



west virginia department of environmental protection

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

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

Wednesday, November 17, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

NORTHEAST NATURAL ENERGY LLC
707 VIRGINIA STREET EAST
STE 1200
CHARLESTON, WV 25301

Re: Permit Modification Approval for PHOENIX 10H
47-061-01891-00-00

Modified the production area of the pad

NORTHEAST NATURAL ENERGY LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: PHOENIX 10H
Farm Name: CHARLES WENDELL MOORE & FRANK M. CHIST
U.S. WELL NUMBER: 47-061-01891-00-00
Horizontal 6A New Drill
Date Modification Issued: 11/17/2021

Promoting a healthy environment.

11/19/2021

PHOENIX WELL PAD

BATTELLE DISTRICT, MONONGALIA COUNTY, WV

AUGUST 2020 ²⁰²¹ *Super Hawk*



TWO WORKING DAYS PRIOR TO EXCAVATION, THE CONTRACTOR MUST CONTACT THE WV ONE CALL SYSTEM, INC., 1-800-245-4848 (WV ONE CALL TICKET #2015627602)

OWNER

NORTHEAST NATURAL ENERGY, LLC
707 VIRGINIA STREET SUITE 1200
CHARLESTON, WV 25301



SHEET INDEX

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21. UNDER DRAIN PROFILES
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36. RECLAMATION PLAN OVERVIEW
- 37-43. RECLAMATION PLAN

PLANS PREPARED BY:
BOORD BENCHEK & ASSOCIATES, INC.
ENGINEERING, SURVEYING, CONSTRUCTION AND MINING SERVICES
SOUTHPOINTE, PA 15317 PHONE: 724-746-1055

RECEIVED
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OCT 29 2021
WV Department of
Environmental Protection

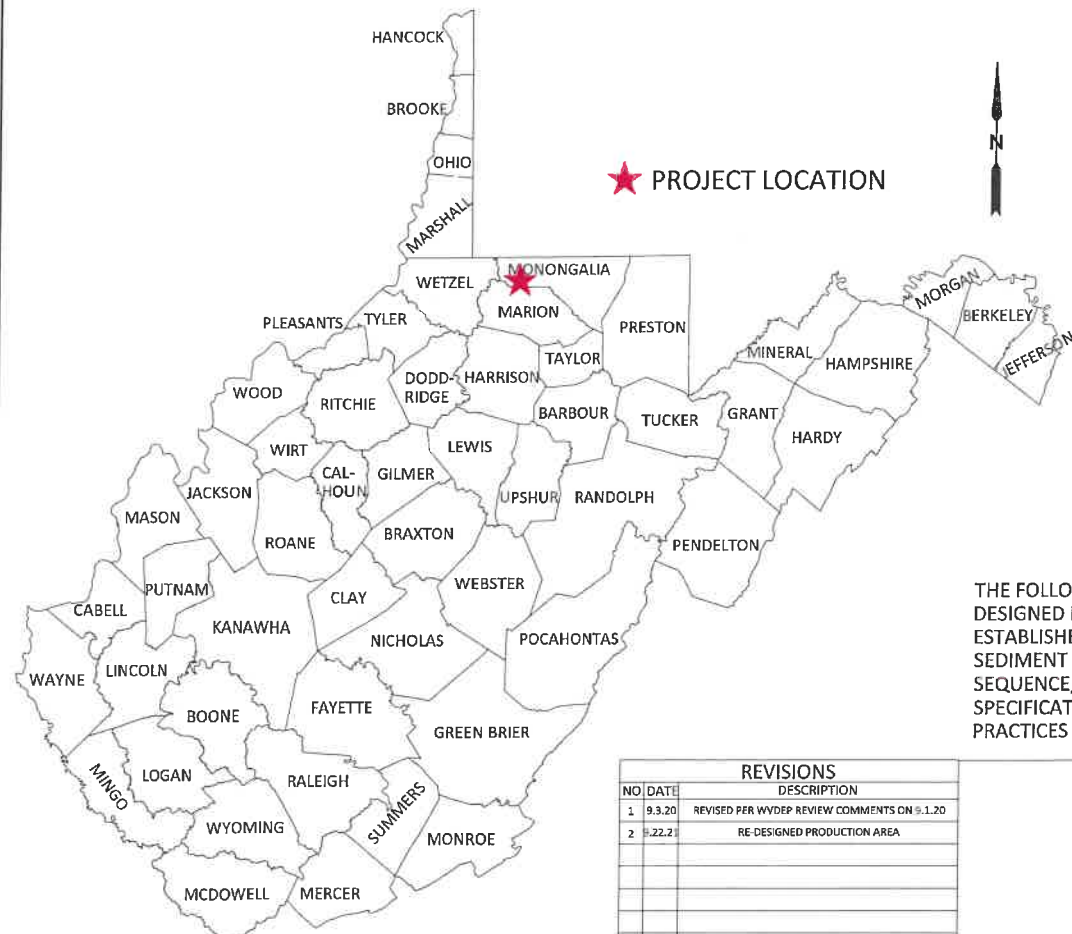


ANDREW BENCHEK
P.E.

TOTAL LIMITS OF DISTURBANCE: 71.17 AC.
ACCESS ROAD DISTURBANCE AREA: 31.70 AC.
WELL PAD DISTURBANCE AREA: 30.19 AC.
AST PAD AND ACCESS ROAD DISTURBANCE AREA: 9.28 AC.

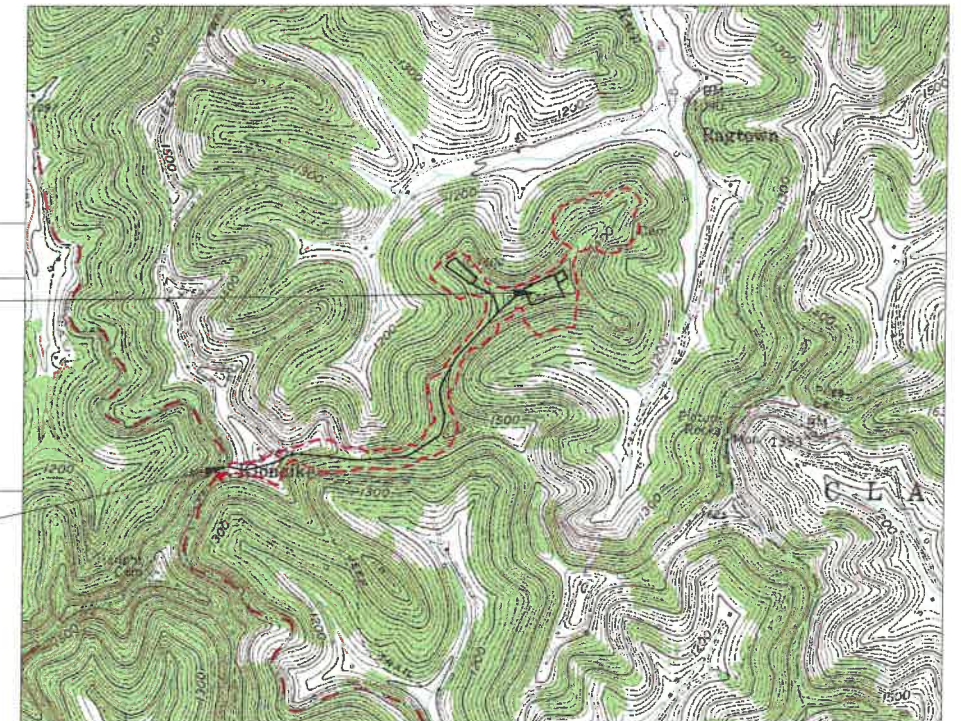
PROPERTY PROJECT BOUNDARY ACREAGE

JOHN L. & HILDA DONALDSON (TAX MAP AND PARCEL 1-24-12): 3.69 AC.
MARY C. WALLS (TAX MAP AND PARCEL 1-24-15): 10.70 AC.
KEVIN D. & MARLA J. AMMONS (TAX MAP AND PARCEL 1-24-20): 7.44 AC.
ELIZABETH ANN WILSON & RANDY LEE DURR (TAX MAP AND PARCEL 1-24-16): 5.92 AC.
CHARLES WENDELL MOORE (TAX MAP AND PARCEL 1-24-19.1): 10.35 AC.
FRANKLIN M. CHISLER (TAX MAP AND PARCEL 1-17-14.1): 30.25 AC.
PHOENIX ENERGY RESOURCES LLC: 2.76 AC.



IN ACCORDANCE WITH WV 35 CSR 8 THE FOLLOWING EROSION & SEDIMENT CONTROL PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES ESTABLISHED BY THE CHIEF AND PROVIDED IN THE OFFICE'S EROSION AND SEDIMENT CONTROL FIELD MANUAL. A GENERAL CONSTRUCTION SEQUENCE, DESCRIPTION OF STABILIZATION METHODS, AND DETAILS & SPECIFICATIONS FOR EROSION & SEDIMENT BEST MANAGEMENT PRACTICES HAVE BEEN INCLUDED IN THE PROVIDED DETAIL SHEETS.

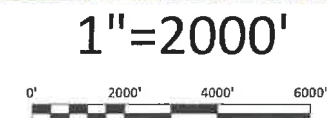
COORDINATES	
CENTER OF WELL PAD (NAD 83)	
LAT: 39° 38' 29.00"	LONG: 80° 16' 18.49"
(NAD 27)	
LAT: 39° 38' 28.71"	LONG: 80° 16' 19.22"
SITE ENTRANCE (NAD 83)	
LAT: 39° 38' 05.18"	LONG: 80° 17' 12.01"
(NAD 27)	
LAT: 39° 38' 04.89"	LONG: 80° 17' 12.73"



REVISIONS		
NO	DATE	DESCRIPTION
1	9.3.20	REVISED PER WVDEP REVIEW COMMENTS ON 9.1.20
2	9.22.21	RE-DESIGNED PRODUCTION AREA

TITLE SHEET
PHOENIX WELL PAD
BATTELLE DISTRICT, MONONGALIA COUNTY, WV

SHEET
1
OF
43



11/19/2021

APPROVED
WV DEP OOG
 Modification
 11/17/2021

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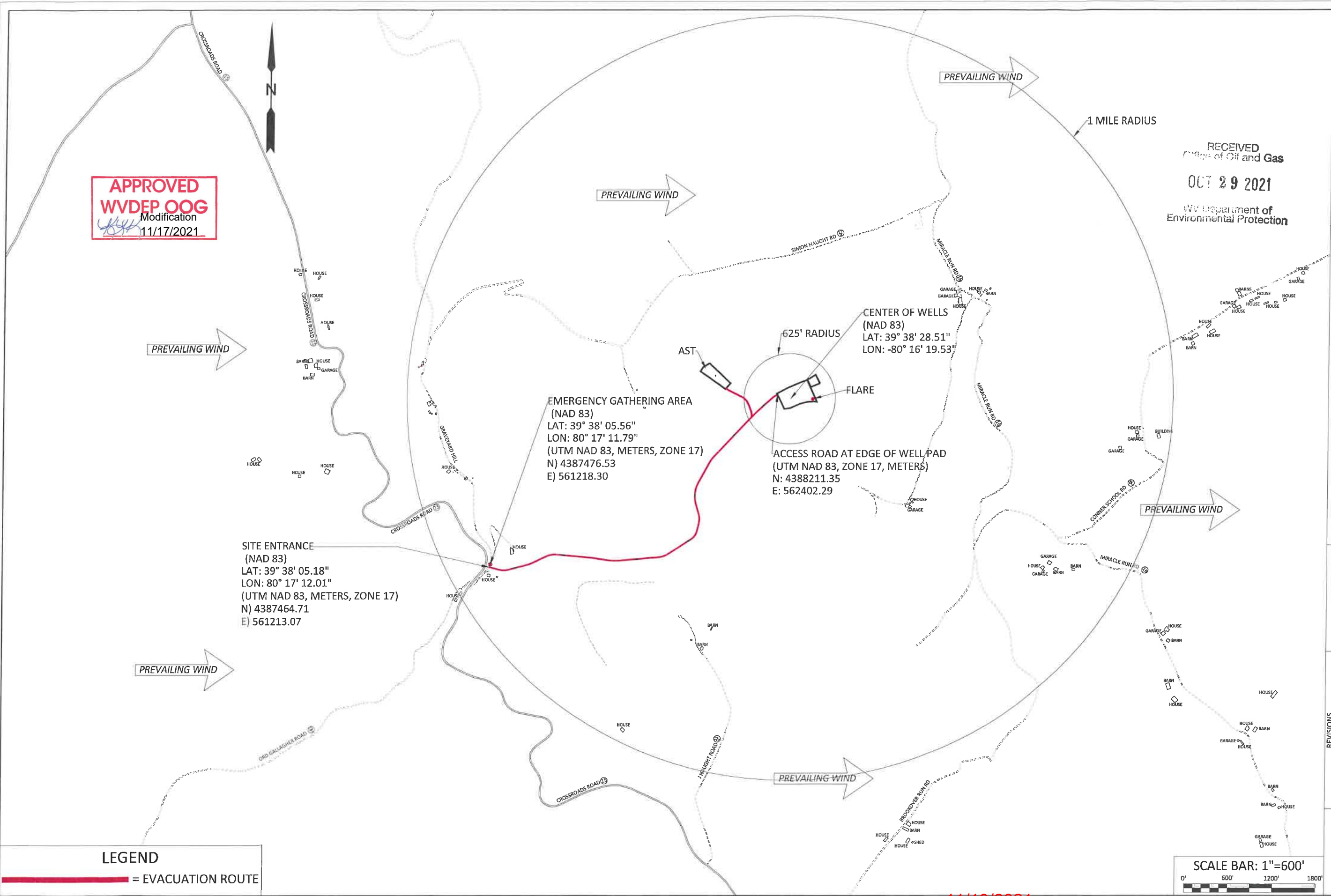
BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
 and Mining Services
 Southpointe, PA 15317 Phone: 724-746-1055

EVACUATION ROUTE/PREVAILING WIND

THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT,
 MONONGALIA COUNTY, PA

NO.	DATE	DESCRIPTION
2	9/22/21	REDESIGNED PRODUCTION AREA

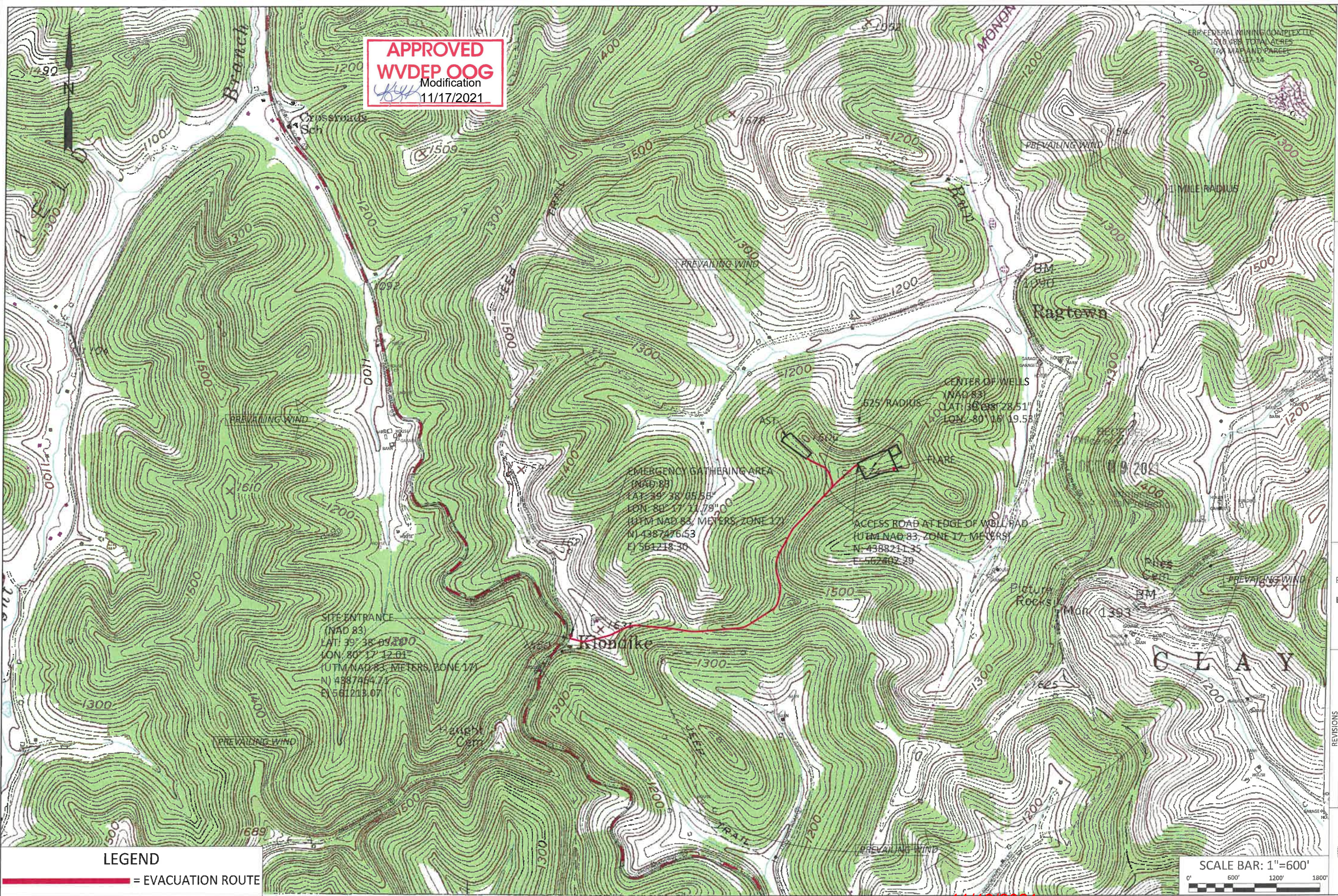


LEGEND
 = EVACUATION ROUTE



11/19/2021

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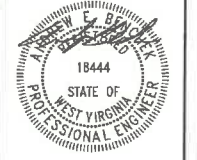
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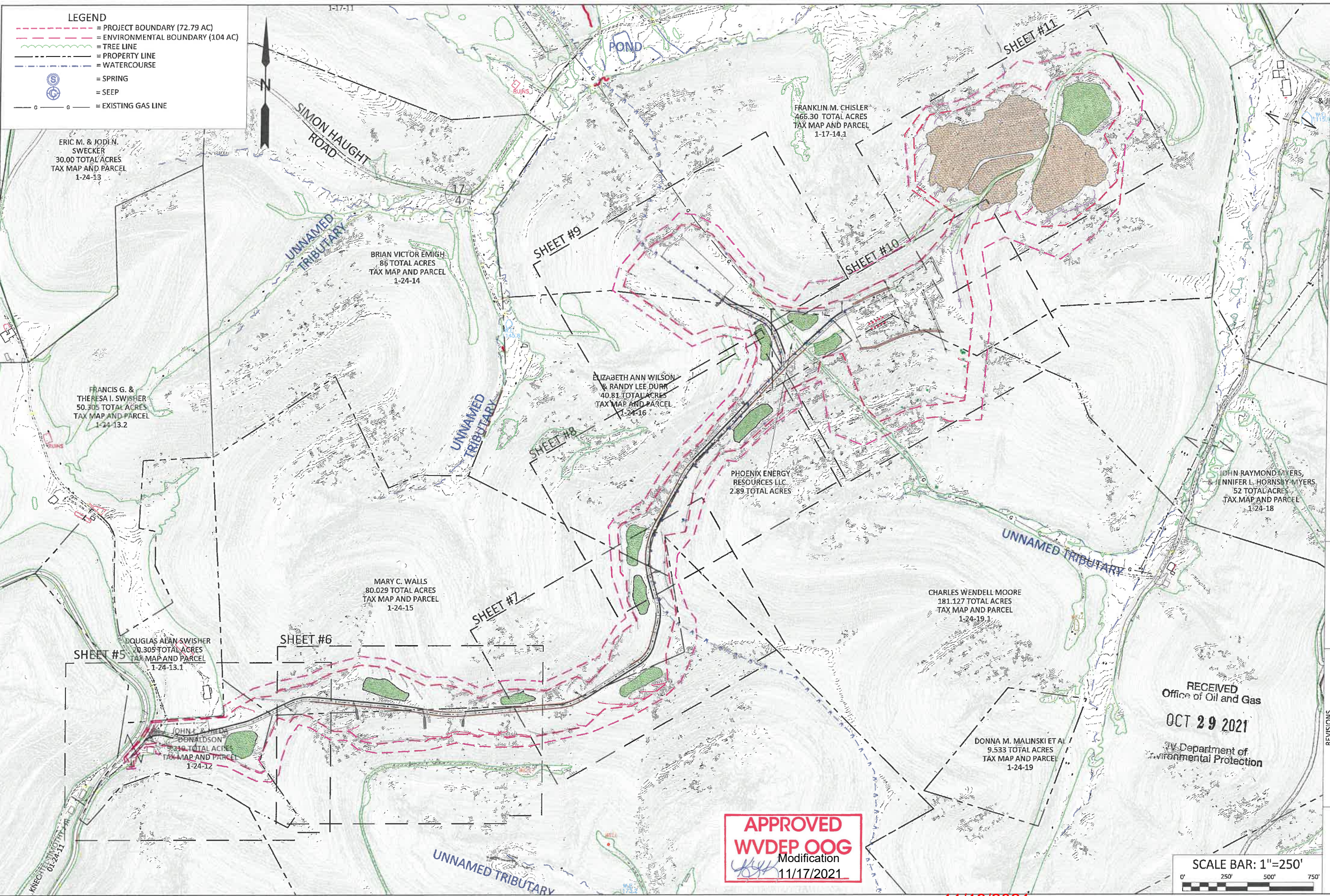
NO.	DATE	DESCRIPTION
2	9.22.21	REDESIGNED PRODUCTION AREA



LEGEND
 = EVACUATION ROUTE



11/19/2021



LEGEND

- - - - - PROJECT BOUNDARY (72.79 AC)
- - - - - ENVIRONMENTAL BOUNDARY (104 AC)
- - - - - TREE LINE
- - - - - PROPERTY LINE
- - - - - WATERCOURSE
- (S) SPRING
- (G) SEEP
- - - - - EXISTING GAS LINE

ERIC M. & JODI N. SWECKER
30.00 TOTAL ACRES
TAX MAP AND PARCEL
1-24-13

FRANCIS G. & THERESA I. SWISHER
50.305 TOTAL ACRES
TAX MAP AND PARCEL
1-24-13.2

DOUGLAS ALAN SWISHER
20.305 TOTAL ACRES
TAX MAP AND PARCEL
1-24-13.1

JOHN L. & NEDA DONALDSON
9.316 TOTAL ACRES
TAX MAP AND PARCEL
1-24-12

BRIAN VICTOR EMIGH
86 TOTAL ACRES
TAX MAP AND PARCEL
1-24-14

MARY C. WALLS
80.029 TOTAL ACRES
TAX MAP AND PARCEL
1-24-15

ELIZABETH ANN WILSON & RANDY LEE DURR
40.81 TOTAL ACRES
TAX MAP AND PARCEL
1-24-16

FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

PHOENIX ENERGY RESOURCES LLC
2.89 TOTAL ACRES

CHARLES WENDELL MOORE
181.127 TOTAL ACRES
TAX MAP AND PARCEL
1-24-19.1

DONNA M. MALINSKI ET AL
9.533 TOTAL ACRES
TAX MAP AND PARCEL
1-24-19

JOHN RAYMOND MYERS & JENNIFER L. HORNSBY MYERS
52 TOTAL ACRES
TAX MAP AND PARCEL
1-24-18

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SCALE BAR: 1"=250'
0' 250' 500' 750'

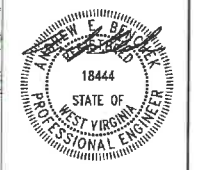
BOORD, BENCHEK and ASSOC., INC.
Engineering, Surveying, Construction,
and Mining Services
Southpointe, PA 15317 Phone: 724-746-1055

E&S CONTROL LAYOUT OVERVIEW
THIS DOCUMENT WAS PREPARED BY:
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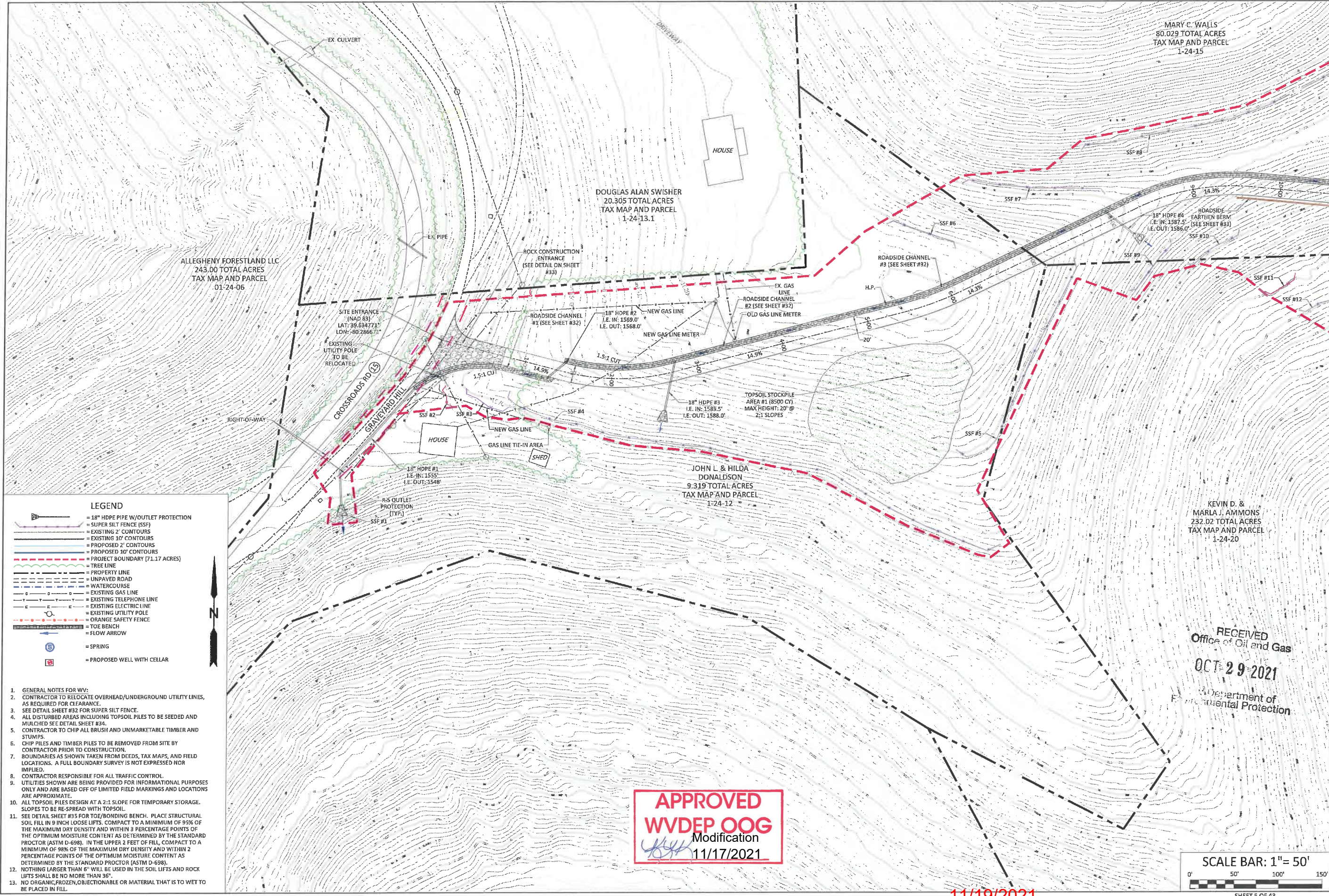
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BATTELLE DISTRICT,
MONONGALIA
COUNTY, PA

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Office of Oil and Gas
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NO.	DATE	DESCRIPTION
1	8.20	REVISED PER WVDEP REVIEW COMMENTS ON 8.1.20
2	9.22.21	RE-DESIGNED PRODUCTION AREA



11/19/2021



LEGEND

- = 18" HDPE PIPE W/OUTLET PROTECTION
- = SUPER SILT FENCE (SSF)
- = EXISTING 2' CONTOURS
- = EXISTING 10' CONTOURS
- = PROPOSED 2' CONTOURS
- = PROPOSED 10' CONTOURS
- = PROJECT BOUNDARY (71.17 ACRES)
- = TREE LINE
- = PROPERTY LINE
- = UNPAVED ROAD
- = WATERCOURSE
- = EXISTING GAS LINE
- = EXISTING TELEPHONE LINE
- = EXISTING ELECTRIC LINE
- = EXISTING UTILITY POLE
- = ORANGE SAFETY FENCE
- = TOE BENCH
- = FLOW ARROW
- = SPRING
- = PROPOSED WELL WITH CELLAR

1. GENERAL NOTES FOR WV:
2. CONTRACTOR TO RELOCATE OVERHEAD/UNDERGROUND UTILITY LINES, AS REQUIRED FOR CLEARANCE.
3. SEE DETAIL SHEET #32 FOR SUPER SILT FENCE.
4. ALL DISTURBED AREAS INCLUDING TOPSOIL PILES TO BE SEEDED AND MULCHED SEE DETAIL SHEET #34.
5. CONTRACTOR TO CHIP ALL BRUSH AND UNMARKETABLE TIMBER AND STUMPS.
6. CHIP PILES AND TIMBER PILES TO BE REMOVED FROM SITE BY CONTRACTOR PRIOR TO CONSTRUCTION.
7. BOUNDARIES AS SHOWN TAKEN FROM DEEDS, TAX MAPS, AND FIELD LOCATIONS. A FULL BOUNDARY SURVEY IS NOT EXPRESSED NOR IMPLIED.
8. CONTRACTOR RESPONSIBLE FOR ALL TRAFFIC CONTROL.
9. UTILITIES SHOWN ARE BEING PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND ARE BASED OFF OF LIMITED FIELD MARKINGS AND LOCATIONS ARE APPROXIMATE.
10. ALL TOPSOIL PILES DESIGN AT A 2:1 SLOPE FOR TEMPORARY STORAGE. SLOPES TO BE RE-SPREAD WITH TOPSOIL.
11. SEE DETAIL SHEET #35 FOR TOE/BONDING BENCH. PLACE STRUCTURAL SOIL FILL IN 9 INCH LOOSE LIFTS. COMPACT TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AND WITHIN 3 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR (ASTM D-698). IN THE UPPER 2 FEET OF FILL, COMPACT TO A MINIMUM OF 98% OF THE MAXIMUM DRY DENSITY AND WITHIN 2 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR (ASTM D-698).
12. NOTHING LARGER THAN 6" WILL BE USED IN THE SOIL LIFTS AND ROCK LIFTS SHALL BE NO MORE THAN 36".
13. NO ORGANIC, FROZEN, OBJECTIONABLE OR MATERIAL THAT IS TO WET TO BE PLACED IN FILL.

