

## **Meadow Deep, LLC Proposed Cottonwood #1 Well**

### **Surface Use Plan of Operations**

#### **1. DIRECTIONS & EXISTING ROADS (See Appendix 1)**

From Campo, Colorado:

Go South 3.25 miles on US Highway 287 to County Road F.

Then turn right and go West 0.5 miles on dirt County Road F to cattle gate, just west of railroad tracks.

Continue through cattle gate onto two-track for 1.75 miles to second windmill, where road turns south.

Continue south from windmill for 0.5 miles; then turn left and go east 545 feet cross-country to the proposed pad.

Roads will be maintained to US Forest Service *Gold Book* standards. For short and long term maintenance, the existing road will be maintained by Meadow Deep LLC. For County Road F or roads considered as collector roads, the operator will defer to the county for maintenance determinations. If existing roads require reconstruction due to activity associated with this project, or if required by the Comanche National Grassland, the operator will upgrade existing non-county road(s) following the most recent *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)* and BLM Handbook 9113 (et al). Water will be used for dust control.

#### **2. ROADS TO BE BUILT OR UPGRADED (See Appendix 6)**

Meadow Deep will upgrade 2.29 miles of existing Forest Road 2484 and 2484B, from the cattle gate on County Road F to the start of the proposed well pad access road in the W/2 of Section 28. A further 545' of new road will be built from Forest Road 2484B to the proposed well pad location in Section 28. Both the 12,102.66' of existing forest road and the 545' of new access road will be upgraded and/or built to BLM Gold Book standards. To minimize impacts to Grassland resources, Meadow Deep will initially use a "primitive" road construction approach, following Gold Book procedures for "exploration drilling locations where it is not certain if the well will be productive" (BLM Gold Book 2007). This approach has the "advantage of reducing construction, maintenance, and reclamation costs and reducing resource impacts" (BLM Gold Book 2007). If the well is productive, the road will be upgraded to a constructed road following Gold Book standards. Estimated maximum cut or fill is 3'. Estimated maximum grade is 15%. A 48"-60" culvert will be installed where forest road 2484 crosses the wash in Section 21.

### 3. EXISTING WELLS (See Appendix 1)

State records show 2 plugged and abandoned oil wells. There are no disposal, injection, or water wells within a mile.

### 4. PROPOSED PRODUCTION FACILITIES (See Appendices 1 & 2)

This Surface Use Plan is in support of Meadow Deep's Cottonwood #1 well pad and access road. Production facilities will be installed on the pad and will include a separator, dehydrator, meter run, and tank battery. Steel tanks will be used for oil storage and fiberglass tanks for produced water storage. Oil will be stored on-site and trucked to sales point. Produced water will be stored on site and trucked to an appropriate disposal site, as needed. Meadow Deep will attempt to identify a commercial water disposal site once production levels have been determined.

Final facility layout will be determined is shown in Appendix 2-7. All above ground structures, except those subject to safety requirements, will be painted covert green or other USFS approved color within 90 days of installation. All production equipment will comply with Visual Resource Management requirements. No gas pipeline or power line will be required at this time as produced gas will be used to power lease operations. Excess gas will be temporarily vented until production levels are determined and gas pipeline options can be explored.

### 5. WATER SUPPLY

Fresh water will be purchased from the City of Campo and trucked to the drill site. No water well will be drilled due to the proximity of a municipal water supply.

### 6. CONSTRUCTION NOTICES, MATERIALS, & METHODS (See Appendices 2 & 6)

Meadow Deep will notify the grazing lease operator(s)  $\geq 10$  business days before starting construction in order to avoid conflicts. Meadow Deep will not stop or delay construction unless directed by the authorized forest officer.

Colorado 811 and the Comanche National Grassland will be called at least 48 hours before construction starts. Construction for the Cottonwood 1 well pad and access road will take 3 weeks and will incorporate a Revegetation Plan.

The pad will be leveled with heavy equipment (e.g., bulldozer) to provide space and a level surface for vehicles and equipment. Only native excavated material will be used on the pad. Excavated materials from the cuts will be used for fill in order to level the pad. No additional materials will be required for construction of the pad.

Construction and maintenance activities will stop when the ground is frozen or soil is highly saturated. Activity will stop when construction equipment cause ruts in the soil 6" in depth.

