

1. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WVDEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS.

2. MEASURES TO CONTROL EROSION AND SILTATION, INCLUDING DETENTION PONDS SERVING AS SILT BASINS DURING CONSTRUCTION, MUST BE PROVIDED PRIOR TO ISSUANCE OF THE SITE DEVELOPMENT PERMIT. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WVDEP 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. NOTIFICATION SHALL BE GIVEN TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPE LINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.

6. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS. 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.

7. THE DEVELOPER WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS TO 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 IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND NOTIFY NAVITUS ENGINEERING AT (888) 662-4185 OR SMITH LAND SURVEYING AT (304) 462-5634 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN.

12. CONTRACTORS 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.

13. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.

14. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR DAILY AND CHECKED AFTER EVERY RAINFALL. ALL DRAIN INLETS SHALL BE FREE OF SILTATION AND DEBRIS. INEFFECTIVE MEASURES SHALL BE REPLACED, AS NECESSARY.

15. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR, 2 DAYS PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION SEQUENCE

THE BMP'S SHALL BE IMPLEMENTED, MAINTAINED, AND OPERATED IN THE FOLLOWING GENERAL SEQUENCE OF CONSTRUCTION TO MITIGATE THE HAZARD OF ACCELERATED EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S FOREMAN AS NEEDED TO ELIMINATE ANY POTENTIAL EROSIVE CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WVDEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

1) STAKE THE LIMITS OF CONSTRUCTION.

2) INSTALL THE ROCK CONSTRUCTION ENTRANCE AS SHOWN ON THE PLANS.

3) INSTALL ALL ORANGE SAFETY FENCE AS SHOWN AROUND ANY DELINEATED STREAMS AND WETLANDS TO CLEARLY IDENTIFY THOSE AREAS THAT ARE NOT TO BE DISTURBED.

4) INSTALL ALL BMP'S (SUPER SILT FENCE, REINFORCED SILT FENCE, SEDIMENT TRAPS, ETC) AS SHOWN ON THE PLANS AND DETAILS.

5) CLEAR AND GRUB THE ACCESS ROAD AND PAD/PIT AREA. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, BOULDERS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY SEDIMENT CONTROLS. TREES SIX INCHES IN DIAMETER AND LARGER SHALL BE CUT AND LOGS STACKED. SMALLER TREES, BRUSH, & STUMPS SHALL BE CUT AND OR GRUBBED AND WINDROWED IN APPROPRIATE AREAS FOR USE AS SEDIMENT BARRIERS AT WATER DRAINAGE OUTLETS, WINDROWED BELOW THE WELL SITE, USED FOR WILDLIFE HABITAT, BURNED (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY OTHER METHODS APPROVED BY DEP.

6) INSTALL ANY WETLAND OR STREAM CROSSINGS AS SHOWN ON THE PLANS.

7) CONVEY UPSLOPE DRAINAGE AROUND THE ACCESS ROAD AND PAD/PIT AREA BY CONSTRUCTING ALL DIVERSION BERM(S) AS SHOWN ON THE PLANS.

8) CONSTRUCT THE ACCESS ROAD. DITCH RELIEF CULVERTS SHALL BE INSTALLED AT A GRADE OF 1-5% TO MINIMIZE OUTLET VELOCITIES TO THE EXTENT POSSIBLE. INSTALL OUTLET PROTECTION AS SHOWN ON PLANS. STABILIZE THE ROAD WITH STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. STOCKPILE AND STABILIZE TOPSOIL ALONG THE ACCESS ROAD, AS NEEDED.

9) STRIP THE TOPSOIL FROM THE PAD/PIT AREA. TOPSOIL SHALL BE STOCKPILED AND IMMEDIATELY STABILIZED.

10) GRADE THE PAD/PIT AREA AS SHOWN ON THE PLAN. IMMEDIATELY STABILIZE THE OUTER AREAS OF THE PIT/IMPOUNDMENT, AS WELL AS THE WELL PAD AND ANY TURNAROUND AREAS WITH STONE AND THE SIDE SLOPES WITH EROSION CONTROL BLANKETING WHEN SLOPES ARE 3:1 OR GREATER. APPLY SEED AND MULCH ALL DISTURBED 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 RE-DISTURBED BEFORE SITE RECLAMATION BEGINS.

11) INSTALL THE PIT LINER SYSTEM AND PERIMETER SAFETY FENCE W/GATE AND EMERGENCY LIFE LINE AS SHOWN ON THE PLANS.

12) PREVIOUSLY DISTURBED AREAS AND IMMEDIATE DOWN SLOPE AREAS SHALL BE INSPECTED AFTER EACH RAINFALL STORM EVENT AND MONITORED WEEKLY FOR SIGNS OF ACCELERATED EROSION. IMPLEMENT ADDITIONAL BMP'S AS DEEMED NECESSARY. THESE INSPECTIONS SHALL CONTINUE DURING THE DURATION OF THE PROJECT AND SUBSEQUENT SITE RECLAMATION.

13) ONCE THE PIT HAVE BEEN COMPLETED, SUBMIT THE AS-BUILT CERTIFICATION FOR THE PIT FACILITY TO THE WVDEP OFFICE OF OIL AND GAS, PRIOR TO PLACING FLUIDS IN THE STRUCTURE.

14) COMMENCE WELL DRILLING ACTIVITY AND USE OF THE ASSOCIATED PIT FACILITY. THE ASSOCIATED PIT SHALL BE MONITORED CONTINUOUSLY DURING THE INITIAL FILLING OPERATION.

15) ONCE DISTURBED AREAS HAVE BEEN RE-VEGETATED AND STABILIZED FOLLOWING RECLAMATION, THE TEMPORARY BMP'S IN THOSE AREAS MAY BE REMOVED. CONTINUE TO MONITOR THESE AREAS TO ENSURE A UNIFORM RATE OF 70% VEGETATIVE COVERAGE IS MAINTAINED. ANY AREAS FOUND TO BE DEFICIENT SHALL BE RE-SEEDED AND MULCHED.

SITE CLEANUP & RECYCLE PROGRAM

1. 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.

2. OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.

3. ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.

4. ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDED AND MULCHED, AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.

MAINTENANCE PROGRAM

1. BMP'S WILL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH MEASURABLE RAINFALL EVENT DURING THE ACTIVE CONSTRUCTION PHASE OF THE PROJECT.

2. ALL REVEGETATED ACCESS ROADS AND FACILITIES ARE TO BE MAINTAINED THROUGHOUT THE LIFE OF EACH STRUCTURE.

3. CULVERTS, ROAD DITCHES, BROAD-BASED DIPS, DIVERSION DITCHES, AND ROCK CHECK DAMS MUST BE MAINTAINED IN PROPER WORKING ORDER AND WILL BE CLEANED OUT, REPAIRED, OR REPLACED AS NECESSARY.

4. FILTER STRIPS AND/OR SILT FENCE WILL BE MAINTAINED.

5. ALL AREAS OF EARTH DISTURBANCE WILL BE REPAIRED WHERE SIGNS OF ACCELERATED EROSION ARE DETECTED.

6. SEEDING AND MULCHING WILL BE REPEATED IN THOSE AREAS THAT APPEAR TO BE FAILING OR HAVE FAILED.

ASSOCIATED PIT CONSTRUCTION STANDARDS NOTES

THE DESIGN, CONSTRUCTION, AND REMOVAL OF EMBANKMENTS ASSOCIATED WITH CENTRALIZED IMPOUNDMENTS/ASSOCIATED PITS FOR OIL AND GAS WELLS 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 IMPOUNDMENT/PIT EMBANKMENTS SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO BE STRUCTURALLY SOUND AND REASONABLY PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES.

1. THE FOUNDATION FOR A ASSOCIATED PIT EMBANKMENT MUST BE STRIPPED AND GRUBBED TO A MINIMUM DEPTH OF 2 FEET PRIOR TO PLACEMENT AND COMPACTION OF EARTHEN FILL MATERIAL. NO EMBANKMENT FILL SHALL BE PLACED ON FROZEN MATERIAL.

2. ANY SPRINGS ENCOUNTERED WITHIN THE FOUNDATION AREA SHALL BE DRAINED TO THE OUTSIDE/DOWNSTREAM TOE OF EMBANKMENT. CONSTRUCTED DRAIN SECTION SHALL BE AN EXCAVATED 2' x 2' TRENCH AND BACK FILLED WITH TYPE A SAND, COMPACTED BY HAND TAMPER. NO GEOTEXTILES SHALL BE USED TO LINE TRENCH. THE LAST 3' OF DRAIN AT THE DOWNSTREAM END SHALL BE CONSTRUCTED WITH AASHTO #8 MATERIAL.

3. SOILS FOR EARTHEN EMBANKMENT CONSTRUCTION SHALL BE LIMITED TO TYPES GC, GM, SC, SM, CL, OR ML (ASTMD-2487 - UNIFIED SOILS CLASSIFICATION). SOILS MUST CONTAIN A MINIMUM OF 20% OF PLUS NO. 200 SIEVE AND BE "WELL GRADED" MATERIAL WITH NO COBBLES OR BOULDER SIZE MATERIAL MIXED WITH THE CLAY. A MINIMUM OF THREE SAMPLES SHALL BE CLASSIFIED.

4. THE EARTHEN EMBANKMENT SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER. THE LIFTS MUST BE IN HORIZONTAL LAYERS WITH A MAXIMUM LOOSE LIFT THICKNESS 12" AND MAXIMUM PARTICLE SIZE LESS THAN 6".

5. THE PLACEMENT OF ALL FILL MATERIAL SHALL BE FREE OF WOOD, STUMPS AND ROOTS, LARGE ROCKS AND BOULDERS, AND ANY OTHER NONCOMPACTABLE SOIL MATERIAL. THE EMBANKMENT SHALL BE COMPACTED TO A MINIMUM OF VISIBLE NON-MOVEMENT, HOWEVER, THE COMPACTION EFFORT SHALL NOT EXCEED THE OPTIMUM MOISTURE LIMITS.

6. THE EMBANKMENT TOP SHALL BE A MINIMUM OF 12' IN WIDTH.

7. THE MINIMUM INSIDE AND OUTSIDE SIDESLOPES SHALL BE 2H:1V, UNLESS OTHERWISE SPECIFIED.

8. ALL EXPOSED EMBANKMENT SLOPES, NOT COVERED BY COMPACTED ROCKFILL OR RIPRAP SHALL BE LIMED, FERTILIZED, SEEDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVER IN COMPLIANCE WITH THE WVDEP EROSION AND SEDIMENT CONTROL FIELD MANUAL MUST BE ESTABLISHED UPON THE COMPLETION OF THE IMPOUNDMENT/PIT CONSTRUCTION. EMBANKMENTS SHALL BE MAINTAINED WITH A GRASSY VEGETATIVE COVER AND FREE OF BRUSH AND/OR TREES.

9. A MINIMUM OF 2' OF FREEBOARD SHALL BE MAINTAINED AT ALL TIMES DURING THE OPERATION OF THE IMPOUNDMENT.

10. ALL EMBANKMENT CONSTRUCTION AND COMPACTION TESTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

ASSOCIATED PIT LINER SYSTEM NOTES:

THE DESIGNED PIT FACILITY SHALL BE FULLY LINED WITH A GEOSYNTHETIC LINER SYSTEM. LINERS SHALL BE INSTALLED IN ACCORDANCE TO MANUFACTURER'S SPECIFICATIONS.

1. THE SUB-BASE SHALL BEAR THE WEIGHT OF THE LINER SYSTEM, WATER, AND EQUIPMENT OPERATING ON THE IMPOUNDMENT/PIT WITHOUT CAUSING OR ALLOWING A FAILURE OF THE LINER SYSTEM.

2. THE SUB-BASE SHALL BE COMPACTED TO ACCOMMODATE POTENTIAL SETTLEMENT WITHOUT DAMAGE TO THE LINER SYSTEM.

3. THE UPPER 6" OF THE SUB-BASE SHALL BE COMPACTED TO A STANDARD PROCTOR DENSITY OF AT LEAST 95%.

4. THE SUB-BASE SHALL BE HARD, UNIFORM, SMOOTH AND FREE OF DEBRIS, ROCK FRAGMENTS, PLANT MATERIAL AND OTHER FOREIGN MATERIAL.

5. THE SUB-BASE SHALL BE COVERED WITH NON-WOVEN GEOTEXTILE FABRIC TO CUSHION THE PRIMARY LINER AND ALLOW FOR ADEQUATE VENTING BETWEEN THE PRIMARY LINER AND THE SUB-BASE TO PREVENT THE ENTRAPMENT OF GASES BENEATH THE LINER SYSTEM.

6. THE PIT AREA SHALL BE DRAINED AND COMPLETELY DRY PRIOR TO THE PLACEMENT OF THE PRIMARY LINER. THE PRIMARY LINER SHALL MEET ALL WV DEP GUIDELINES FOR MINIMUM THICKNESS AND SHALL PREVENT THE MIGRATION OF WATER THROUGH THE LINER TO THE GREATEST DEGREE THAT IS TECHNOLOGICALLY POSSIBLE.

7. THE PRIMARY LINER SHALL FULLY COVER THE BOTTOM AND SIDEWALLS OF THE PIT.

8. AN ANCHOR TRENCH SHALL BE EXCAVATED COMPLETELY AROUND THE PERIMETER OF THE PIT AREA AT THE PLANNED ELEVATION OF THE TOP OF THE LINING. THE TRENCH SHALL BE A MINIMUM 36 INCHES DEEP AND 24 INCHES WIDE.

9. ALL ELEMENTS OF THE LINER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS. ALL SEAMS AND SEALS AROUND ANY PROJECTIONS SHALL BE SEALED AND TESTED IN A METHOD APPROVED BY THE MANUFACTURER.

10. GAS RELIEF VENTS SHALL BE PROVIDED ALONG THE TOP OF THE LINER AND WITHIN ONE FOOT OF THE PERIMETER TO ALLOW GASES TO ESCAPE FROM UNDER THE GEOMEMBRANE. MAXIMUM SPACING FOR VENTS SHALL BE 30 FEET.

11. WATER LEVEL MARKINGS SHALL BE CLEARLY PAINTED (1' INCREMENTS) ON THE LINER SYSTEM TO IDENTIFY THE WATER SURFACE ELEVATION.