APPROVED
WVDEP OOG
 Modification

 11/17/2021

SCALE BAR: 1" = 50'

E&S CONTROL LAYOUT

BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
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 Southpointe, PA 15317 Phone: 724-746-1055

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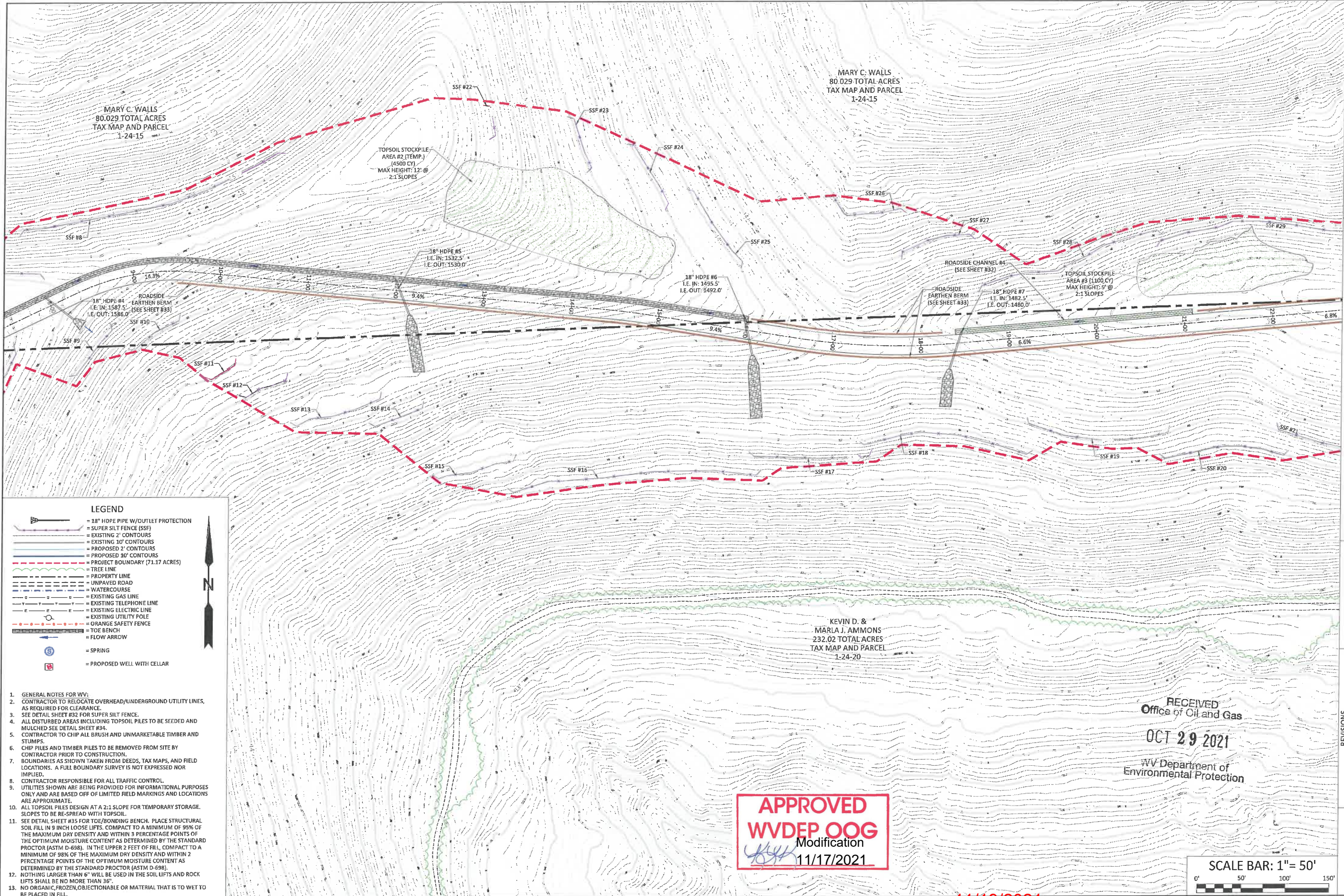
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11/19/2021



MARY C. WALLS
80.029 TOTAL ACRES
TAX MAP AND PARCEL
1-24-15

MARY C. WALLS
80.029 TOTAL ACRES
TAX MAP AND PARCEL
1-24-15

TOPSOIL STOCKPILE
AREA #2 (TEMP.)
(4500 CY)
MAX HEIGHT: 12' @
2:1 SLOPES

TOPSOIL STOCKPILE
AREA #3 (1100 CY)
MAX HEIGHT: 9' @
2:1 SLOPES

KEVIN D. &
MARIA J. AMMONS
232.02 TOTAL ACRES
TAX MAP AND PARCEL
1-24-20

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BOORD, BENCHEK and ASSOC., INC.
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E&S CONTROL LAYOUT

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APPROVED
WVDEP OOG
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1	9.3.20	REVISED PER WVDEP REVIEW COMMENTS OCT 14, 2020

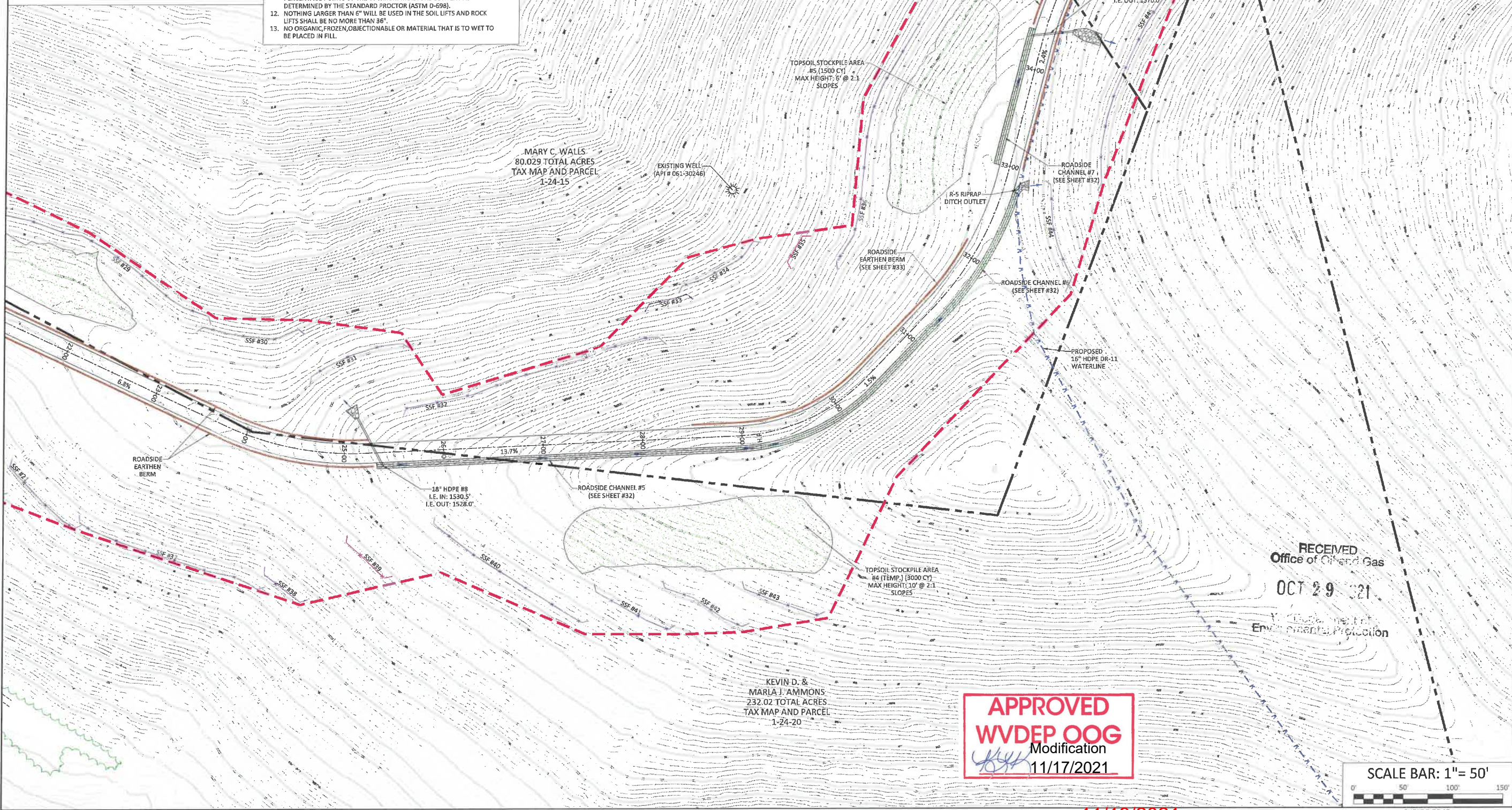


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SCALE BAR: 1" = 50'
 0' 50' 100' 150'

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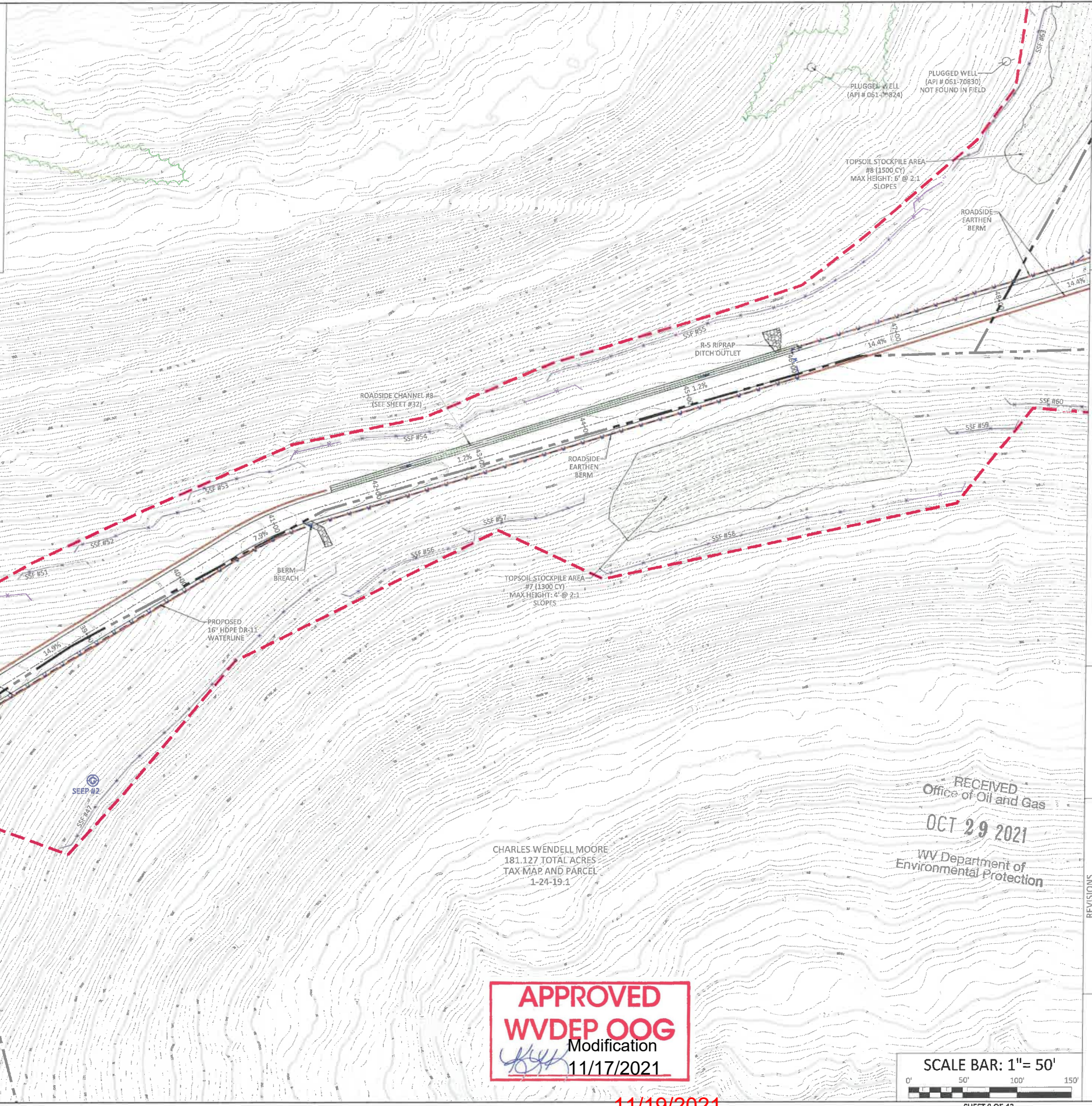


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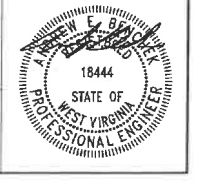
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 11/17/2021

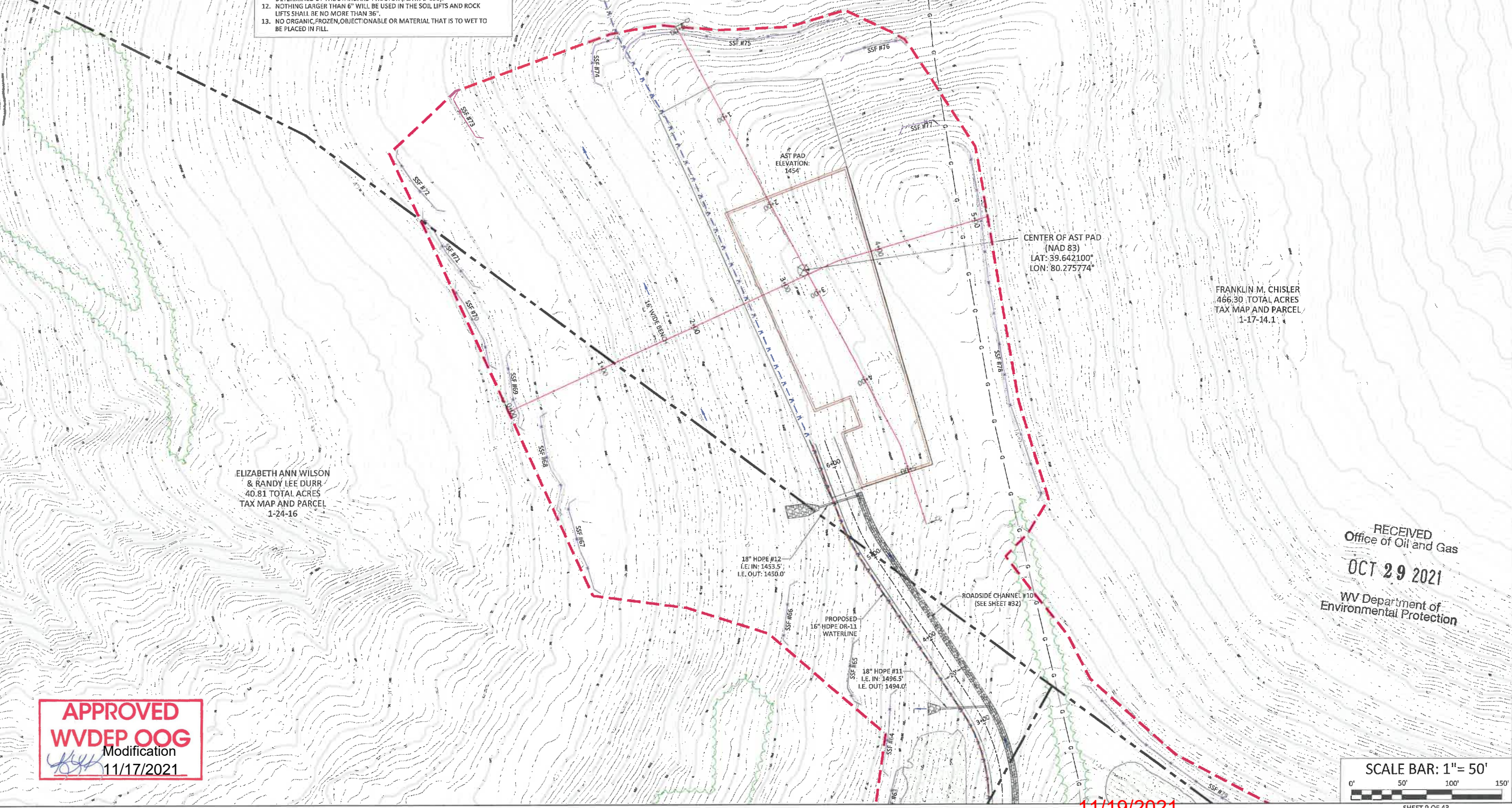


11/19/2021

LEGEND

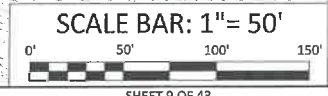
- 18" HDPE PIPE W/OUTLET PROTECTION
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- WATERCOURSE
- EXISTING GAS LINE
- EXISTING TELEPHONE LINE
- EXISTING ELECTRIC LINE
- EXISTING UTILITY POLE
- ORANGE SAFETY FENCE
- TOE BENCH
- FLOW ARROW
- SPRING
- PROPOSED WELL WITH CELLAR

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BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
 and Mining Services
 Southpointe, PA 15317 Phone: 724-746-1055

E&S CONTROL LAYOUT

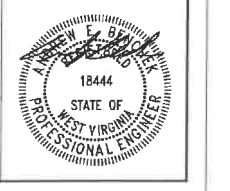
THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020

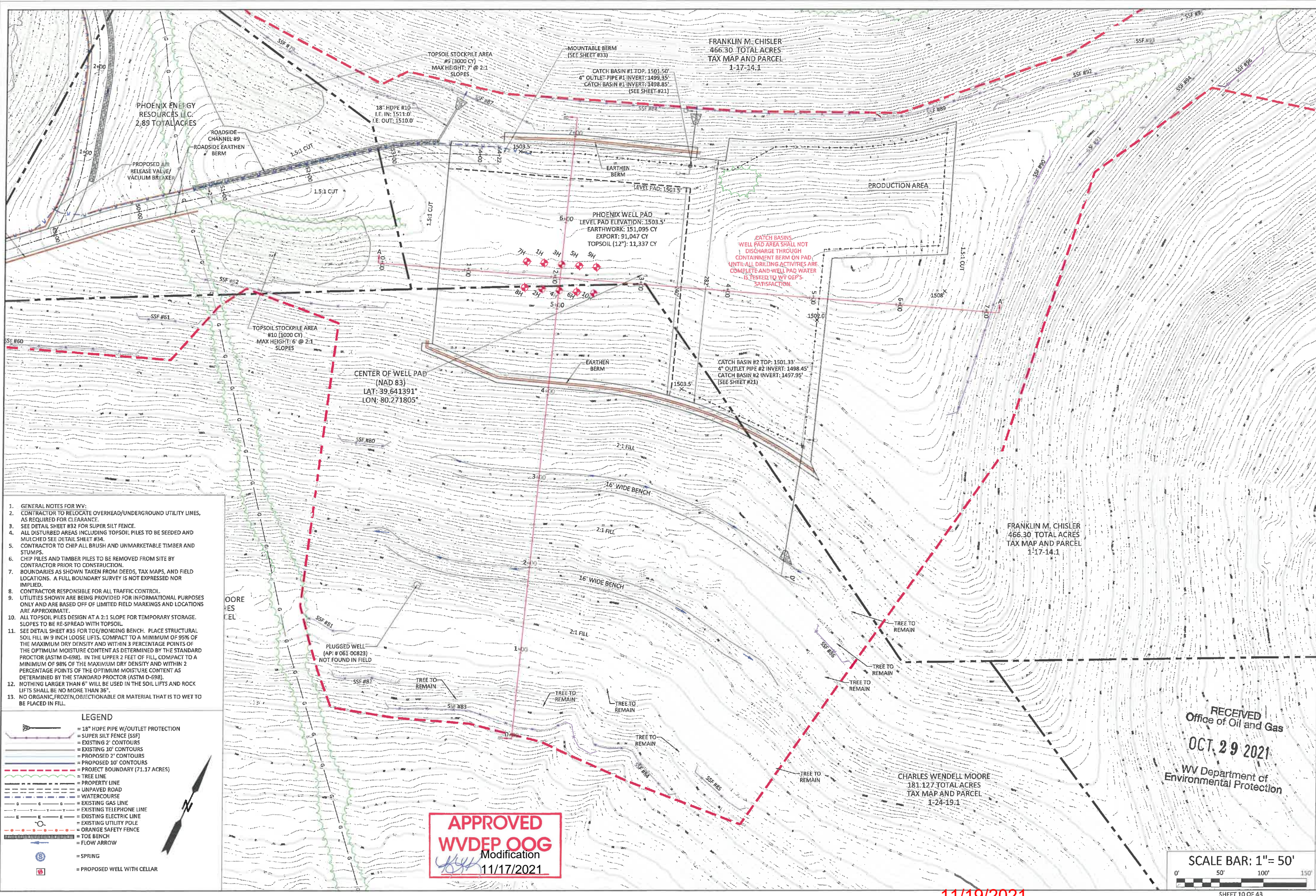
PHOENIX WELL PAD

BATTELLE DISTRICT,
 MONONGALIA
 COUNTY, PA

NO.	DATE	DESCRIPTION
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11/19/2021



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- PROPERTY LINE
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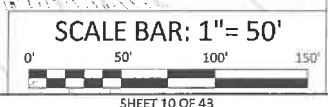
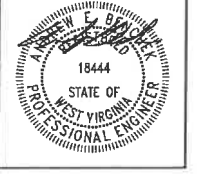
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E&S CONTROL LAYOUT
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 COUNTY, PA

NO.	DATE	DESCRIPTION
1	8.3.20	REVISED PER WVDEP REVIEW COMMENTS
2	9.22.21	RE-DESIGNED PRODUCTION AREA

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 Office of Oil and Gas
 OCT. 29 2021
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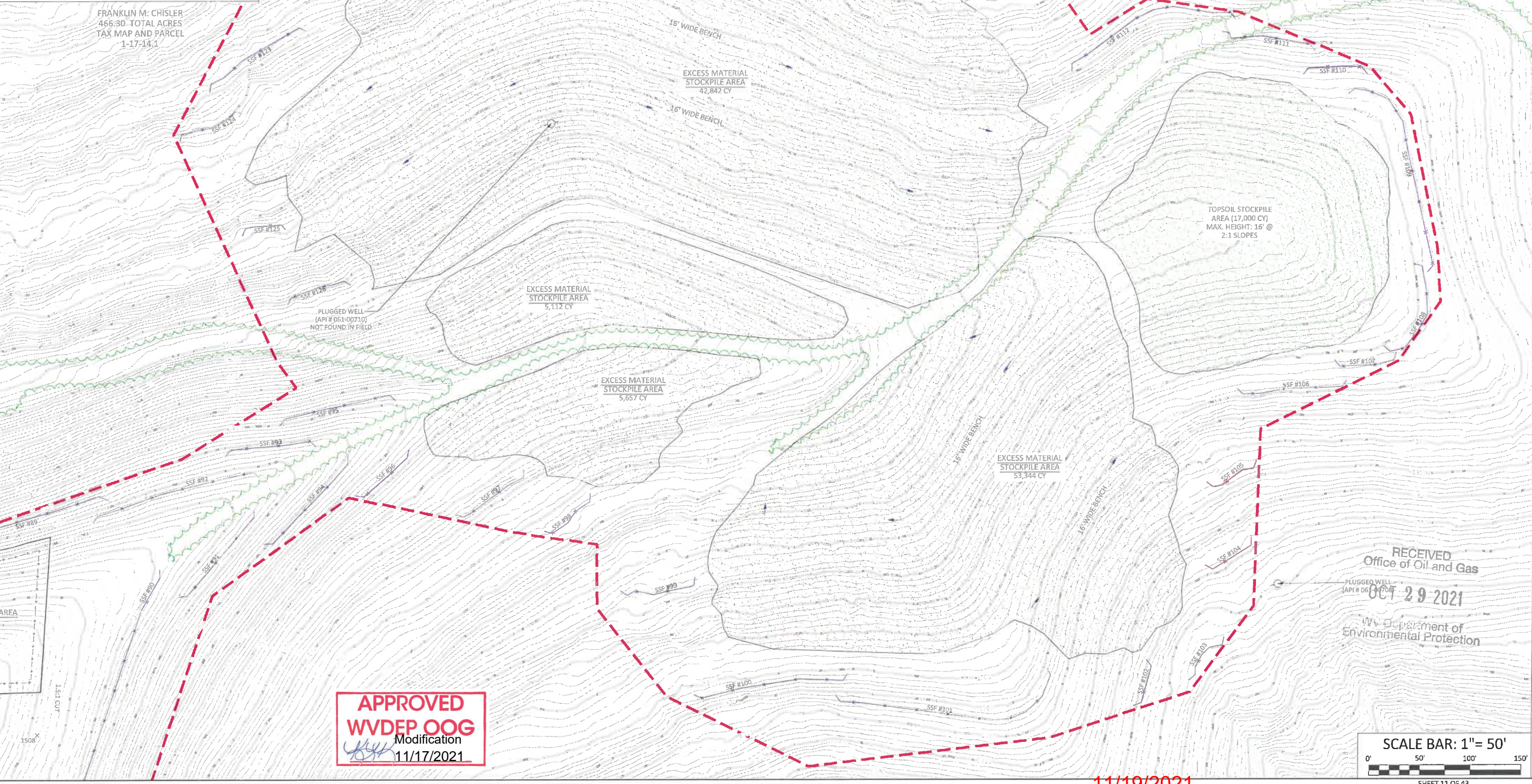
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- GENERAL NOTES FOR WW.
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E&S CONTROL LAYOUT

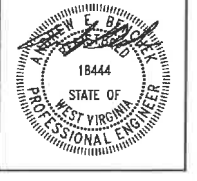
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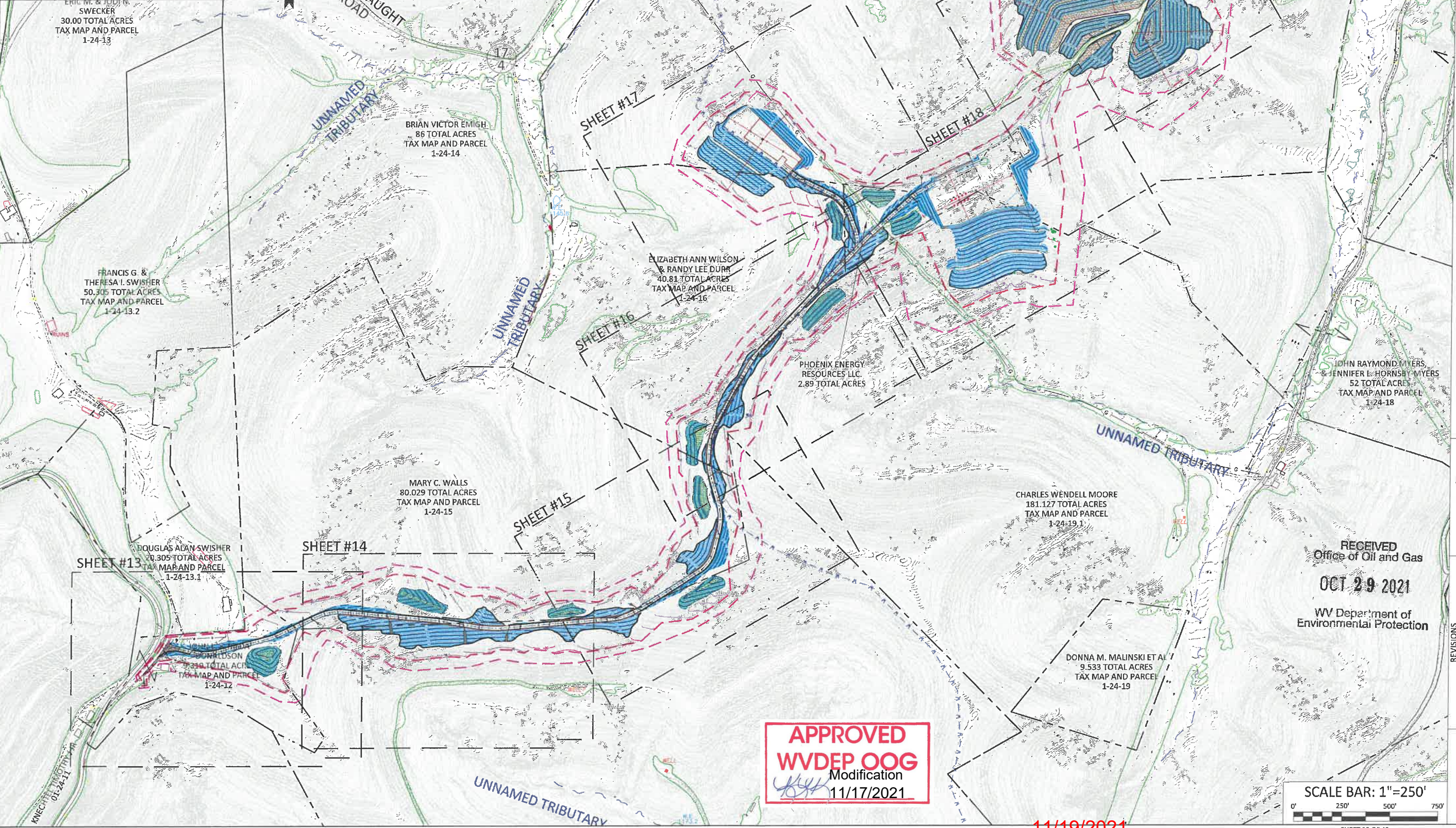
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2	9.22.21	RE-DESIGNED PRODUCTION AREA



11/19/2021

LEGEND

- - - - - PROJECT BOUNDARY (72.79 AC)
- - - - - ENVIRONMENTAL BOUNDARY (104 AC)
- - - - - TREE LINE
- - - - - PROPERTY LINE
- - - - - WATERCOURSE
- ⊙ SPRING
- ⊙ SEEP
- - - - - EXISTING GAS LINE



ERIC W. & JUDITH SWECKER
30.00 TOTAL ACRES
TAX MAP AND PARCEL
1-24-13

FRANCIS G. & THERESA I. SWISHER
50.305 TOTAL ACRES
TAX MAP AND PARCEL
1-24-13.2

BRIAN VICTOR EMIGH
86 TOTAL ACRES
TAX MAP AND PARCEL
1-24-14

ELIZABETH ANN WILSON & RANDY LEE DURM
40.81 TOTAL ACRES
TAX MAP AND PARCEL
1-24-16

PHOENIX ENERGY RESOURCES LLC
2.89 TOTAL ACRES

FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

MARY C. WALLS
80.029 TOTAL ACRES
TAX MAP AND PARCEL
1-24-15

CHARLES WENDELL MOORE
181.127 TOTAL ACRES
TAX MAP AND PARCEL
1-24-19.1

DOUGLAS ALAN SWISHER
70.305 TOTAL ACRES
TAX MAP AND PARCEL
1-24-13.1

DAVID WILSON
9.336 TOTAL ACRES
TAX MAP AND PARCEL
1-24-12

DONNA M. MALINSKI ET AL
9.533 TOTAL ACRES
TAX MAP AND PARCEL
1-24-19

JOHN RAYMOND MYERS & JENNIFER L. HORNSBY MYERS
52 TOTAL ACRES
TAX MAP AND PARCEL
1-24-18

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SCALE BAR: 1"=250'
0' 250' 500' 750'