Brush will be mulched and spread on bare dirt. The top 6" of soil will be bladed and piled around the northern perimeter of the pad. A silt trap will be built east of the topsoil pile.

Gravel for road construction will be sourced from the nearest existing gravel pit.

#### 7. WASTE DISPOSAL (See Appendix 2)

No reserve pit will be used. A closed-loop mud system will be utilized to capture drilling mud and waste will be hauled to an approved disposal facility near Liberal, Kansas.

All trash will be placed in a portable metal trash cage. It will be hauled to an approved landfill. Human waste will be disposed of in chemical toilets. Toilets will be provided and maintained during all construction, drilling, and completion operations. Toilet contents will be hauled to a state approved dump station.

#### 8. ANCILLARY FACILITIES (See Appendix 2)

There will be no airstrip, camp, or staging area. Camper trailers will be on location for the company man, tool pusher, and mud logger.

#### 9. WELL SITE LAYOUT

See Appendix 2 for depictions of the well pad, cage, and access onto the location, parking, living facilities, and rig orientation.

#### 10. RECLAMATION (See Appendices 2 & 5)

Once production equipment is installed, the pad will be reduced in size and unneeded areas will be reclaimed. Water bars will be installed in cut every  $\approx 100'$  and skewed to drain on the pipeline route. Interim reclamation will consist of reclaiming the pipeline route and north and west side of the pad within 90 days of completing the well. Disturbed areas will be contoured to a natural topography. Soil and brush will be evenly spread over disturbed areas. Seeded areas will be ripped and harrowed  $\geq 18"$  deep. Enough stockpiled topsoil will be retained to cover the remainder of the pad when the well is plugged. Amount will be determined by the % of area remaining after interim reclamation. (For example, if  $\frac{1}{4}$  of the pad is interim reclaimed, then  $\frac{3}{4}$  of the topsoil will remain for final reclamation). The US Forest Service will determine the area to be interim reclaimed after a "production facility"

on site. The retained topsoil piles will be seeded and mulched. Once the well is plugged, then the remainder of the pad and road will be similarly reclaimed. Noxious weeds will be controlled.

Disturbance & Reclamation for Meadow Deep's project will be:

300 x 300' well site = 2.07 acres  
20' x 545' new access road = 0.26 acre  
**Total Short Term = 2.33 acres**  
-0.93 acres interim pad reclamation  
**Total Long Term = 1.4 acres**

Final reclamation will occur once the well has been plugged and will consist of removing all surface facilities and returning the surface topography of all reclaimed areas, including the pad and the 545' of access road between the pad and Forest Road 2484B, to their approximate, pre-disturbance grade. Reclaimed areas will be reseeded with an appropriate seed mix. Total final reclaimed area would be approximately 1.4 acres (1.14 acres for the pad and 0.26 acres for the road).

11. SURFACE OWNER (See Appendix 1)

All construction for Meadow Deep's well pad and water line will be on Comanche National Grassland federally-managed surface. The entirety of Meadow Deep's access to the well site will begin and end on the grassland.

12. OTHER INFORMATION

Section 28 is located within a known Lesser Prairie Chicken (LPC) habitat area. Meadow Deep's permitting agent, Permits West Inc., has made contact with staff at the Comanche National Grassland, Colorado Parks and Wildlife (CPW), and the Colorado Oil & Gas Conservation Commission (COGCC) in regards to surface restrictions and/or other conservation considerations in this area. According to recent wildlife surveys by CPW, there are currently no active leks within 2 miles of the proposed location.