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CHRIS B. KIMES
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
05/01/2014

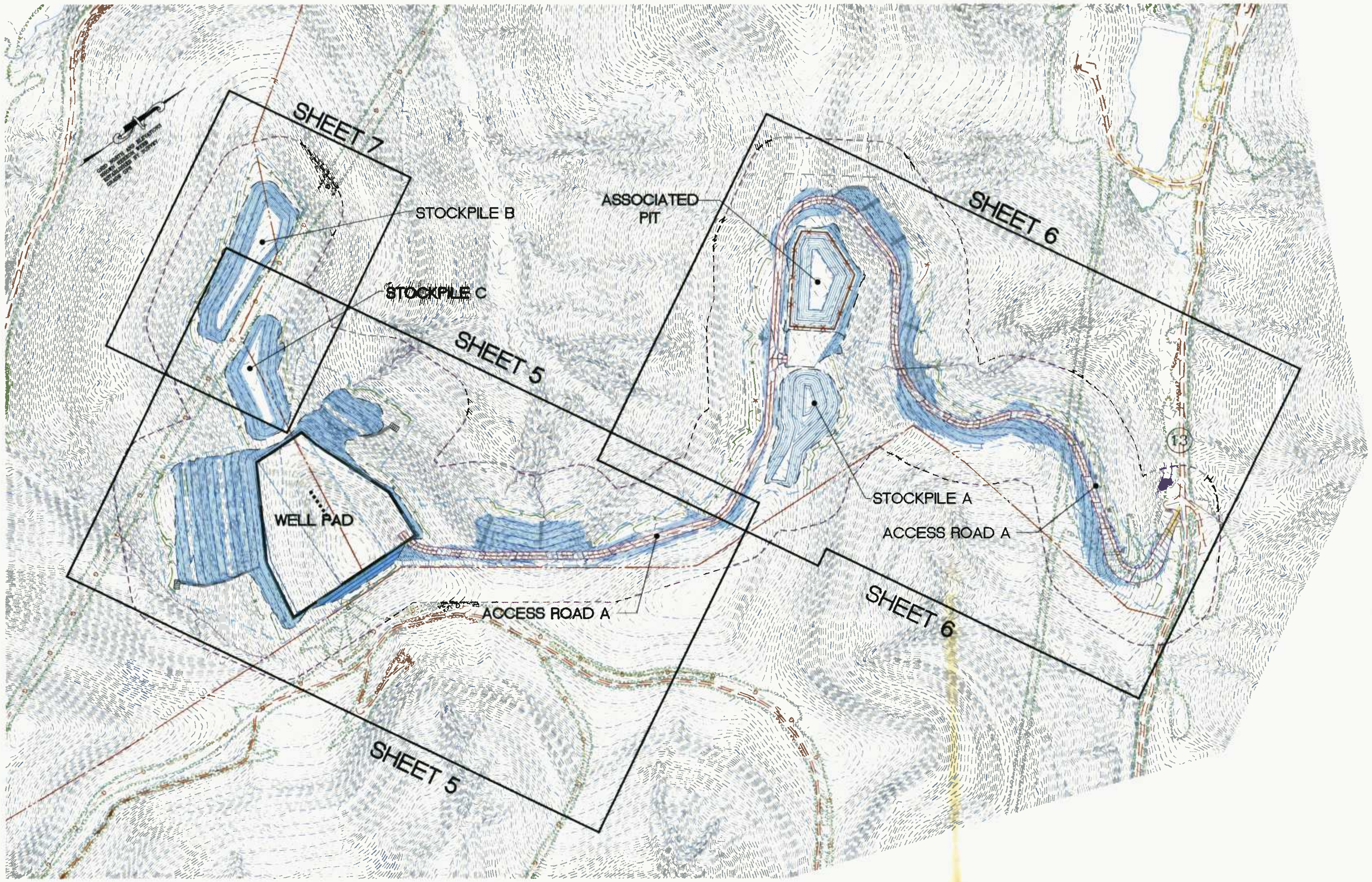
THIS DOCUMENT WAS PREPARED BY:
NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

NOTES
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: N/A
DESIGNED BY: CSK
FILE NO. 7889
SHEET 2 OF 21
REV: 05/01/2014

OVERALL SHEET INDEX & VOLUMES

(PROPOSED WELLS NO. WV 513153, WV 513154, WV 513155, WV 513700, WV 513701, WV 514095, WV 514096 & WV 514097)



150 0 150 300

SCALE: 1" = 150'

NOTE:
ALL EARTHWORK VOLUMES WERE CALCULATED USING A CUT SWELL FACTOR OF 1.0 AND A FILL SHRINK FACTOR OF 1.0

NOTE:

1. ALL PROPOSED DRAINAGE CULVERTS AND DRAIN PIPES SHALL HAVE ADEQUATE OUTLET PROTECTION (RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN 12" LIFTS (9" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR.

3. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS PRIOR TO CONSTRUCTING STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED TOPSOIL IS TO BE REAPPLIED AT A DEPTH OF 6". SLOPES SHALL BE TRACKED BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR.

4. AERIAL TOPOGRAPHIC MAPPING WAS PREFORMED BY BLUE MOUNTAIN AERIAL MAPPING, DATED 4-1-13.

OXF 159 ASSOCIATED PIT VOLUME

Elevation	Barrels	Gallons	Acre-Ft
1229	0	0.0	0
1230	478	20,085.5	0.17084
1231	1,119	46,987.8	0.3708
1232	1,929	81,026.2	0.60034
1233	2,922	122,741.7	0.86107
1234	4,111	172,668.7	1.15454
1235	5,508	231,348.0	1.48216
1236	7,127	299,320.6	1.84544
1237	8,979	377,117.6	2.24587
1238	11,078	465,283.2	2.68489
1239	13,437	564,338.8	3.16398
1240	16,065	674,747.0	3.68464
1241	18,982	797,237.8	4.24837
1242 Storage	22,197	932,260.9	4.8567
1243	25,723	1,080,347.3	5.5111
1244	29,585	1,242,559.4	6.21488

Incised Elev. = 1238.0

MATERIAL STOCKPILES

Name	Excess	Topsoil
A	0	10,835
B	17,469	0
C	12,952	0
TOTAL	30,421	10,835

OXF 159 WELL PAD & ASSOCIATED PIT

Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	Length of Slope (FT)
Access Road "A"	17,932.3	20,571.7	0.0	2,639.4	15.4	215.0
Well Pad	61,745.3	37,865.8	23,879.5	0.0	n/a	n/a
Associated Pit	11,758.4	1,694.8	10,063.6	0.0	n/a	n/a
Truck Turnaround Pad	0.1	1,447.3	0.0	1,447.2	n/a	n/a
Stripped Topsoil (6")	10,378.4	0.0	10,378.4	0.0	n/a	n/a
Material Stockpiles	0.0	41,255.9	0.0	41,255.9	n/a	n/a
Totals	101,814.5	102,835.5	44,321.5	45,342.5	n/a	n/a
	Total Spoil (CY) =		-1,021.0			

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CYRUS S. KUMP REGISTERED 19578 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

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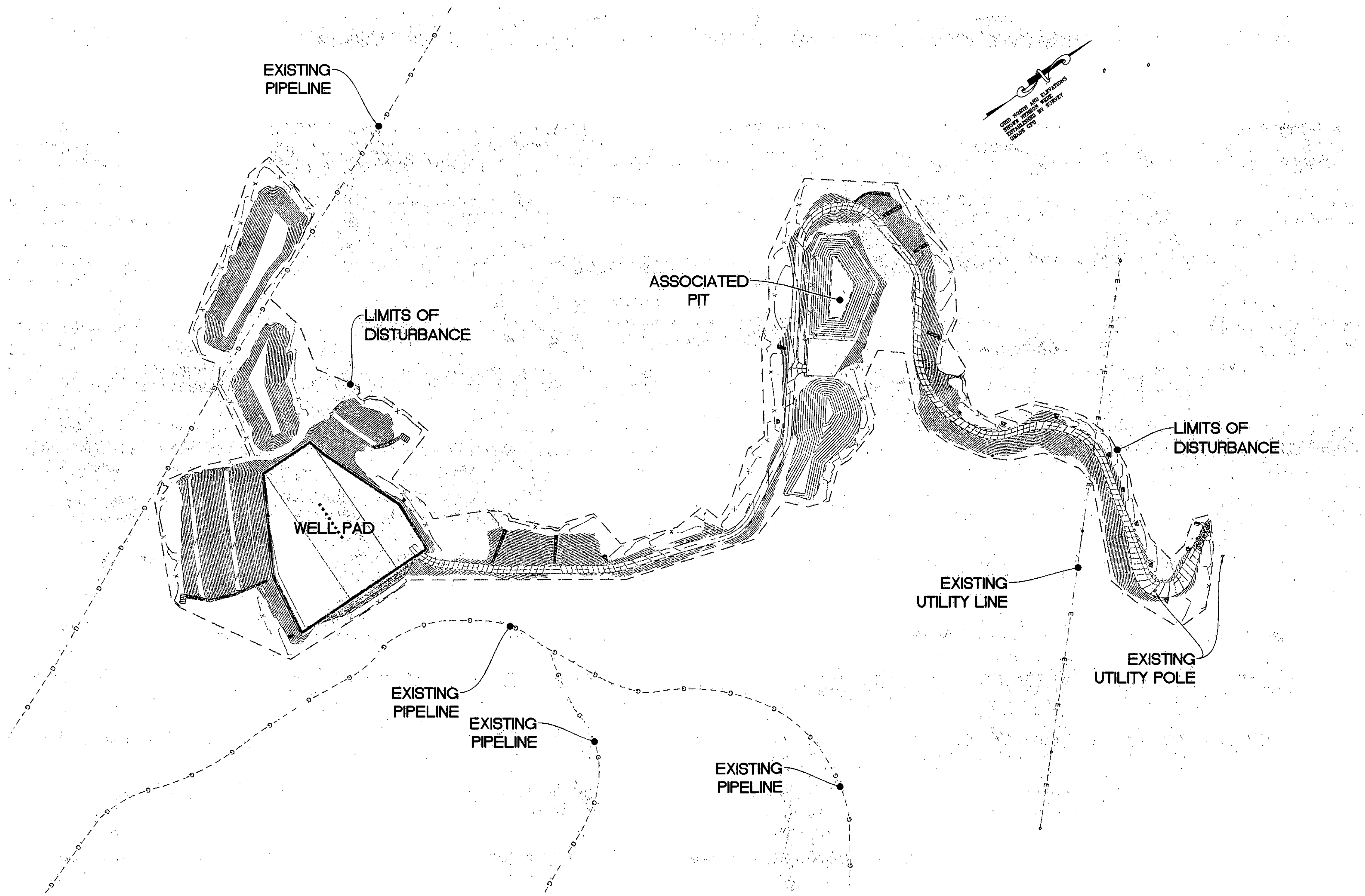
OVERALL SHEET INDEX & VOLUMES
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: 1" = 150'
DESIGNED BY: CSK
FILE NO. 7889
SHEET 3 OF 21
REV: 05/01/2014

EXISTING UTILITY LAYOUT PLAN



150 0 150 300

SCALE: 1" = 150'

GENERAL NOTES:

1. THE UTILITIES AND THEIR LOCATIONS AS SHOWN HEREON ARE BASED ON: A) OBSERVABLE EVIDENCE OF THOSE VISIBLE, ABOVE-GROUND FACILITIES, FEATURES, AND MARKERS WHICH WERE FOUND ON THE SUBJECT PROPERTY AT THE TIME OF SURVEY PERFORMED BY SLS, INC. AND B) FIELD MARKINGS PLACED BY UTILITY COMPANIES IN RESPONSE TO THE WV 811 TICKET SUBMITTED BY SLS, INC. SLS, INC., NOR NAVITUS ENGINEERING CANNOT GUARANTEE THE ACCURACY OF THE UTILITY MARKINGS PERFORMED BY OTHERS OR THAT ALL 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 SLS, INC., NAVITUS ENGINEERING AND/OR EQT PRODUCTION COMPANY.

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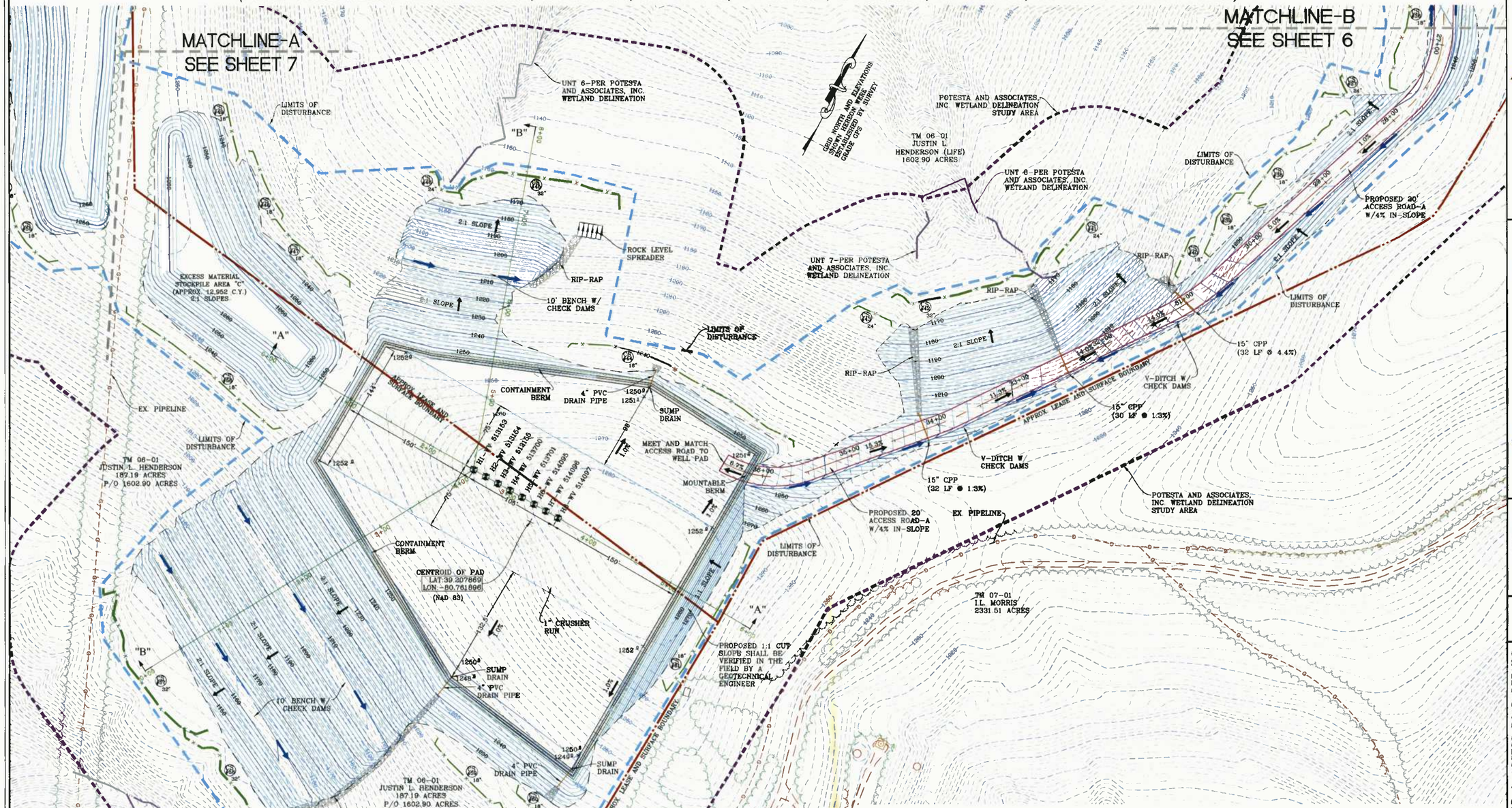
THIS DOCUMENT WAS PREPARED BY: NAVITUS ENGINEERING INC. FOR: EQT PRODUCTION COMPANY

EXISTING UTILITY LAYOUT PLAN
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014	
SCALE: 1" = 150'	
DESIGNED BY:	CSK
FILE NO.	7889
SHEET 4	OF 21
REV: 05/01/2014	

WELL PAD & ACCESS ROAD DETAILS

(PROPOSED WELLS NO. WV 513153, WV 513154, WV 513155, WV 513700, WV 513701, WV 514095, WV 514096 & WV 514097)



NOTE:
ALL EARTHWORK VOLUMES WERE CALCULATED USING A CUT SWELL FACTOR OF 1.0 AND A FILL SHRINK FACTOR OF 1.0

NOTE:

1. ALL PROPOSED DRAINAGE CULVERTS AND DRAIN PIPES SHALL HAVE ADEQUATE OUTLET PROTECTION (RIP-RAP) AS SHOWN ON THESE PLANS.
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REGISTERED
19576
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

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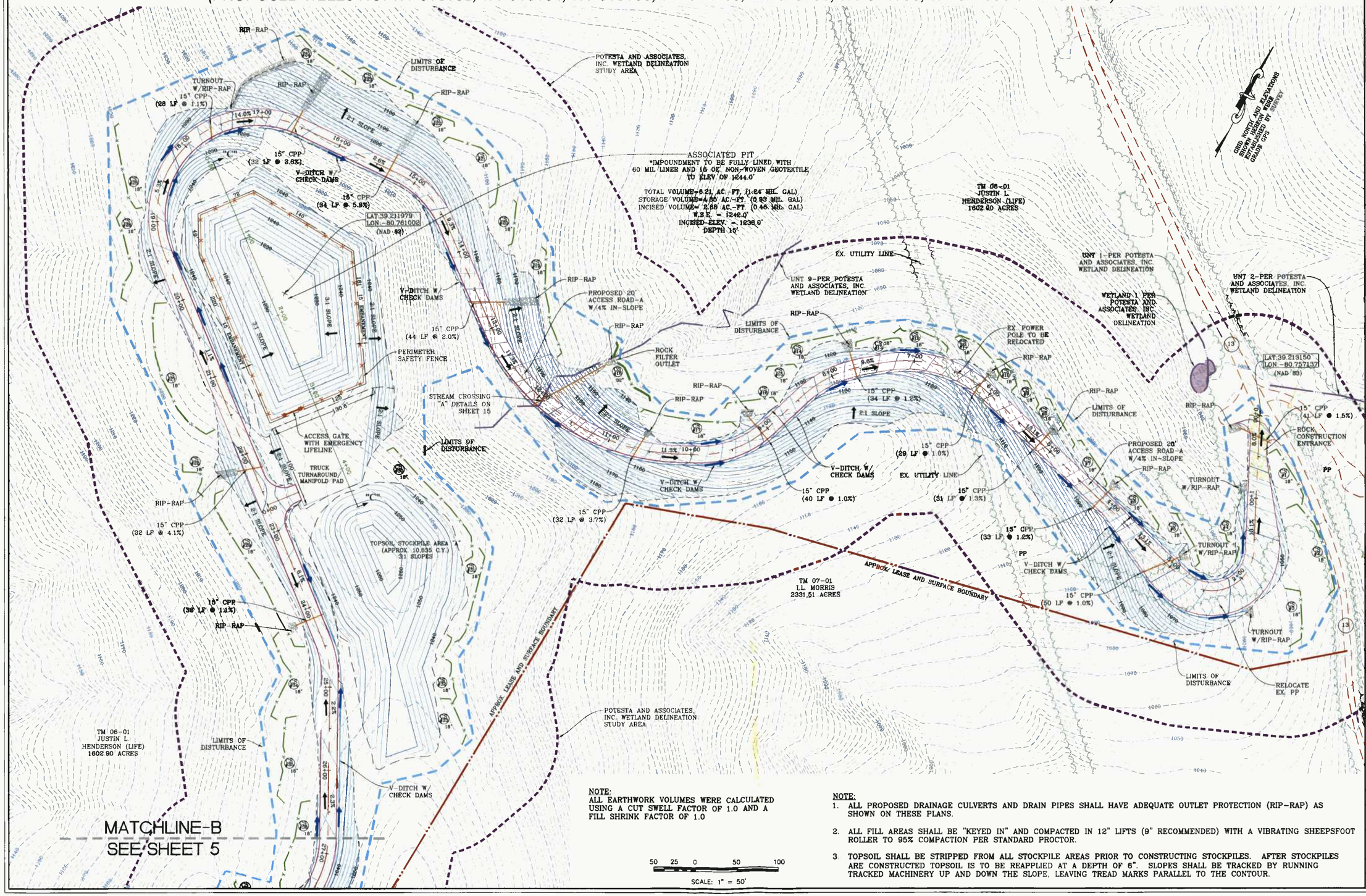
FOR: EQT PRODUCTION COMPANY