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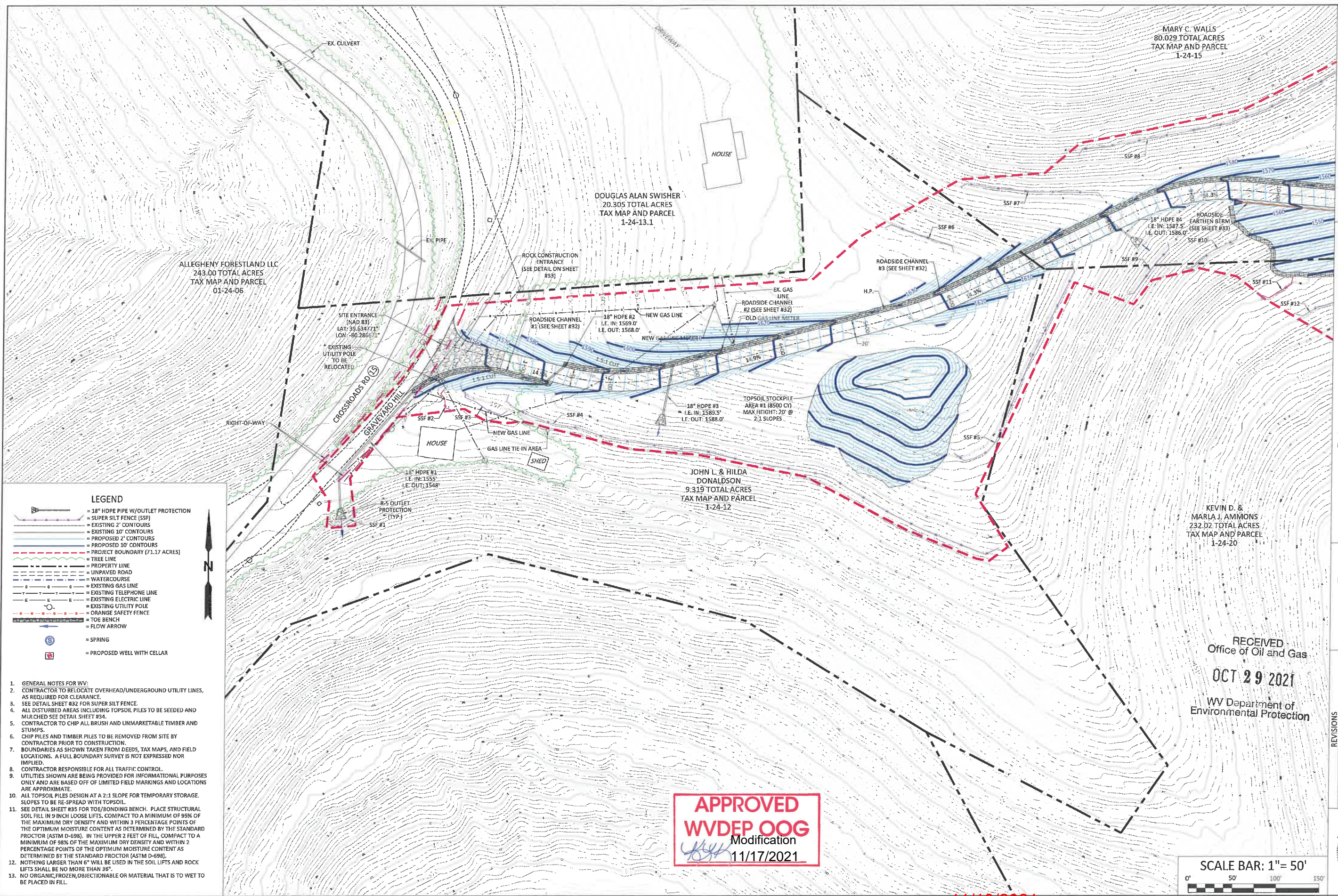
E&S CONTROL AND SITE PLAN OVERVIEW
THIS DOCUMENT WAS PREPARED BY:
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E&S CONTROL AND SITE PLAN
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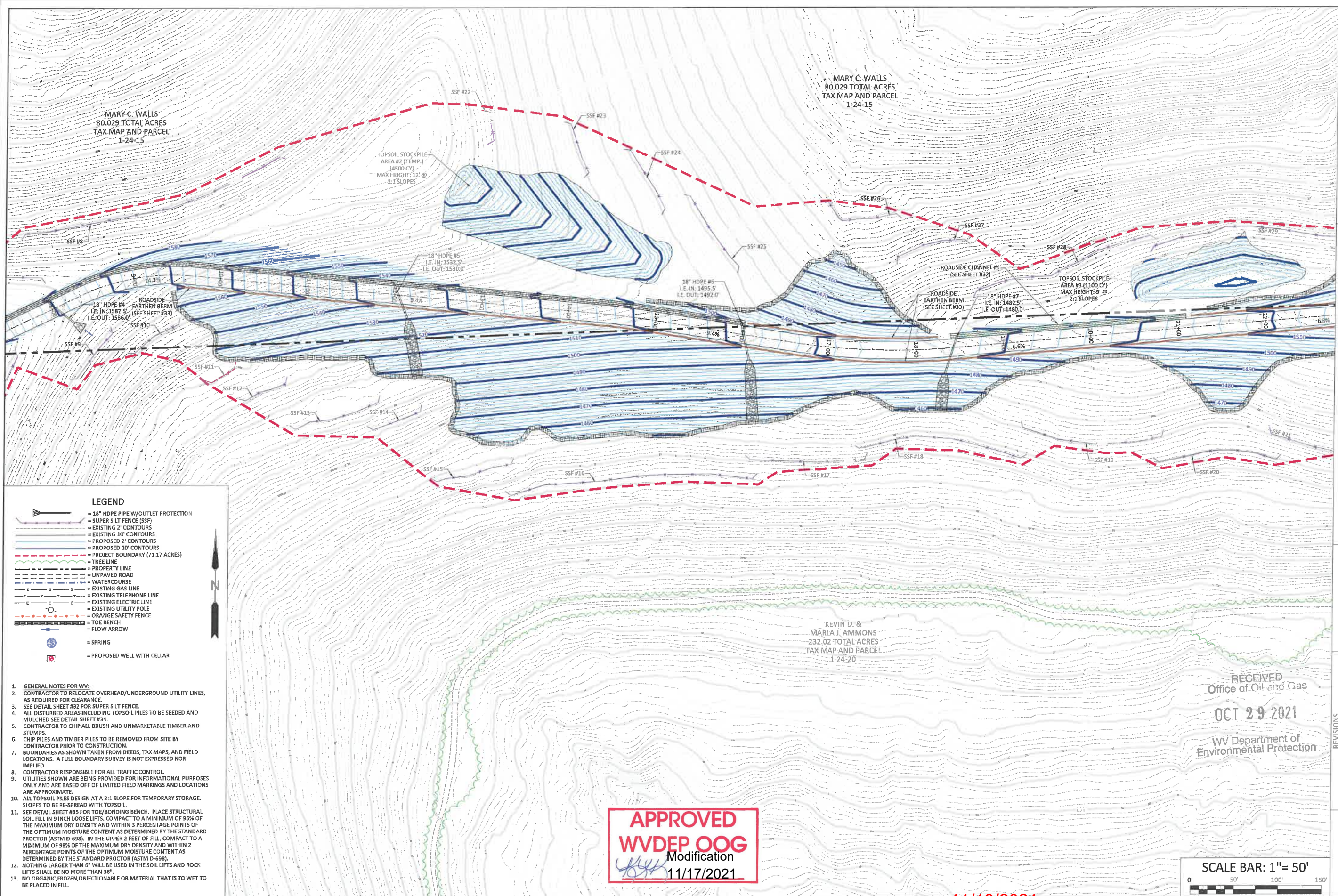
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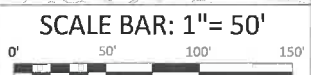
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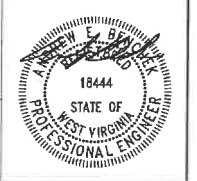
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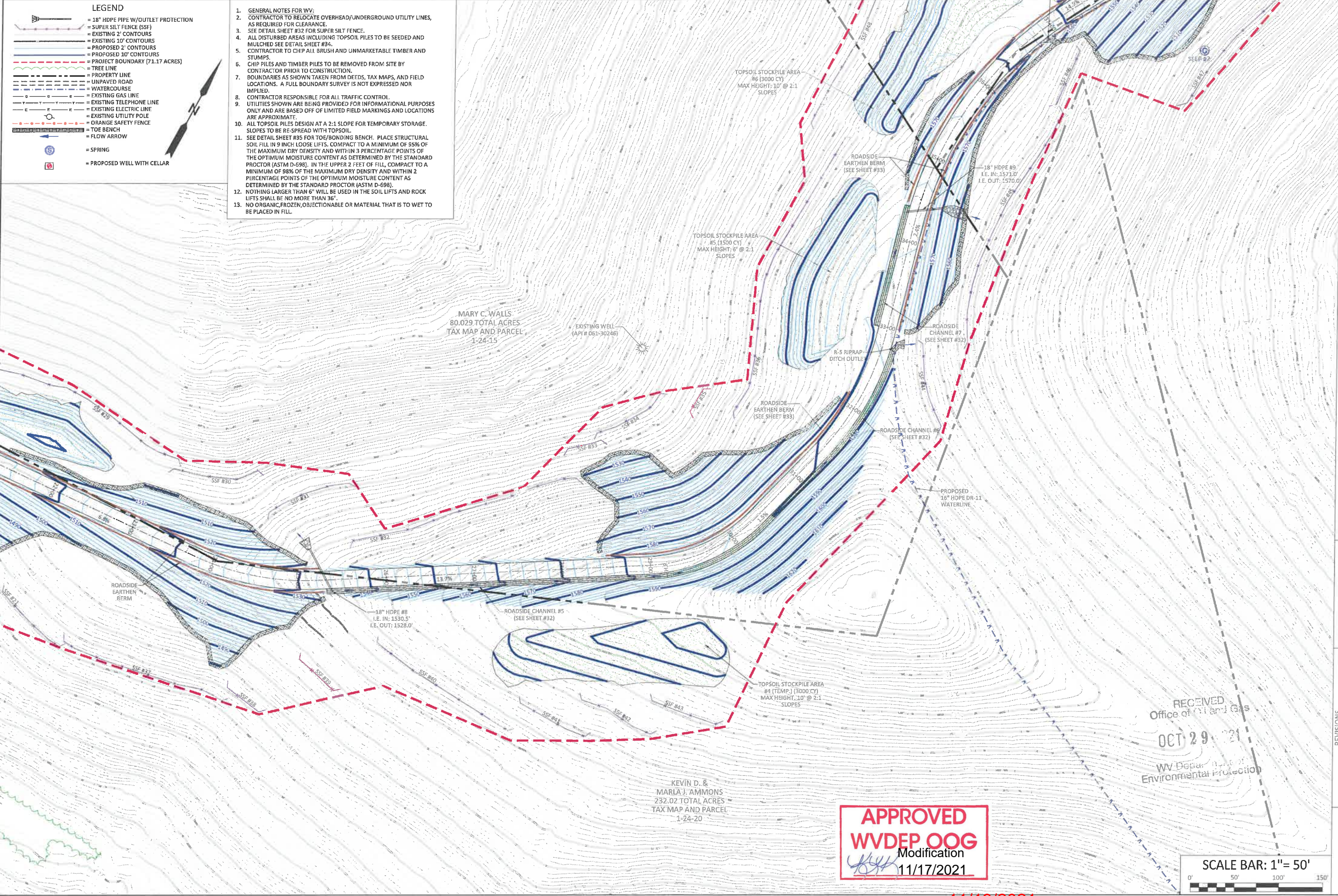


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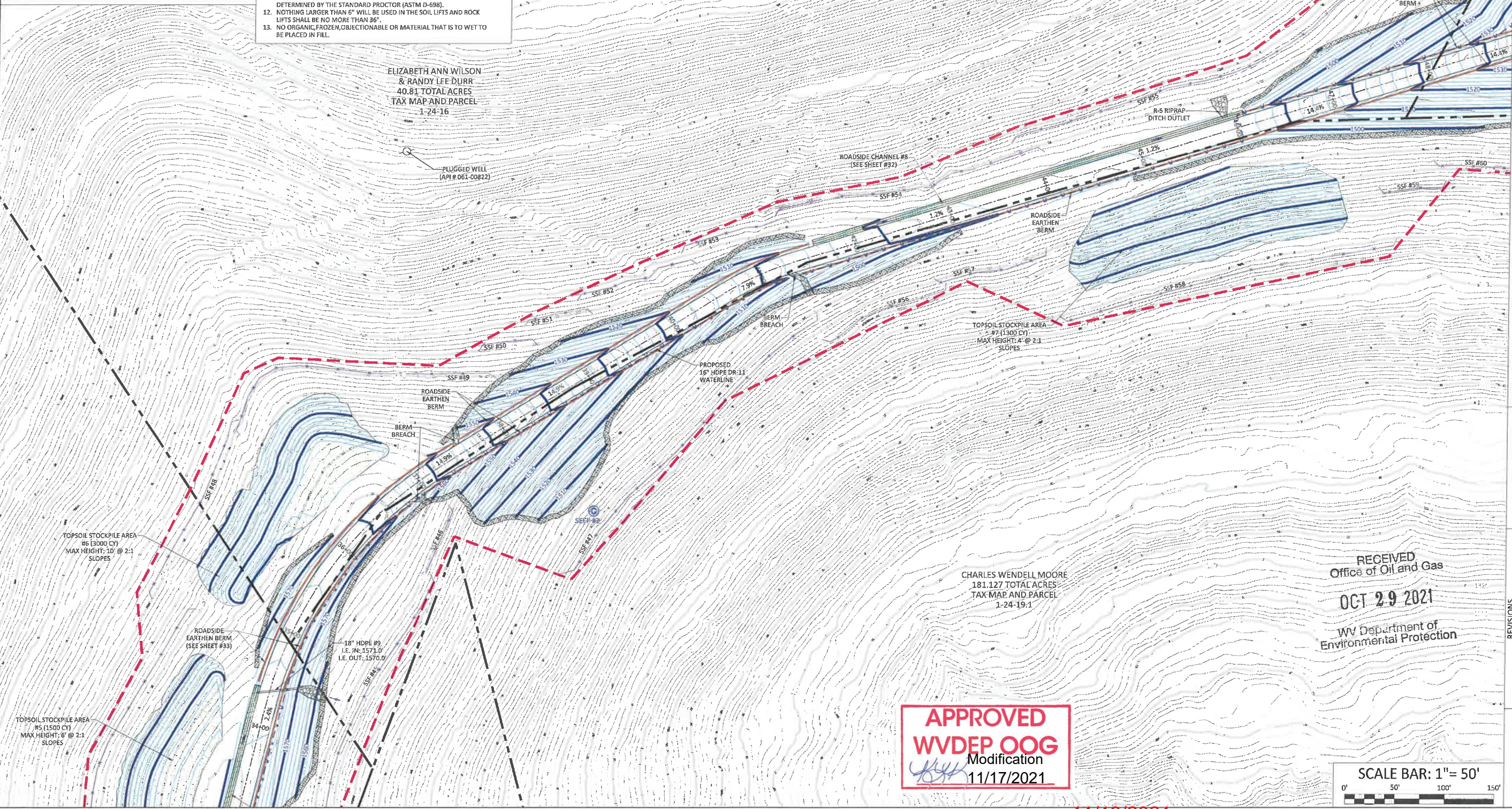


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- = PROPOSED 2' CONTOURS
- = PROPOSED 10' CONTOURS
- = PROJECT BOUNDARY (71.17 ACRES)
- = TREE LINE
- = PROPERTY LINE
- = UNPAVED ROAD
- = WATERCOURSE
- = EXISTING GAS LINE
- = EXISTING TELEPHONE LINE
- = EXISTING ELECTRIC LINE
- = EXISTING UTILITY POLE
- = ORANGE SAFETY FENCE
- = TOE BENCH
- = FLOW ARROW
- = SPRING
- = PROPOSED WELL WITH CELLAR

1. GENERAL NOTES FOR WW CONTRACTOR TO RELOCATE OVERHEAD/UNDERGROUND UTILITY LINES, AS REQUIRED FOR CLEARANCE.
2. SEE DETAIL SHEET #32 FOR SUPER SILT FENCE.
3. ALL DISTURBED AREAS INCLUDING TOPSOIL PILES TO BE SEEDED AND MULCHED SEE DETAIL SHEET #34.
4. CONTRACTOR TO CHIP ALL BRUSH AND UNMARKETABLE TIMBER AND STUMPS.
5. CHIP PILES AND TIMBER PILES TO BE REMOVED FROM SITE BY CONTRACTOR PRIOR TO CONSTRUCTION.
6. BOUNDARIES AS SHOWN TAKEN FROM DEEDS, TAX MAPS, AND FIELD LOCATIONS. A FULL BOUNDARY SURVEY IS NOT EXPRESSED NOR IMPLIED.
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BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
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 Southpointe, PA 15317 Phone: 724-746-1055

**E&S CONTROL AND
 SITE PLAN**

THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020
 PHOENIX WELL PAD
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NO.	DATE	DESCRIPTION
1	9.3.20	REVISED PER WVDEP REVIEW COMMENTS ON 9.3.20

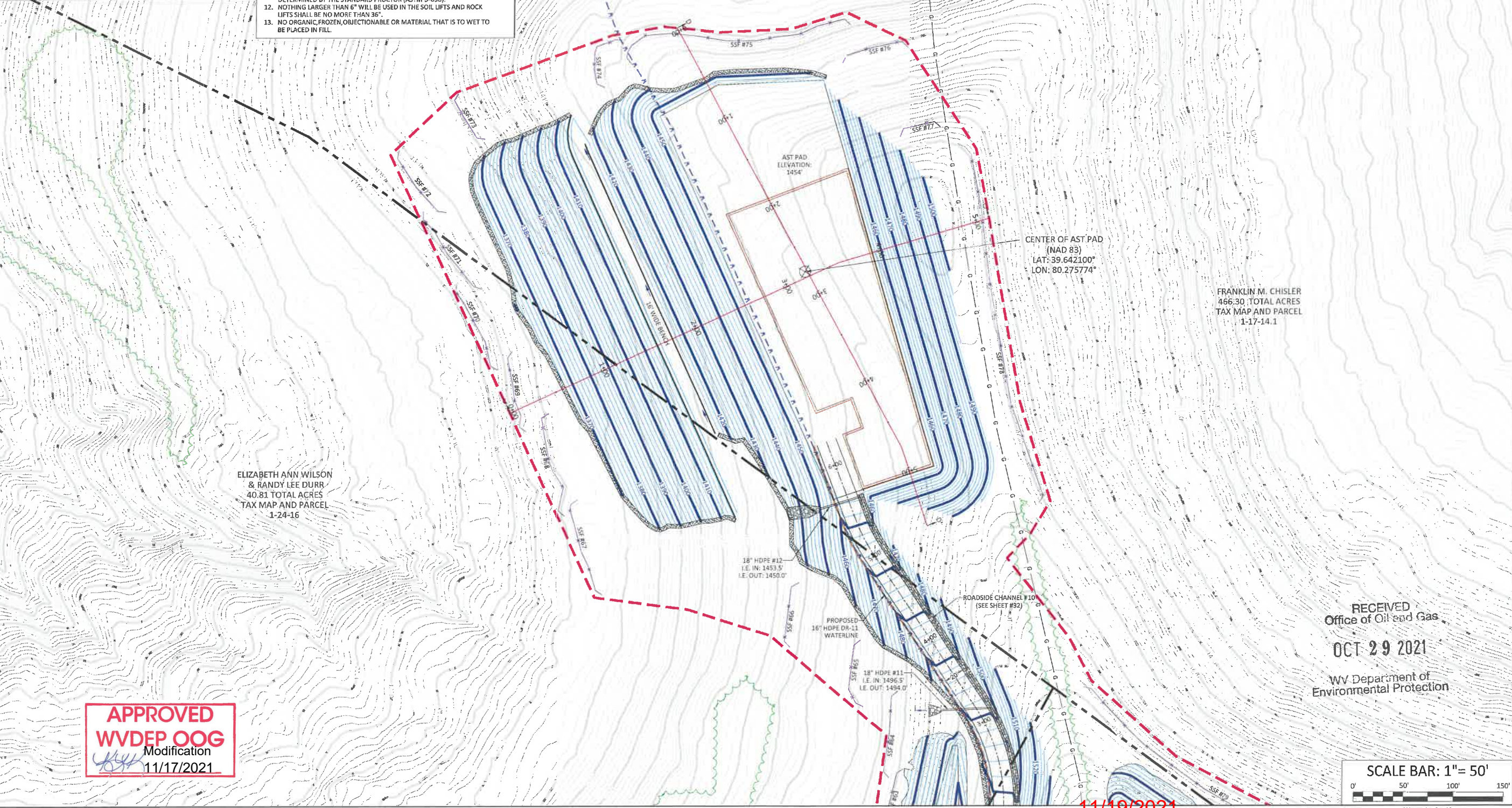


11/19/2021

LEGEND

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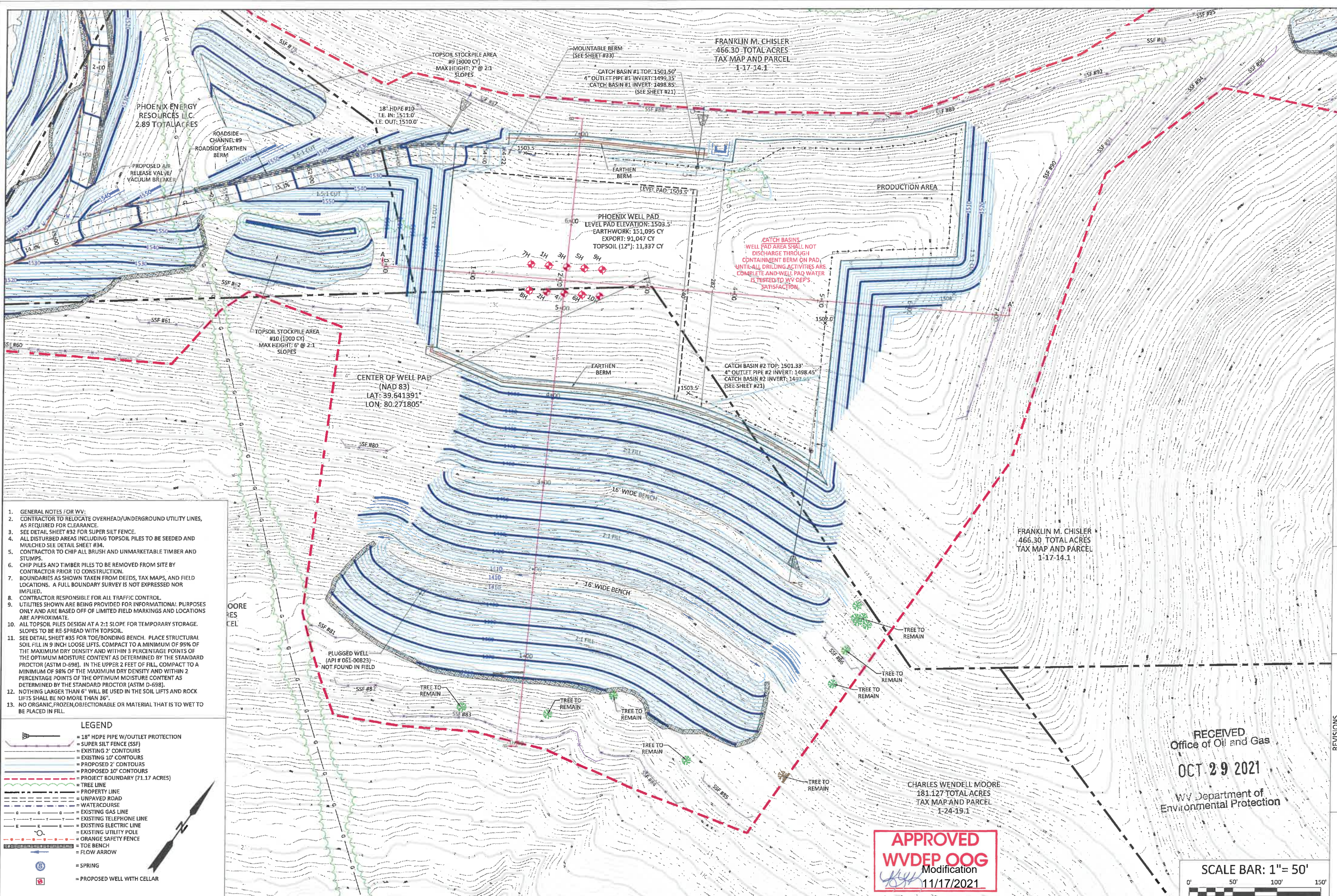
PHOENIX WELL PAD

BATTELLE DISTRICT,
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 THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT,
 MONONGALIA COUNTY, PA

NO.	DATE	DESCRIPTION
1	8.3.20	REVISED PER WVDEP REVIEW COMMENTS ON 8.1.20
2	9.23.21	RE-DESIGNED PRODUCTION AREA

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11/19/2021

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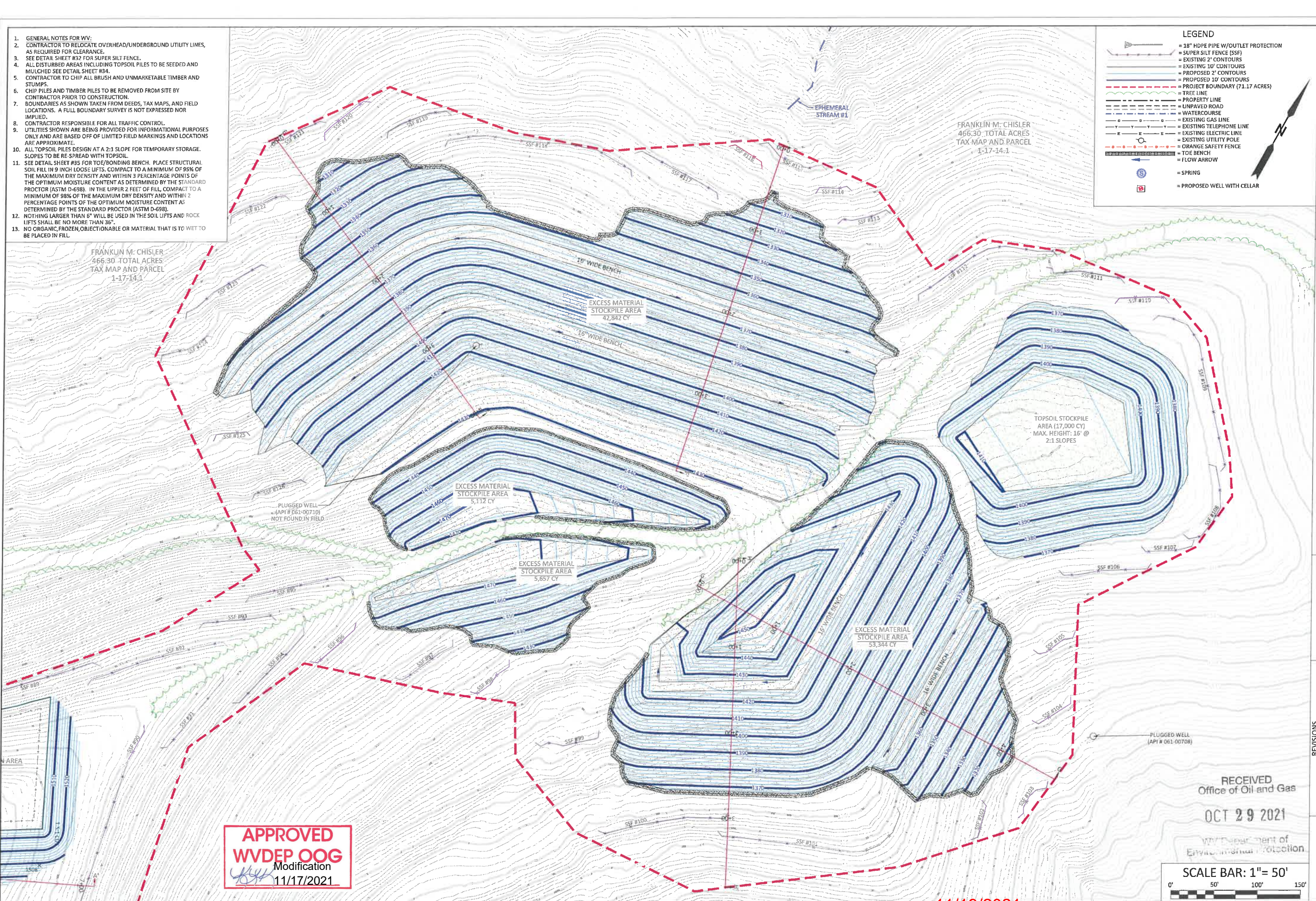
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FRANKLIN M. CHISLER
 466.30 TOTAL ACRES
 TAX MAP AND PARCEL
 1-17-14-1

FRANKLIN M. CHISLER
 466.30 TOTAL ACRES
 TAX MAP AND PARCEL
 1-17-14-1



E&S CONTROL AND SITE PLAN

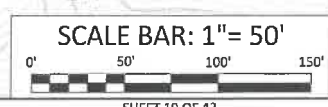
THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT,
 MONONGALIA COUNTY, PA

NO.	DATE	DESCRIPTION
1	9.13.20	REVISED PER WVDEP REVIEW COMMENTS
2	9.22.21	RE-DESIGNED PRODUCTION AREA

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 OCT 29 2021

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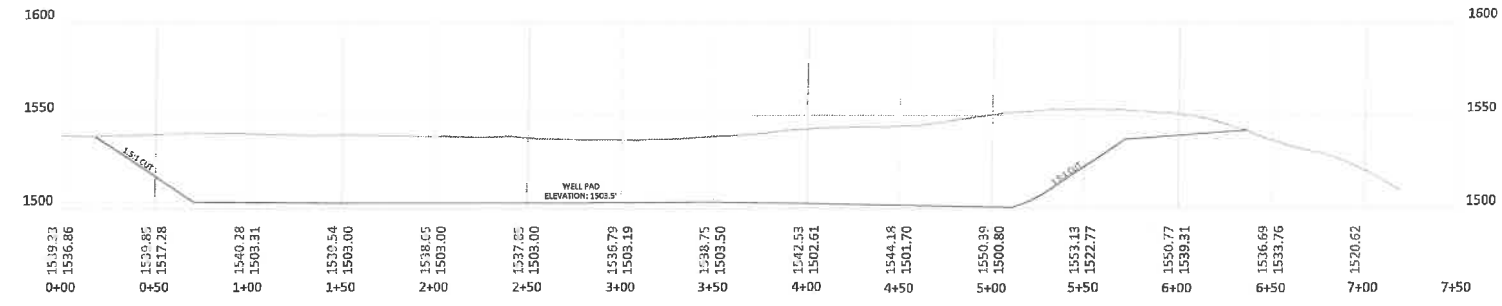


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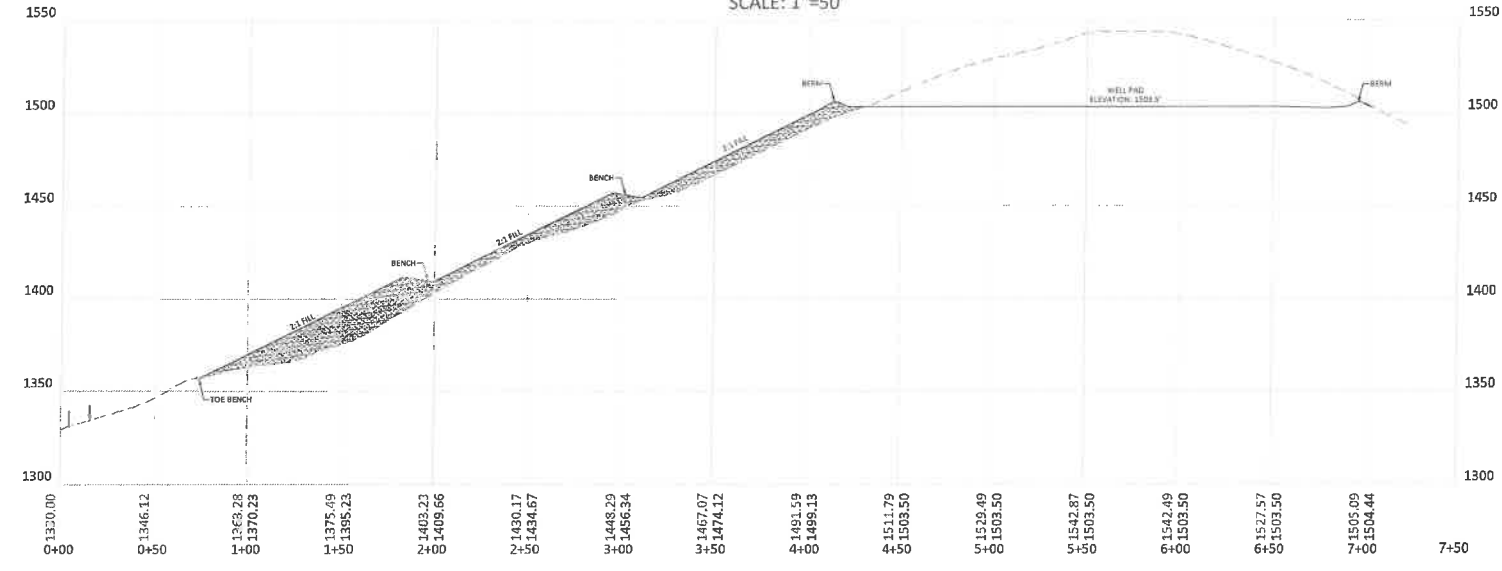
WELL PAD
CROSS-SECTION A-A'
SCALE: 1"=50'



LEGEND

- - - ORIGINAL GRADE
- PROPOSED GRADE
- PROJECT BOUNDARY
- SUPER SILT FENCE

WELL PAD
CROSS-SECTION B-B'
SCALE: 1"=50'

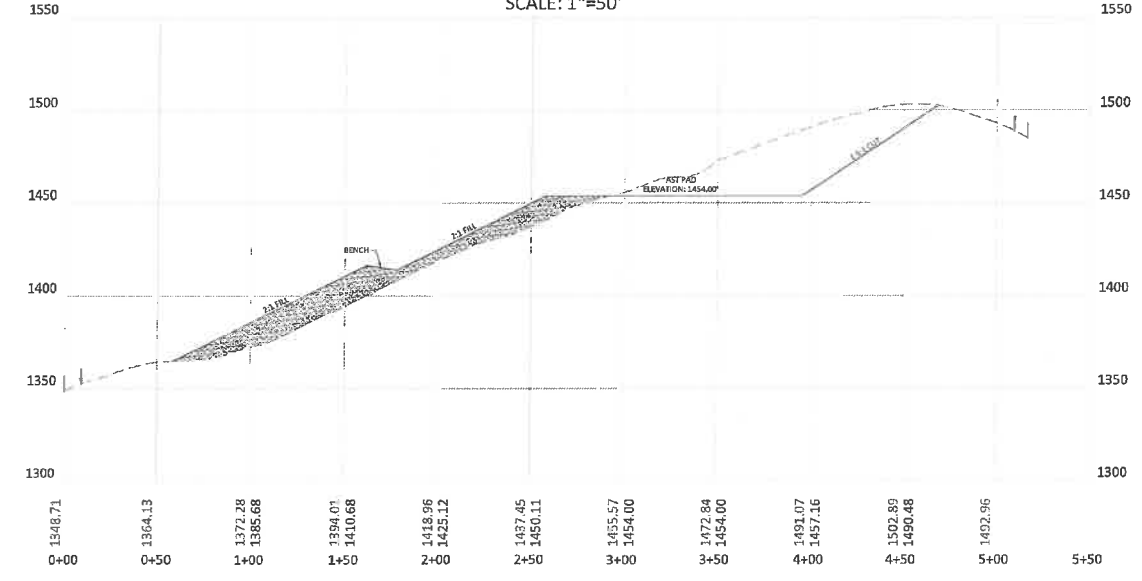


*SEE DETAIL SHEET #35 FOR TOE/BONDING BENCH.