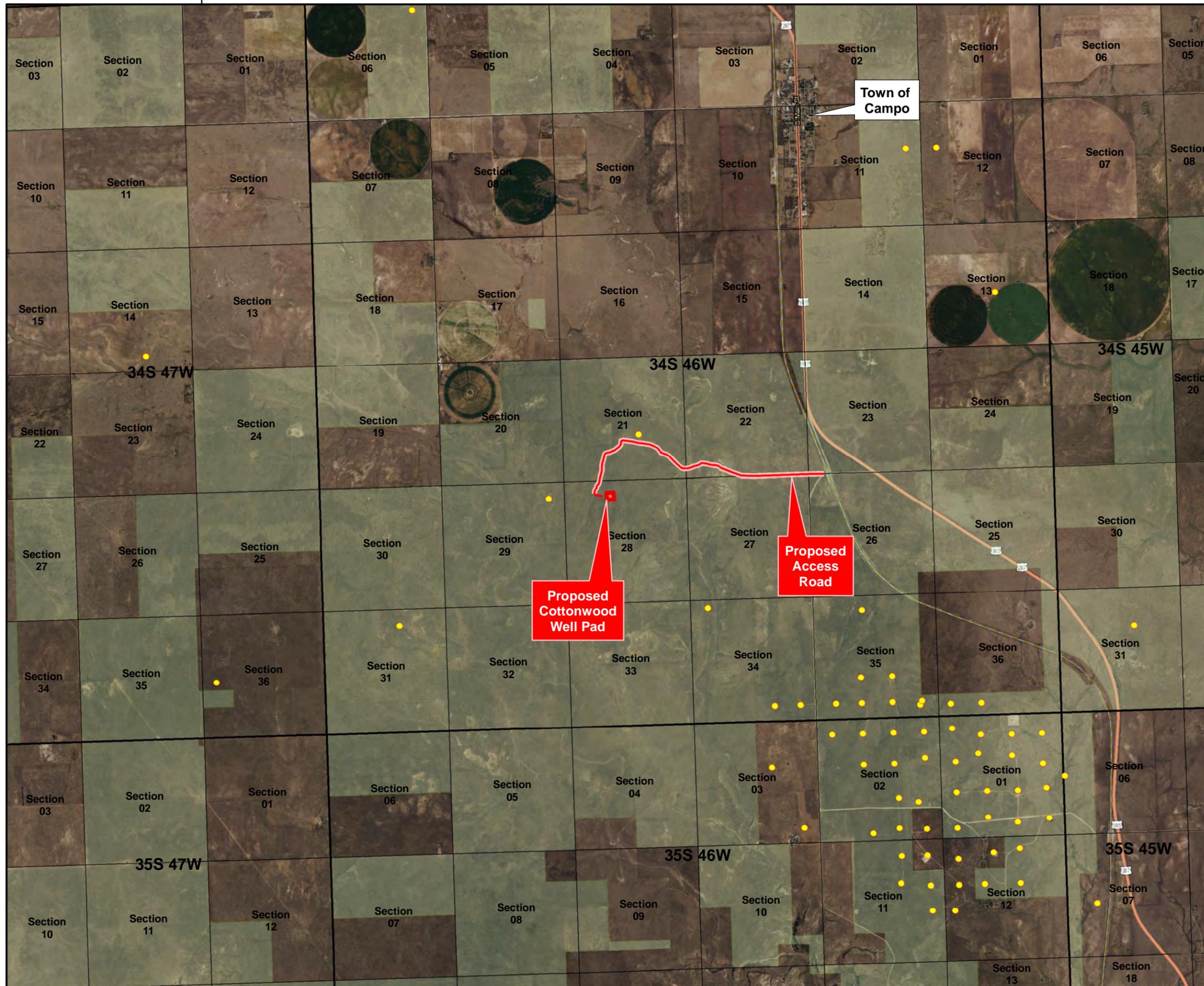
### 13. REPRESENTATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U. S. C. 1001 for the filing of false statements. Revised and executed this 5th day of February, 2018.



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Mike Deutsch, Project Director  
Permits West, Inc.  
37 Verano Loop, Santa Fe, NM 87508  
(505) 466-8120



# Meadow Deep, LLC

## Proposed Cottonwood #1 Project Location Map

Sections 21, 22, 23, & 28,  
Township 34S, Range 46W  
Campo, Baca County, Colorado

### Surface Owner

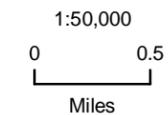
Comanche National Grasslands

### Proposed Facilities

- Proposed 300' x 300' Pad
- New Road
- Road to be Upgraded

### Existing Oil & Gas Wells

- Existing O&G Well (any status)



NAD 1983  
Colorado State Plane  
South (feet)