WELL PAD & ACCESS ROAD DETAILS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE:	04/08/2014
SCALE:	1" = 50'
DESIGNED BY:	CSK
FILE NO.	7889
SHEET	5 OF 21
REV:	05/01/2014

ASSOCIATED PIT & ACCESS ROAD DETAILS

(PROPOSED WELLS NO. WV 513153, WV 513154, WV 513155, WV 513700, WV 513701, WV 514095, WV 514096 & WV 514097)



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CHRIS S. KING
REGISTERED
15576
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

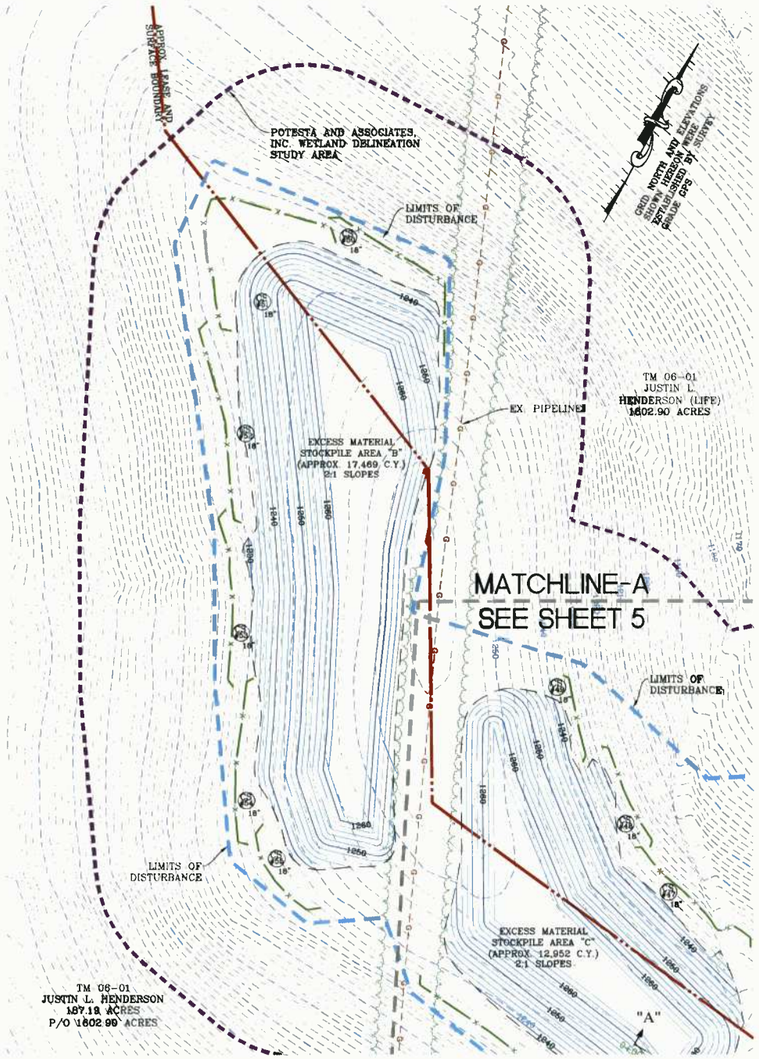
THIS DOCUMENT WAS PREPARED BY: NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

ASSOCIATED PIT & ACCESS ROAD DETAILS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: 1" = 50'
DESIGNED BY: CSK
FILE NO. 7889
SHEET 6 OF 21
REV: 05/01/2014

STOCKPILE DETAILS

(PROPOSED WELLS NO. WV 513153, WV 513154, WV 513155, WV 513700, WV 513701, WV 514095, WV 514096 & WV 514097)



NOTE:
ALL EARTHWORK VOLUMES WERE CALCULATED USING A CUT SWELL FACTOR OF 1.0 AND A FILL SHRINK FACTOR OF 1.0

NOTE:

1. ALL PROPOSED DRAINAGE CULVERTS AND DRAIN PIPES SHALL HAVE ADEQUATE OUTLET PROTECTION (RIP-RAP) AS SHOWN ON THESE PLANS.
2. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN 12" LIFTS (9" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR.
3. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS PRIOR TO CONSTRUCTING STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED TOPSOIL IS TO BE REAPPLIED AT A DEPTH OF 6". SLOPES SHALL BE TRACKED BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR.

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CHRIS S. KUHN
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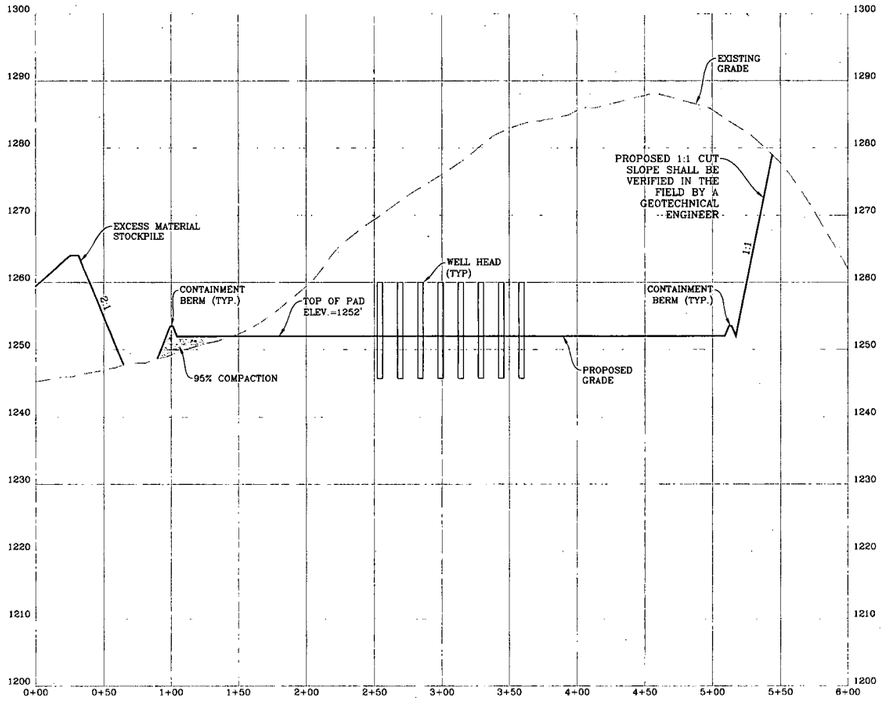
STOCKPILE DETAILS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

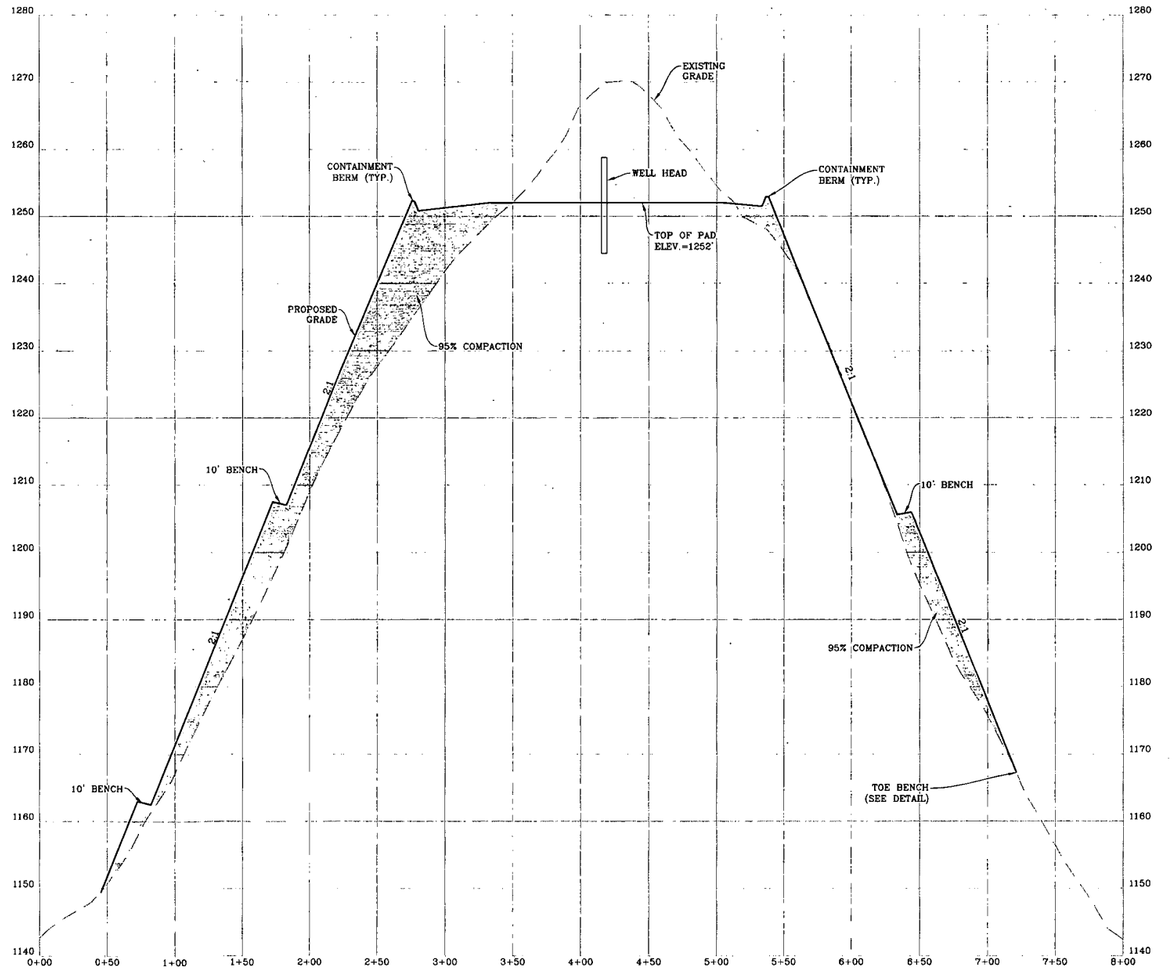
DATE: 04/08/2014
SCALE: 1" = 50'
DESIGNED BY: CSK
FILE NO. 7889
SHEET 7 OF 21
REV: 05/01/2014

WELL PAD SECTIONS



WELL PAD CROSS-SECTION "A-A"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



WELL PAD CROSS-SECTION "B-B"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTE:
1. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN 12" LIFTS (9" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR.

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CYRUS S. KING
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19578
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
05/01/2014

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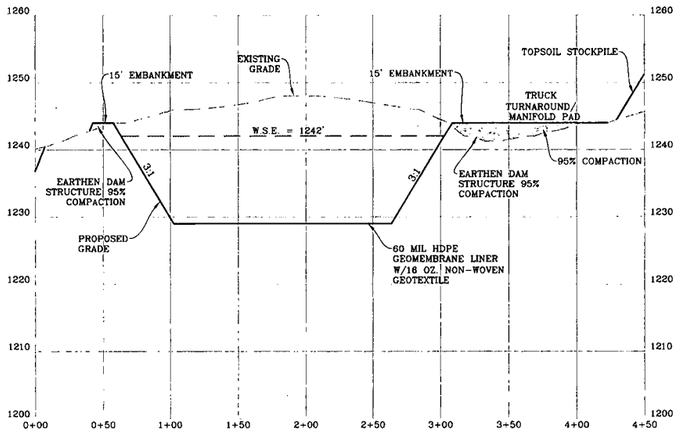
WELL PAD SECTIONS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

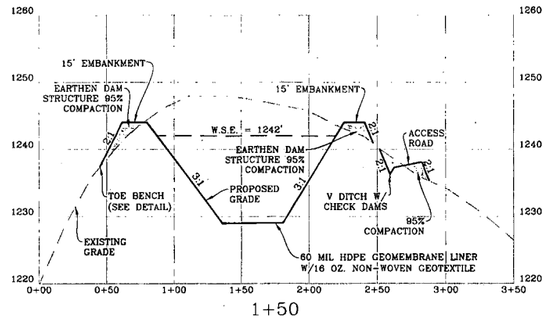
DATE: 04/08/2014
SCALE: AS SHOWN
DESIGNED BY: CSK
FILE NO. 7889
SHEET 8 OF 21
REV: 05/01/2014

ASSOCIATED PIT SECTIONS



ASSOCIATED PIT CROSS-SECTION "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



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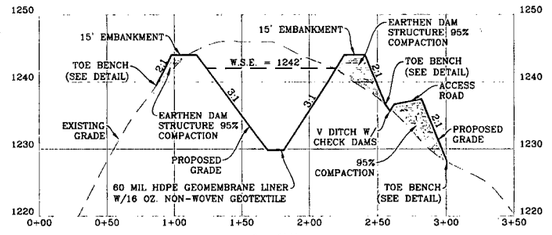

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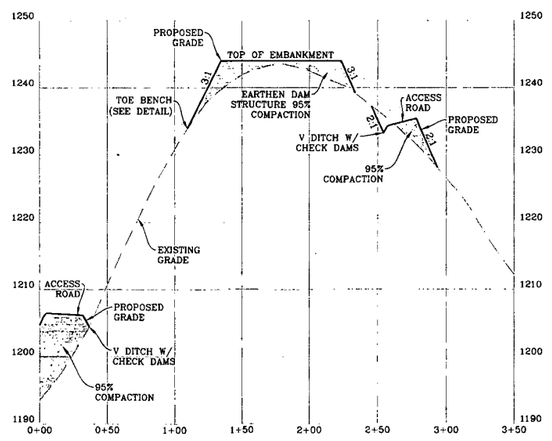

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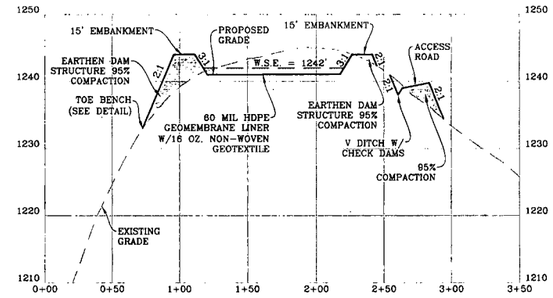
ASSOCIATED PIT CROSS-SECTIONS ALONG BASELINE "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



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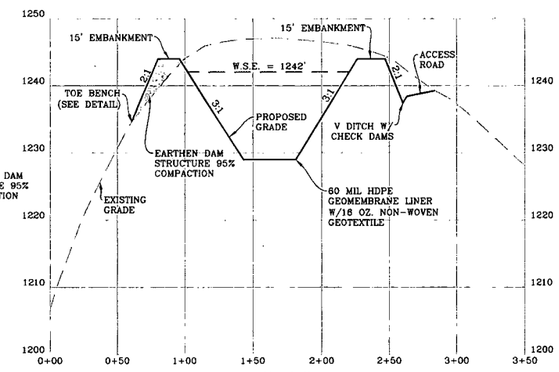

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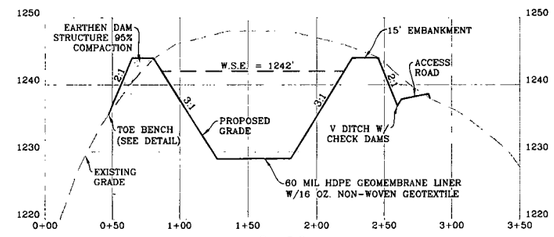

2+00

ASSOCIATED PIT CROSS-SECTIONS ALONG BASELINE "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTE:
1. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN 12" LIFTS (9" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR.