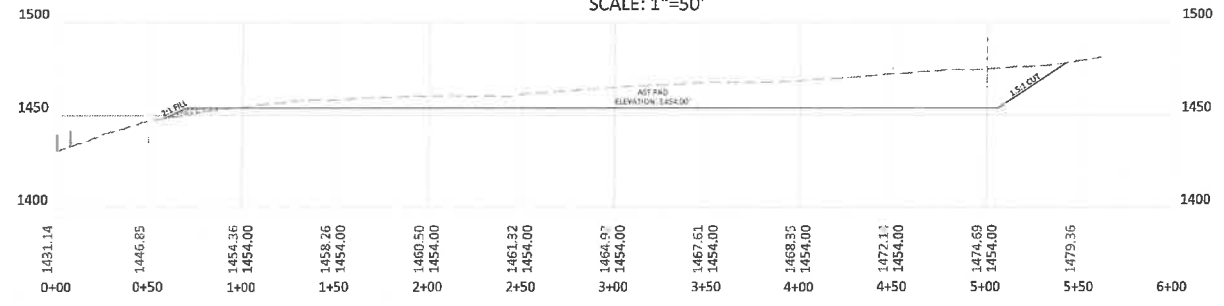
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AST PAD
CROSS-SECTION C-C'
SCALE: 1"=50'



AST PAD
CROSS-SECTION D-D'
SCALE: 1"=50'



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Engineering, Surveying, Construction,
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Southpointe, PA 15317 Phone: 724-746-1055

**WELL PAD AND AST PAD
CROSS-SECTIONS**
THIS DOCUMENT WAS PREPARED BY:
BOORD, BENCHEK AND ASSOC., INC.
FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
AUGUST 2020
PHOENIX WELL PAD
BATTELLE DISTRICT,
MONONGALIA
COUNTY, PA

NO.	DATE	DESCRIPTION
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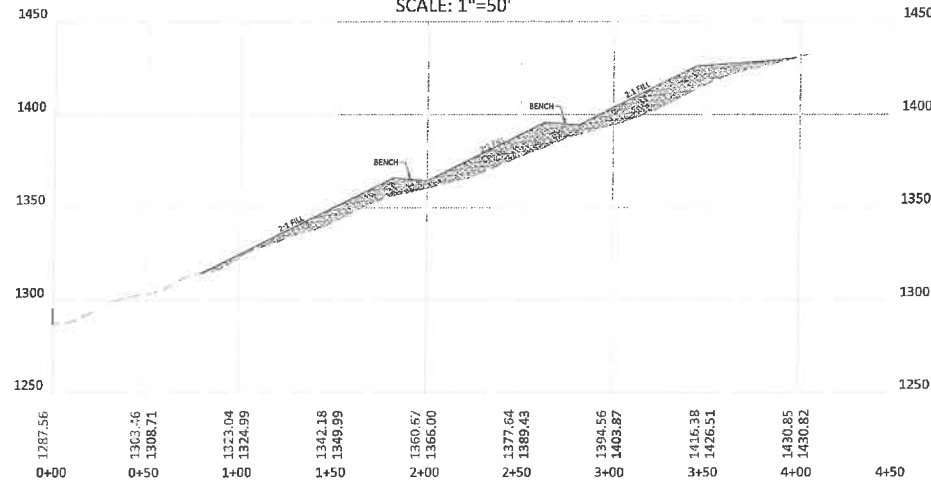
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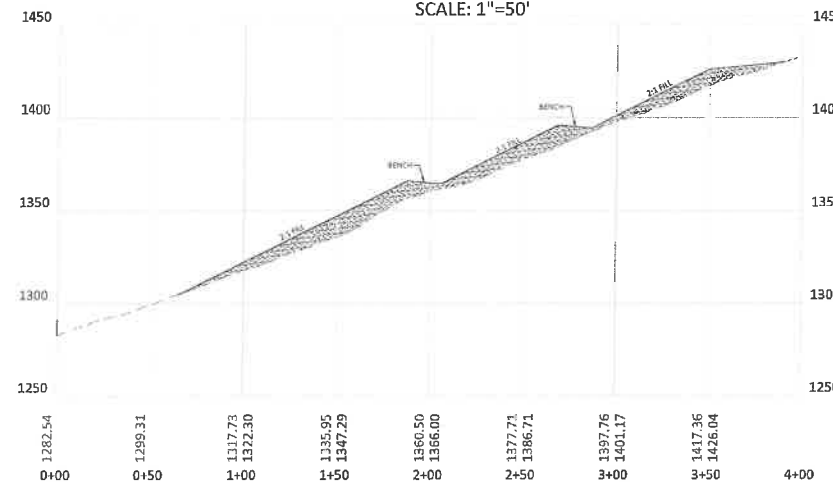
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EXCESS MATERIAL STOCKPILE AREA (42,842 CY)
CROSS-SECTION E-E'
SCALE: 1"=50'

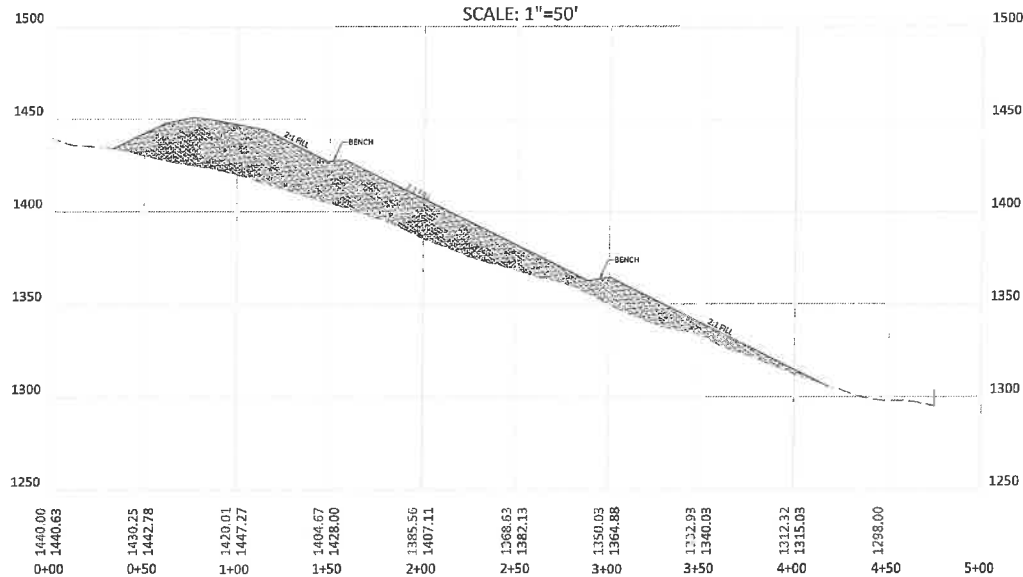


EXCESS MATERIAL STOCKPILE AREA (42,842 CY)
CROSS-SECTION F-F'
SCALE: 1"=50'

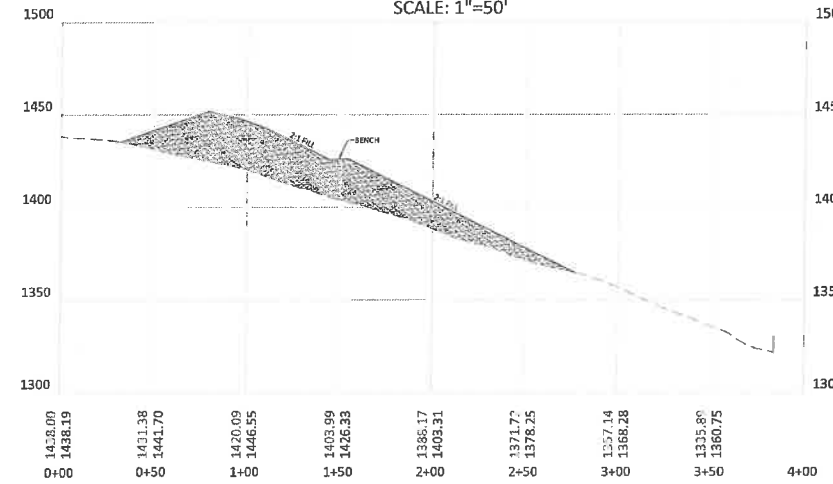


LEGEND
 - - - - - ORIGINAL GRADE
 _____ PROPOSED GRADE
 | | | PROJECT BOUNDARY
 - - - - - SUPER SILT FENCE

EXCESS MATERIAL STOCKPILE AREA (53,344 CY)
CROSS-SECTION G-G'
SCALE: 1"=50'



EXCESS MATERIAL STOCKPILE AREA (53,344 CY)
CROSS-SECTION H-H'
SCALE: 1"=50'



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EXCESS MATERIAL STOCKPILE AREA
CROSS-SECTIONS

THIS DOCUMENT WAS PREPARED BY:
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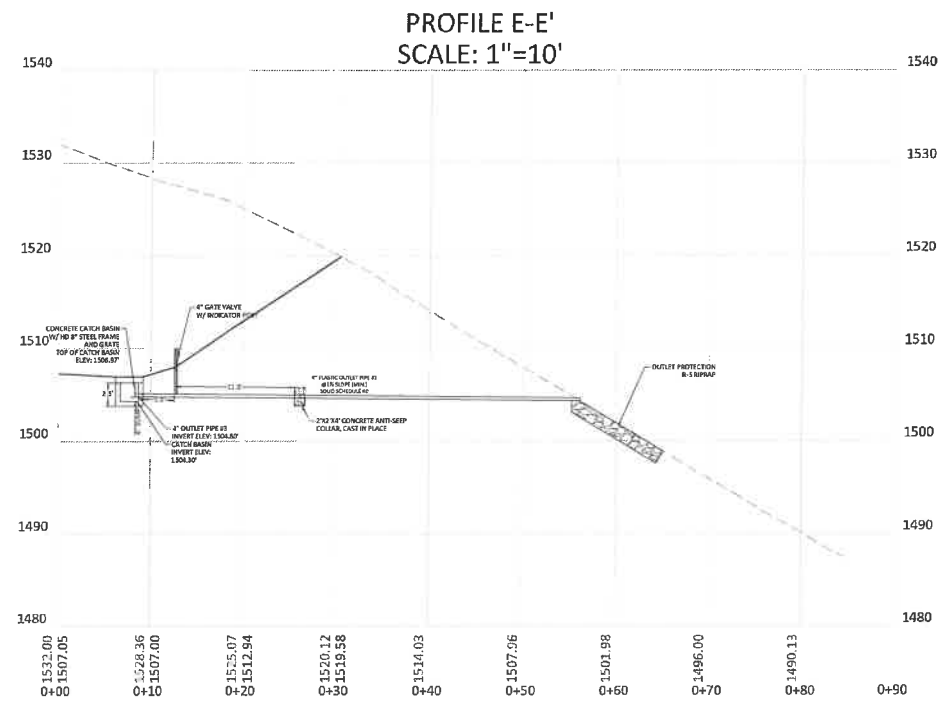
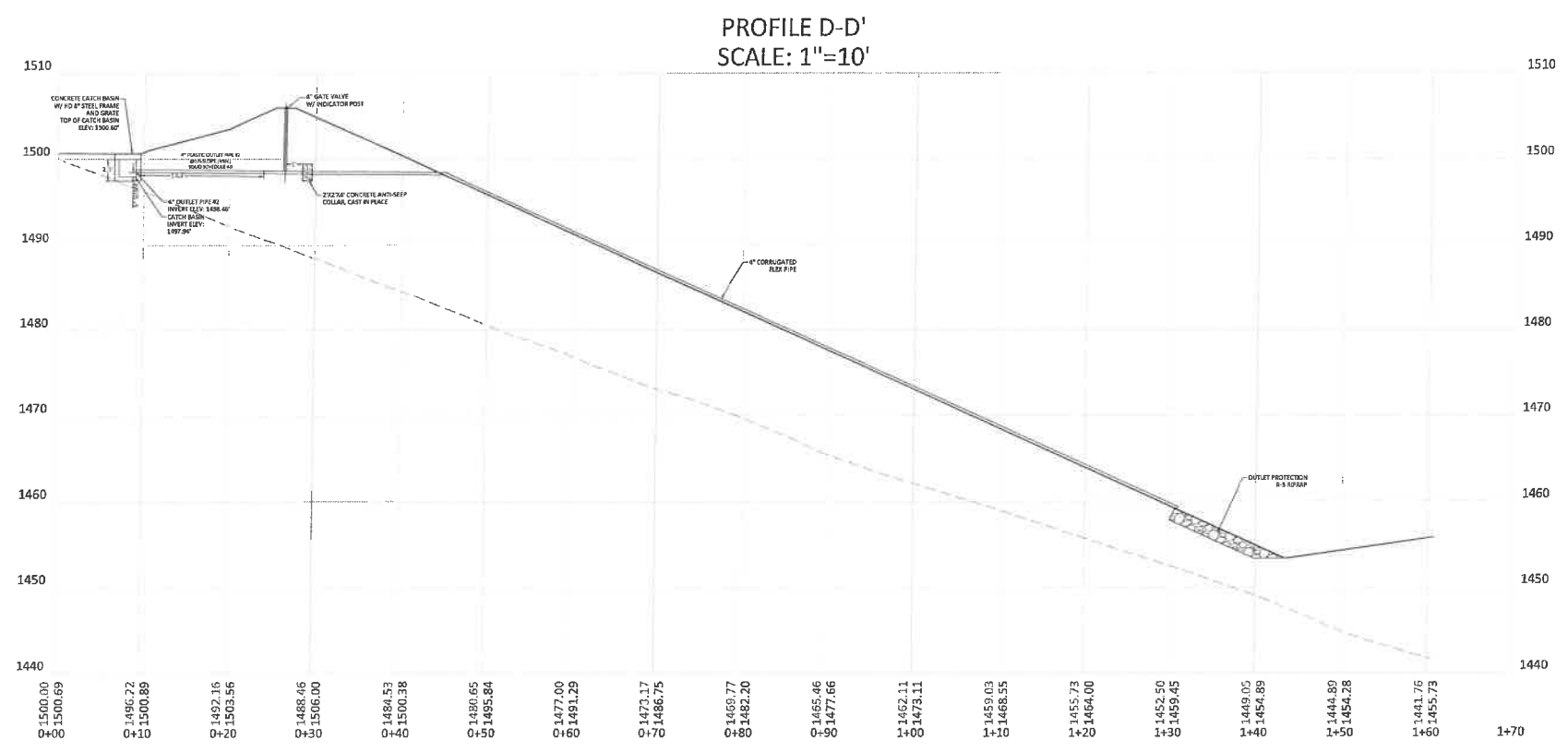
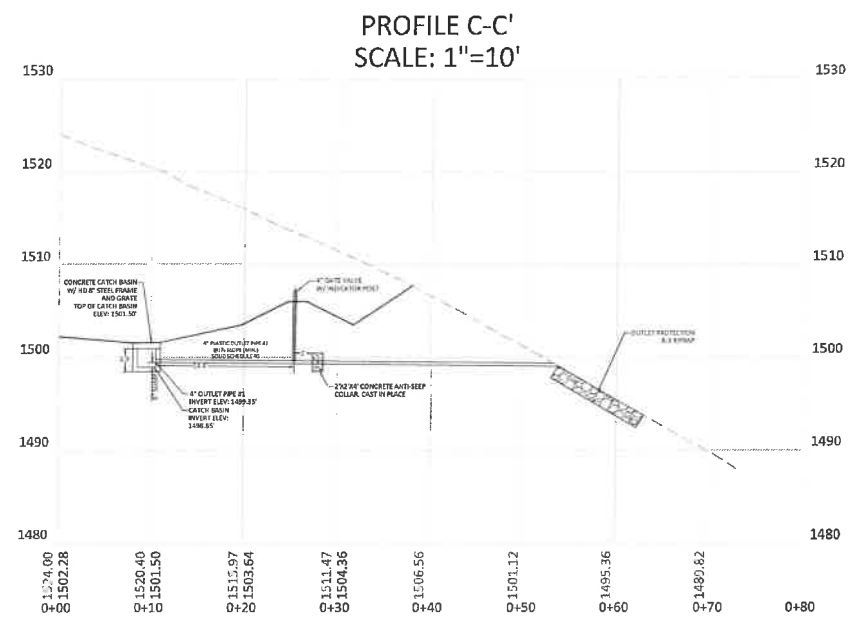
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LEGEND
 EXISTING GRADE - - - - -
 PROPOSED GRADE _____

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CATCH BASINS
 WELL PAD AREA SHALL NOT DISCHARGE THROUGH CONTAINMENT BERM
 ON PAD UNTIL ALL DRILLING ACTIVITIES ARE COMPLETE AND WELL PAD
 WATER IS TESTED TO WV DEP'S SATISFACTION.

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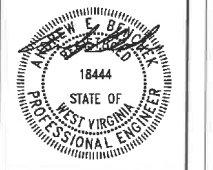


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**UNDER DRAIN
 PROFILES**
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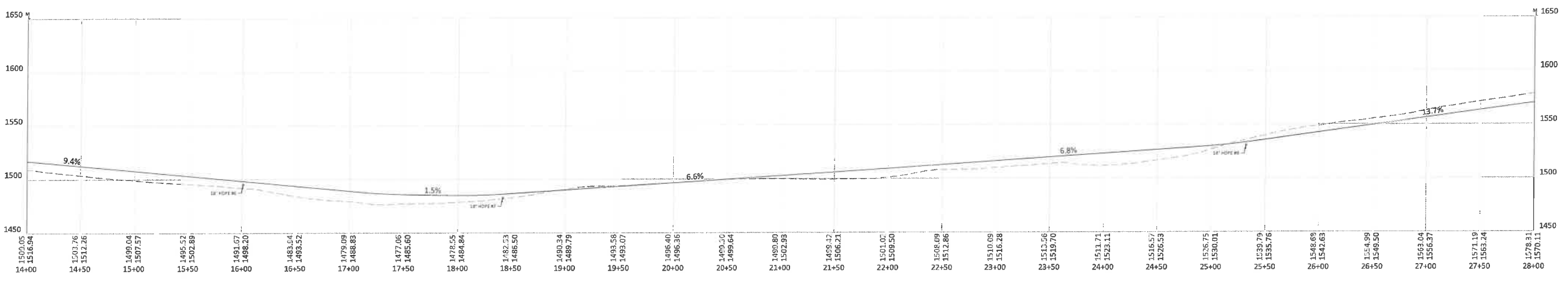
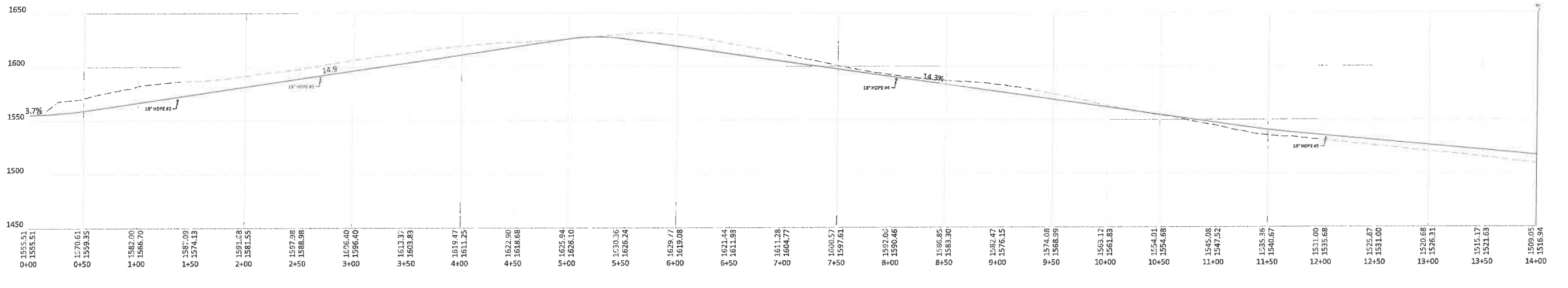
NO.	DATE	DESCRIPTION
2	9/22/21	RE-DESIGNED PRODUCTION AREA



11/19/2021

LEGEND
 - - - ORIGINAL GRADE
 — PROPOSED GRADE

ACCESS ROAD PROFILE
 SCALE: 1"=50'



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ACCESS ROAD PROFILE
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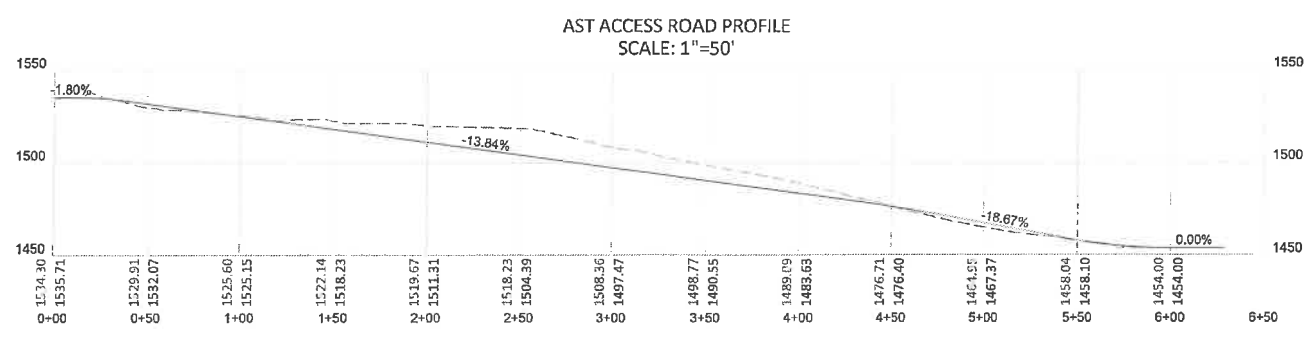
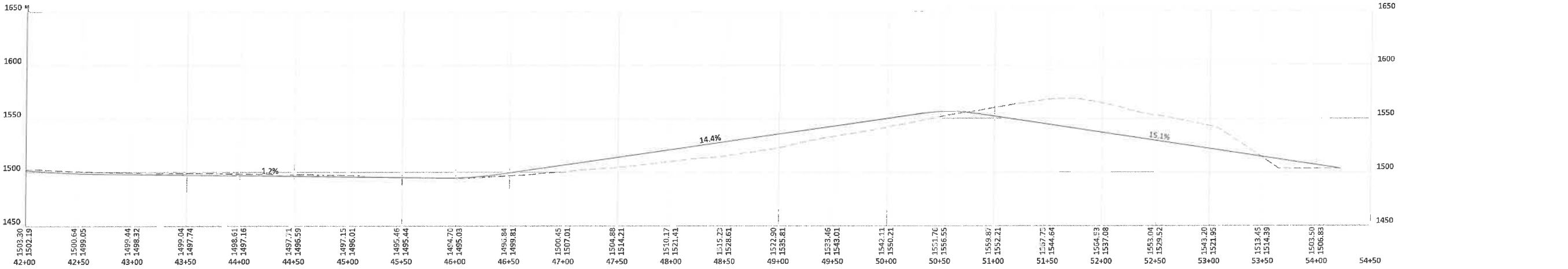
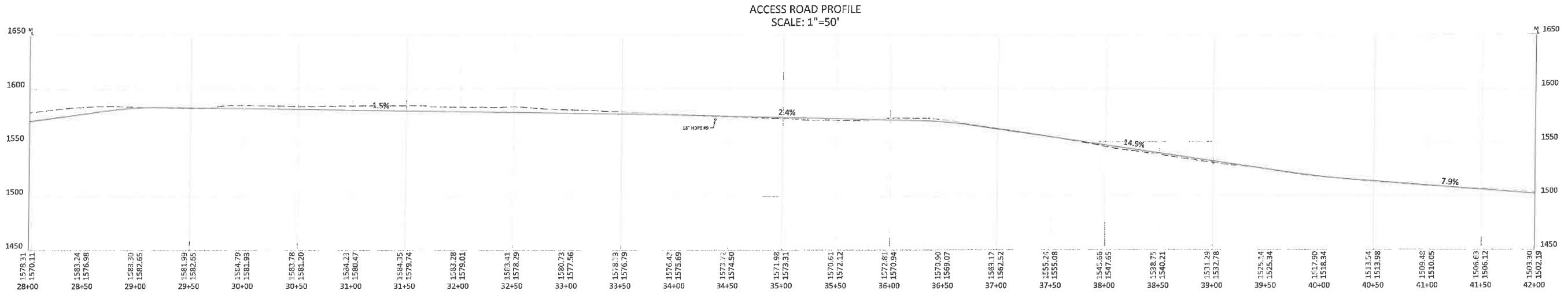
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LEGEND
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**ACCESS ROAD AND AST ACCESS ROAD
 PROFILES**

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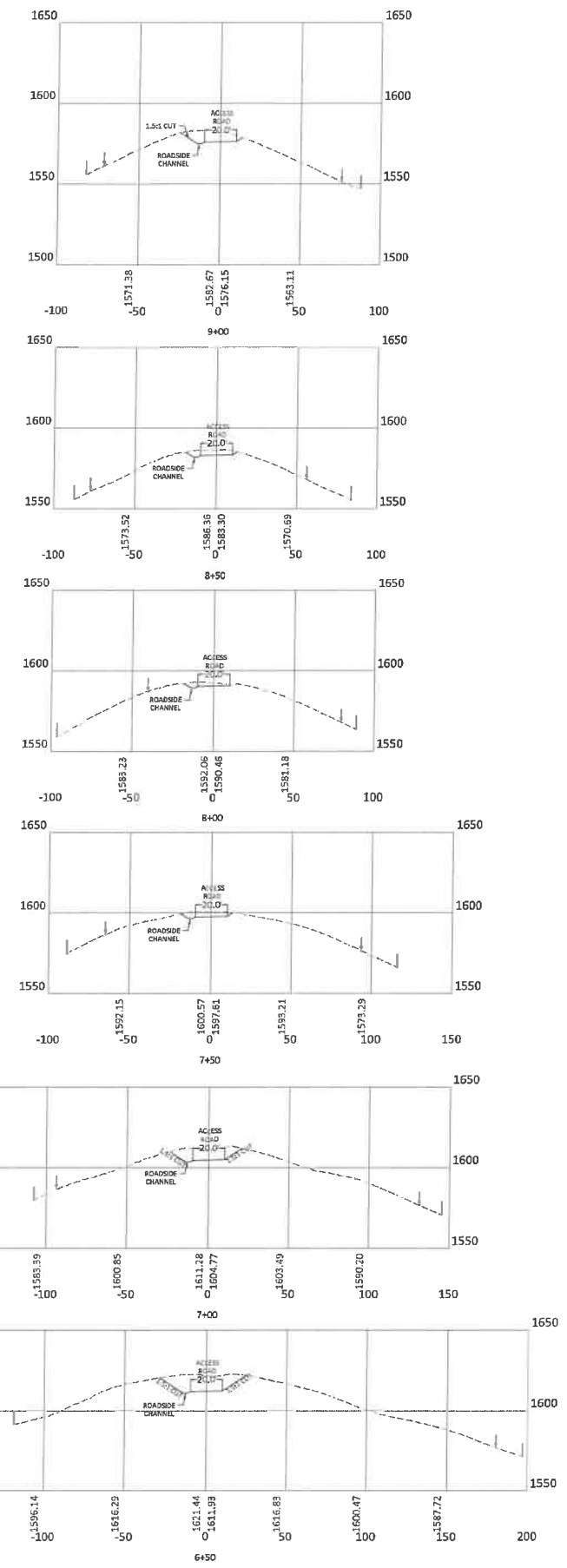
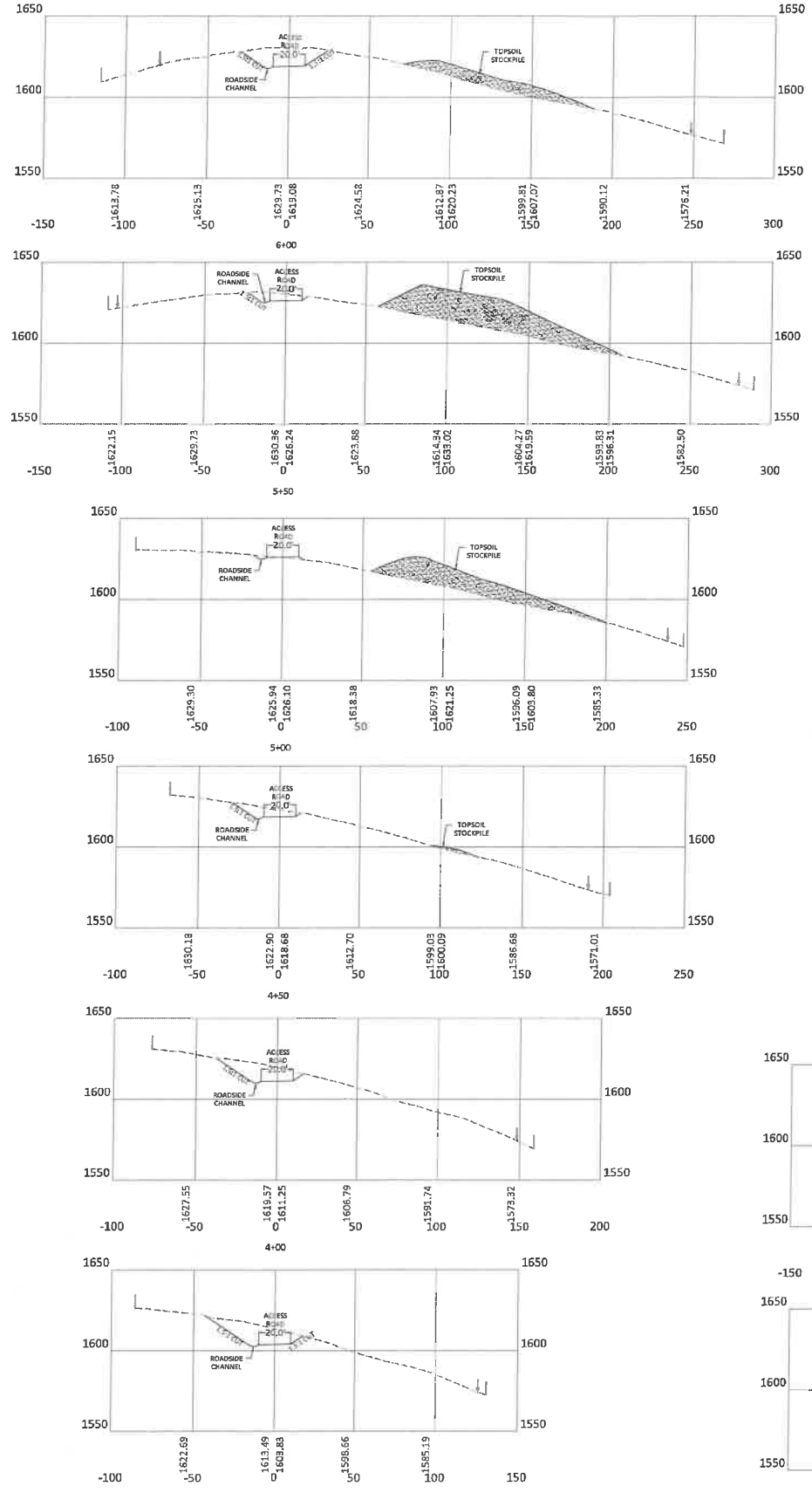
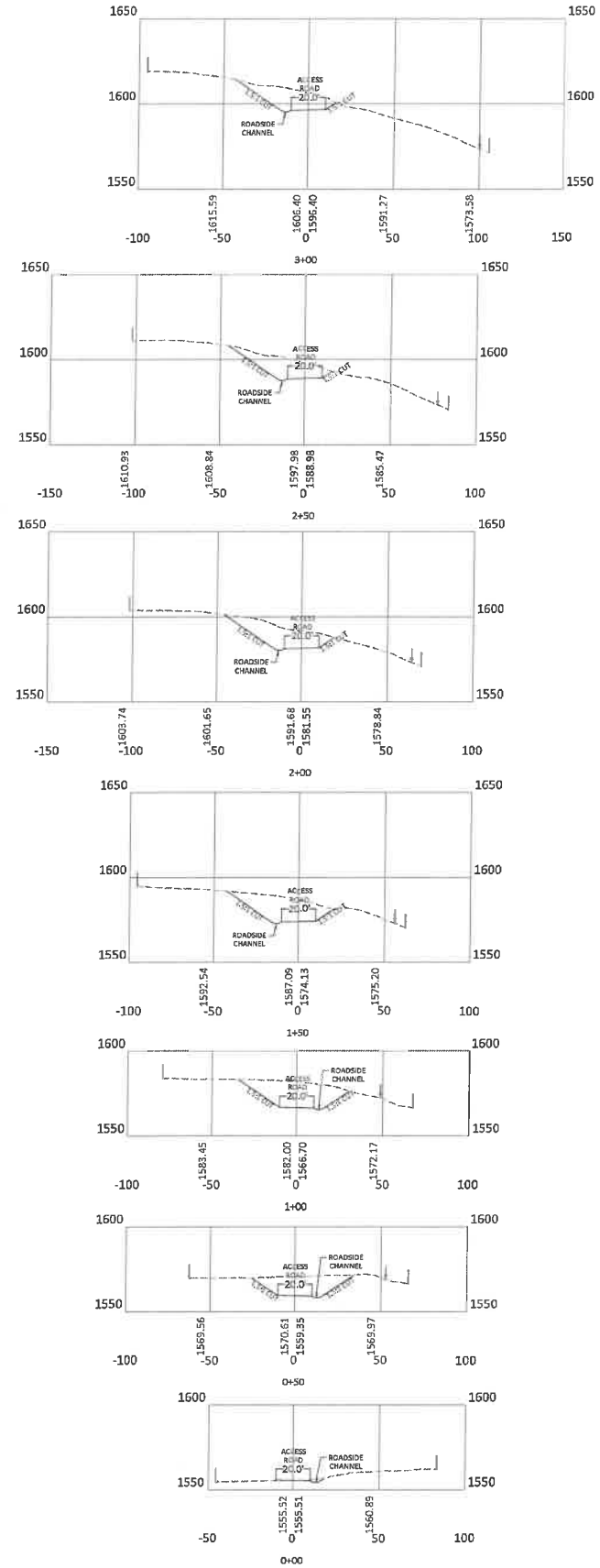
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WVDEP OOG
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 11/17/2021

SCALE BAR: 1"= 50'
 0' 50' 100' 150'



11/19/2021

ACCESS ROAD CROSS-SECTIONS
SCALE: 1"=50'



LEGEND
 - - - ORIGINAL GRADE
 - - - PROPOSED GRADE
 --- PROJECT BOUNDARY
 --- SUPER SILT FENCE

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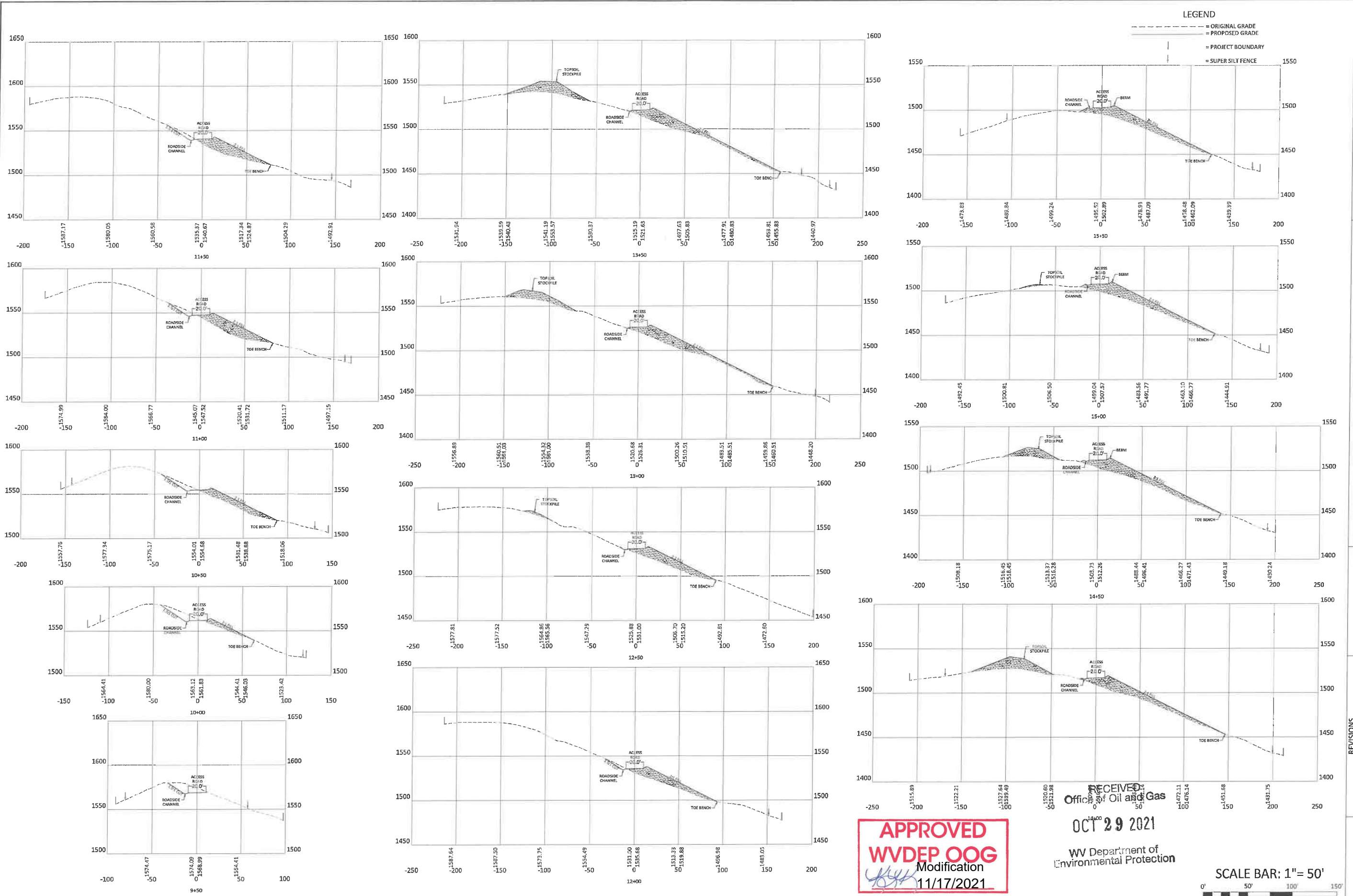
THIS DOCUMENT WAS PREPARED BY:
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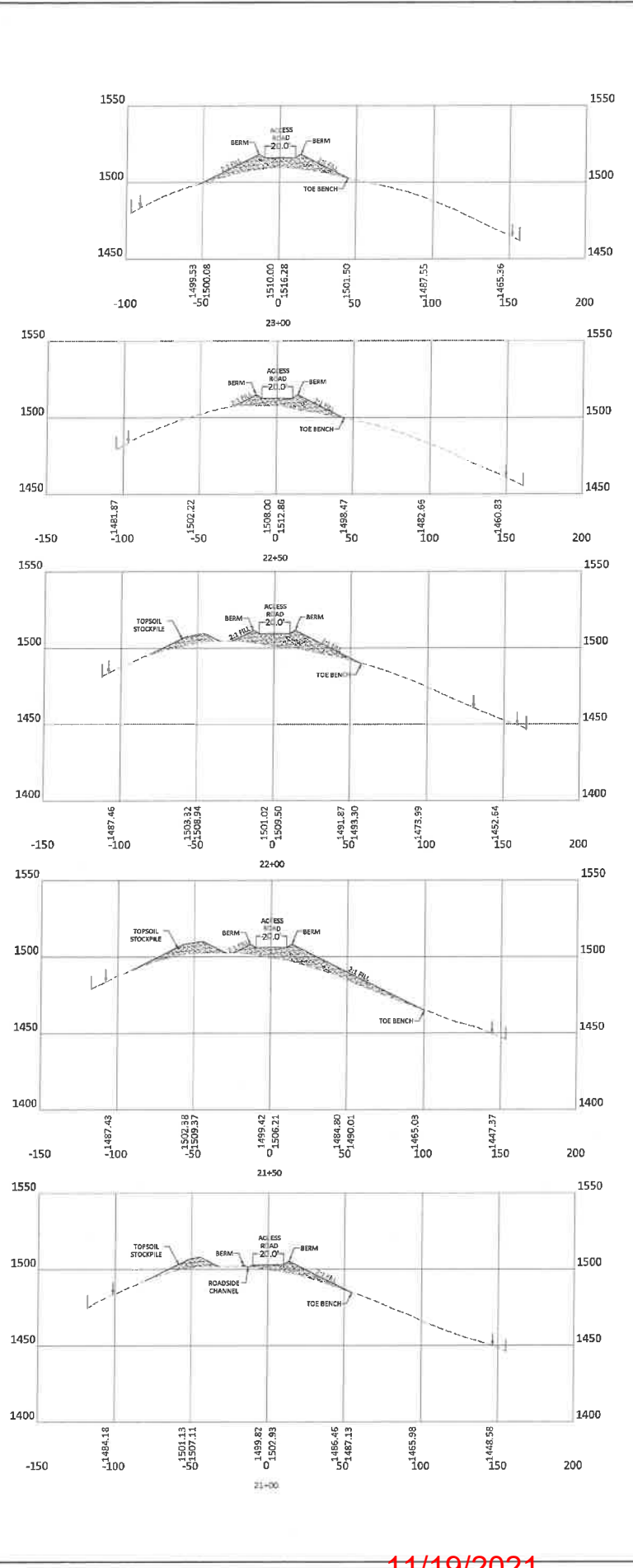
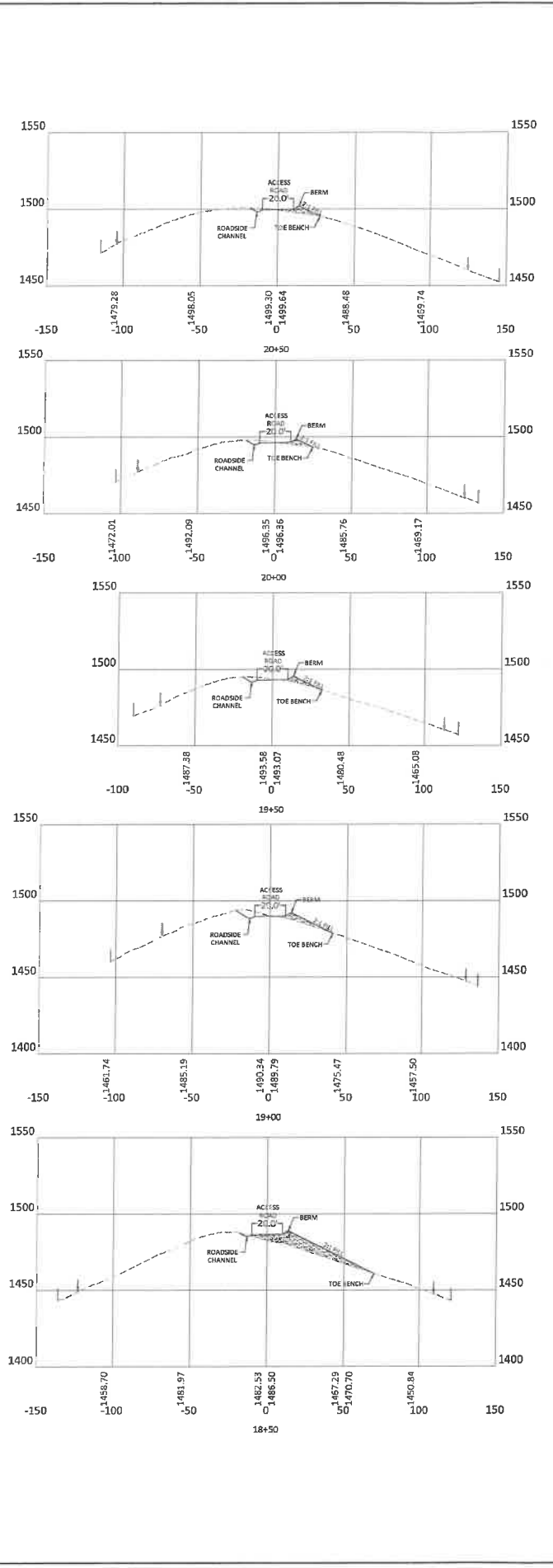
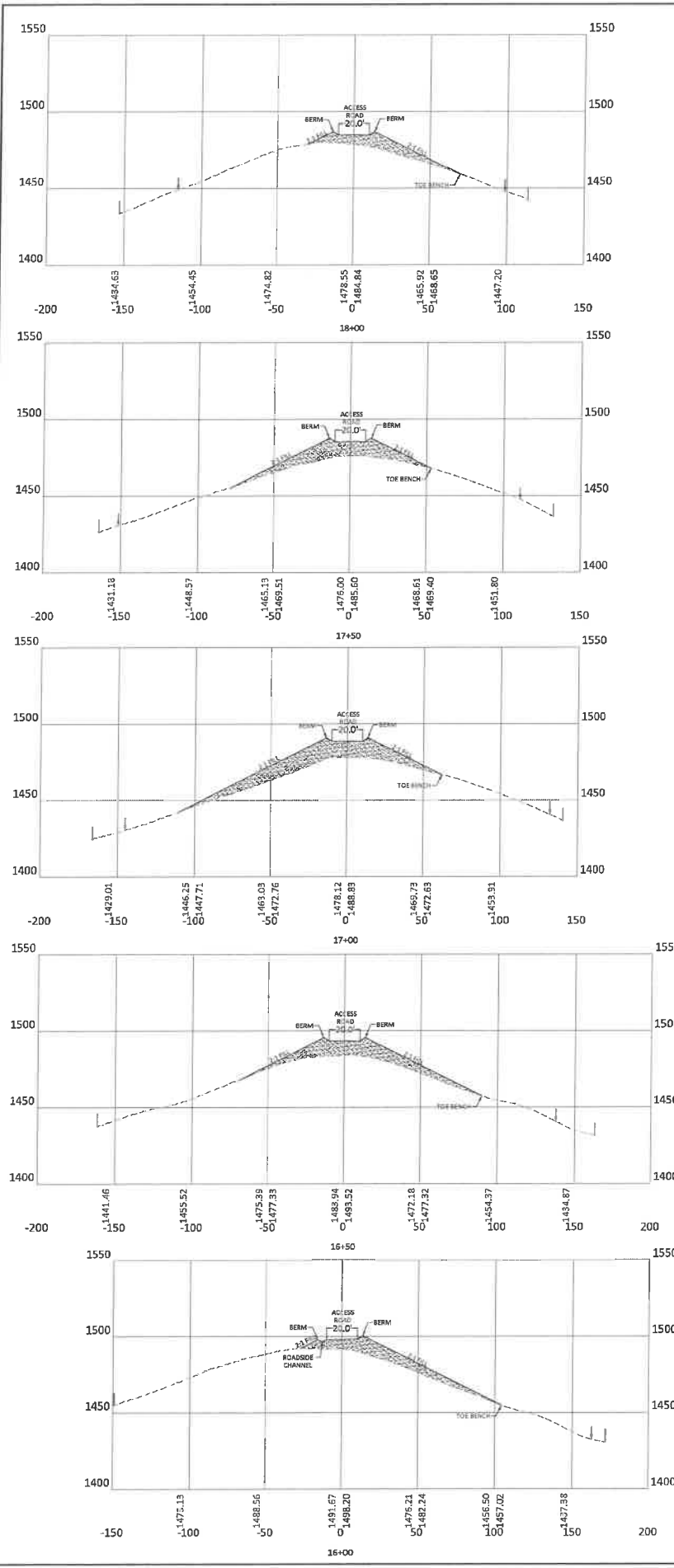
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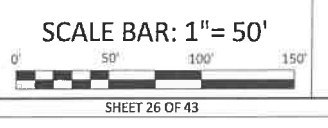
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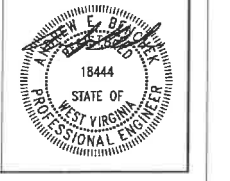
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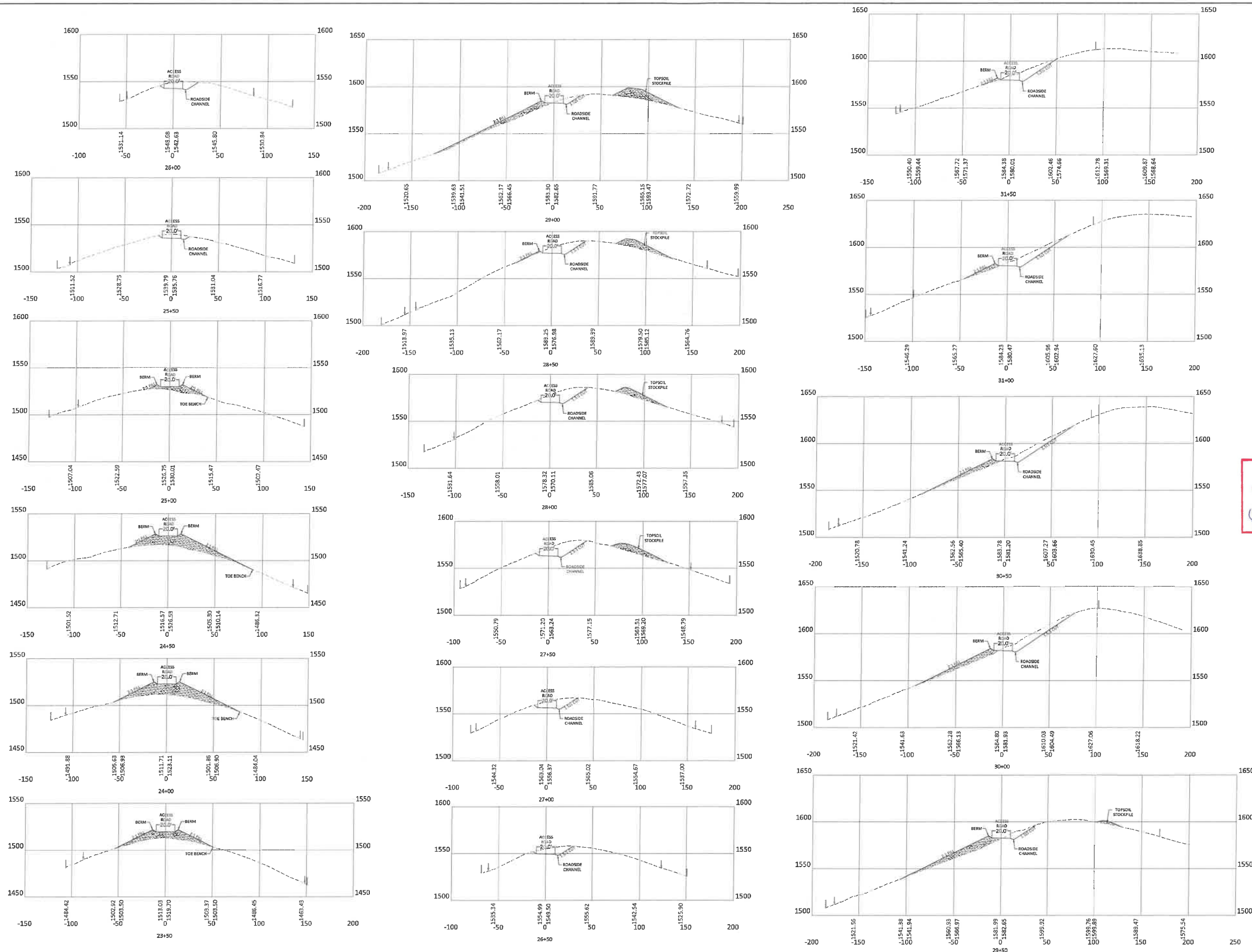
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SHEET 27 OF 43

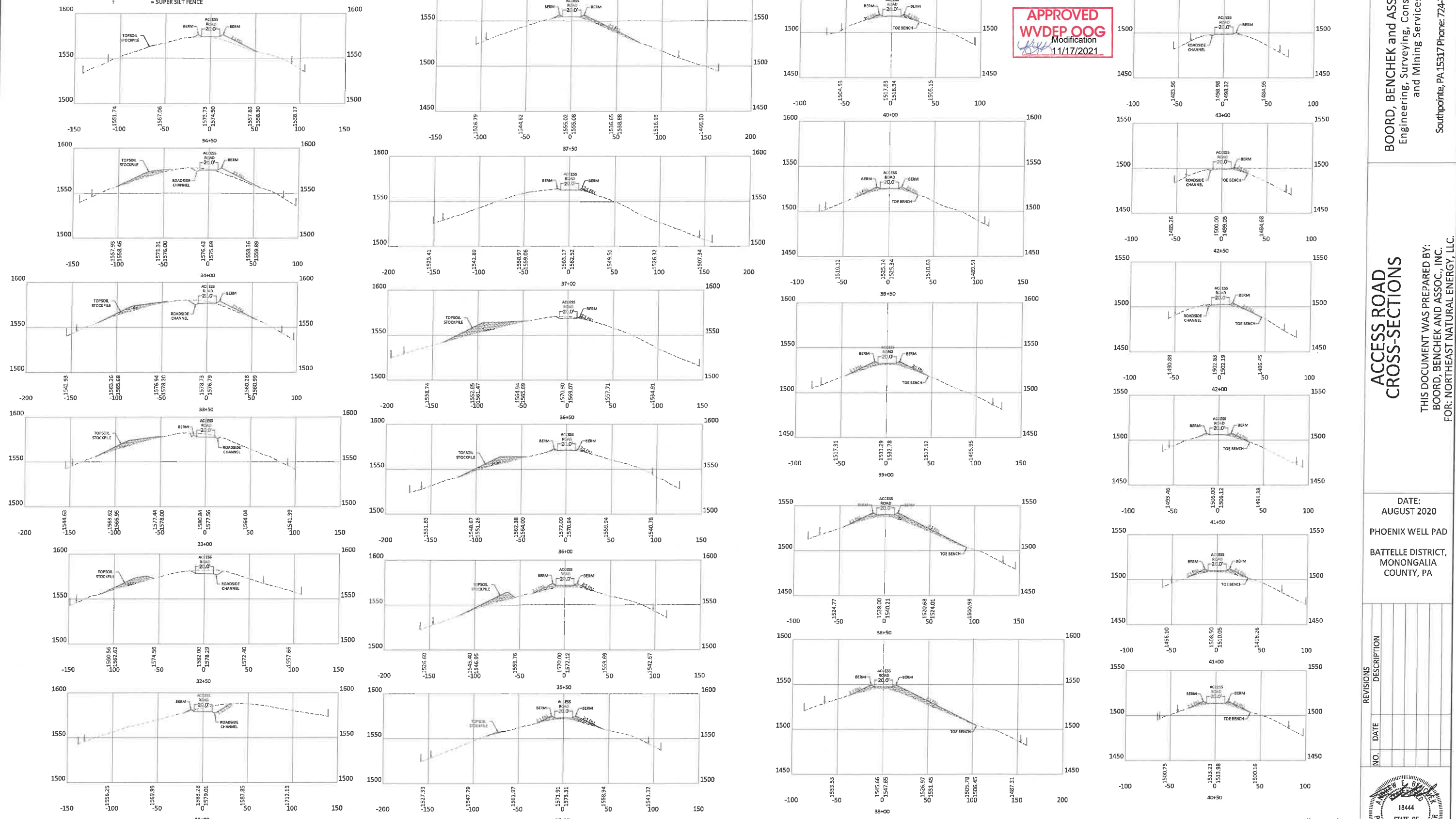
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LEGEND