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CYRUS S. KING
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19578
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PROFESSIONAL ENGINEER
05/01/2014

THIS DOCUMENT WAS PREPARED BY:
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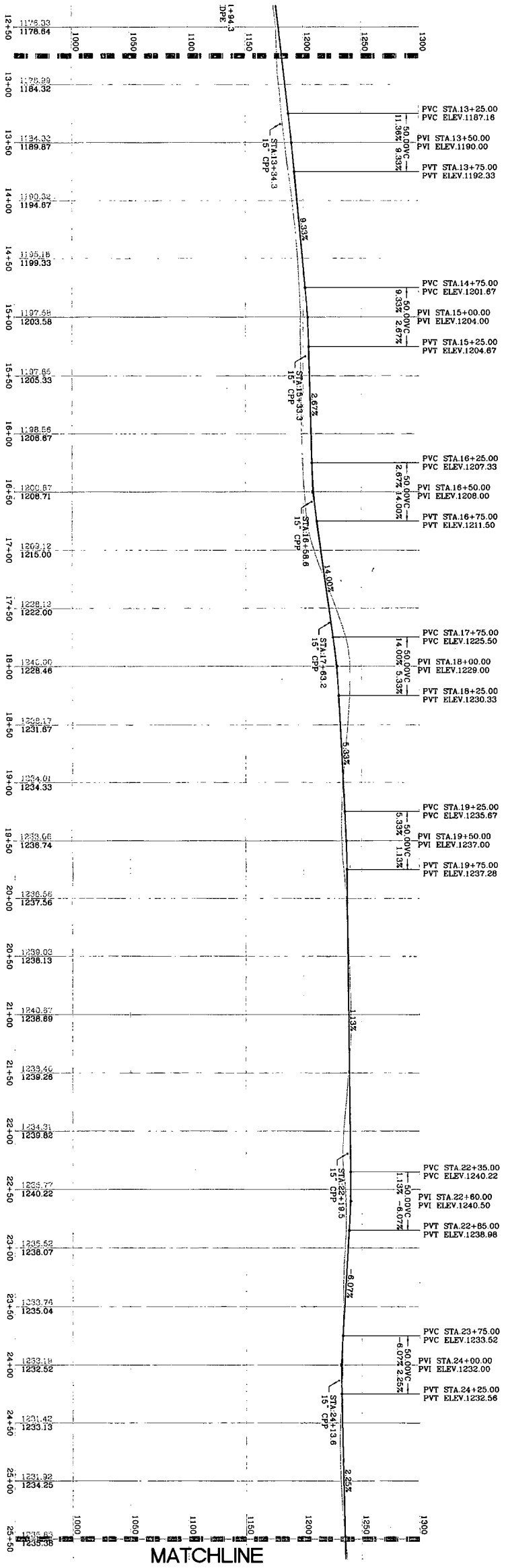
FOR: EQT PRODUCTION COMPANY

ASSOCIATED PIT SECTIONS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: AS SHOWN
DESIGNED BY: CSK
FILE NO. 7889
SHEET 9 OF 21
REV: 05/01/2014

MATCHLINE
'STA 12+75'
SEE THIS SHEET

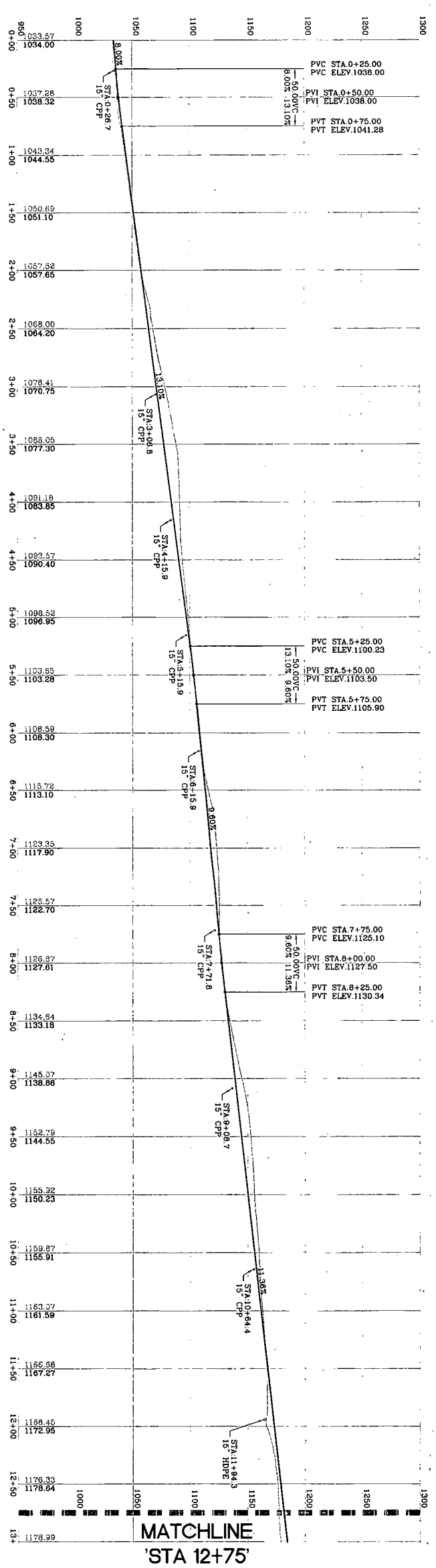


ACCESS ROAD "A" PROFILE
SCALE: HORIZ. 1" = 50' VERT. 1" = 50'

MATCHLINE
'STA 25+50'
SEE SHEET 11

SCALE: 1" = 50'

ACCESS ROAD "A" PROFILE



ACCESS ROAD "A" PROFILE
SCALE: HORIZ. 1" = 50' VERT. 1" = 50'

MATCHLINE
'STA 12+75'
SEE THIS SHEET

ACCESS ROAD "A" PROFILE

DATE: 04/08/2014	ACCESS ROAD PROFILE
SCALE: AS SHOWN	OXF 159
DESIGNED BY: CSK	NEW MILTON & SOUTHWEST DISTRICT
FILE NO. 7889	DODDRIDGE COUNTY, WV
SHEET 10 OF 21	THIS DOCUMENT WAS PREPARED BY: NAVITUS ENGINEERING INC. FOR: EQT PRODUCTION COMPANY
REV: 05/01/2014	

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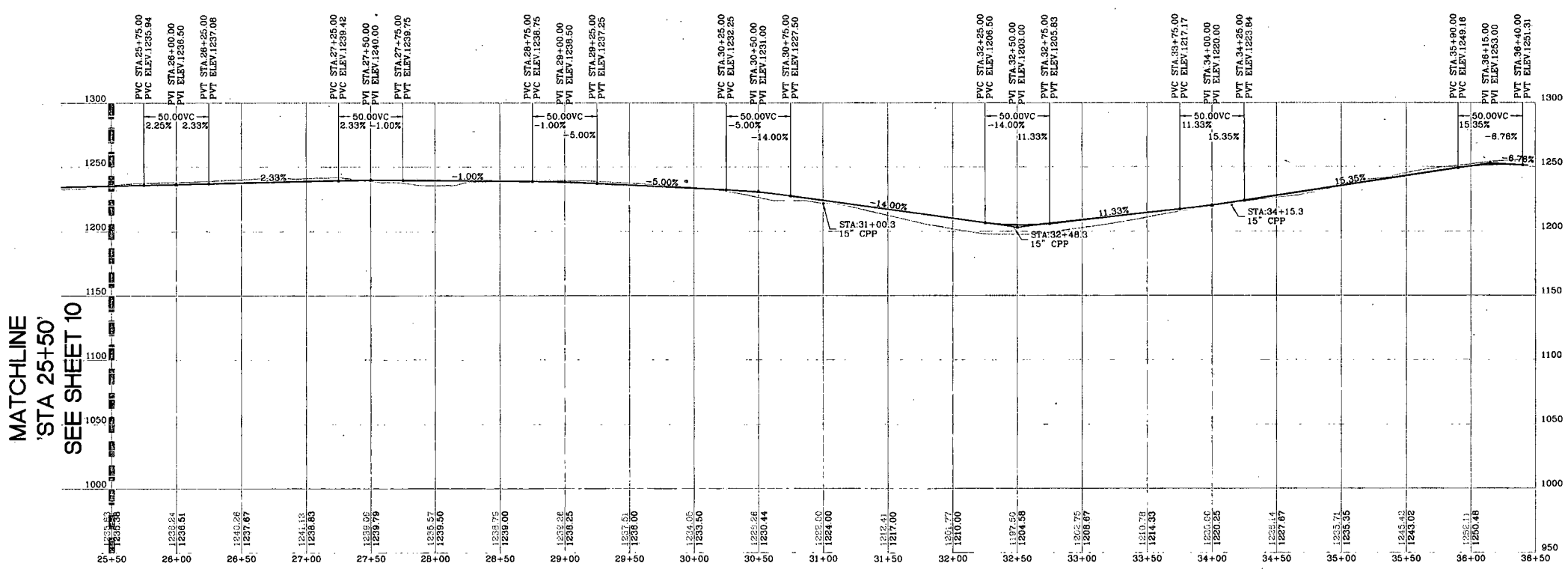
ACCESS ROAD "A" PROFILE



MATCHLINE
'STA 25+50'
SEE SHEET 10

ACCESS ROAD "A" PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'

50 25 0 50 100

SCALE: 1" = 50'

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FOR: EQT PRODUCTION COMPANY

ACCESS ROAD "A" PROFILE
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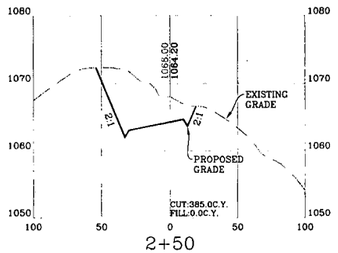
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: AS SHOWN
DESIGNED BY: CSK
FILE NO. 7889
SHEET 11 OF 21
REV: 05/01/2014

ROAD SECTIONS

ACCESS ROAD "A" CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



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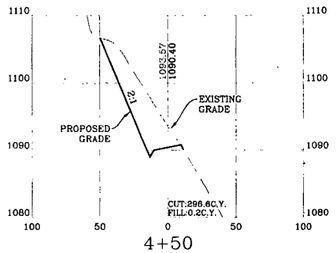

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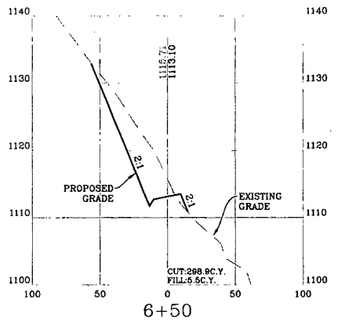

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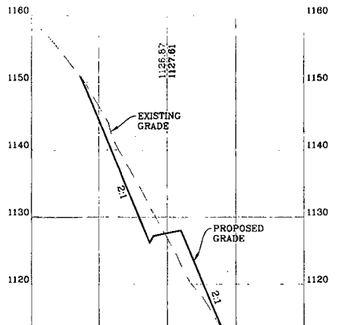

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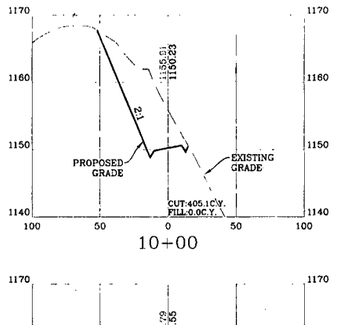

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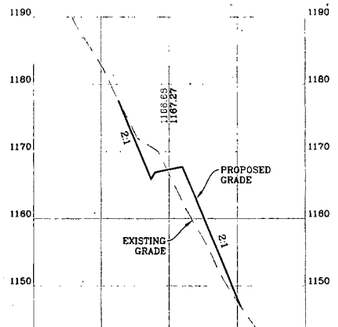

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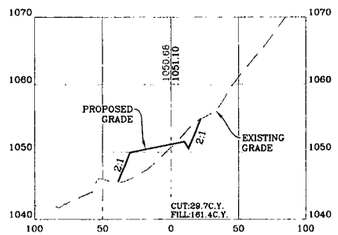

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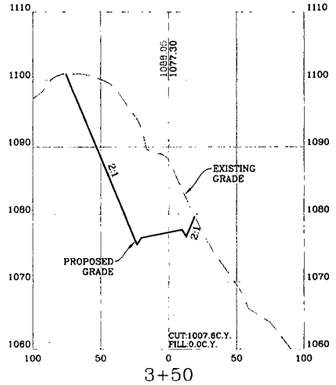

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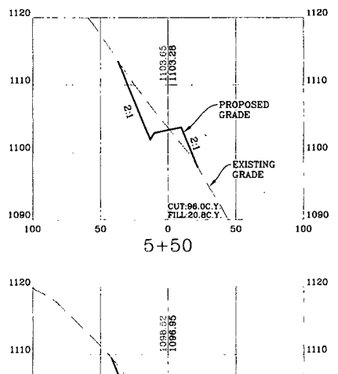

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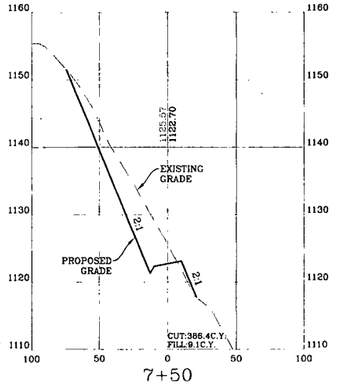

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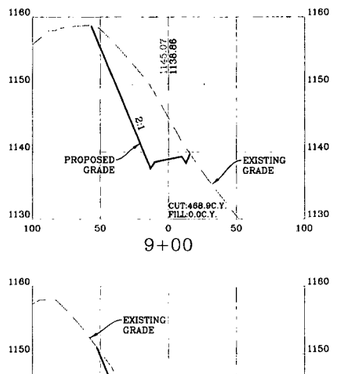

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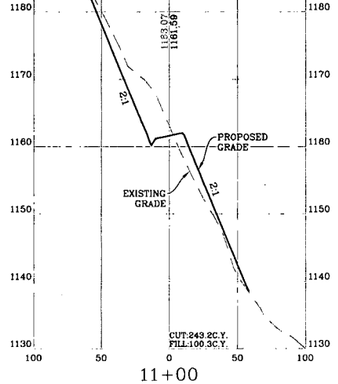

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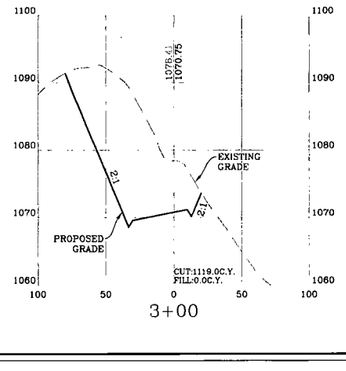
1+00



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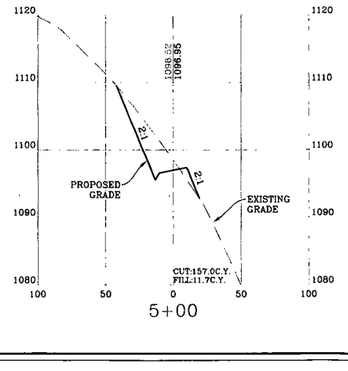

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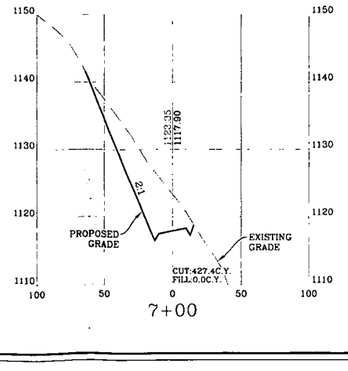