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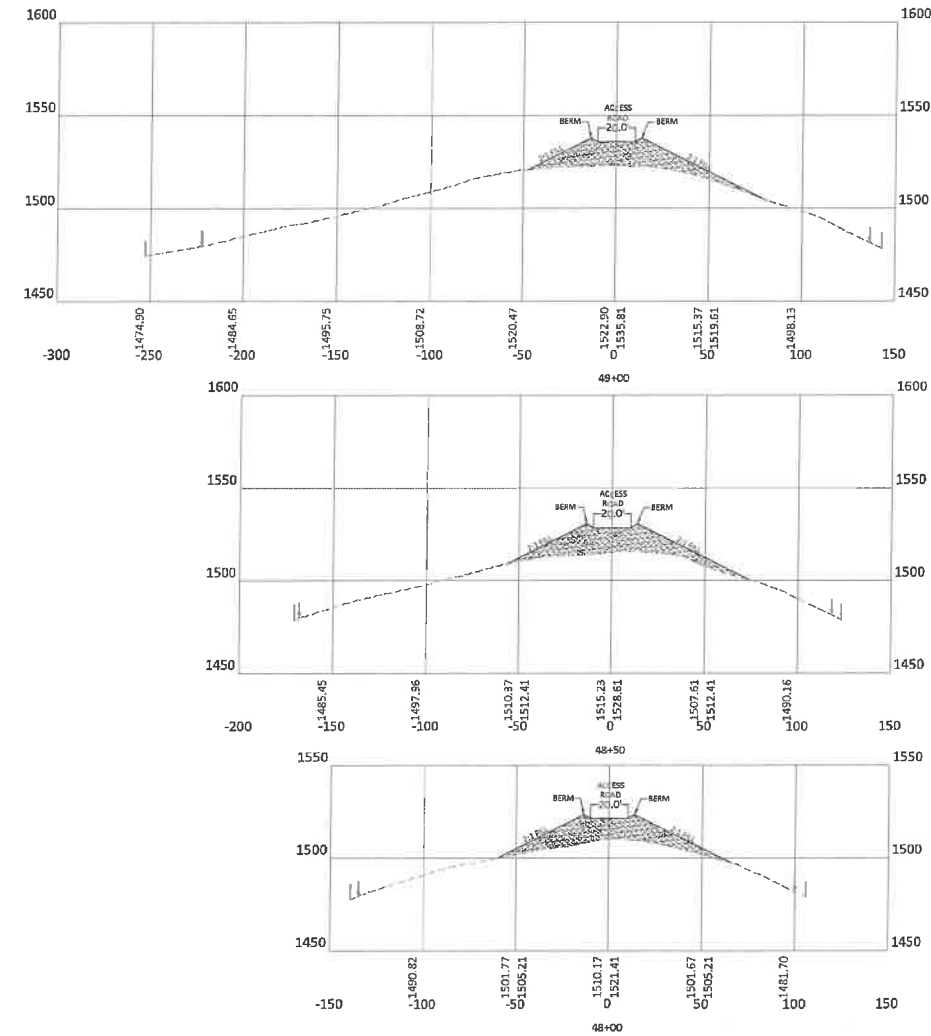
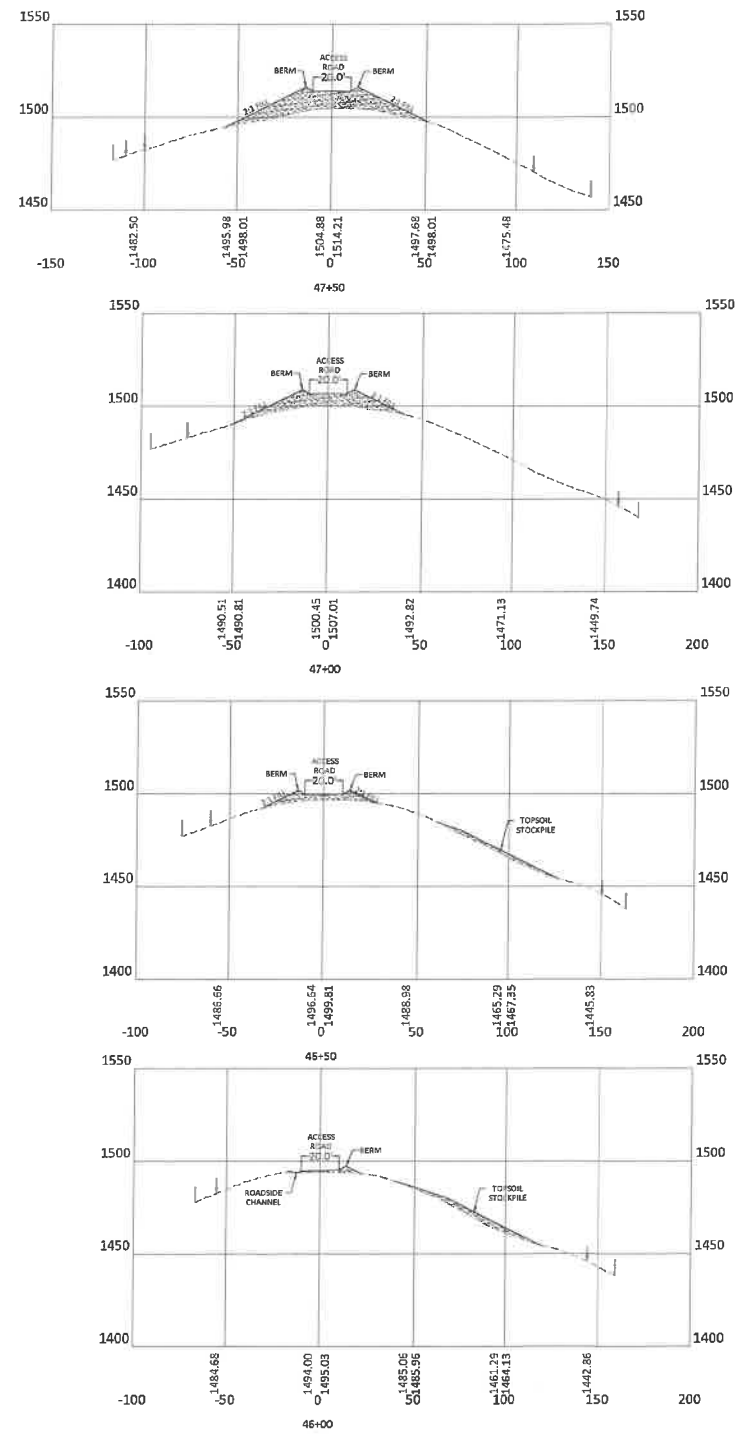
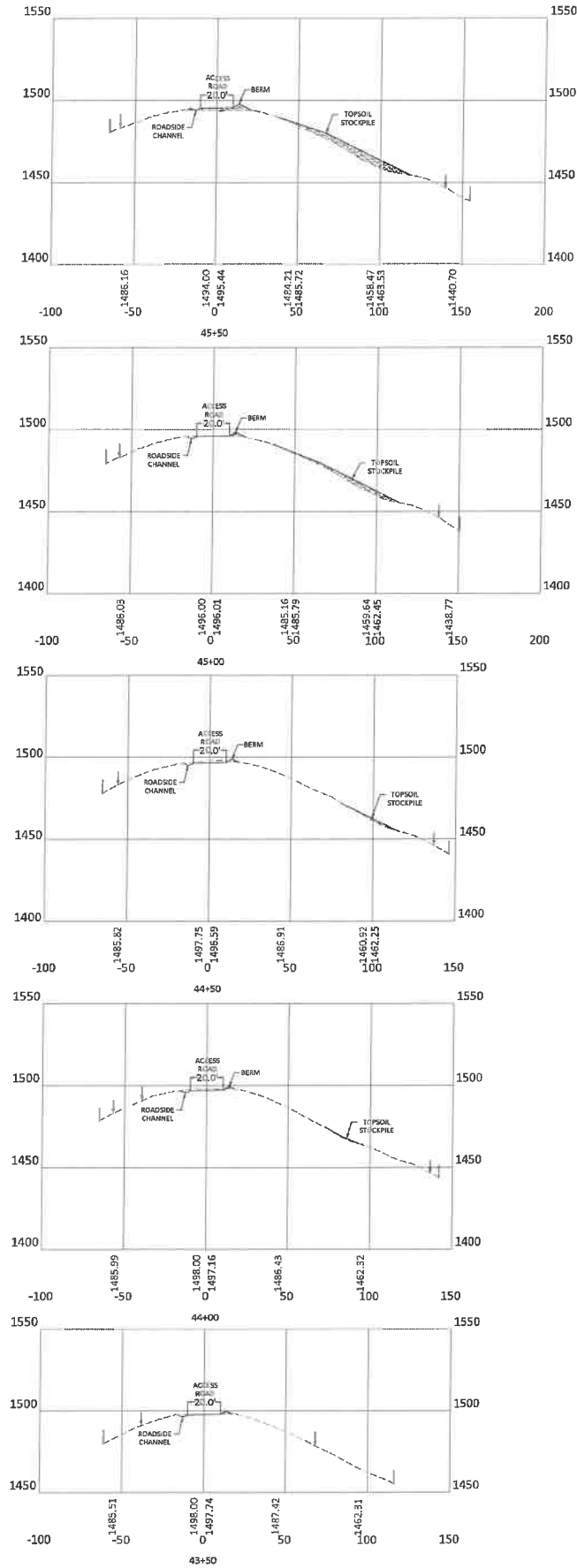
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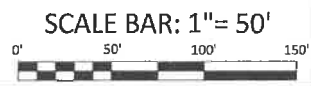
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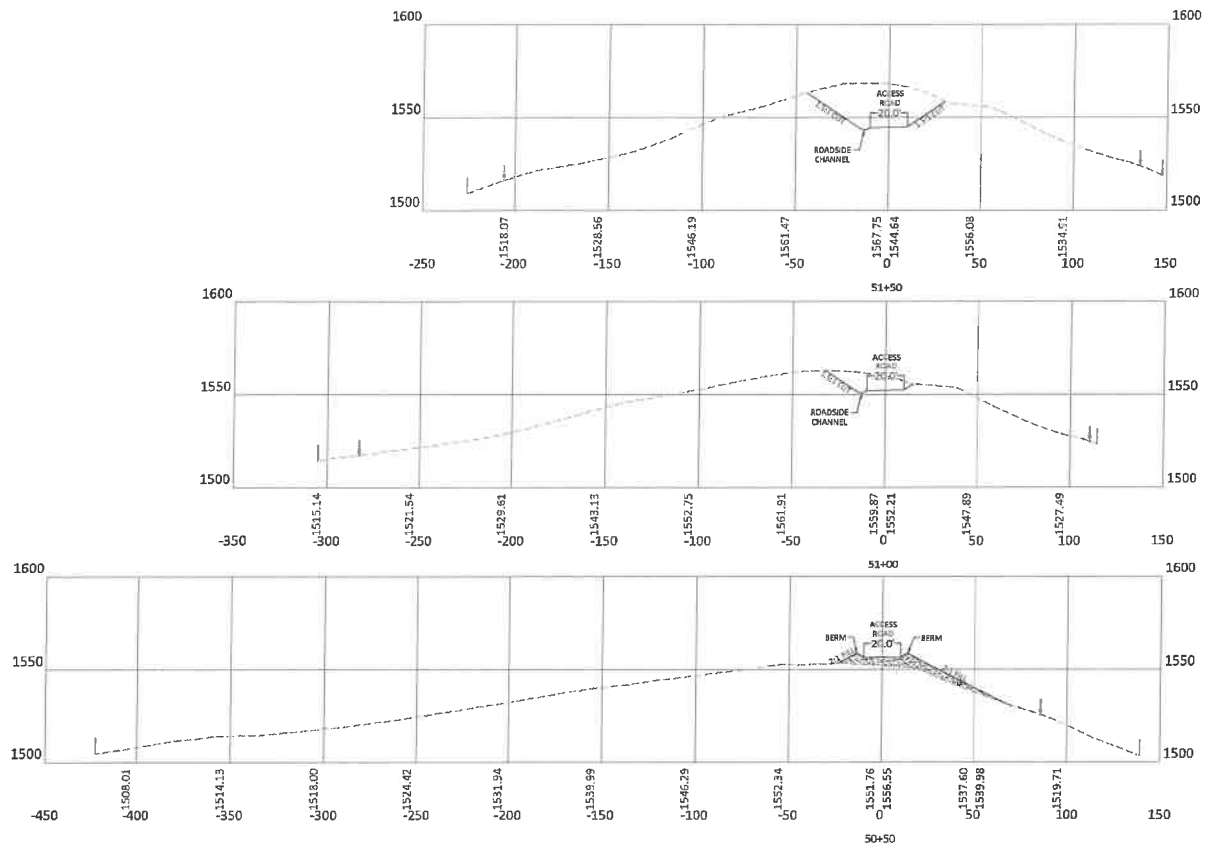
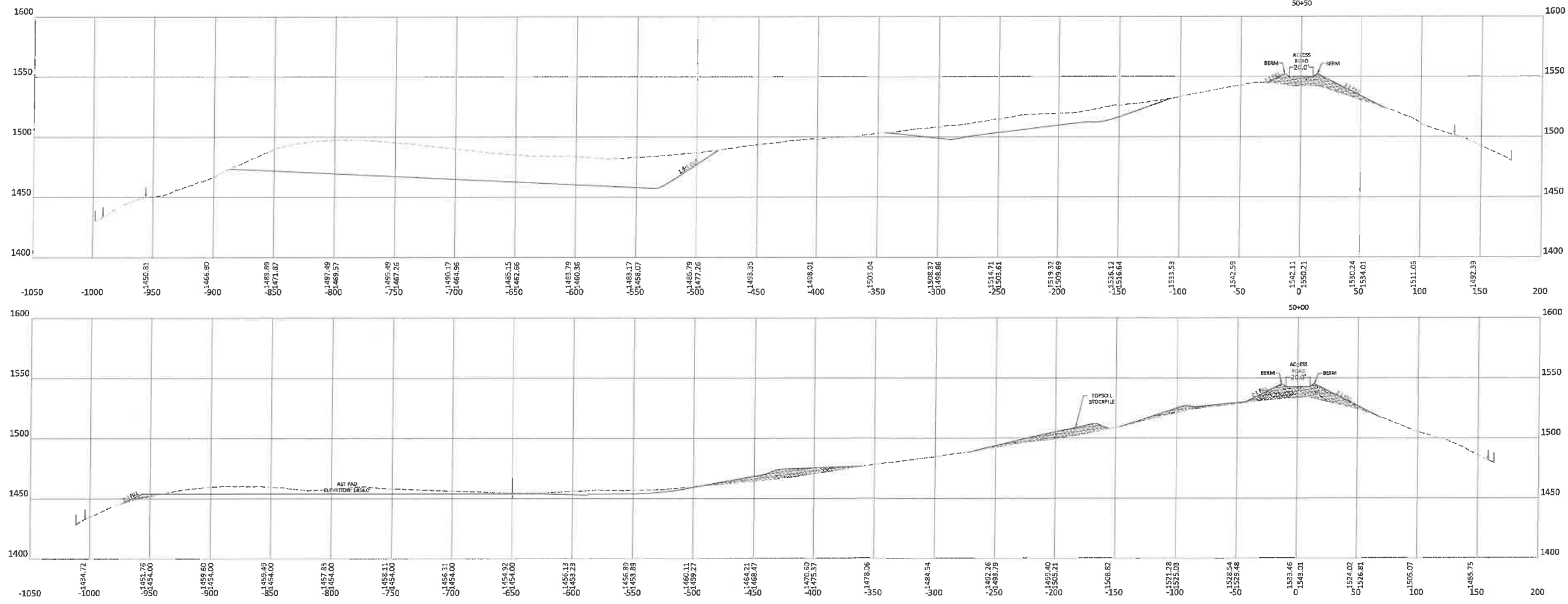
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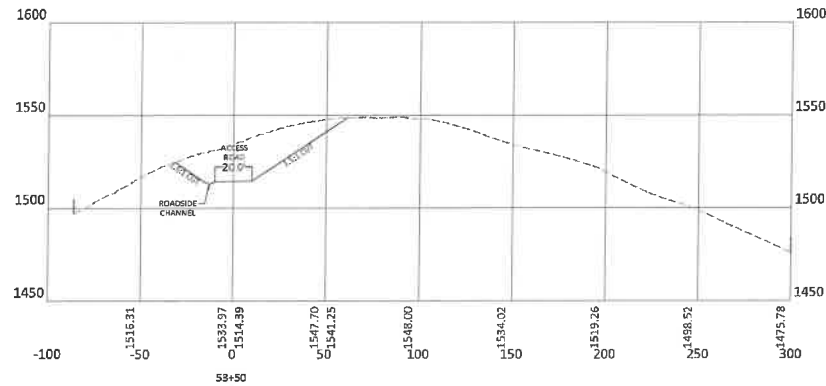
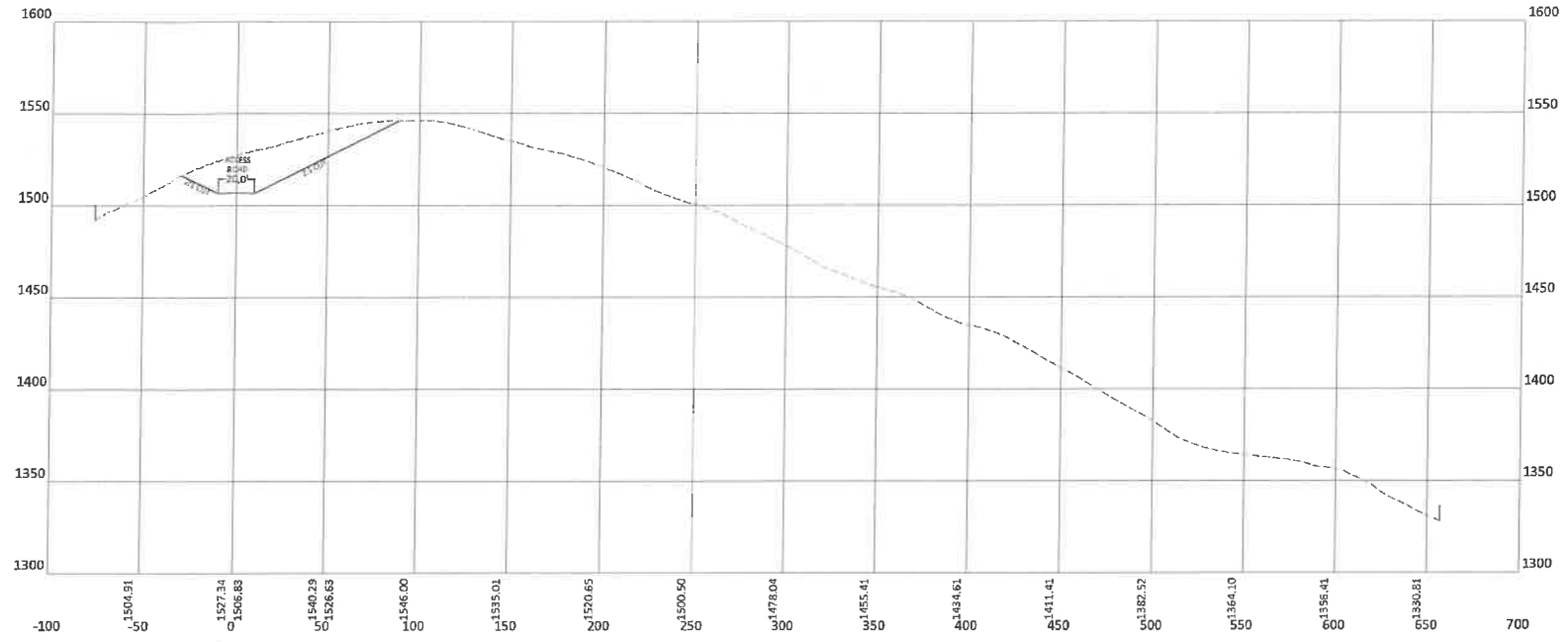
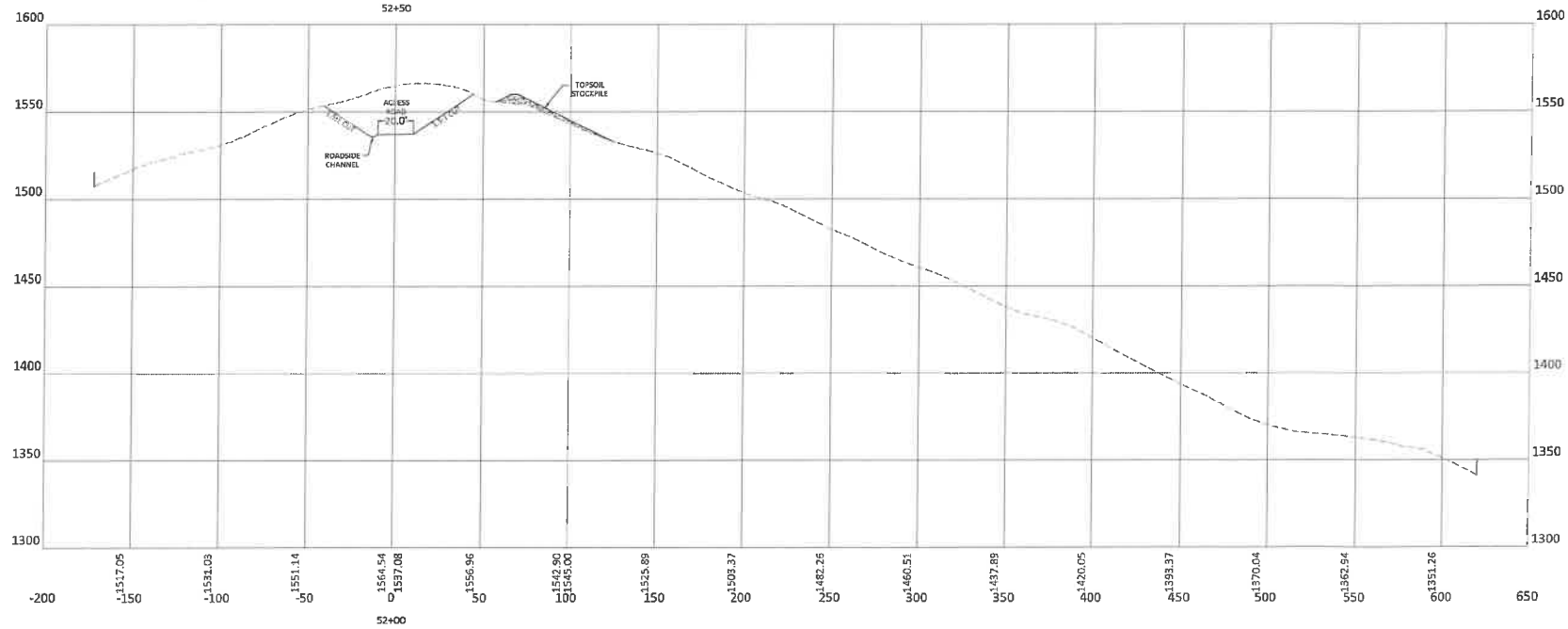
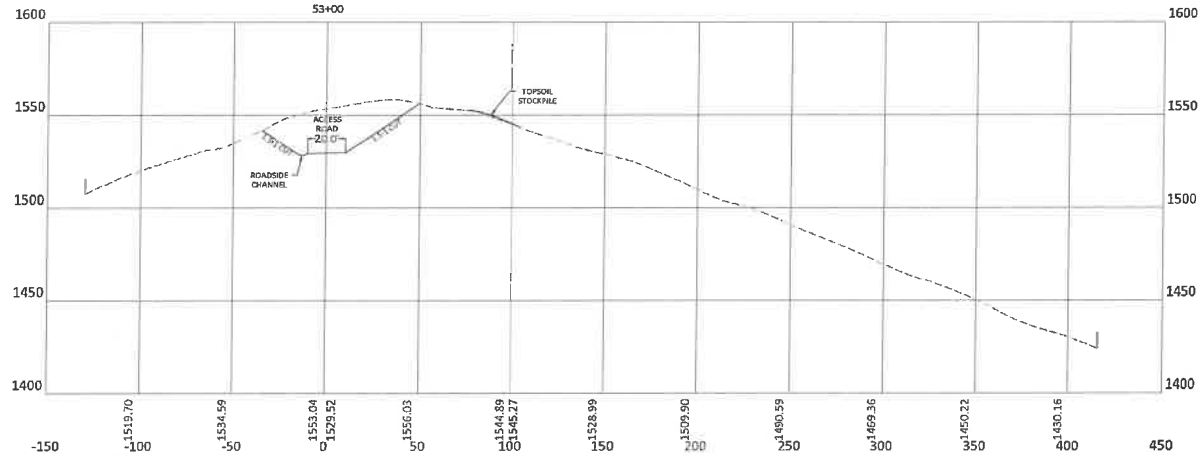
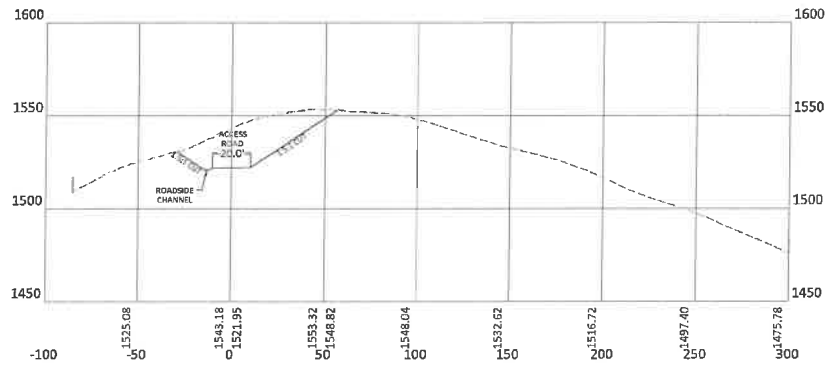
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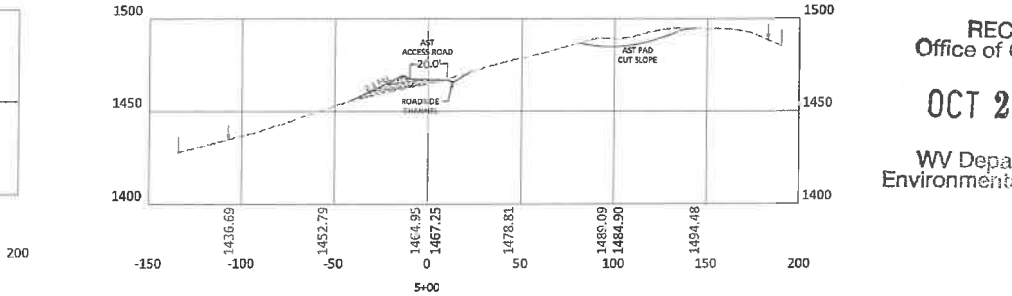
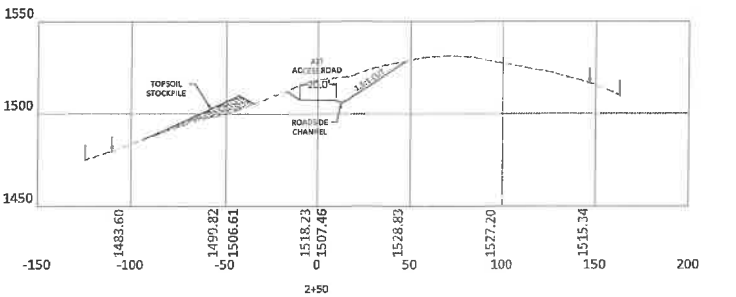
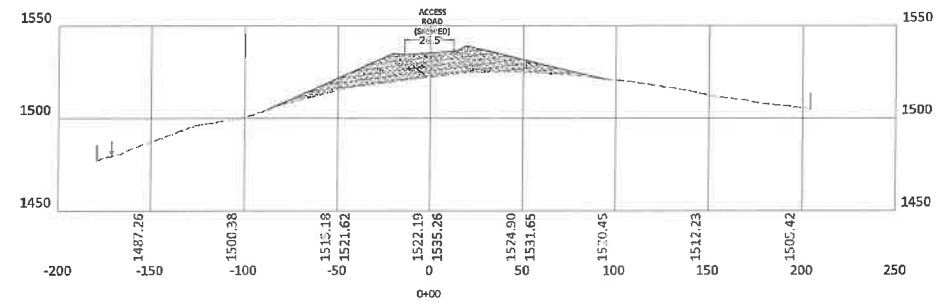
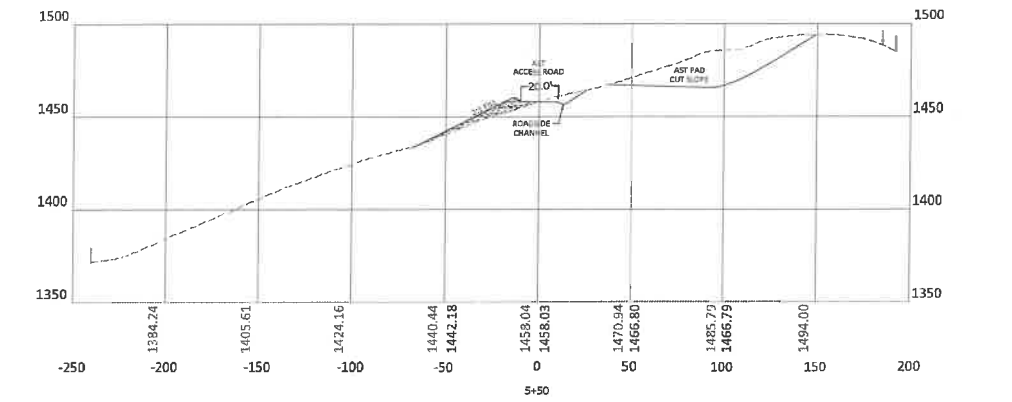
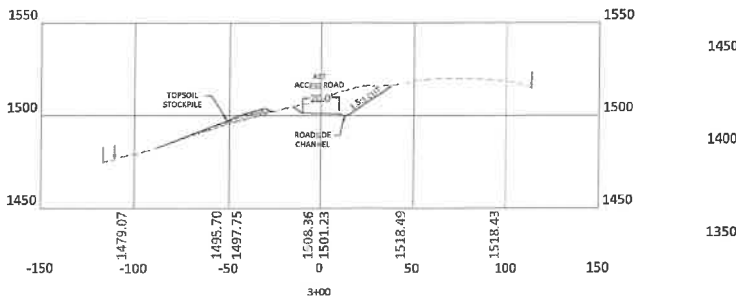
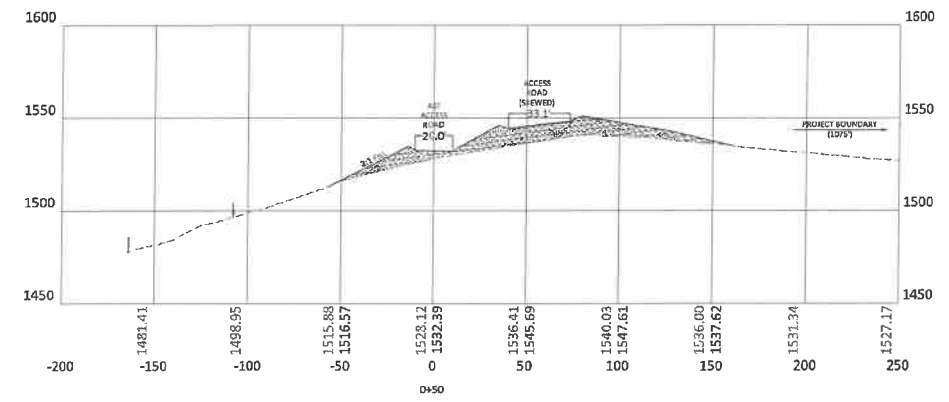
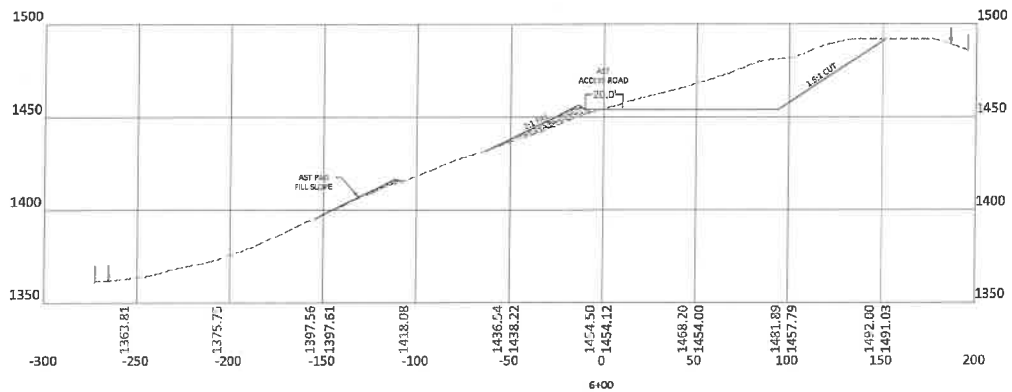
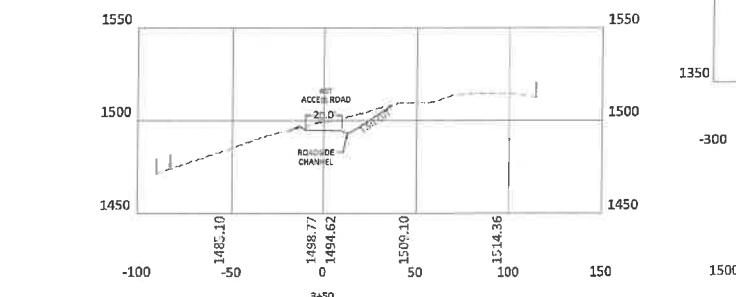
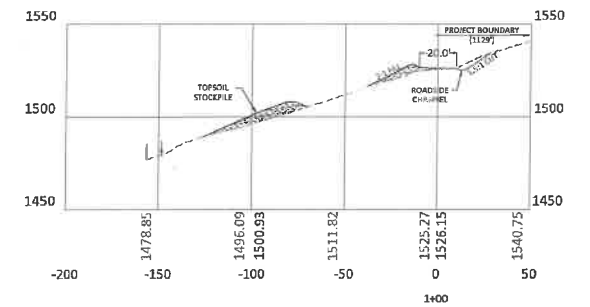
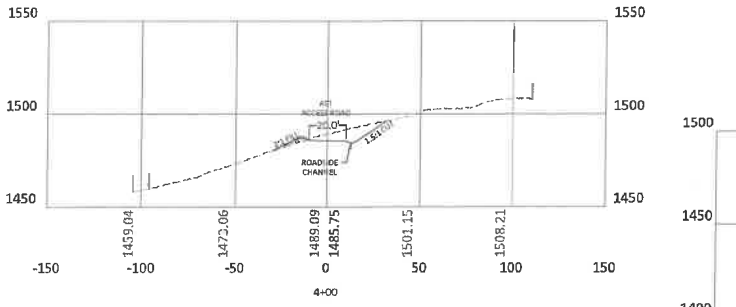
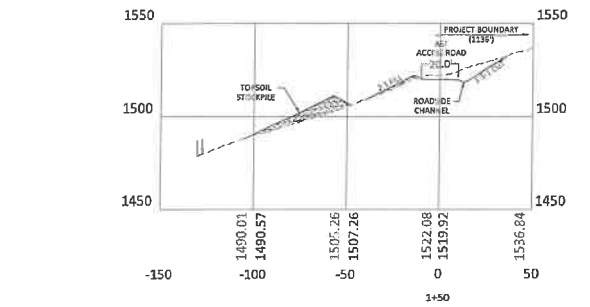
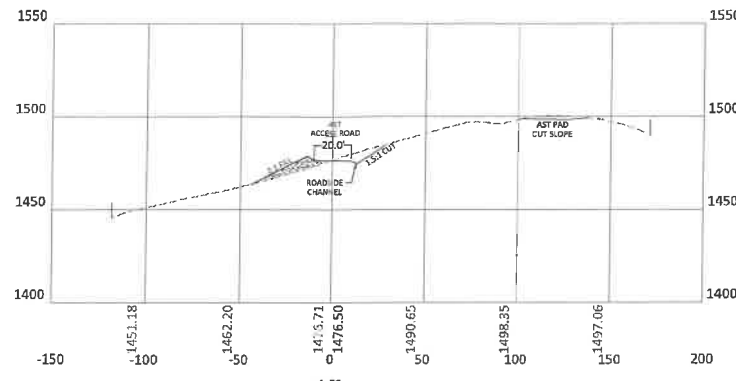
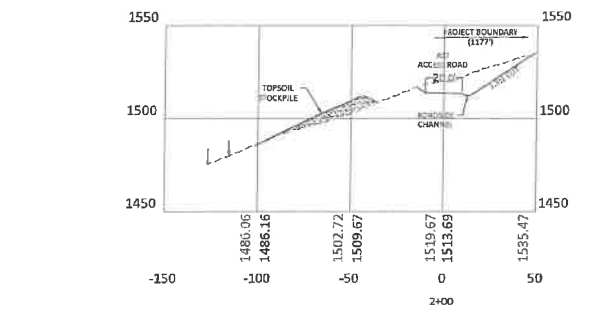
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NO.	DATE	DESCRIPTION
1	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
2	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
3	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
4	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
5	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
6	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
7	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
8	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
9	9.3.20	REVISION PER WV DEP REVIEW COMMENTS
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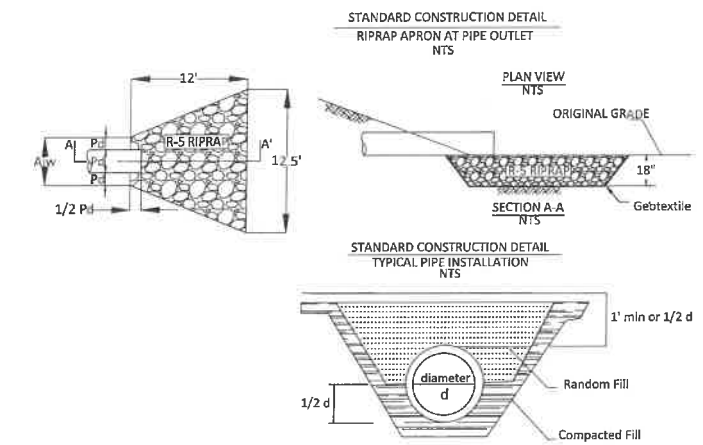


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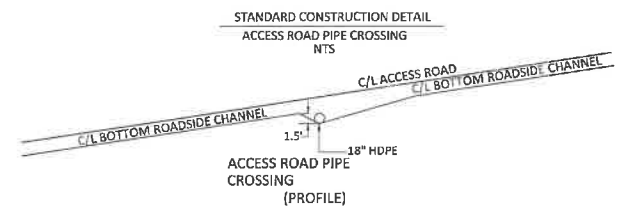
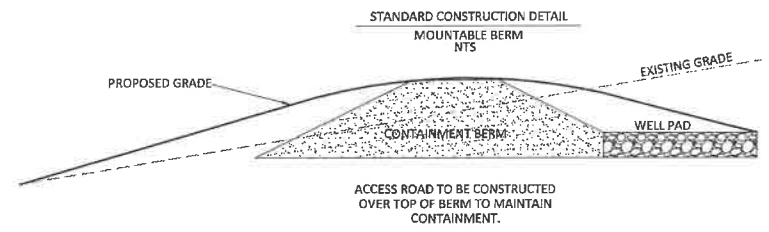
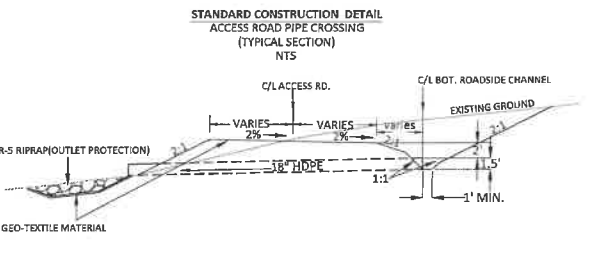
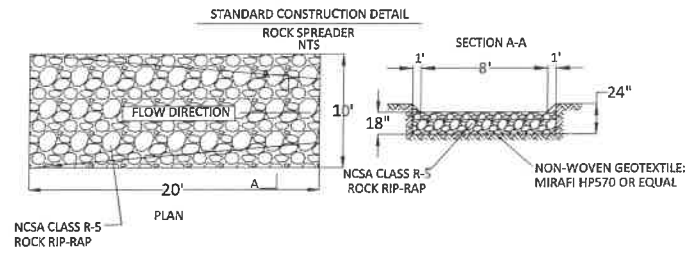
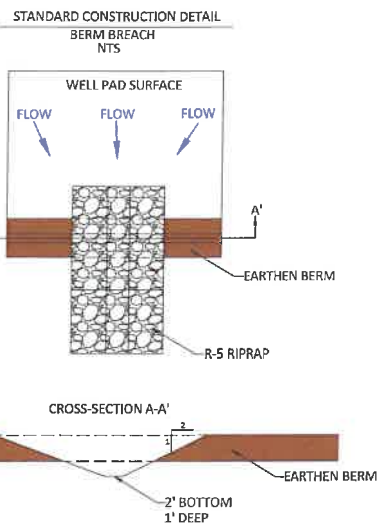
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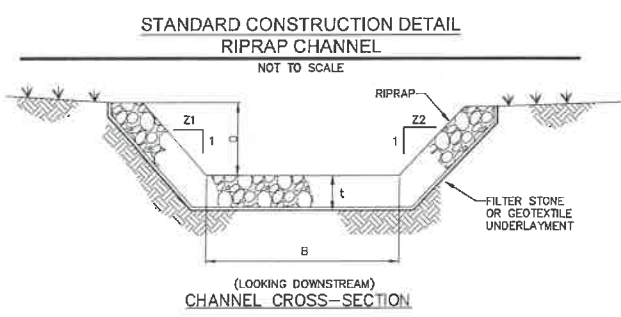
NO.	DATE	REVISIONS DESCRIPTION



CROSSING	ACCESS RD. STATION	LENGTH (FT.)	d (FT.)	TYPE	OUTLET PROTECTION (R-)
#1	1+0	108	1.5'	HDPE	R-5
#2	1+36	31	1.5'	HDPE	R-5
#3	2+70	80	1.5'	HDPE	R-5
#4	2+04	43	1.5'	HDPE	R-5
#5	12+06	44	1.5'	HDPE	R-5
#6	16+01	44	1.5'	HDPE	R-5
#7	18+42	45	1.5'	HDPE	R-5
#8	25+32	55	1.5'	HDPE	R-5
#9	34+37	42	1.5'	HDPE	R-5
#10	53+50	44	1.5'	HDPE	R-5
#11	3+19	50	1.5'	HDPE	R-5
#12	5+65	42	1.5'	HDPE	R-5



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CHANNEL NO.	STATIONS	BOTTOM WIDTH B (FT)	DEPTH D (FT)	Z1 (FT)	Z2 (FT)	RIPRAP GRADATIO N (R-)	RIPRAP DEPTH T (IN)
1	0+00 - 1+40	2	1	2	2	5	27
2	1+40 - 5+25	2	1	2	2	5	27
3A	5+25 - 12+0	2	1	2	2	5	27
3B	12+00 - 16+00	2	1	2	2	4	18
5	25+35 - 29+15	2	1	2	2	4	18
9	50+65 - 53+50	2	1	2	2	5	27
10A	0+75 - 3+10	2	1	2	2	4	18
10B	3+10 - 5+65	2	1	2	2	5	27

NOTES:

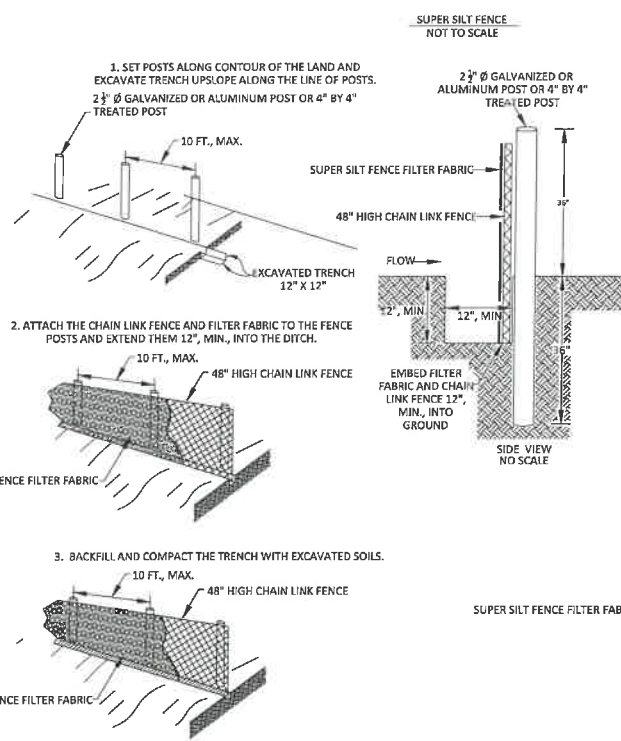
FILTER STONE UNDERLAYMENT FOR BED SLOPES ≥ 0.10 FT/FT (10 %) SHALL BE USED.

CHANNEL DIMENSIONS ARE FOR THE COMPLETED CHANNEL AFTER ROCK PLACEMENT. CHANNEL MUST BE OVER-EXCAVATED A SUFFICIENT AMOUNT TO ALLOW FOR THE VOLUME OF ROCK PLACED WITHIN THE CHANNEL WHILE PROVIDING THE SPECIFIED FINISHED DIMENSIONS.

CHANNEL DIMENSIONS SHALL BE CONSTANTLY MAINTAINED. CHANNEL SHALL BE CLEANED WHENEVER TOTAL CHANNEL DEPTH IS REDUCED BY 25% AT ANY LOCATION. SEDIMENT DEPOSITS SHALL BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR AS SOON AS SOIL CONDITIONS PERMIT ACCESS TO CHANNEL WITHOUT FURTHER DAMAGE.

DAMAGED LINING SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS OF DISCOVERY.

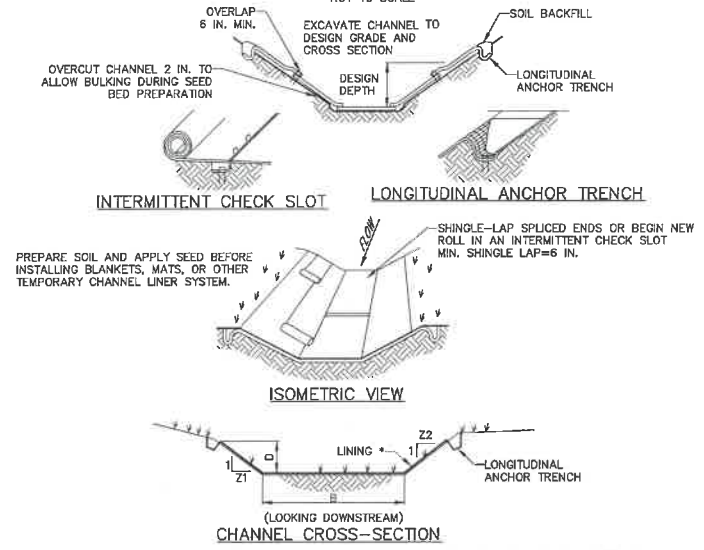
THE MINIMUM ROCK THICKNESS (t) SHALL BE 1.5 TIMES THE MAX ROCK SIZE.



SUPER SILT FENCE NOTES:

- CHAIN LINK FENCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 608 OF THE WVDOH SPECIFICATIONS. CHAIN LINK FENCE SHALL BE FASTENED SECURELY TO THE POSTS WITH WIRE TIES OR STAPLES.
- POSTS NEED NOT BE SET IN CONCRETE.
- THE FILTER FABRIC SHALL BE FASTENED TO THE CHAIN LINK FENCE WITH TIES EVERY 24" AT THE TOP AND MID SECTION.
- FABRIC AND FENCE SHALL BE EMBEDDED 12", MINIMUM, INTO THE GROUND.
- A 6" MINIMUM OVERLAP SHALL BE PROVIDED WHERE TWO SECTIONS OF FABRIC ADJOIN. THE OVERLAPPED FABRIC SHALL BE FOLDED TOGETHER AND ATTACHED TO THE CHAIN LINK FENCE.
- 4" BY 4" PRESSURE TREATED POSTS MAY BE SUBSTITUTED FOR METAL FENCE POSTS WITH THE APPROVAL OF THE ENGINEER.
- THE LENGTH OF SLOPE ABOVE THE FENCE SHALL NOT EXCEED 400 FEET IN STEEP TERRAIN. IN FLATTER AREAS THE LENGTH CAN BE EXTENDED WITH THE APPROVAL OF THE ENGINEER.