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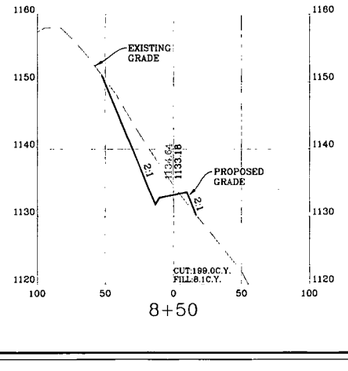

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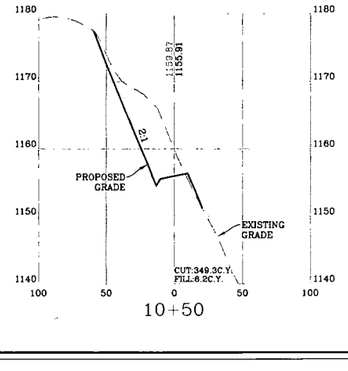

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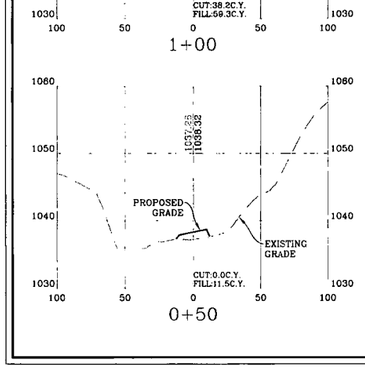

0+50

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CRUIS S. KIMP
REGISTERED
19578
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PROFESSIONAL ENGINEER

THIS DOCUMENT WAS PREPARED BY:
NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

ROAD SECTIONS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: AS SHOWN
DESIGNED BY: CSK
FILE NO. 7889
SHEET 12 OF 21
REV: 05/01/2014

ROAD SECTIONS

ACCESS ROAD "A" CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

13+50

13+00

12+50

12+00

15+50

15+00

14+50

14+00

17+00

16+50

16+00

19+00

18+50

18+00

17+50

21+50

21+00

20+50

20+00

19+50

23+50

23+00

22+50

22+00

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CRUG B. KUHN
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9576
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
05/01/2014

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ROAD SECTIONS
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NEW MILTON & SOUTHWEST DISTRICT
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SHEET 13 OF 21
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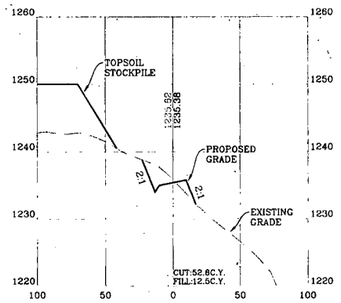
ROAD SECTIONS

ACCESS ROAD "A" CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



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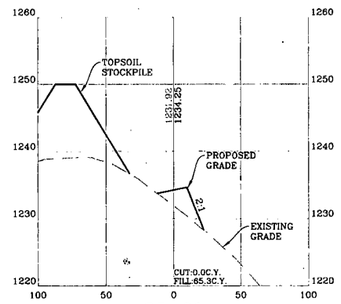
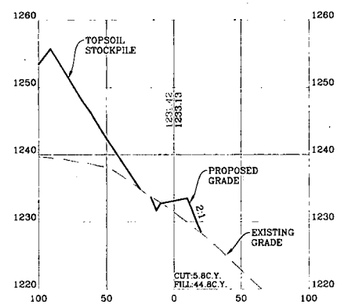


25+00



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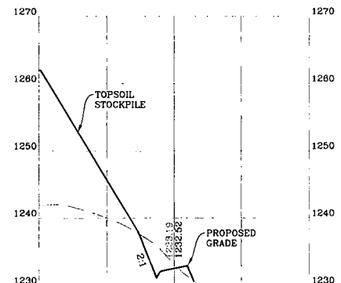

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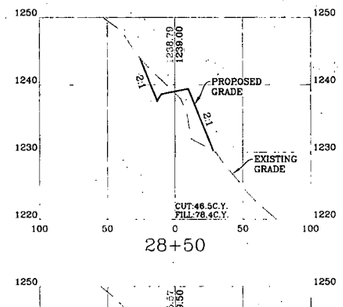
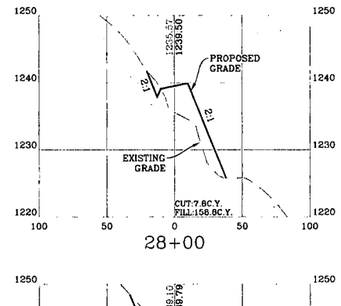


28+50



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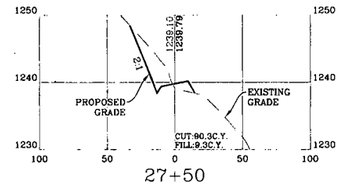

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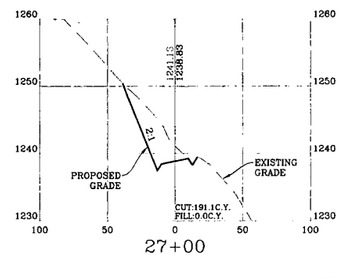

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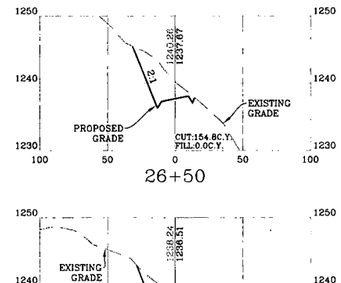

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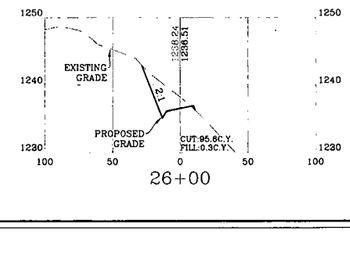

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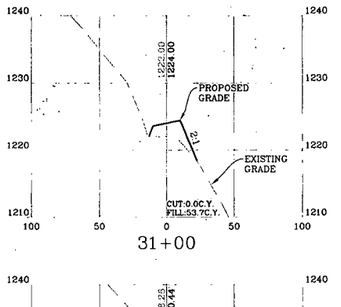

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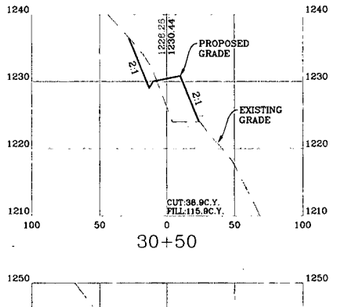

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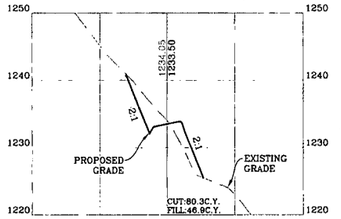

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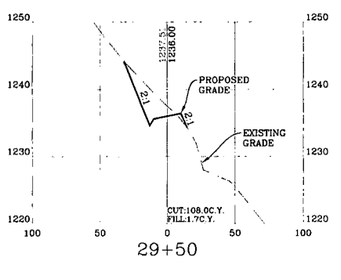

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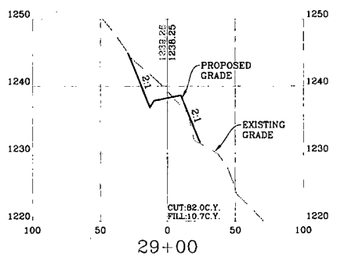

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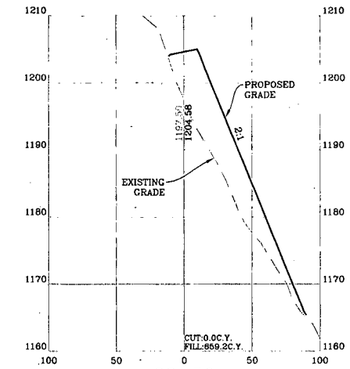

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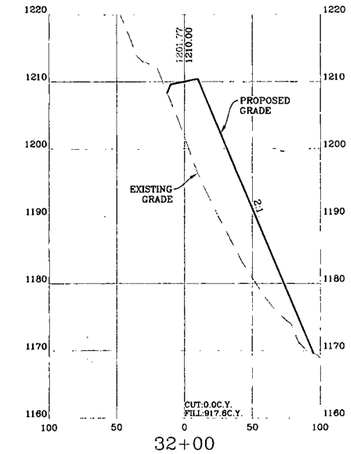

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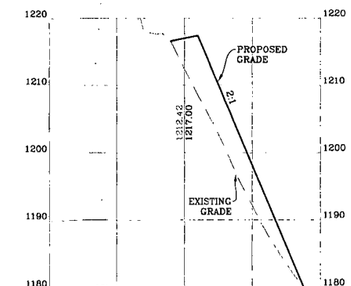

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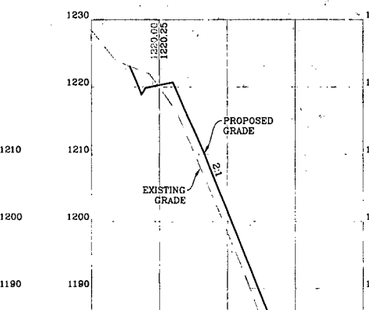

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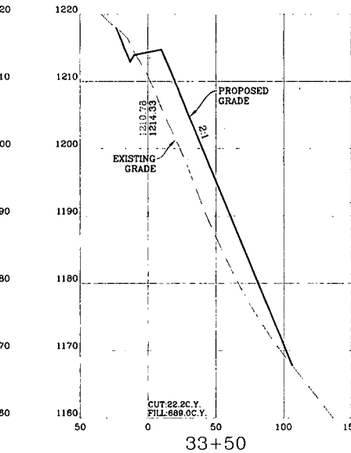

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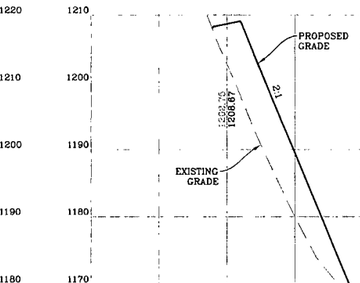

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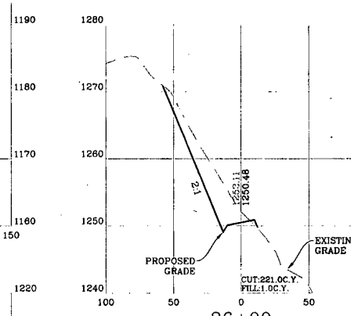

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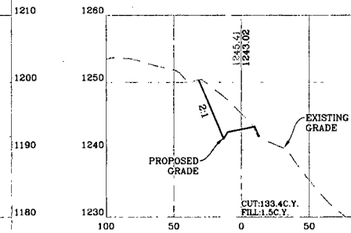

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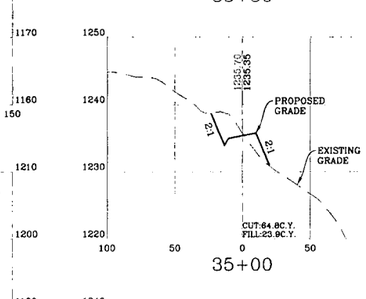

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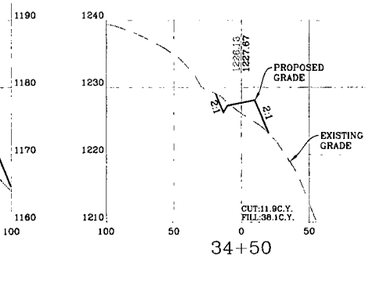

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CHRIS S. KING
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
05/01/2014

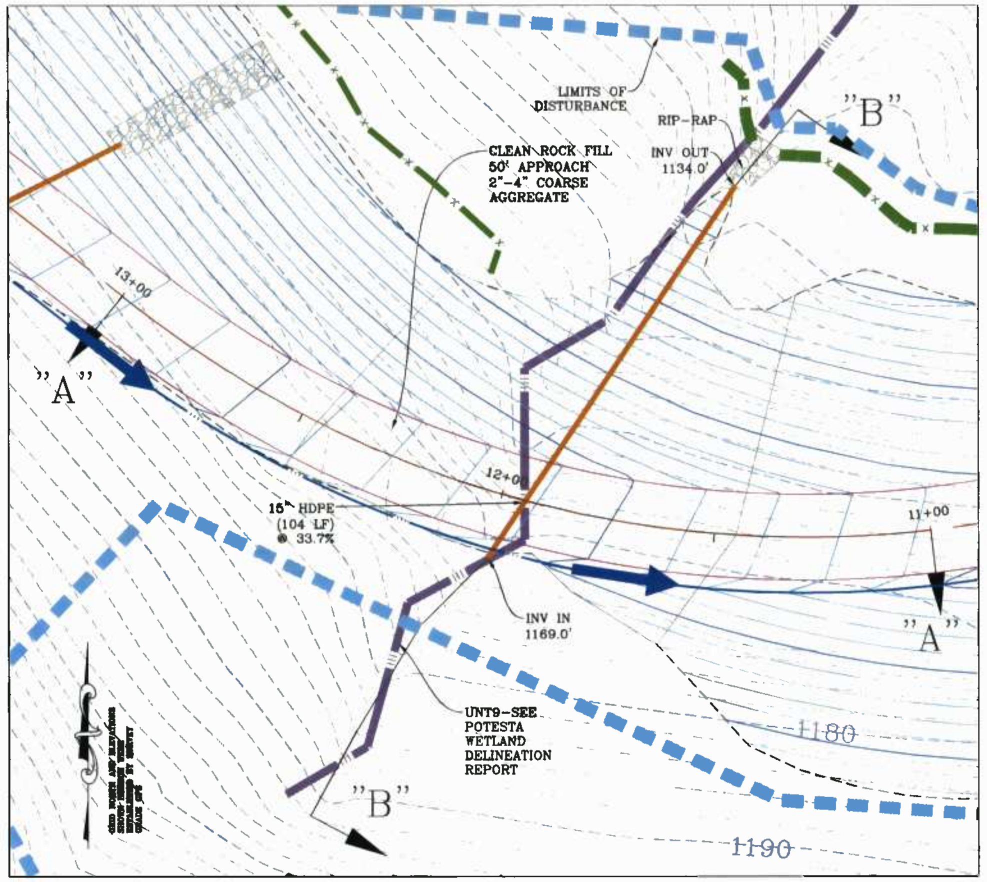
THIS DOCUMENT WAS PREPARED BY: NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

ROAD SECTIONS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: AS SHOWN
DESIGNED BY: CSK
FILE NO. 7869
SHEET 14 OF 21
REV: 05/01/2014

STREAM CROSSING DETAILS

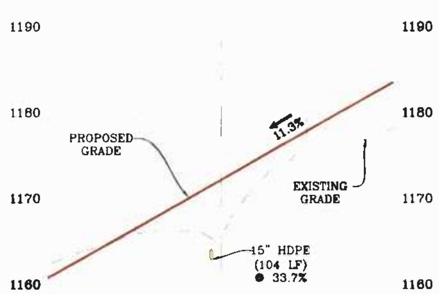
STREAM CROSSING "A" DETAILS



20 10 0 20 40

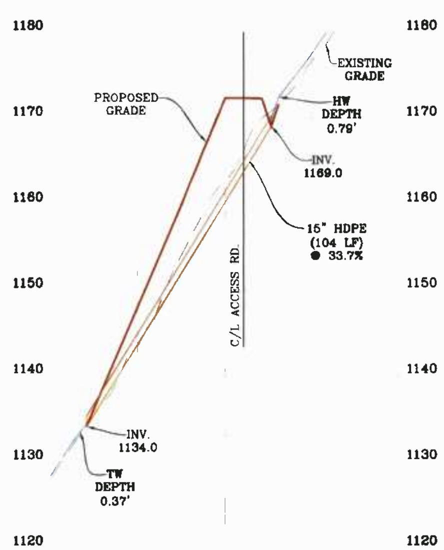
SCALE: 1" = 20'

STREAM CROSSING "A" SECTIONS



CROSS SECTION "A-A"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



CROSS SECTION "B-B"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTE:

1) SEE STREAM CROSSING REPORT BY NAVITUS ENGINEERING FOR CULVERT AND DRAINAGE COMPUTATIONS.
2) EQT SHALL OBTAIN A STREAM ACTIVITY PERMIT THROUGH THE PUBLIC LAND CORPORATION OFFICE OF LAND AND STEAMS FOR STREAM CROSSING "A".

GENERAL STREAM CROSSING NOTES:

1) 2" TO 4" COARSE AGGREGATE OR LARGER SHALL BE USED TO FORM THE FIRST 6" OF FILL FOR THE CROSSING, THE REMAINDER OF MATERIAL SHALL BE ONLY LARGE ANGULAR DURABLE ROCK. "DO NOT USE ERODIBLE MATERIAL FOR CONSTRUCTION OF THE CROSSING."
2) DEPTH OF STONE COVER OVER THE CULVERTS SHALL BE EQUAL TO ONE-HALF THE CULVERT DIAMETER OR 12 INCHES, WHICHEVER IS GREATER.
3) IF MULTIPLE CULVERTS ARE USED, THEY SHALL BE SEPARATED BY AT LEAST 12 INCHES OF COMPACTED AGGREGATE FILL.
4) CLEARING AND EXCAVATION OF THE STREAMBED AND BANKS SHALL BE KEPT TO A MINIMUM.
5) FILTER CLOTH SHALL BE PLACED ON THE STREAMBED AND STREAMBANKS PRIOR TO PLACEMENT OF THE PIPE CULVERTS AND AGGREGATE. THE FILTER CLOTH SHALL COVER THE STREAMBED AND EXTEND A MINIMUM OF SIX INCHES AND A MAXIMUM OF ONE FOOT BEYOND THE END OF THE CULVERTS AND BEDDING MATERIAL.
6) A WATER DIVERTING SWALE SHALL BE CONSTRUCTED ACROSS THE ROADWAY ON EITHER SIDE OF THE STREAM CROSSING.
7) APPROPRIATE PERIMETER CONTROLS SUCH AS COMPOST FILTER SOCK, SUPER SILT FENCE AND/OR SEDIMENT TRAPS SHALL BE EMPLOYED ALONG THE BANKS AND PARALLEL TO THE STREAMBED.
8) CROSS CRIBBING OF THE DOWNSTREAM SIDE OF THE CULVERT INSTALLATIONS MAY BE NEEDED TO AID IN REDUCING STRUCTURAL DAMAGE DURING HIGH VELOCITY WATER OVERFLOW PERIODS.
9) STREAMBED MATERIAL IS NOT TO BE USED AS FILL.
10) GREEN CONCRETE SHALL NOT BE PLACED IN CONTACT WITH FLOWING WATER.
11) WHEN THE CROSSING HAS SERVED ITS PURPOSE, ALL STRUCTURES INCLUDING CULVERTS, BEDDING, AND FILTER CLOTH SHALL BE REMOVED. REMOVAL OF THE STRUCTURE AND CLEAN UP OF THE AREA SHOULD BE ACCOMPLISHED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE WATERWAY CHANNEL. UPON REMOVAL OF THE STRUCTURE, THE STREAM BANK SHALL IMMEDIATELY BE STABILIZED.
12) DURING ROUTINE MAINTENANCE DO NOT GRADE MUD AND DEBRIS OVER THE SIDES OF THE CROSSING INTO THE STREAM.
13) THE CROSSING MUST BE INSPECTED AFTER EVERY RAIN EVENT OF 0.5 INCHES OR MORE AND ONCE A WEEK TO ENSURE THAT THE CULVERTS, STREAMBED, AND STREAM BANKS ARE MAINTAINED AND NOT DAMAGED. NEVER ALLOW THE CULVERTS TO BECOME CLOGGED WITH DEBRIS AND REMOVE ANY OBSTRUCTIONS IMMEDIATELY.
14) FLUSHING IS NOT AN APPROVED METHOD TO BE UTILIZED FOR CULVERT CLEANOUT.

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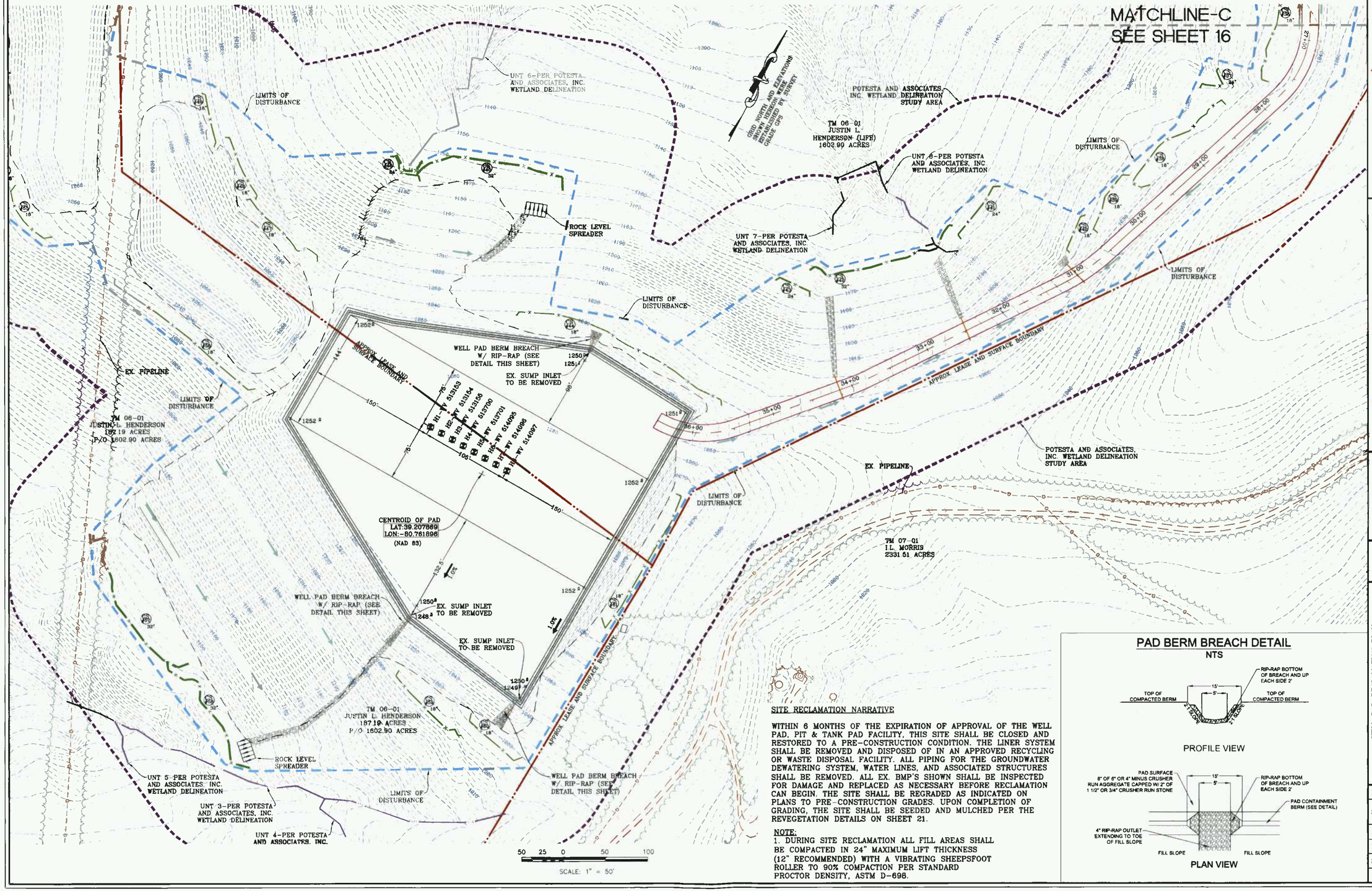
CYRUS S. KUMP
REGISTERED
19578
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

THIS DOCUMENT WAS PREPARED BY: NAVITUS ENGINEERING INC. FOR: EQT PRODUCTION COMPANY

STREAM CROSSING DETAILS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: AS SHOWN
DESIGNED BY: CSK
FILE NO. 7889
SHEET 15 OF 21
REV: 05/01/2014

WELL PAD RECLAMATION PLAN



PAD BERM BREACH DETAIL

NTS

PROFILE VIEW

PLAN VIEW

SITE RECLAMATION NARRATIVE

WITHIN 6 MONTHS OF THE EXPIRATION OF APPROVAL OF THE WELL PAD, PIT & TANK PAD FACILITY, THIS SITE SHALL BE CLOSED AND RESTORED TO A PRE-CONSTRUCTION CONDITION. THE LINER SYSTEM SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED RECYCLING OR WASTE DISPOSAL FACILITY. ALL PIPING FOR THE GROUNDWATER DEWATERING SYSTEM, WATER LINES, AND ASSOCIATED STRUCTURES SHALL BE REMOVED. ALL EX. BMP'S SHOWN SHALL BE INSPECTED FOR DAMAGE AND REPLACED AS NECESSARY BEFORE RECLAMATION CAN BEGIN. THE SITE SHALL BE REGRADED AS INDICATED ON PLANS TO PRE-CONSTRUCTION GRADES. UPON COMPLETION OF GRADING, THE SITE SHALL BE SEEDED AND MULCHED PER THE REVEGETATION DETAILS ON SHEET 21.

NOTE:
1. DURING SITE RECLAMATION ALL FILL AREAS SHALL BE COMPACTED IN 24" MAXIMUM LIFT THICKNESS (12" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 90% COMPACTION PER STANDARD PROCTOR DENSITY, ASTM D-698.

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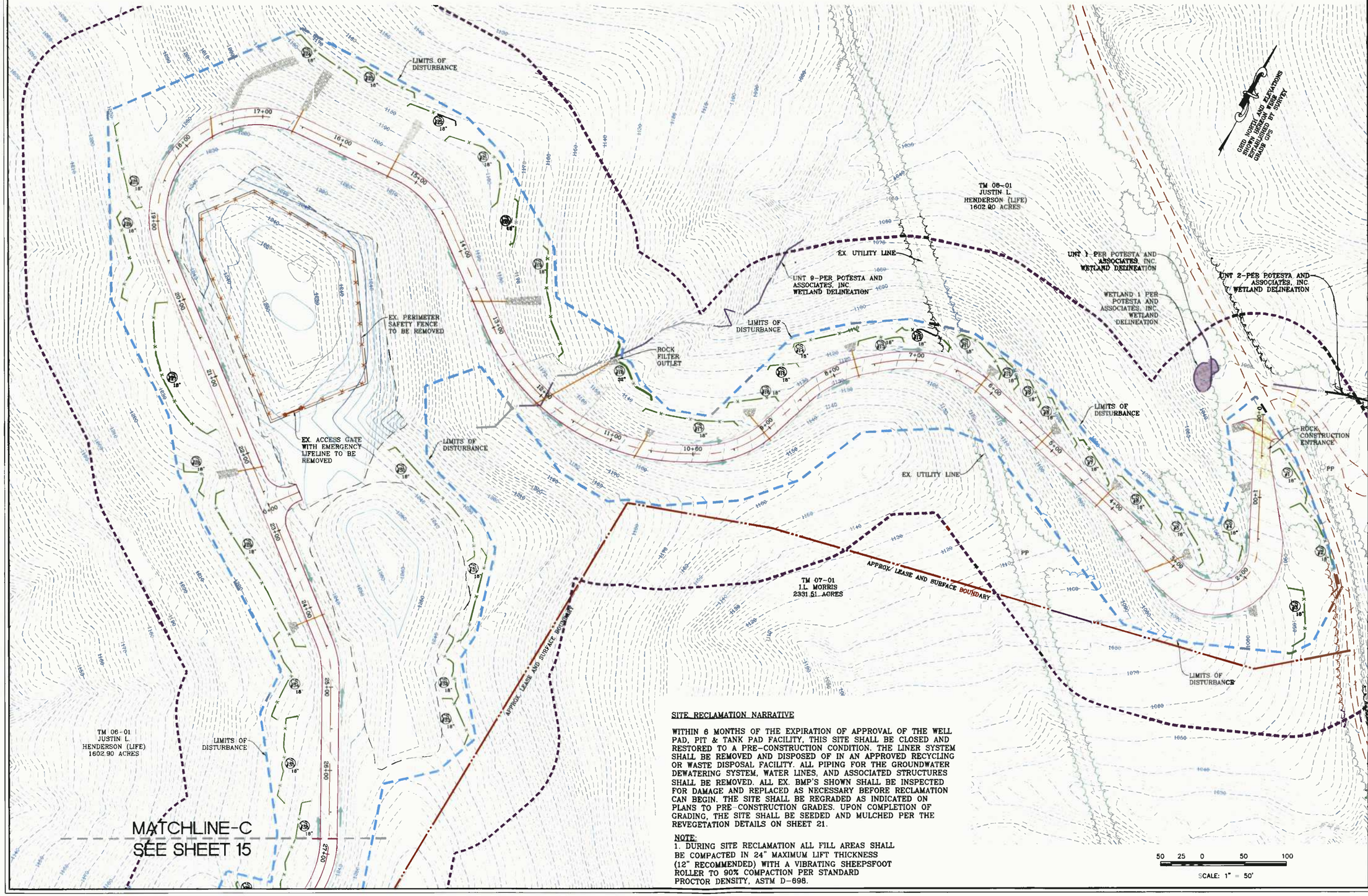
CRUG S. KUMP
REGISTERED
No. 9578
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

THIS DOCUMENT WAS PREPARED BY:
NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

WELL PAD RECLAMATION PLAN
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE:	04/08/2014
SCALE:	1" = 50'
DESIGNED BY:	CSK
FILE NO.	7889
SHEET	16 OF 21
REV:	05/01/2014

ASSOCIATED PIT RECLAMATION PLAN



SITE RECLAMATION NARRATIVE

WITHIN 6 MONTHS OF THE EXPIRATION OF APPROVAL OF THE WELL PAD, PIT & TANK PAD FACILITY, THIS SITE SHALL BE CLOSED AND RESTORED TO A PRE-CONSTRUCTION CONDITION. THE LINER SYSTEM SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED RECYCLING OR WASTE DISPOSAL FACILITY. ALL PIPING FOR THE GROUNDWATER DEWATERING SYSTEM, WATER LINES, AND ASSOCIATED STRUCTURES SHALL BE REMOVED. ALL EX. BMP'S SHOWN SHALL BE INSPECTED FOR DAMAGE AND REPLACED AS NECESSARY BEFORE RECLAMATION CAN BEGIN. THE SITE SHALL BE REGRADED AS INDICATED ON PLANS TO PRE-CONSTRUCTION GRADES. UPON COMPLETION OF GRADING, THE SITE SHALL BE SEEDED AND MULCHED PER THE REVEGETATION DETAILS ON SHEET 21.

NOTE:
1. DURING SITE RECLAMATION ALL FILL AREAS SHALL BE COMPACTED IN 24" MAXIMUM LIFT THICKNESS (12" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 90% COMPACTION PER STANDARD PROCTOR DENSITY, ASTM D-698.

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9578
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

THIS DOCUMENT WAS PREPARED BY NAVITUS ENGINEERING INC. FOR: EQT PRODUCTION COMPANY

ASSOCIATED PIT RECLAMATION PLAN

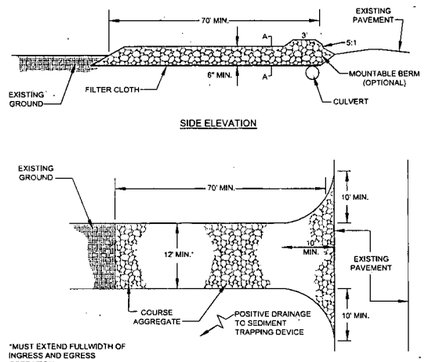
OXF 159

NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: 1" = 50'
DESIGNED BY: CSK
FILE NO. 7889
SHEET 17 OF 21
REV: 05/01/2014

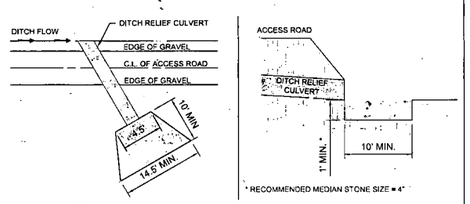
FIGURE 3.02.1

STONE CONSTRUCTION ENTRANCE



SOURCE: ADAPTED from the 1983 Maryland Standards for Soil Erosion and Sediment Control and Va. DSWC

TYPICAL DITCH RELIEF CULVERT OUTLET TREATMENT



NOTE:
ALL DITCH LINE PROTECTION SHALL BE INSTALLED AS RECOMMENDED IN THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL. DITCH LINE PROTECTION SHALL BE BASED ON THE FOLLOWING GRADES:

1. LESS THAN 3% – GRASSED
2. 3–9% – GRASS WITH ROLLED EROSION CONTROL PRODUCTS (RECP)
3. GREATER THAN 9% – RIPRAP OR EQUIVALENT GEOTEXTILE

IF HIGH EROSIVE SOILS ARE ENCOUNTERED DURING CONSTRUCTION, THE ENGINEER SHOULD BE CONTACTED FOR FURTHER EVALUATION.