STANDARD CONSTRUCTION DETAIL
VEGETATED CHANNEL
NOT TO SCALE



* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, VEGETATIVE STABILIZATION FOR SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION

CHANNEL NO.	STATIONS	BOTTOM WIDTH B (FT)	DEPTH D (FT)	TOP WIDTH W (FT)	Z1 (FT)	Z2 (FT)	LINING *
4	18+40 - 21+10	2	1	6	2	2	SC-250
6	29+15 - 32+75	2	1	6	2	2	SC-250
7	33+00 - 34+35	2	1	6	2	2	SC-250
8	41+60 - 46+00	2	1	6	2	2	SC-250

NOTES:

ANCHOR TRENCHES SHALL BE INSTALLED AT BEGINNING AND END OF CHANNEL IN THE SAME MANNER AS LONGITUDINAL ANCHOR TRENCHES.

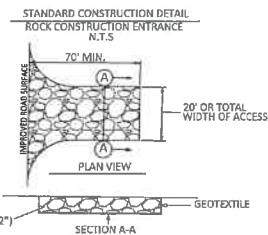
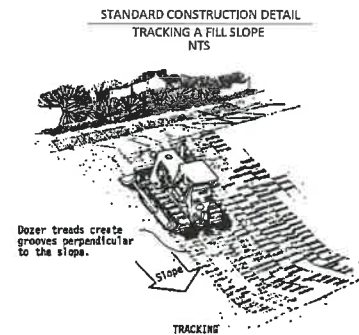
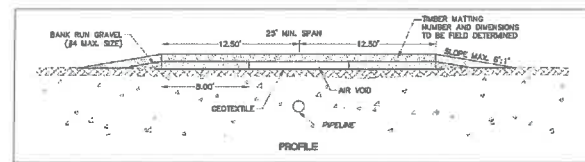
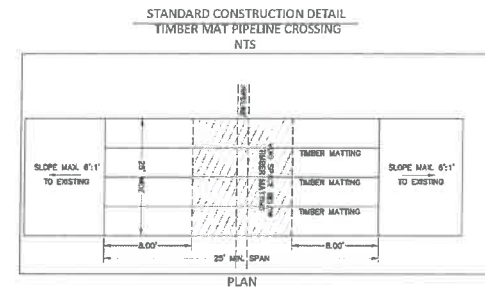
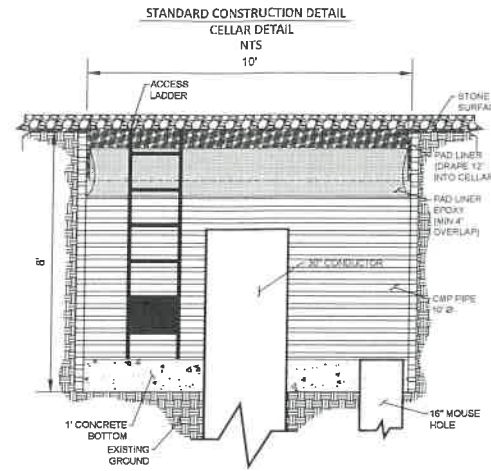
CHANNEL DIMENSIONS SHALL BE CONSTANTLY MAINTAINED. CHANNEL SHALL BE CLEANED WHENEVER TOTAL CHANNEL DEPTH IS REDUCED BY 25% AT ANY LOCATION. SEDIMENT DEPOSITS SHALL BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR AS SOON AS SOIL CONDITIONS PERMIT ACCESS TO CHANNEL WITHOUT FURTHER DAMAGE. DAMAGED LINING SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS OF DISCOVERY.

NO MORE THAN ONE THIRD OF THE SHOOT (GRASS LEAF) SHALL BE REMOVED IN ANY MOWING. GRASS HEIGHT SHALL BE MAINTAINED BETWEEN 2 AND 3 INCHES UNLESS OTHERWISE SPECIFIED. EXCESS VEGETATION SHALL BE REMOVED FROM PERMANENT CHANNELS TO ENSURE SUFFICIENT CHANNEL CAPACITY.

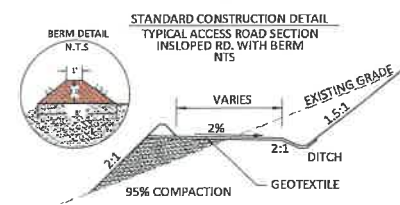
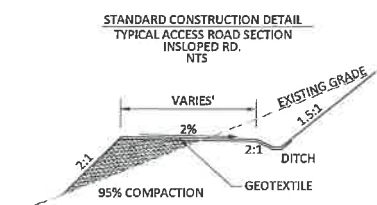
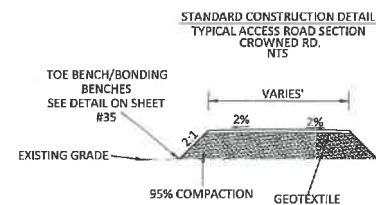
CONSTRUCTION SEQUENCE FOR PHOENIX WELL PAD

- 1) Install rock construction entrance from station 0+0 to station 0+70.
- 2) Install super silt fence (SSF) #1 - #126.
- 3) Clear/grub and remove topsoil from end of rock construction entrance to edge of well pad and place topsoil and timber in designated areas.
- 4) Construct access road from end of rock construction entrance to edge of well pad along roadside channel #1 - #9 and 18" HDPE #1 - #10 with outlet protection.
- 5) Place geotextile material on access road sub-grade from end of rock construction entrance to edge of well pad.
- 6) Place clean stone on access road from end of rock construction entrance to edge of well pad.
- 7) Re-spread topsoil across access road slopes.
- 8) Seed and mulch all disturbed areas including access road slopes.
- 9) Clear/grub and remove topsoil from well pad and excess material areas and place topsoil and timber in designated areas.
- 10) Construct well pad and place excess material in designated areas.
- 11) Place geotextile material on well pad sub-grade.
- 12) Re-spread topsoil across well pad slopes.
- 13) Seed and mulch all disturbed areas including slopes.
- 14) Clear/grub and remove topsoil from AST and AST access road areas and place materials in designated areas.
- 15) Construct AST, AST access road, roadside channel #10, and 18" HDPE #11 with outlet protection.
- 16) Place geotextile material on AST pad and AST access road sub-grade.
- 17) Place clean stone on AST pad and AST access road.
- 18) Re-spread topsoil across slopes.
- 19) Seed and mulch all disturbed areas including slopes.
- 20) Keep all erosion and sedimentation controls in place until there is 70% growth over the entire site.

*Contractor may deviate from the construction sequence if the design deems it appropriate and all the eas through out the entire site. (e.g. borrow from well pad to finish building access road.)



ROCK CONSTRUCTION ENTRANCE THICKNESS WILL BE CONSTANTLY MAINTAINED TO SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL WILL BE MAINTAINED ON THE SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PUBLIC ROADWAYS WILL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.



COLLECTION CHANNEL SYNTHETIC LINER DETAILS

SC250 Turf Reinforcement Mat

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into a permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized netting with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (stamped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an ultra heavy UV stabilized netting with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form a permanent three-dimensional turf reinforcement matting.

The SC250 shall meet requirements established by the Erosion Control Technology Council (ECTC) Specification and the US Department of Transportation, Federal Highway Administration's (FHWA) Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-43 Section 713.18 as a type SA, B, and C Permanent Turf Reinforcement Mat.

Installation staple patterns shall be clearly marked on the turf reinforcement matting with environmentally safe paint. All mats shall be manufactured with a colored thread stitched along both outer edges (approximately 2-6 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

Material Content			
Matrix	70% Straw / 30% Coconut fibers	0.35 lbs/yd ² (0.19 kg/m ²)	0.15 lbs/yd ² (0.08 kg/m ²)
Nettings	Top and Bottom, UV stabilized Polypropylene	5 lbs/1000 ft ² (2.44 kg/100 m ²)	
	Middle, corrugated UV stabilized Polypropylene	24 lbs/1000 ft ² (11.7 kg/100 m ²)	
Thread	Polypropylene, UV stabilized		

SC250 is available in the following roll sizes:

Width 6.5 ft (2.0 m)
 Length 55.5 ft (16.9 m)
 Weight ± 10% 34 lbs (15.42 kg)
 Area 40.0 yd² (33.4 m²)

Index Value Properties:		Typical	Net Only
Property	Test Method		
Thickness	ASTM D6525	0.72 in (18.3 mm)	0.49 in
Resiliency	ASTM 6524	95.2%	---
Density	ASTM D792	0.53 oz/in ³	---
Mass/Unit Area	ASTM 6566	17.88 oz/yd ² (606 g/m ²)	---
Porosity	ECTC Guidelines	88%	---
Softness	ASTM D1388	222.85 oz-in	---
Light Penetration	ECTC Guidelines	6.9%	---
UV Stability	ASTM D4355/1000 hr	100%	100%
Tensile Strength MD	ASTM D6818	620 lbs/R (9.05 MN/m)	655 lbs/R
Elongation MD	ASTM D6818	35%	25%
Tensile Strength TD	ASTM D6818	737 lbs/R (10.75 MN/m)	666 lbs/R
Elongation TD	ASTM D6818	16%	16%

Performance Design Values:		
Phase	Maximum Permissible Shear Stress	
	Short Duration	Long Duration
Phase 1 Unvegetated	3.0 lbs/R ² (144 Pa)	2.5 lbs/R ² (120 Pa)
Phase 2 Partially Veg.	8.0 lbs/R ² (383 Pa)	8.0 lbs/R ² (383 Pa)
Phase 3 Fully Veg.	10.0 lbs/R ² (480 Pa)	8.0 lbs/R ² (383 Pa)
Velocity Unveg.	9.5 ft/s (2.9 m/s)	
Velocity Veg.	15 ft/s (4.6 m/s)	

Slope Design Data: C Factors		
Slope Length (L)	Slope Gradients (S)	
	≤ 20 ft (6 m)	≤ 3:1
20-50 ft	3:1 - 2:1	0.0209
≥ 50 ft (15.2 m)	≥ 2:1	0.0286
		0.0574
		0.0455
		0.0555
		0.081

Bench Scale Testing (NTPEP):		Results
Test Method	Parameters	
ECTC Method 2	50 mm (2 in) for 30 min	SLR** = 19.25
Rainfall	100mm (4 in) for 30 min	SLR** = 20.87
	150 mm (6 in) for 30 min	SLR** = 22.74
ECTC Method 3	Shear at 0.50 inch soil loss	7.7 lbs/R ²
Shear Resistance	Top Soil, Fescue, 21 day incubation	52% improvement of biomass

Product Participant of:

APPROVED WVDEP OOG Modification 11/17/2021

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 Engineering, Surveying, Construction, and Mining Services
 Southpointe, PA 15317 Phone: 724-746-1055

DETAIL SHEET
 THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE: AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT, MONONGALIA COUNTY, PA

NO.	DATE	DESCRIPTION

Table 4a. Permanent seeding mixtures suitable for establishment in WV.

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/ Sericea 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
Sericea 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/ Perennial Ryegrass/ Tall Fescue/ Lathco Flatpea *	50 10 15 20	Well - Poorly	4.5 - 7.5 5.0 - 8.0

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

Table IV-1 Recommended seeding dates for permanent and temporary cover unless otherwise specified.

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 - Dec. 1	HIGH RISK - Freeze damage to young seedlings
Dec. 1 - March 1	Good seeding period. Dormant seeding.

Table 2. Acceptable fertilization recommendation in absence of a soil test.

Species	N (lbs/ac)	P2O5 (lbs/ac)	K2O(lbs/ac)	Example Rec. (per acre)
Cool Season Grass	40	80	80	400 lbs. 10-20-20
CS Grass & Legume	30	60	60	300 lbs. 10-20-20
Temporary Cover	40	40	40	200 lbs. 19-19-19

Table 3. Temporary cover suitable for establishment in West Virginia.

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
Sudangrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Winter Rye	188	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.

INSTALLATION

Strictly comply with equipment manufacturer's installation instructions and recommendations. Use approved hydro-spraying machines with fan-type nozzle (50-degree tip). To achieve optimum soil surface coverage, apply HP-FGM from opposing directions to soil surface. Rough surfaces (rocky terrain, cat tracks and ripped soils) may require higher application rates to achieve 100% cover. Slope interruption devices or water diversion techniques are recommended when slope lengths exceed 100 feet (30m). Maximum slope length is for product applications on a 3H:1V slope. For application on steeper slopes, slope interruption lengths may need to be decreased based on actual site conditions. Not recommended for channels or areas with concentrated water flow. No chemical additives with the exception of fertilizer, liming and biostimulant materials should be added to this product. To ensure proper application rates, measure and stake area. For maximum performance, apply HP-FGM in a two-step process as follows:

- Step One: Apply fertilizer with specified prescriptive agronomic formulations and 50% of seed with a small amount of HP-FGM for visual metering.
- Step Two: Mix balance of seed and apply HP-FGM at a rate of 50 lb per 125 gallons (23kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.

APPLICATION RATES: These application rates are for standard conditions. Designers may wish to reduce rates to encourage faster vegetation establishment or may need to increase application rates on rough surfaces. Consult application and loading charts to determine number of bags to be added for desired area and application rate.

Loading Chart for Profile's SMMs, BFM, HP-FGMs and ET-FGM

Tank Size (gal)	# of 50-lb bales	Displacement (lb)	2,500 lb/acre		3,000 lb/acre		3,500 lb/acre		4,000 lb/acre		4,500 lb/acre		
			Sq ft	Acres	Sq ft	Acres	Sq ft	Acres	Sq ft	Acres	Sq ft	Acres	
250	2	100	260	1,742	0.040	1,452	0.033	1,245	0.029	1,089	0.025	968	0.022
500	4	200	560	3,485	0.080	2,904	0.067	2,489	0.057	2,178	0.050	1,936	0.044
750	6	300	840	5,227	0.120	4,356	0.100	3,734	0.086	3,267	0.075	2,904	0.067
1,000	8	400	1,120	6,970	0.160	5,808	0.133	4,978	0.114	4,356	0.100	3,872	0.089
1,500	12	600	1,680	10,454	0.240	8,712	0.200	7,467	0.171	6,534	0.150	5,808	0.133
2,000	16	800	2,240	13,939	0.320	11,616	0.267	9,957	0.229	8,712	0.200	7,744	0.178
2,500	20	1,000	2,800	17,424	0.400	14,520	0.333	12,446	0.286	10,890	0.250	9,680	0.222
3,000	24	1,200	3,360	20,909	0.480	17,424	0.400	14,935	0.343	13,068	0.300	11,616	0.267
3,500	28	1,400	3,920	24,394	0.560	20,328	0.467	17,424	0.400	15,246	0.350	13,552	0.311
4,000	32	1,600	4,480	27,878	0.640	23,232	0.533	19,913	0.457	17,424	0.400	15,488	0.356

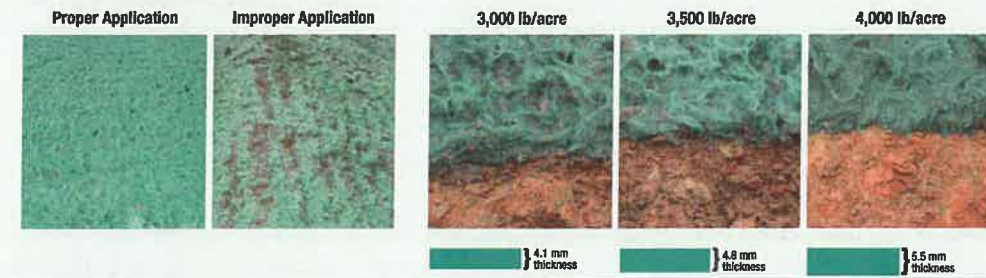
Additional Notes:

- For those applications, 35 lb/100 gal is recommended.
- Rough surfaces (rocky terrain, cat tracks, ripped soils, etc.) may require additional product to achieve 100% coverage.
- Be sure to allow for residual material in tank on subsequent applications.

Application Rates		Slope Interruption Limits*	
Slope Condition	English	SI	Product Category
≤ 4H to 1V	2500 lb/acre	2900 kg/hectare	SMM
> 4H to 1V and ≤ 3H to 1V	3000 lb/acre	3400 kg/hectare	BFM
> 3H to 1V and ≤ 2H to 1V [†]	3500 lb/acre	3900 kg/hectare	HP-FGM
> 2H to 1V and ≤ 1H to 1V [†]	4000 lb/acre	4500 kg/hectare	ET-FGM
> 1H to 1V [†]	4500 lb/acre	5100 kg/hectare	
Below ECB or TRM	1500 lb/acre	1700 kg/hectare	
As Infill for TRM [†]	3500 lb/acre	3900 kg/hectare	

*SMM not recommended for slopes greater than 2H:1V
[†]BFM not recommended for slopes greater than 1H:1V
^{††}HP-FGM or ET-FGM recommended for slopes greater than 1H:1V
^{†††}Use only approved and tested TRMs to create the GreenArmor System.

Visual Key for Proper Application
(Flexterra HP-FGM shown below)



FERTILIZER
1,000lbs./ACRES NUTRIENTS (23 lbs./1,000 SQ. FT.) 10-20-20

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Table 4b. Mixtures in the table below are more wildlife and farm friendly.

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage Preference	pH Range
KY Bluegrass/ Redtop	20 3	Well - Mod. Well	5.5 - 7.5
Ladino Clover or Birdsfoot Trefoil	2/16		
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 Kentucky Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil/ Redtop/ Orchardgrass	10 5 20	Well - Mod. Well	5.5 - 7.5
Lathco Flat Pea/ Perennial Ryegrass	30 20	Well - Mod. Well	5.5 - 7.5
Lathco Flat Pea/ Orchardgrass	30 20	Well - Mod. Well	5.5 - 7.5

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in fiber strips.
[†]Lathco Flatpea is particularly palatable to some livestock. All legumes should be planted with proper inoculation prior to seeding.
^{††}For improved seedbeds or seeding on steep slopes, add 50% more seed to the specified rate.

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, harrowing or tilling 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 100%	Subject to Wind blowing or washing unless bed down
Wood Fiber	100 to 150 Bales	80% of Surface	For Hydroseeding
Pulp Fiber	1000 to 1500 lbs	Cover all	For Hydroseeding
Wood-Cellulose Recirculated Paper		Distributed Areas	

Mulching

1. General Organic Mulches

The application of straw, hay or other suitable materials to the soil surface to prevent erosion. Straw made from wheat or oats is the preferred mulch, the use of hay is permissible, but not encouraged due to the risk of spreading invasive species. Mulch must be applied to all temporary and permanent seeding on all disturbed areas. Depending on site conditions, in critical areas such as waterways, or steep slopes, additional or substitute soil protective measures may be used if deemed necessary. Examples include jute mesh, and soil stabilization blankets or erosion control matting.

Areas that have been temporarily or permanently 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 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.

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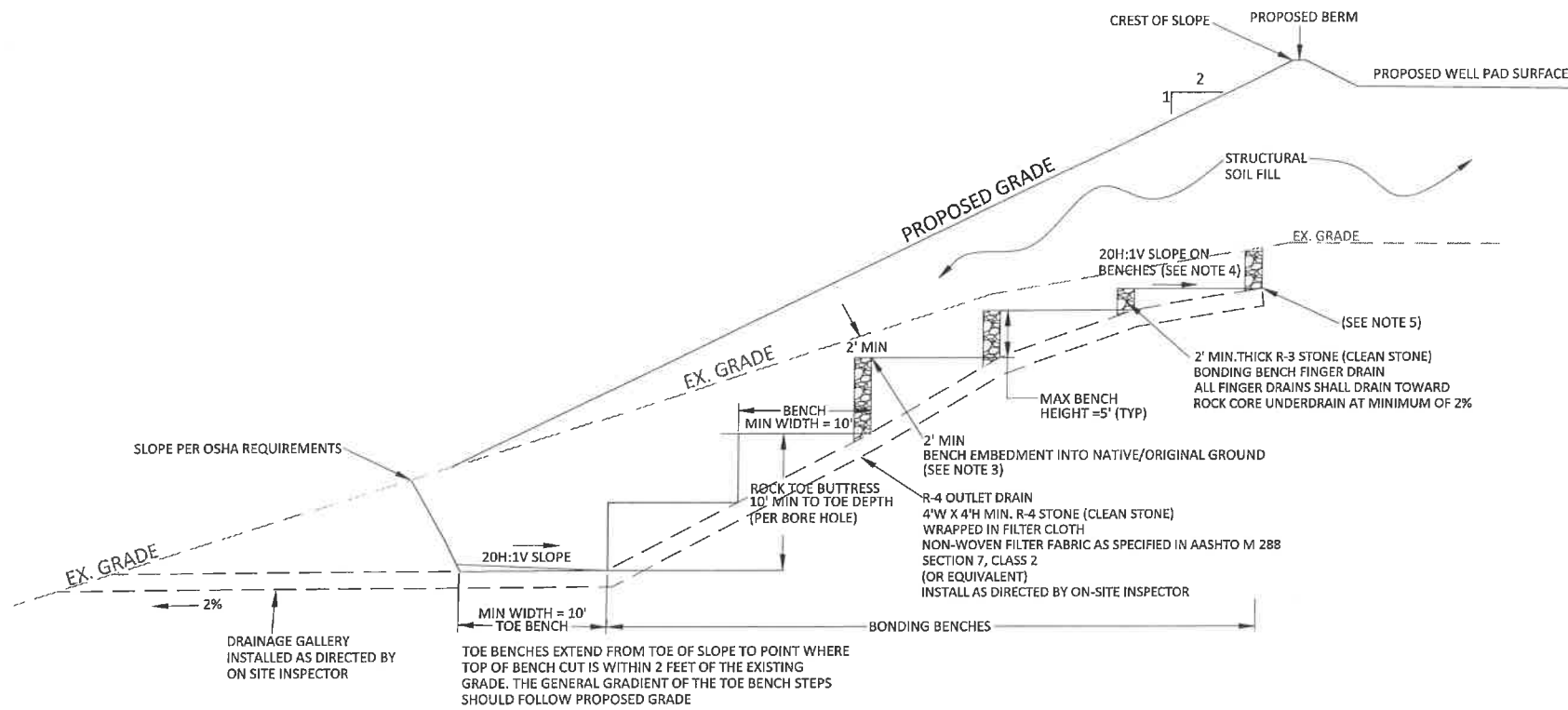
DETAIL SHEET
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DATE:
AUGUST 2020
PHOENIX WELL PAD
BATTELLE DISTRICT,
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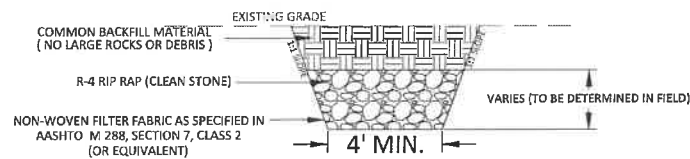
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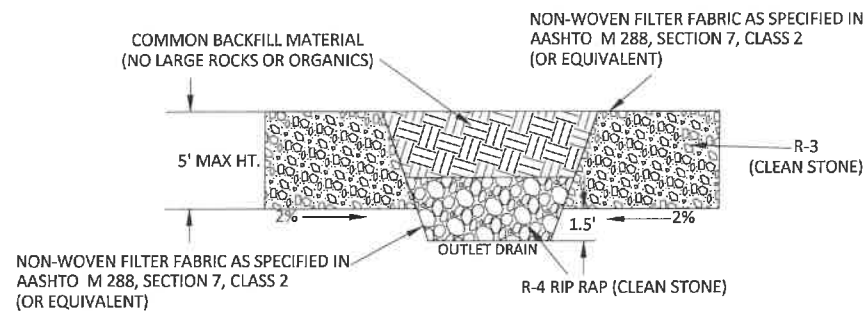
TOE/BONDING BENCH TYPICAL (N.T.S)



STONE DRAINAGE GALLERY (NTS)



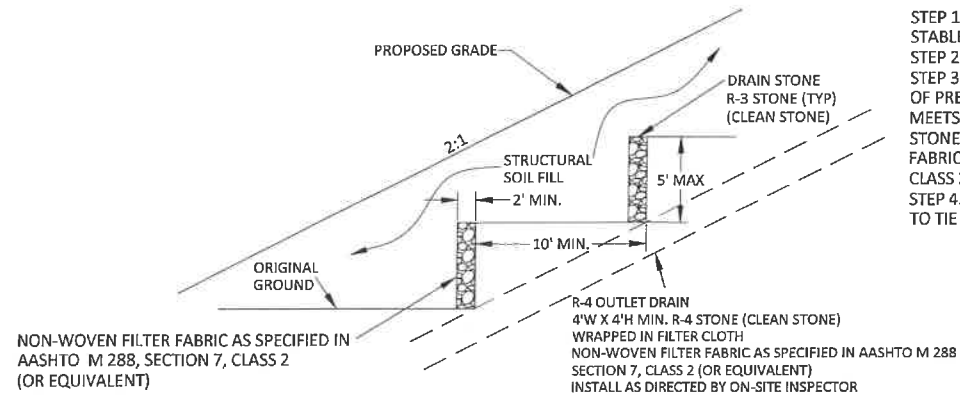
R-4 OUTLET DRAIN DETAIL (NTS)



TOE/BONDING BENCH NOTES

- 1) TOE BENCHES SHALL BE CONSTRUCTED IN COMPETENT ROCK TO THE MINIMUM DEPTH REQUIRED. ADDITIONAL DEPTHS MAY BE REQUIRED IN FIELD DEPENDING UPON THE STABILITY OF SUBGRADE MATERIAL. AT THE REQUEST OF THE FIELD ENGINEER, PERFORM TEST PITS AND PROOFROLLING OF THE BENCH SUBGRADE TO EVALUATE THE SUBGRADE CONDITIONS. REMOVE UNSTABLE SOILS AND EXTEND THE DEPTH OF THE TOE BENCH AS REQUESTED BY THE ENGINEER. PROVIDE A HORIZONTAL (ALONG THE LENGTH OF THE TOE BENCH) GRADE OF AT LEAST 2% TO ALLOW WATER TO DRAIN TO LOW POINTS FOR OULET. 3 FT. OF R-4 STONE SHALL BE PLACED IN THE BOTTOM OF THE TOE KEY AND COVERED WITH NON-WOVEN FILTER FABRIC.
- 2) AFTER FILLING TO TOP OF BENCH, EXCAVATE TRENCH AND INSTALL R-4 OUTLET DRAINS AND DRAINAGE GALLERYS AS DIRECTED BY ON SITE INSPECTOR.
- 3) BONDING BENCHES SHALL BE EMBEDDED A MINIMUM OF 2 FEET BELOW THE NATIVE/ORIGINAL GROUND SURFACE EXCEPT WHERE NOTED. ADJUST THE HEIGHT OF THE BONDING BENCH TO ACCOMMODATE THE 2 FOOT MINIMUM EMBEDMENT DEPTH. EXCAVATION OF COAL AND/OR CARBONACEOUS SHALE IN THE TOE OR BONDING BENCHES MAY ENCOUNTER PERCHED WATER TABLES. PLANS TO CONTROL, DRAIN, AND TREAT IF NECESSARY ARE RECOMMENDED.
- 4) PROVIDE A 20H:1V SLOPE ON ALL BENCH BOTTOMS IN THE DIRECTION SHOWN TO DIRECT SEEPAGE INTO BENCH DRAINS PLACED AT THE REAR OF THE BENCH.
- 5) TERMINATE BONDING BENCHES WHEN THE NATIVE SLOPES ARE FLATTER THAN 5H:1V OR A MINIMUM OF 10 FEET BEHIND THE CREST OF SLOPE.
- 6) THE CONTRACTOR IS RESPONSIBLE FOR SAFETY OF EXCAVATIONS, INCLUDING SEQUENCING OF BENCHING OPERATIONS, AND SLOPES PER OSHA 29CFR 1926.650 REQUIREMENTS, TO ALLOW THE APPROPRIATE ENGINEERING EVALUATIONS. THIS MAY REQUIRE STARTING EXCAVATION AT THE MID-HEIGHT OF THE BONDING BENCHES TO REMOVE THE SLOPE OVERBURDEN THAT COULD SLIDE INTO THE SUBSEQUENT TOE BENCH EXCAVATION.
- 7) PLACE STRUCTURAL SOIL FILL IN 9 INCH LOOSE LIFTS. COMPACT TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AND WITHIN 3 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR (ASTM D-698). IN THE UPPER 2 FEET OF FILL, COMPACT TO A MINIMUM OF 98% OF THE MAXIMUM DRY DENSITY AND WITHIN 2 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR (ASTM D-698).

BENCH DRAIN DETAIL (NTS)



- STEP 1.) EXCAVATE BENCH TO ORIGINAL AND STABLE SOIL.
- STEP 2.) COMPACT FILL UP TO THE NEXT BENCH.
- STEP 3.) EXCAVATE 2' WIDE TRENCH TO BOTTOM OF PREVIOUS BENCH, WHERE COMPACTED FILL MEETS NATURAL GROUND. USE R-3 STONE (CLEAN STONE) FOR DRAIN WITH NON-WOVEN FILTER FABRIC AS SPECIFIED IN AASHTO M 288, SECTION 7, CLASS 2 (OR EQUIVALENT) ON TOP AND FACE ONLY.
- STEP 4.) RUN DRAINS ON A MINIMUM 2% GRADE TO TIE INTO DRAINAGE OUTLETS.

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 COUNTY, PA

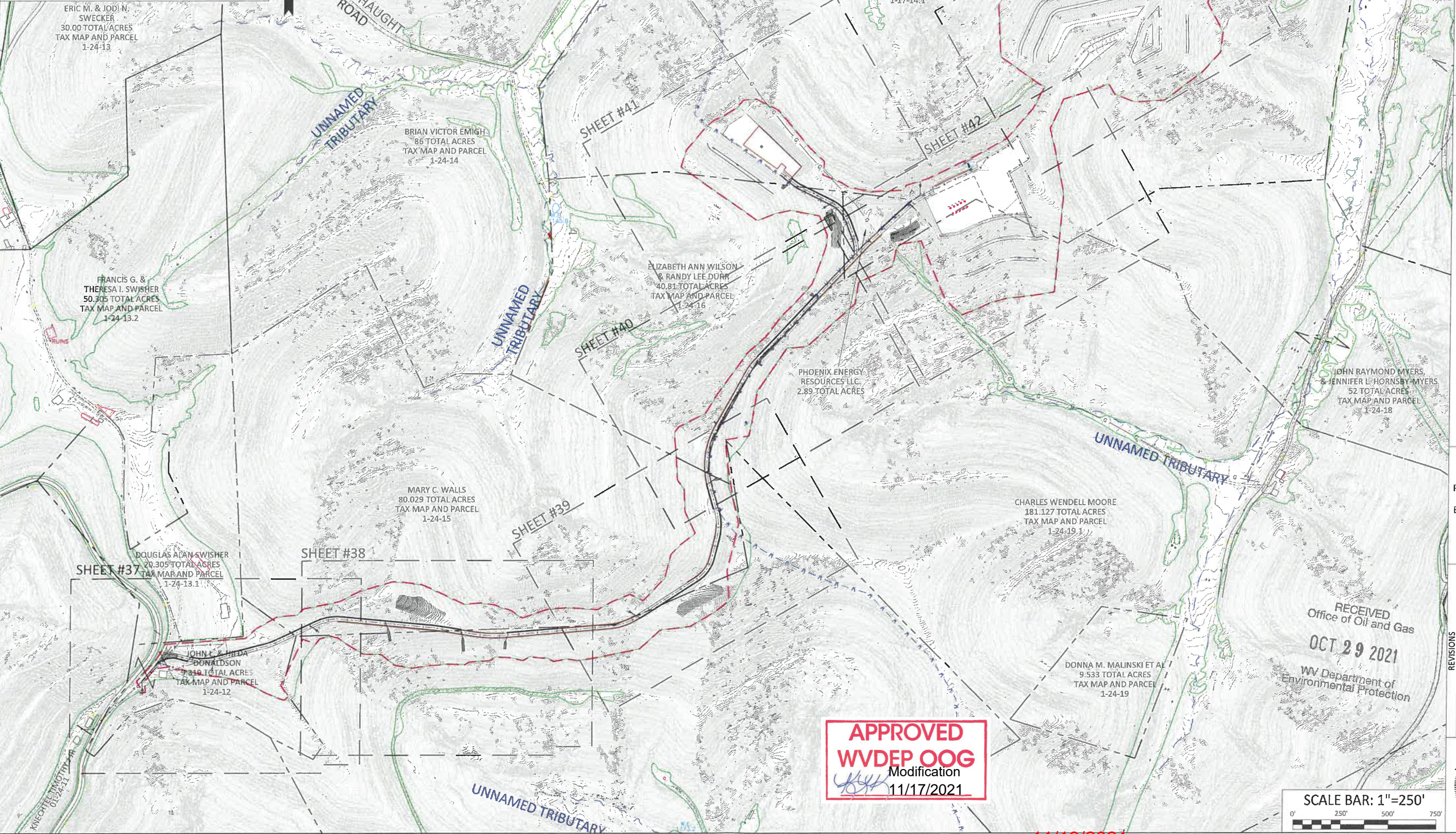
REVISIONS	DESCRIPTION	DATE	NO.