Modified Figure 3.1 – Typical Roadside Ditch Section Sump at Ditch Relief Culvert

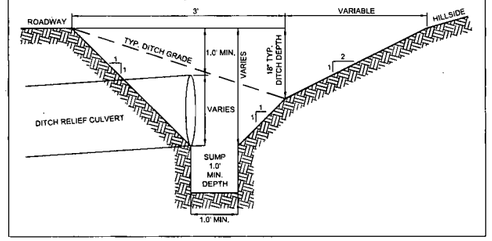
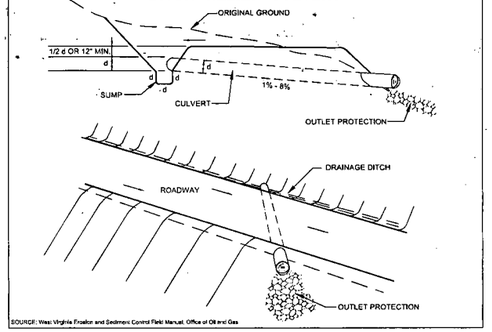


FIGURE II-4

DITCH RELIEF CULVERT



SOURCE: West Virginia Erosion and Sediment Control Field Manual, Office of Oil and Gas

Table II-5

Pipe Sizes for Culverts Across Roads		
Drainage Area (Ac)	Pipe Diameter (In)	Pipe Capacity (Cfs)
10	15	5
20	18	9
30	21	12
50	24	18
80	27	24
100	30	29
300	36	60
500	42	85

Table II-6

Spacing of Culverts	
Road Grade %	Distance (Ft)
2-5	500-300
6-10	300-200
11-15	200-100
16-20	100

FIGURE 3.05.1

ROCK CHECK DAM

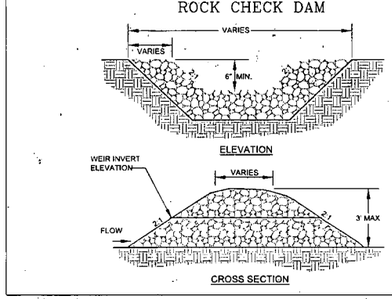
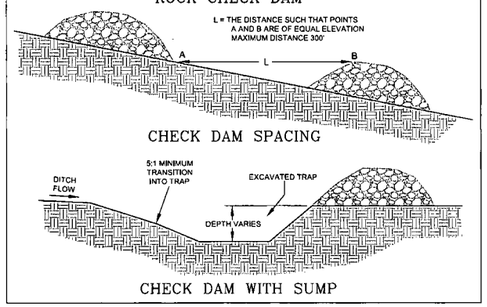
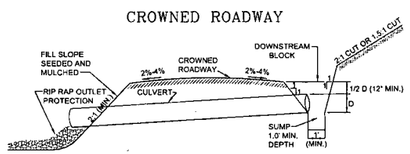


FIGURE 3.05.2

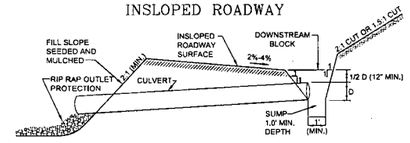
ROCK CHECK DAM



CROWNED ROADWAY



INSLOPED ROADWAY



Cut and fill slopes shall be stabilized immediately upon completion of roadway grading. These areas shall be blanketed wherever they are located within 50 feet of a surface water or within 100 feet of a surface water where a suitable vegetative filter strip does not exist.

A durable top dressing shall be provided for soils having low strength.

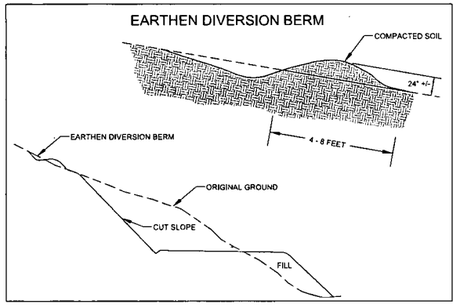
Roadside ditches shall be provided with adequate protective lining.

Adequately sized culverts or other suitable cross drains shall be provided at all seeps, springs, and drainageways.

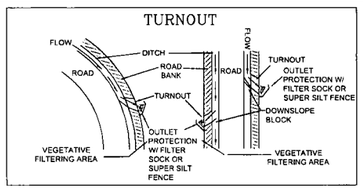
Roadway shall be inspected weekly and after each runoff event. Damaged roadways, ditches, or cross drains shall be repaired immediately.

SOURCE: PA DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF OIL AND GAS MANAGEMENT 5500-FM-BOGM0111 APPENDIX A BMP CONSTRUCTION DETAILS (MODIFIED)

EARTHEN DIVERSION BERM



TURNOUT



TOE BENCH DETAIL

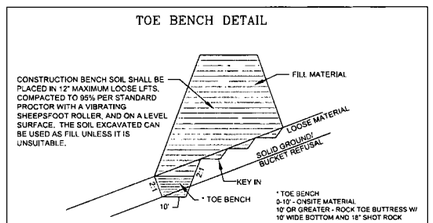
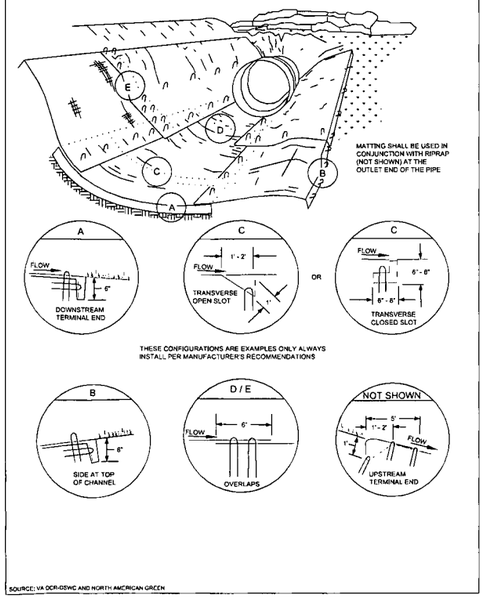


FIGURE 3.13.1

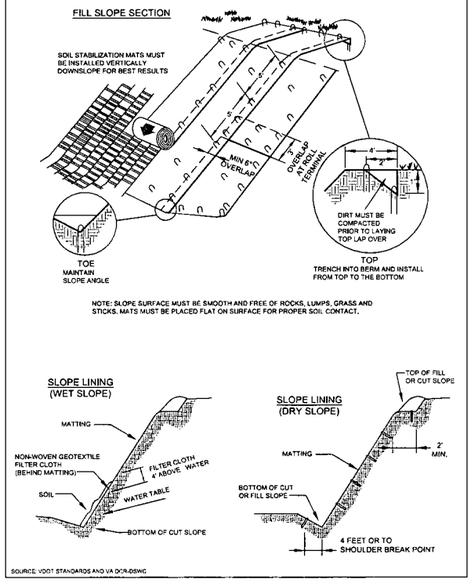
TYPICAL RECP CHANNEL INSTALLATION



SOURCE: VA DCR-DSWC AND NORTH AMERICAN GREEN

FIGURE 3.13.2

ROLLED EROSION CONTROL PRODUCTS



SOURCE: VDOT STANDARDS AND VA DCR-DSWC

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19578
STATE OF
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PROFESSIONAL ENGINEER

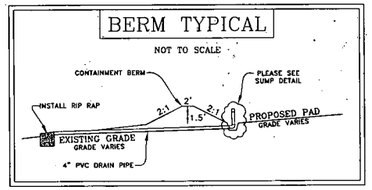
THIS DOCUMENT WAS PREPARED BY:
NAVITUS ENGINEERING INC.
FOR: EQT PRODUCTION COMPANY

CONSTRUCTION DETAILS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

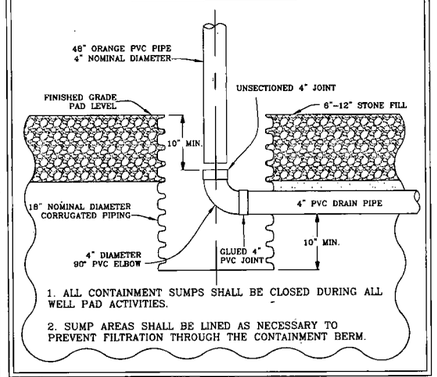
DATE: 04/08/2014
SCALE: N/A
DESIGNED BY: CSK
FILE NO. 7889
SHEET 18 OF 21
REV: 05/01/2014

BERM TYPICAL

NOT TO SCALE

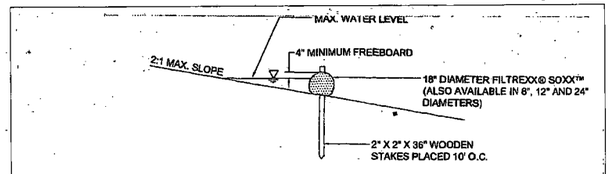


SUMP TYPICAL

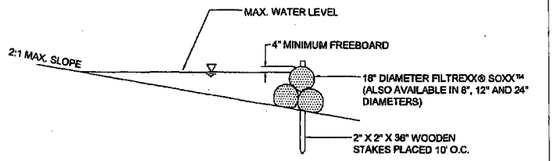


1. ALL CONTAINMENT SUMPS SHALL BE CLOSED DURING ALL WELL PAD ACTIVITIES.

2. SUMP AREAS SHALL BE LINED AS NECESSARY TO PREVENT FILTRATION THROUGH THE CONTAINMENT BERM.



SINGLE INSTALLATION SECTION
NTS

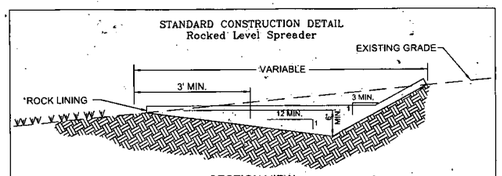


PYRAMID INSTALLATION SECTION
NTS

FILTREXX® RUNOFF DIVERSION SECTIONS

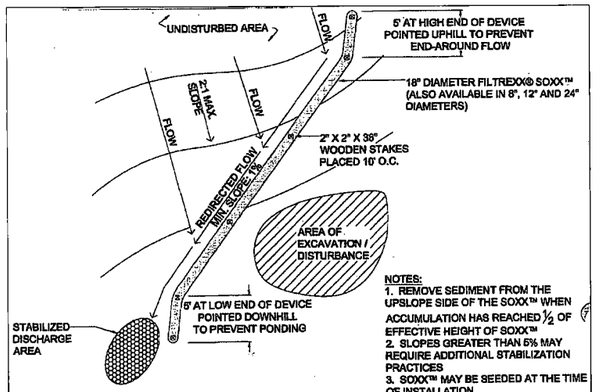
NTS

STANDARD CONSTRUCTION DETAIL
Rocked Level Spreader



SECTION VIEW
NTS

*All Level Spreader rock shall be a minimum of R4.

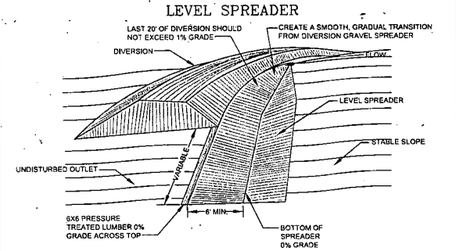


NOTES:
1. REMOVE SEDIMENT FROM THE UPSLOPE SIDE OF THE SOXX™ WHEN ACCUMULATION HAS REACHED ½ OF EFFECTIVE HEIGHT OF SOXX™
2. SLOPES GREATER THAN 5% MAY REQUIRE ADDITIONAL STABILIZATION PRACTICES
3. SOXX™ MAY BE SEEDED AT THE TIME OF INSTALLATION

FILTREXX® RUNOFF DIVERSION

FIGURE 3.02.1

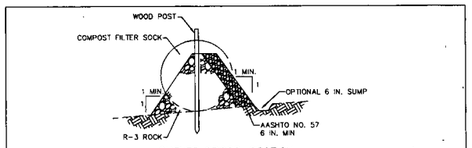
LEVEL SPREADER



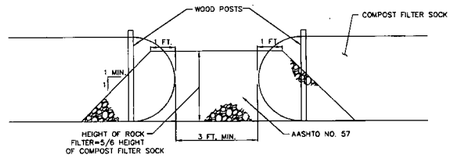
PERSPECTIVE VIEW

NOTE: ALL TEMPORARY BERMS, SWALES AND LEVEL SPREADER DITCHES MUST RECEIVE TEMPORARY SEEDING AND MULCHING AFTER INSTALLATION

SOURCE: ADAPTED FROM N.C. E&S Control Planning and Design Manual and VA DCSO



OUTLET CROSS-SECTION



UP-SLOPE FACE

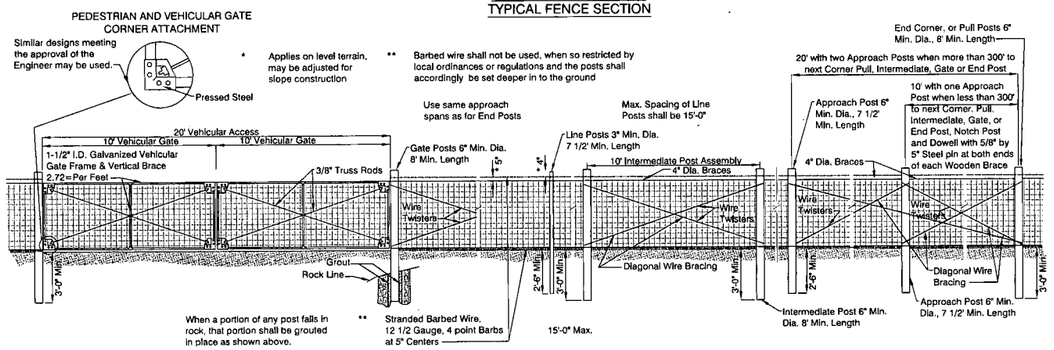
NOTES:

A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A COMPOST FILTER SOCK HAS OCCURRED DUE TO CONCENTRATED FLOW.

SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

ROCK FILTER OUTLET
(MODIFIED FROM PA DEP)
NOT TO SCALE

CONSTRUCTION DETAIL
TYPICAL FENCE SECTION



NOTES:

Posts and braces may be either round or square shaped. Dimensions shown on the plans are for round posts and braces only. When square posts are used, line posts shall be 3" square (min.);braces 4" square (min.); corner, end, pull, gate, approach, and intermediate posts 6" square (min.).
The positioning of the fence fabric and barbed wire on the posts, as shown on the "Typical Fence Section" detail, applies for level and gentle sloping terrain. For fence erected on slopes, the positioning may be adjusted to meet the slope conditions as long as the adjustment is continued from post to post in a uniform manner. Trenching on slopes may be warranted. On slopes, posts will continue to be erected vertically, unless otherwise directed, and the ends of the fencing fabric shall be cut on a skew as may be necessary for proper connection to the posts.

Dumped rock channel protection will be used at channel crossings when called for on the plans.

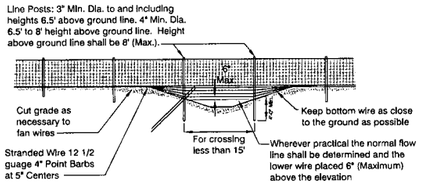
Install drainage structure terminal installation as called for on the plans and/or as shown on typical fence details.

Unless otherwise specified, or directed by the Engineer, the farm field fence may be installed with the fence fabric and barbed wire positioned on either side of the fence posts.

Hardware and miscellaneous fittings, not specifically designated herein as to type or dimensions, shall conform to the applicable requirements of Section 608 of the Specifications and shall be of good quality commerical design acceptable to the Engineer.

In lieu of the barbed wire detailed herein, the following additional types are acceptable, provided they retain the "4-point barb at 5-inch centers" requirement and provided they meet or exceed the strength and coating requirements for the standard, 12 1/2 gauge, barbed wire as called for in 712.10 of the Specifications.
(a) stranded, 15 1/2 gauge, high carbon steel barbed wire
(b) one strand, 12 gauge, steel barbed wire

Vehicular gate frames (and vertical braces) may be either galvanized steel pipe members as shown herein or may be triple-coated steel pipe members meeting the requirements specified on Standard Sheet F2. All other metal components of the gate shall be galvanized, with the exception of the die-cast aluminum corner fittings, or pressed steel corner fittings.



DETAIL SHOWING TYPICAL SECTION AT MINOR DEPRESSIONS AND WET WEATHER CROSSINGS

BRUSH PILE SEDIMENT BARRIER
FIGURE II-10

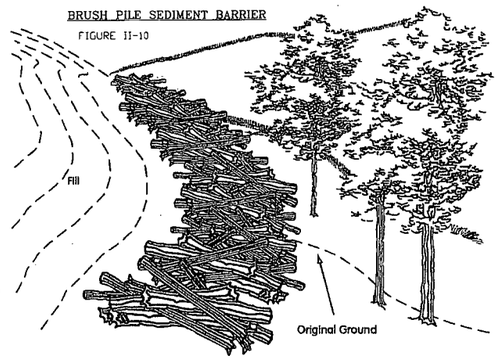
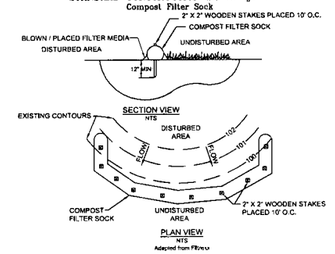


Table 4.1
Compost Sock Fabric Minimum Specifications

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Textile Strength		28 psi	28 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply systems					
Inner Containment Netting				HDPE biaxial net	
				Continuously wound	
				Fusion-welded junctures	
				3/4" x 3/4" Max. aperture size	
Outer Filtration Mesh				Composite Polypropylene Fabric (Woven layer & non-woven fleece mechanically fused via needle punch)	
				3/16" Max. aperture size	
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

STANDARD CONSTRUCTION DETAIL #4-1
Compost Filter Sock



PLAN VIEW
NTS
Adapted from FDrevu

Sock fabric shall meet standards of Table 4.1. Compost shall meet the following standards:

Organic Matter Content	80% -100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5-8.0
Moisture Content	35%-55%
Particle Size	98% pass through 1" screen
Soluble Salt Concentration	5.0 dS Maximum

Compost Filter Sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up the slope at 45 degrees to the main sock alignment. Maximum slope length above any sock shall not exceed manufacturer's maximum permissible slope length.

Traffic shall not be permitted to cross filter socks.

Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.

Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.

In the event the ground is frozen, #5 rebar with safety caps shall be used instead of wooden stakes to anchor the filter sock. Once the ground thaws the rebar anchors shall be removed and replaced with 2" x 2" wooden stakes and installed as shown in the detail above.

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OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
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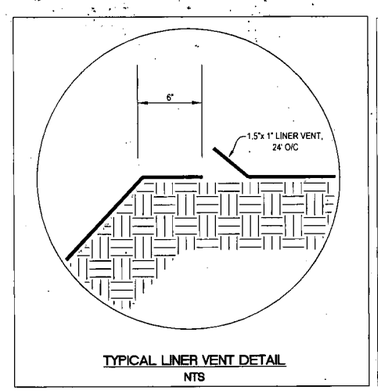
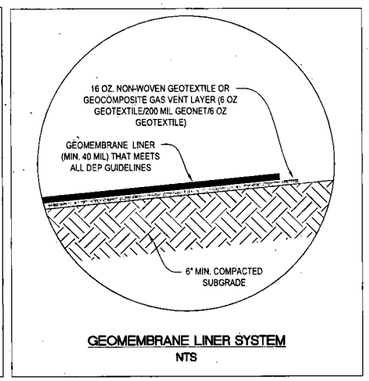
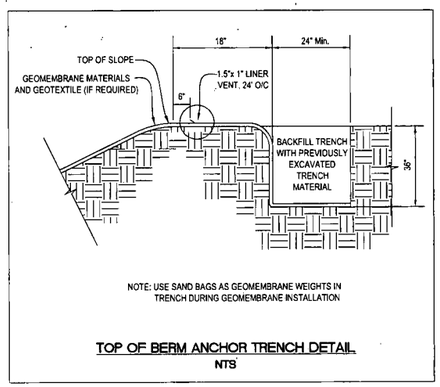
SHEET 19 OF 21
REV: 05/01/2014



TYPICAL LINER VENT DETAIL
NTS

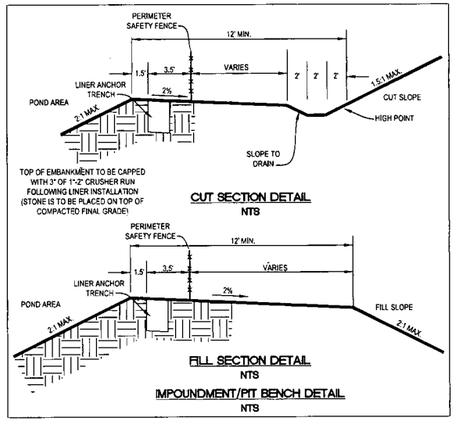


GEOMEMBRANE LINER SYSTEM
NTS



NOTE: USE SAND BAGS AS GEOMEMBRANE WEIGHTS IN TRENCH DURING GEOMEMBRANE INSTALLATION

TOP OF BERM ANCHOR TRENCH DETAIL
NTS

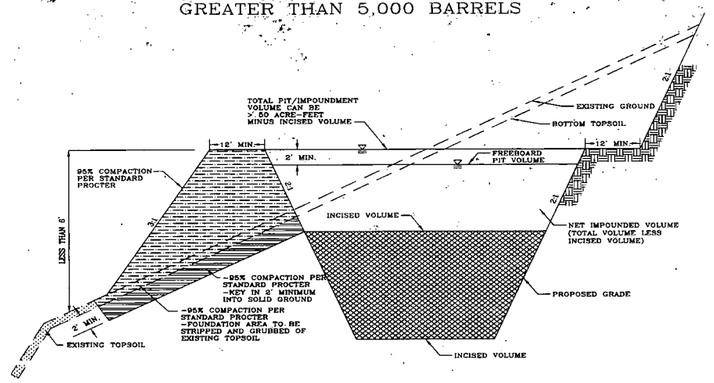


CUT SECTION DETAIL
NTS

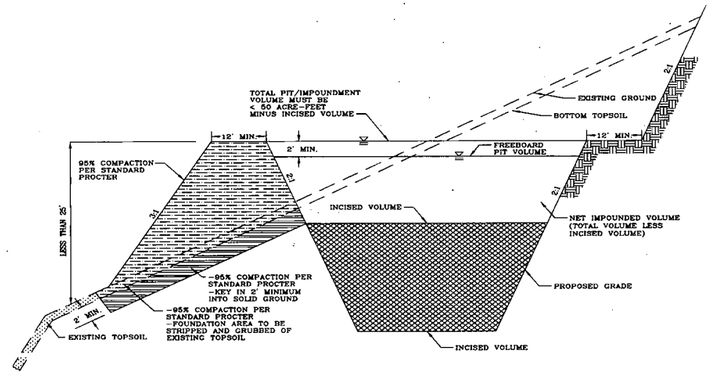
FILL SECTION DETAIL
NTS

IMPOUNDMENT/PIT BENCH DETAIL
NTS

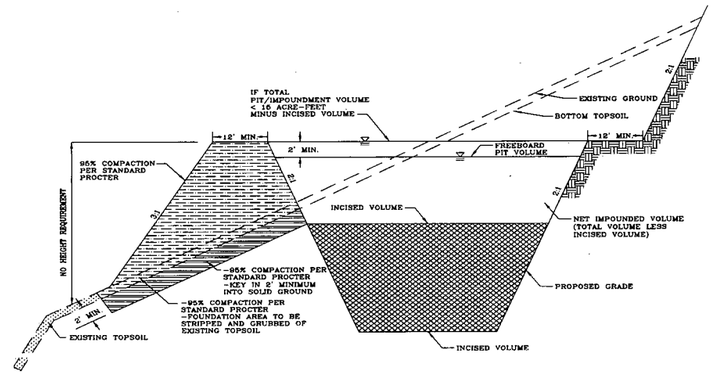
WEST VIRGINIA CODE 35, CSR 4
DESIGN AND CONSTRUCTION REQUIREMENTS FOR ASSOCIATED PITS, ASSOCIATED IMPOUNDMENTS, & CENTRALIZED IMPOUNDMENTS GREATER THAN 5,000 BARRELS



SECTION VIEW



SECTION VIEW



SECTION VIEW

NOTES:
1. ALL FILL SHOULD BE KEYED IN TO ORIGINAL GROUND EVERY 2-5 VERTICAL FEET DEPENDING ON EXISTING GROUND SLOPE

2. MINIMUM OUTSIDE AND INSIDE EMBANKMENT (FILL) SLOPES SHALL BE 2H:1V. THE INSIDE AND OUTSIDE SLOPES MUST ADD UP TO 5H:1V.

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SHEET 20 OF 21
REV: 05/01/2014

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

a. General Conditions Where Practice Applies
Where exposed soil surfaces are not to be fine-graded or worked for periods longer than 21 days. Temporary vegetative cover with sediment controls must be established where runoff will go directly into a stream. Immediately upon construction of the site (site includes road and location), vegetation must be established on road bank and location slopes. A permanent vegetative cover shall be applied to areas that will be left un-worked for a period of more than six months.

b. Seed Mixtures and Planting Dates
Refer to Tables 2 through 4 for recommended dates to establish vegetative cover and the approved lists of temporary and permanent plant species, and planting rates. Table 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.

c. Seed Application
Apply seed by broadcasting, drilling, or by hydroseed according to the rates indicates in Table IV-3. Perform all planting operations at right angles to the slope. Necessary site preparation and roughening of the soil surface should be done just prior to seeding. Seedbed preparation may not be required on newly disturbed areas.

Permanent Seeding

a. General
Permanent vegetative cover will be established where no further soil disturbance is anticipated or needed. Soil fertility and pH level should be tested and adjusted according to seed 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 slopes steeper than 2:1 unless a good bonding to the sub-layer can be achieved. After proper grading and seedbed preparation, the vegetation will reestablish ground cover for the control of surface water runoff erosion.
All required seedbed preparation and loosening of soil by disking or dozer tracking should be performed just prior to seeding. If seedbed preparation is not feasible, 50% 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 mix 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, and 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.

b. 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 by a certified soil test.
3. Application: For best results and maximum benefits, the lime and fertilizer are to be applied at the time of seedbed preparation.

c. 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 b, Permanent Seeding Mixtures Suitable for Establishment in West Virginia.
Notes:
1. All legumes must be planted with the proper inoculants prior to seeding.
2. 'Lathco' Flatpea is potentially poisonous to some livestock.
3. Only endophyte free varieties of Tall Fescue should be used. Tall Fescue and Crownvetch are also very invasive species, non-native to WV.
4. For unprepared seedbeds or seeding outside the optimum timeframes, add 50% more seed to the specified rate. Mixtures in Table 4b are more wildlife and farm friendly; those listed in bold are suitable for use in shaded woodland settings. Mixtures in italic are suitable for use in filter strips.

d. 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 no or low maintenance long-lived plants adaptable to sites which may be difficult to maintain with equipment.

Mulching

a. 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 seeded 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 seeded 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 seeded as soon as weather or seasonal conditions permit. Do not use fiber mulch (cellulose-hydroseed) 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 operations 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 seeded 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.

b. 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 over 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 that organic mulches have.

c. Specifications
From Table IV-6 select the type of mulch and rate of application that will best suit the conditions at the site.

d. Anchoring
Depending on the field situation, mulch may not stay in place because of wind action or rapid 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 disk is used set the disk straight and pull across slope.
Mulch material should be tucked into the soil about three inches.
2. Mulch netting
Follow manufacturer's recommendation when positioning and stapling the mulch netting in the soil.

Table IV-1
Recommended Seeding Dates

Planting Dates	Suitability
March 1 - April 15 and August 1 - October 1	Best Seeding Periods
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 2
Acceptable Fertilization Recommendation

Species	N (lbs/ac)	P2O5 (lbs/ac)	Example Rec. (per acre)
Cool Season Grass	40	80	400 lbs. 10-20-20
CS Grass & Legume	30	60	300 lbs. 10-20-20
Temporary Cover	40	40	200 lbs. 19-19-19

Table 3
Temporary Cover

Species	Seeding Rate (lbs/acre)	Optimum Seeding Dates	Drainage	pH Range
Annual Ryegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Poorly	5.5 - 7.5
Field Bromegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Mod. Well	6.0 - 7.0
Spring Oats	96	3/1 - 6/15	Well - Poorly	5.5 - 7.0
Sundangrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Winter Rye	168	8/15 - 10/15	Well - Poorly	5.5 - 7.5
Winter Wheat	180	8/15 - 11/15	Well - Mod. Well	5.5 - 7.0
Japanese Millet	30	6/15 - 8/15	Well	4.5 - 7.0
Redtop	5	3/1 - 6/15	Well	4.0 - 7.5
Annual Ryegrass	26	3/1 - 6/15	Well - Poorly	5.5 - 7.5
Spring Oats	64	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.*

Table 4a
Permanent Seeding Mixture

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
Crownvetch /	10 - 15	Well - Mod. Well	5.0 - 7.5
Tall Fescue	30		
Crownvetch /	10 - 15	Well - Mod. Well	5.0 - 7.5
Perennial Ryegrass	20		
Flatpea or Perennial Pea /	**20**	**Well - Mod. Well**	**4.0 - 8.0**
Tall Fescue	**15**		
Ladino Clover /	30		
Serecia Lespedeza /	25	Well - Mod. Well	4.5 - 7.5
Tall Fescue	2		
Tall Fescue /	*40*		
Ladino Clover /	*3*	*Well - Mod. Well*	*5.0 - 7.5*
Redtop	*3*		
Crownvetch /	10		
Tall Fescue /	20	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Tall Fescue /	40		
Birdsfoot Trefoil /	10	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Sérecia Lespedeza /	25		
Tall Fescue /	30	Well - Mod. Well	4.5 - 7.5
Redtop	3		
Redtop /	30		
Tall Fescue /	3	Well - Mod. Well	5.0 - 7.5
Creeping Red	50		
Tall Fescue	*50*	*Well - Poorly*	*4.5 - 7.5*
Perennial Ryegrass /	**10**		
Tall Fescue /	**15**	**Well -Poorly**	**5.8 - 8.0**
Lathco Flatpea *	**20**		

** 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.*
Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table 4b
Wildlife and Farm Friendly Seed Mixtures

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
KY Bluegrass /	20		
Redtop /	3	Well - Mod. Well	5.5 - 7.5
Ladino Clover or Birdsfoot Trefoil	2 / 10		
Timothy /	5	Well - Mod. Well	6.5 - 8.0
Alfalfa	12		
Timothy /	5	Well - Poorly	5.5 - 7.5
Birdsfoot Trefoil	8		
Orchardgrass /	*10*		
Ladino Clover /	*2*	*Well - Mod. Well*	*5.5 - 7.5*
Redtop	*3*		
Orchardgrass /	*10*	*Well - Mod. Well*	*5.5 - 7.5*
Ladino Clover	*2*		
Orchardgrass /	*20*	*Well - Mod. Well*	*5.5 - 7.5*
Perennial Ryegrass	*10*		
Creeping Red Fescue /	**30**	**Well - Mod. Well**	**5.5 - 7.5**
Perennial Ryegrass	**10**		
Orchardgrass or KY Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil /	10		
Redtop /	5	Well - Mod. Well	5.5 - 7.5
Orchardgrass	20		
Lathco Flatpea */	**30**	**Well - Mod. Well**	**5.5 - 7.5**
Perennial Ryegrass	**20**		
Lathco Flatpea */	30	Well - Mod. Well	5.5 - 7.5
Orchardgrass	20		

** 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.*

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-5
Lime and Fertilizer Application Table

pH of Soil	Lime in Tons per Acre	Fertilizer, Lbs. per Acre (10-20-20 or Equivalent)
Above 6.0	2	500
5.0 to 6.0	3	500
Below 5.0	4	500

The pH can be determined with a portable pH testing kit or by sending the soil samples to a soil testing laboratory. When 4 tons of lime per acre are applied it must be incorporated into the soil by disking, backblading or tracking up and down the slope.

Table IV-6
Mulch Materials Rates and Uses

Material	Minimum Rates per acre	Coverage	Remarks
Hay or Straw	2 to 3 Tons	Cover 75% to 90%	Subject to wind blowing or washing unless
	100 to 150 bales	of Surface	tied down
Wood Fiber	1000 to 1500 lbs	Cover all	For hydroseeding
Pulp Fiber		Disturbed Areas	
Wood - Cellulose			
Recirculated Paper			

Tables IV 1-4 taken from Natural Resources Conservation Service Manual 'Critical Area Planting'

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CONSTRUCTION DETAILS
OXF 159
NEW MILTON & SOUTHWEST DISTRICT
DODDRIDGE COUNTY, WV

DATE: 04/08/2014
SCALE: N/A
DESIGNED BY: CSK
FILE NO. 7889
SHEET 21 OF 21
REV: 05/01/2014