11/19/2021

LEGEND

- - - - - PROJECT BOUNDARY (72.79 AC)
- - - - - ENVIRONMENTAL BOUNDARY (104 AC)
- - - - - TREE LINE
- - - - - PROPERTY LINE
- - - - - WATERCOURSE
- (S) = SPRING
- (G) = SEEP
- G - G - EXISTING GAS LINE



BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
 and Mining Services
 Southpointe, PA 15317 Phone: 724-746-1055

**RECLAMATION PLAN
 OVERVIEW**

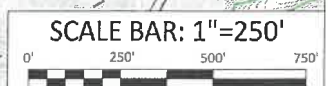
THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT,
 MONONGALIA
 COUNTY, PA

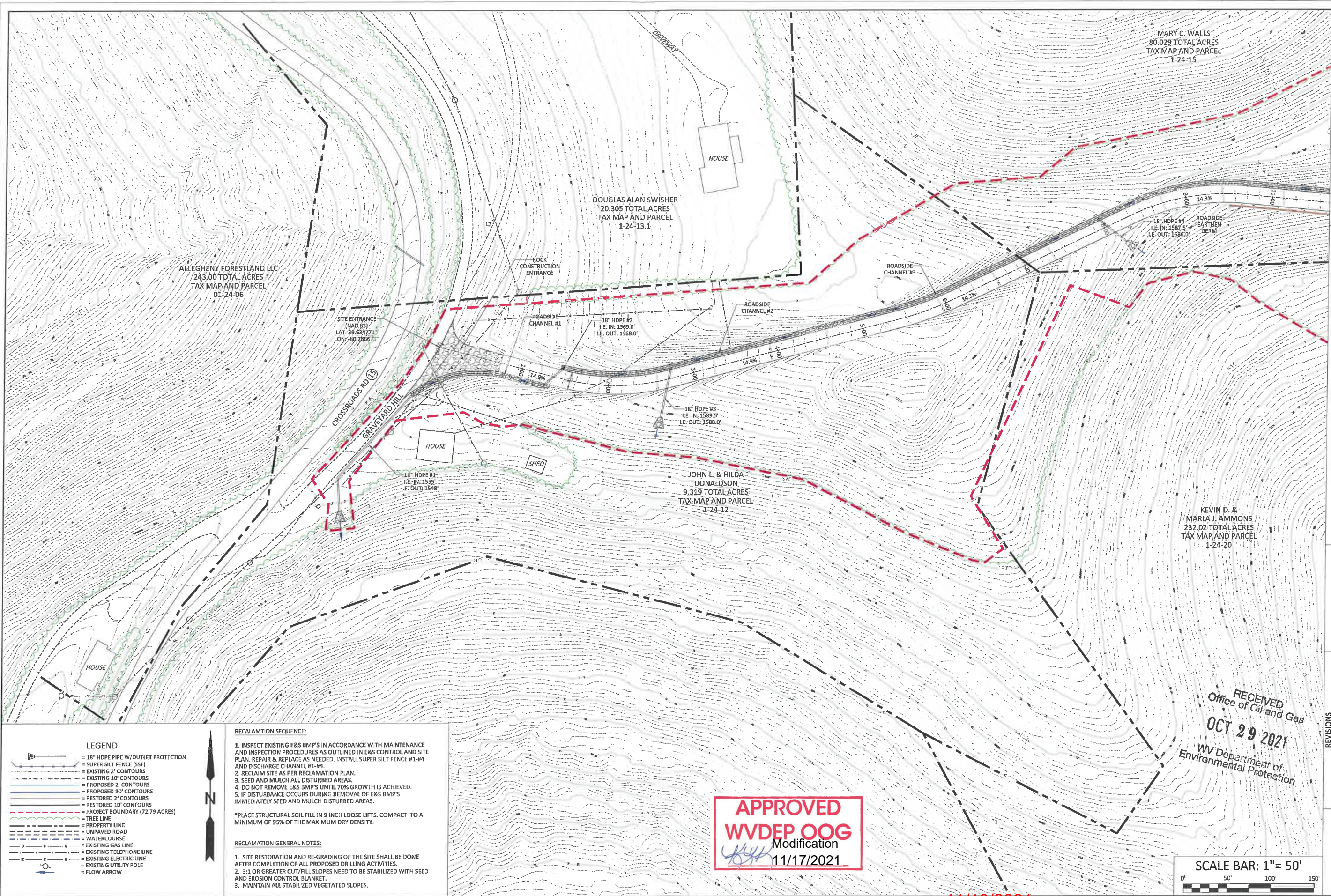
NO.	DATE	DESCRIPTION
1	8.3.20	REVISED PER WVDEP REVIEW COMMENTS
2	9.22.21	RE-DESIGNED PRODUCTION AREA

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 Southpointe, PA 15317 Phone: 724-746-1055

RECLAMATION PLAN

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SCALE BAR: 1" = 50'
 0' 50' 100' 150'
 SHEET 37 OF 43

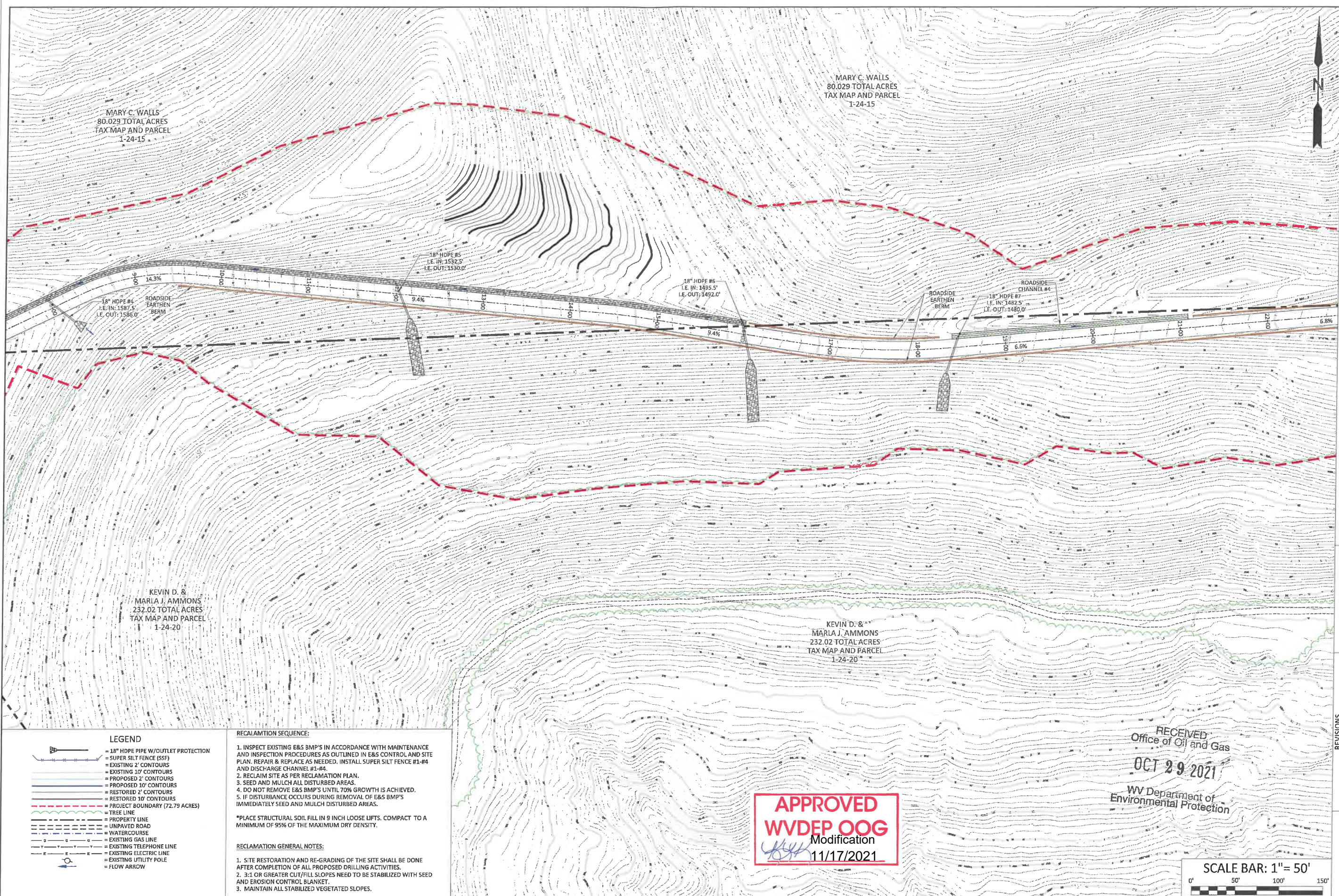


11/19/2021

- LEGEND**
- 18" HDPE PIPE W/OUTLET PROTECTION
 - SUPER SILT FENCE (SSF)
 - EXISTING 2' CONTOURS
 - EXISTING 10' CONTOURS
 - PROPOSED 2' CONTOURS
 - PROPOSED 10' CONTOURS
 - RESTORED 2' CONTOURS
 - RESTORED 10' CONTOURS
 - PROJECT BOUNDARY (72.79 ACRES)
 - TREE LINE
 - PROPERTY LINE
 - UNPAVED ROAD
 - WATERCOURSE
 - EXISTING GAS LINE
 - EXISTING TELEPHONE LINE
 - EXISTING ELECTRIC LINE
 - EXISTING UTILITY POLE
 - FLOW ARROW

- RECLAMATION SEQUENCE:**
1. INSPECT EXISTING E&S BMP'S IN ACCORDANCE WITH MAINTENANCE AND INSPECTION PROCEDURES AS OUTLINED IN E&S CONTROL AND SITE PLAN. REPAIR & REPLACE AS NEEDED. INSTALL SUPER SILT FENCE #1-#4 AND DISCHARGE CHANNEL #1-#4.
 2. RECLAIM SITE AS PER RECLAMATION PLAN.
 3. SEED AND MULCH ALL DISTURBED AREAS.
 4. DO NOT REMOVE E&S BMP'S UNTIL 70% GROWTH IS ACHIEVED.
 5. IF DISTURBANCE OCCURS DURING REMOVAL OF E&S BMP'S IMMEDIATELY SEED AND MULCH DISTURBED AREAS.
- *PLACE STRUCTURAL SOIL FILL IN 9 INCH LOOSE LIFTS. COMPACT TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY.

- RECLAMATION GENERAL NOTES:**
1. SITE RESTORATION AND RE-GRADING OF THE SITE SHALL BE DONE AFTER COMPLETION OF ALL PROPOSED DRILLING ACTIVITIES.
 2. 3:1 OR GREATER CUT/FILL SLOPES NEED TO BE STABILIZED WITH SEED AND EROSION CONTROL BLANKET.
 3. MAINTAIN ALL STABILIZED VEGETATED SLOPES.



BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
 and Mining Services
 Southpointe, PA 15317 Phone: 724-746-1055

RECLAMATION PLAN

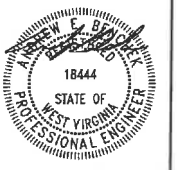
THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
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DATE:
 AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT,
 MONONGALIA COUNTY, PA

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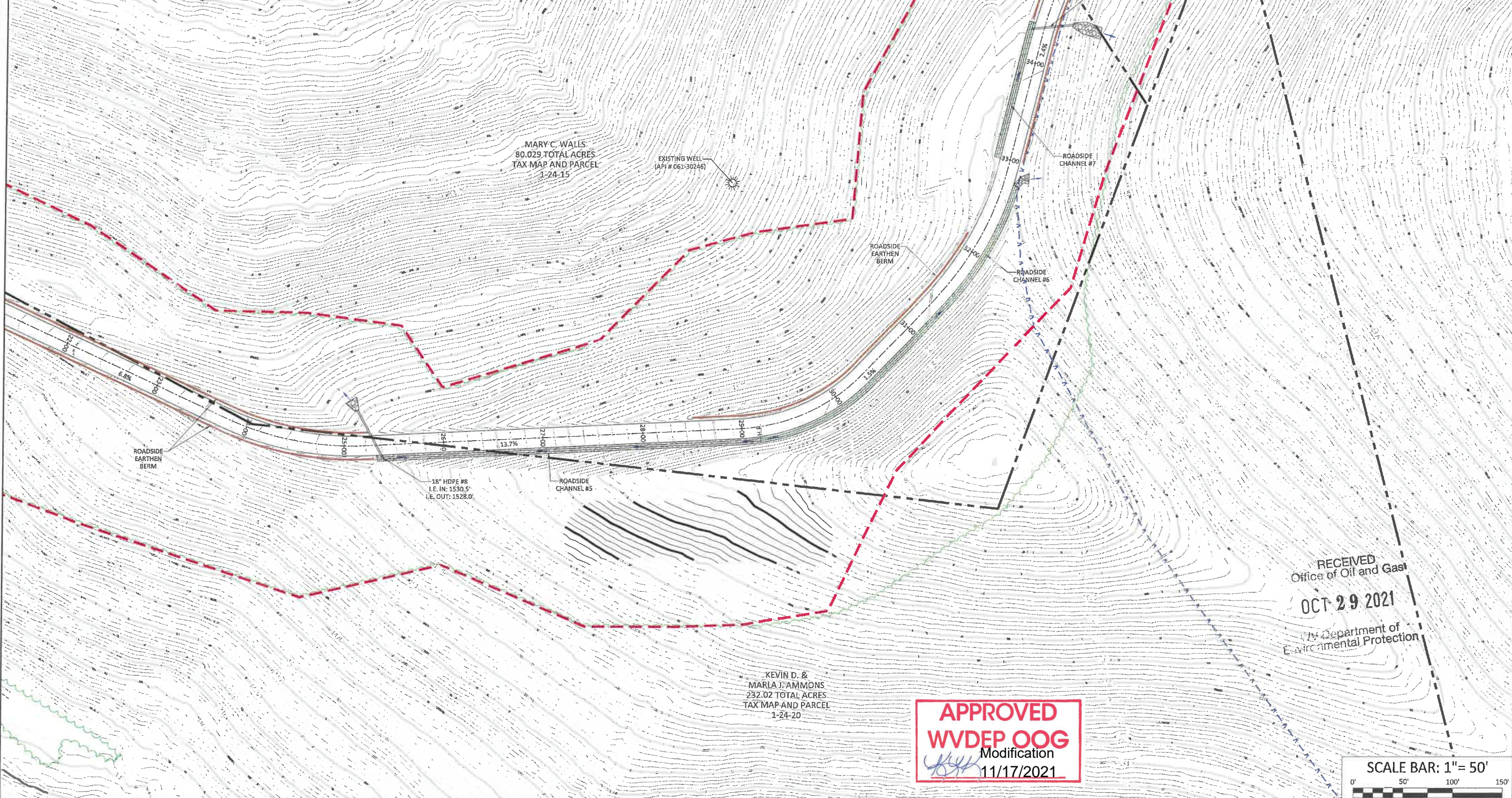
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11/19/2021

LEGEND

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BOORD, BENCHEK and ASSOC., INC.
 Engineering, Surveying, Construction,
 and Mining Services
 Southpointe, PA 15317 Phone: 724-746-1055

RECLAMATION PLAN

THIS DOCUMENT WAS PREPARED BY:
 BOORD, BENCHEK AND ASSOC., INC.
 FOR: NORTHEAST NATURAL ENERGY, LLC.

DATE:
 AUGUST 2020

PHOENIX WELL PAD

BATTELLE DISTRICT,
 MONONGALIA
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KEVIN D. &
 MARLA J. AMMONS
 232.02 TOTAL ACRES
 TAX MAP AND PARCEL
 1-24-20

APPROVED
WVDEP OOG
 Modification
 11/17/2021



NO.	DATE	DESCRIPTION



11/19/2021

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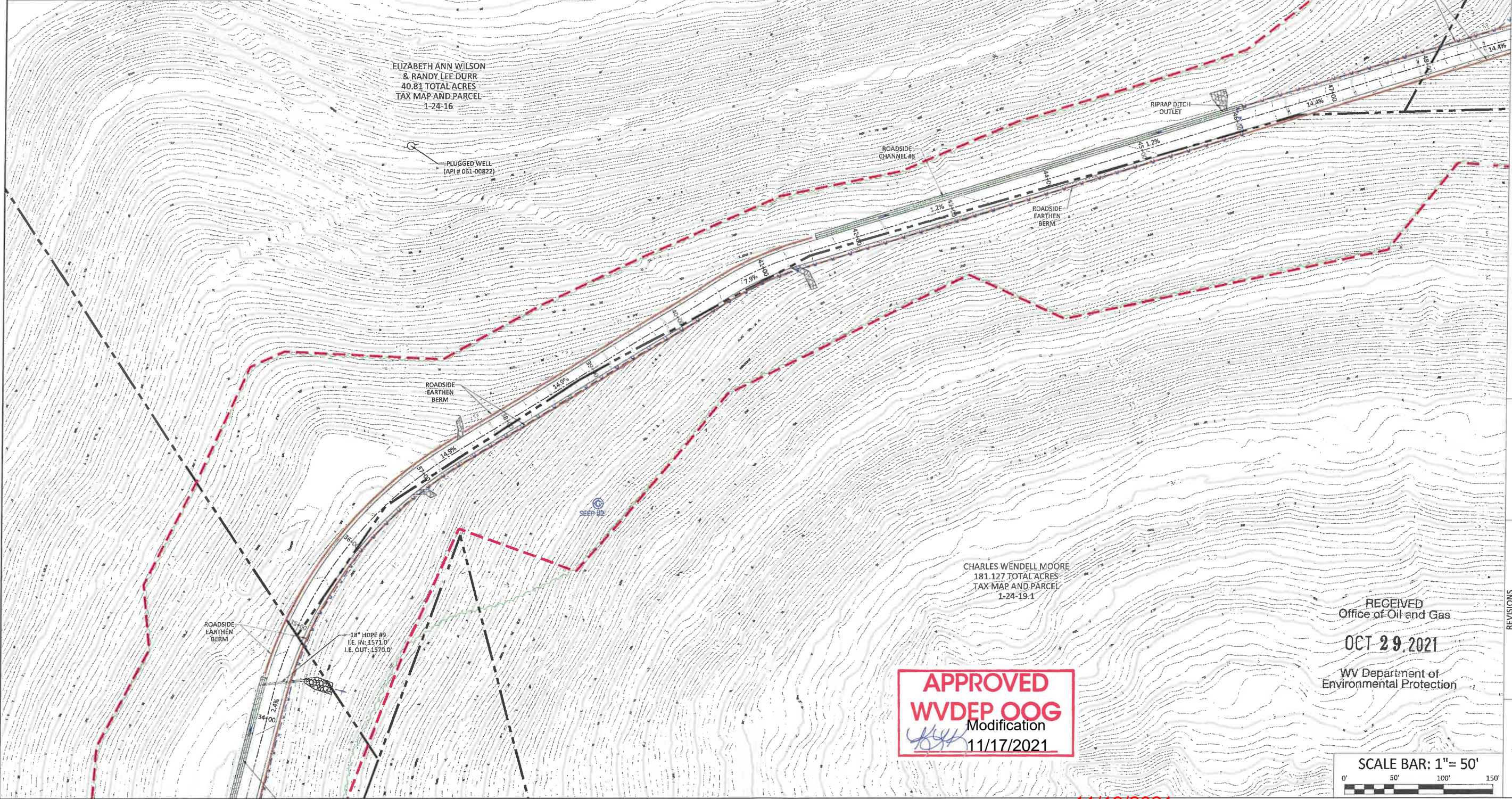
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RECLAMATION PLAN

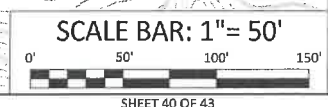
THIS DOCUMENT WAS PREPARED BY:
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DATE:
 AUGUST 2020
 PHOENIX WELL PAD
 BATTELLE DISTRICT,
 MONONGALIA
 COUNTY, PA

NO.	DATE	DESCRIPTION

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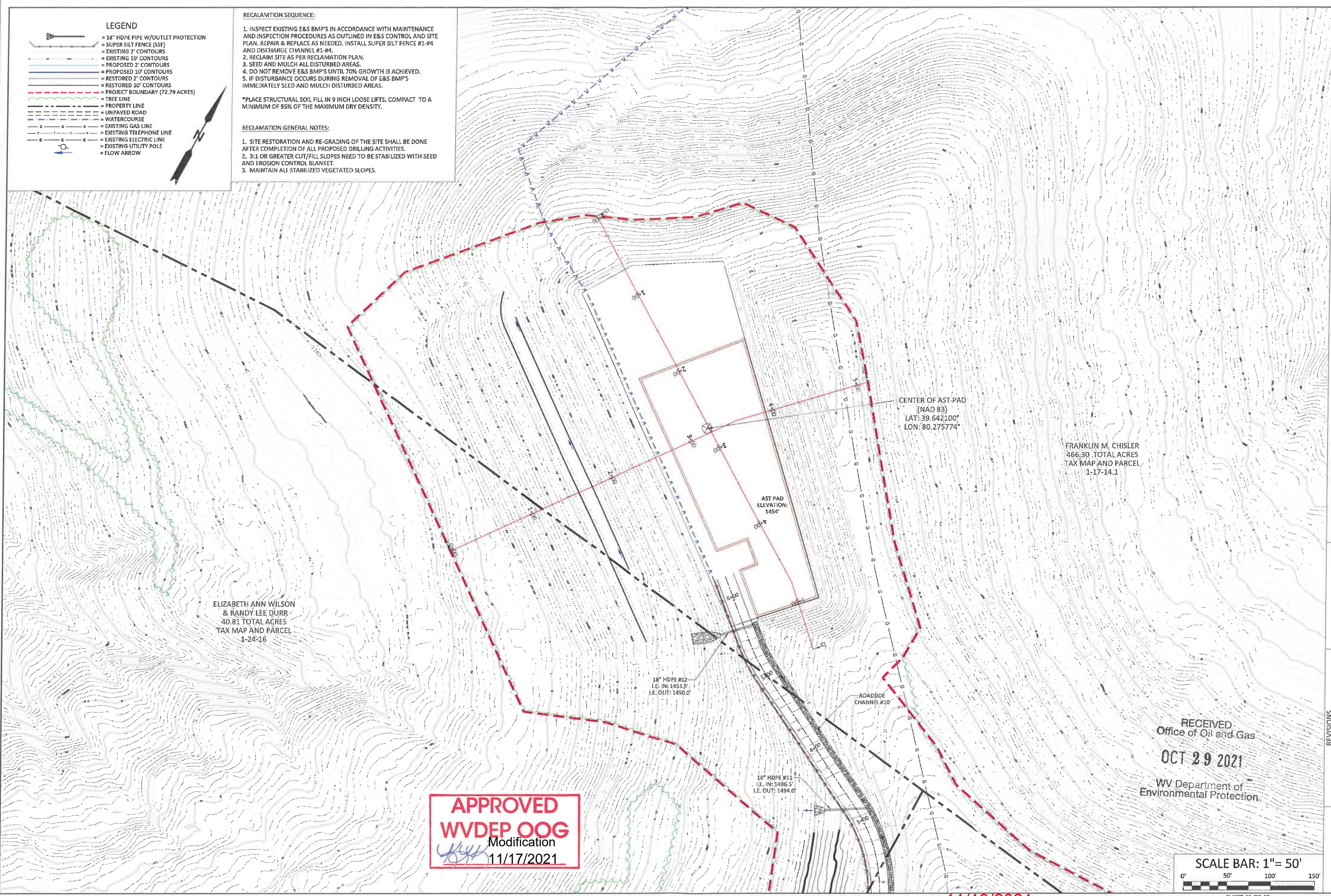
APPROVED
WVDEP OOG
 Modification
 11/17/2021



11/19/2021

- LEGEND**
- 18" HDPE PIPE W/OUTLET PROTECTION
 - SUPER SILT FENCE (SSF)
 - EXISTING 2' CONTOURS
 - EXISTING 10' CONTOURS
 - PROPOSED 2' CONTOURS
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ELIZABETH ANN WILSON
& RANDY LEE DURR
40.81 TOTAL ACRES
TAX MAP AND PARCEL
1-24-16

CENTER OF AST-PAD
(NAD 83)
LAT: 39.642100°
LON: 80.275774°

FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

18" HDPE #12
I.E. IN: 1453.5'
I.E. OUT: 1450.0'

18" HDPE #11
I.E. IN: 1496.5'
I.E. OUT: 1494.0'

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WVDEP OOG
Modification
11/17/2021

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Southpointe, PA 15317 Phone: 724-746-4055

RECLAMATION PLAN

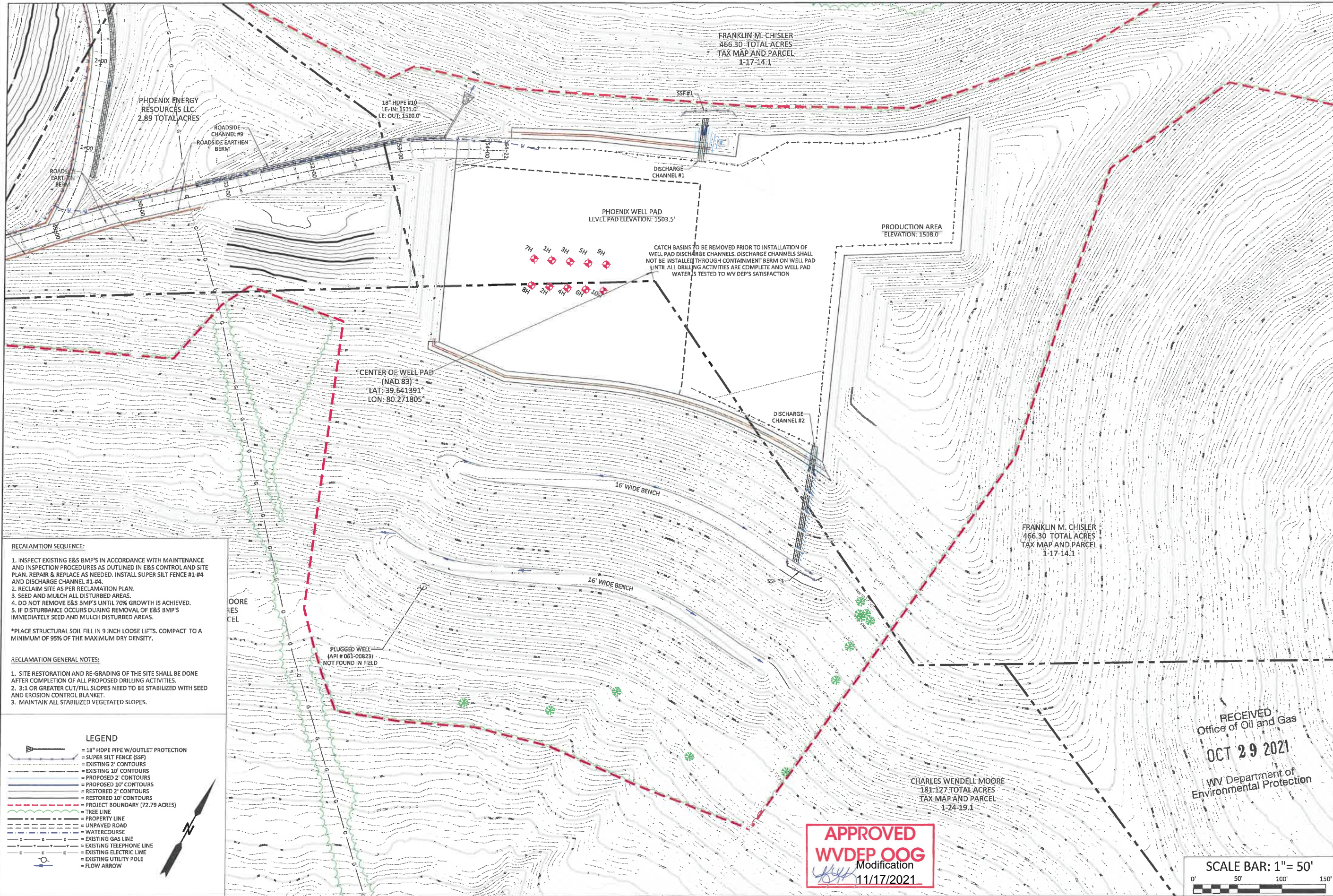
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DATE:
AUGUST 2020
PHOENIX WELL PAD
BATTELLE DISTRICT,
MONONGALIA
COUNTY, PA

NO.	DATE	DESCRIPTION
1	9.2.20	REVISED PER WVDEP REVIEW COMMENTS ON 9.1.20



11/19/2021



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LEGEND

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- EXISTING UTILITY POLE
- FLOW ARROW

FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

CHARLES WENDELL MOORE
181.127 TOTAL ACRES
TAX MAP AND PARCEL
1-24-19.1

CATCH BASINS TO BE REMOVED PRIOR TO INSTALLATION OF WELL PAD DISCHARGE CHANNELS. DISCHARGE CHANNELS SHALL NOT BE INSTALLED THROUGH CONTAINMENT BERM ON WELL PAD UNTIL ALL DRILLING ACTIVITIES ARE COMPLETE AND WELL PAD WATER IS TESTED TO WV DEP'S SATISFACTION

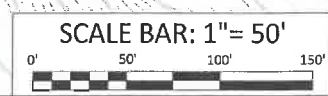
CENTER OF WELL PAD
(NAD 83)
LAT: 39.641391°
LON: 80.271805°

PHOENIX WELL PAD
LEVEL PAD ELEVATION: 1503.5'

PRODUCTION AREA
ELEVATION: 1508.0'

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Office of Oil and Gas
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WV Department of
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DATE:
AUGUST 2020

PHOENIX WELL PAD

BATTELLE DISTRICT,
MONONGALIA COUNTY, PA

NO.	DATE	DESCRIPTION
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2	9.23.21	RE-DESIGNED PRODUCTION AREA

18444
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

11/19/2021

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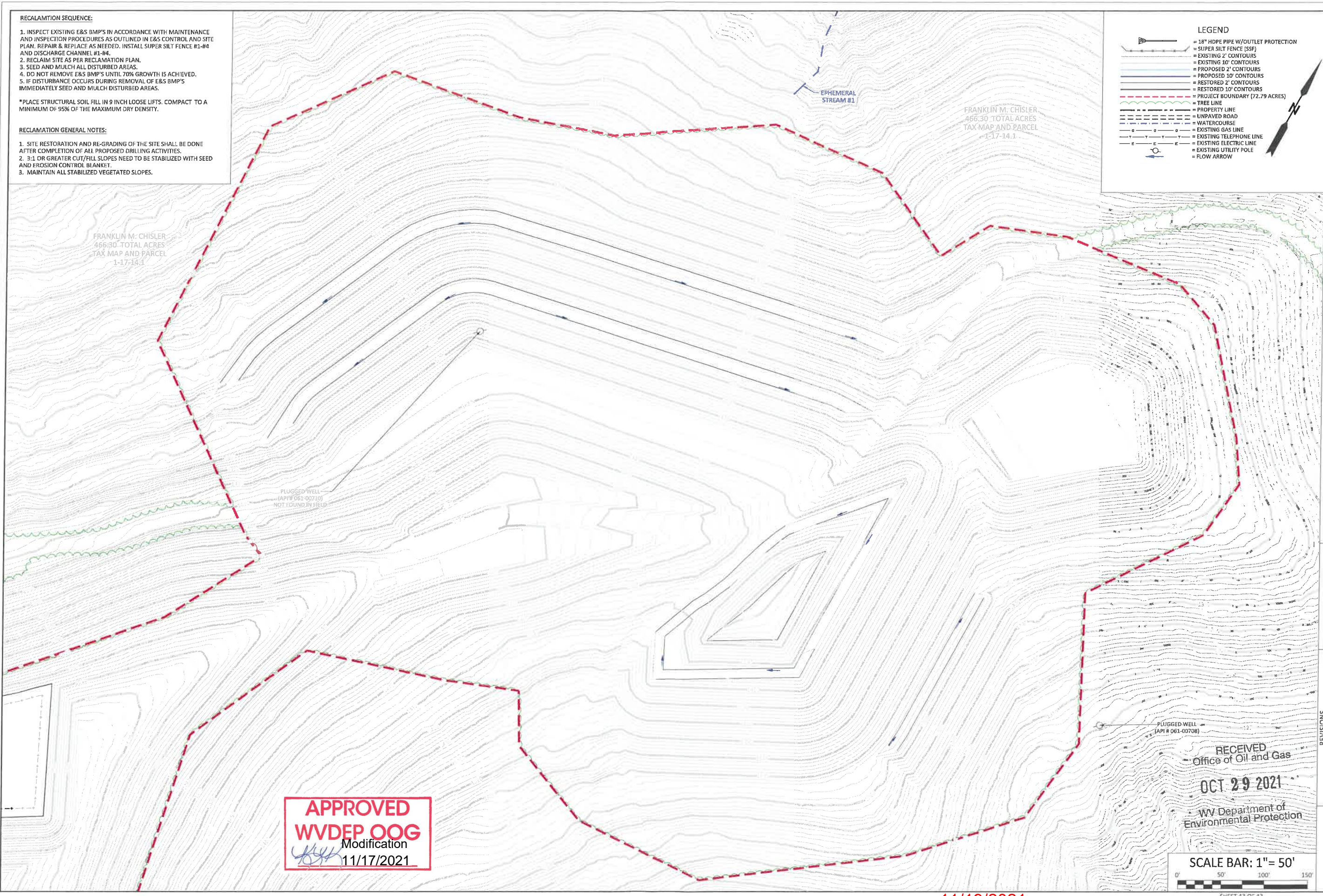
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FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

FRANKLIN M. CHISLER
466.30 TOTAL ACRES
TAX MAP AND PARCEL
1-17-14.1

APPROVED
WVDEP OOG
Modification
[Signature]
11/17/2021

RECEIVED
Office of Oil and Gas
OCT 29 2021
WV Department of
Environmental Protection

SCALE BAR: 1" = 50'
0' 50' 100' 150'

BOORD, BENCHEK and ASSOC., INC.
Engineering, Surveying, Construction,
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RECLAMATION PLAN

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DATE:
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PHOENIX WELL PAD
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NO.	DATE	DESCRIPTION
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Professional Engineer Seal: BOORD, BENCHEK & ASSOC., INC. 18444 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

11/19/2021