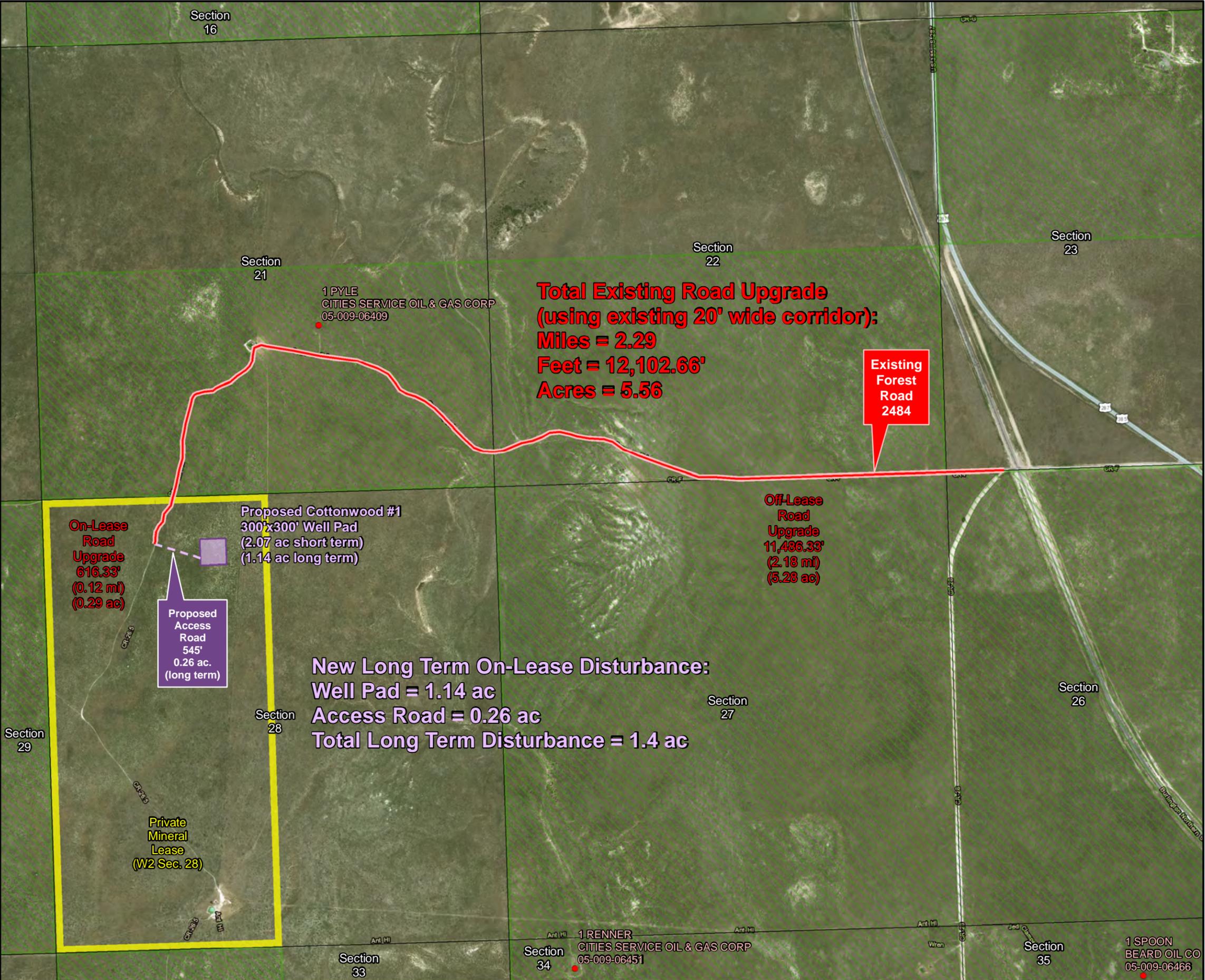
Prepared by Permits West, Inc., October 2, 2017 for  
Meadow Deep, LLC



# Meadow Deep, LLC

## Proposed Cottonwood #1 Well Pad Plan of Development and Access Map

Sec. 21, 22, 23, & 28, Township 34S, Range 46W  
Campo, Baca County, Colorado



### Existing & Proposed Infrastructure

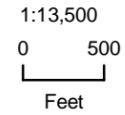
- Proposed Well Pad
- Existing Forest Road to be Upgraded
- New Access Road to be Built
- Private (Fee)

### Existing Oil & Gas Wells

- Producing
- Dry Hole
- Abandoned
- Injector

### Mineral Owner

- Federal
- State
- Private (Fee)

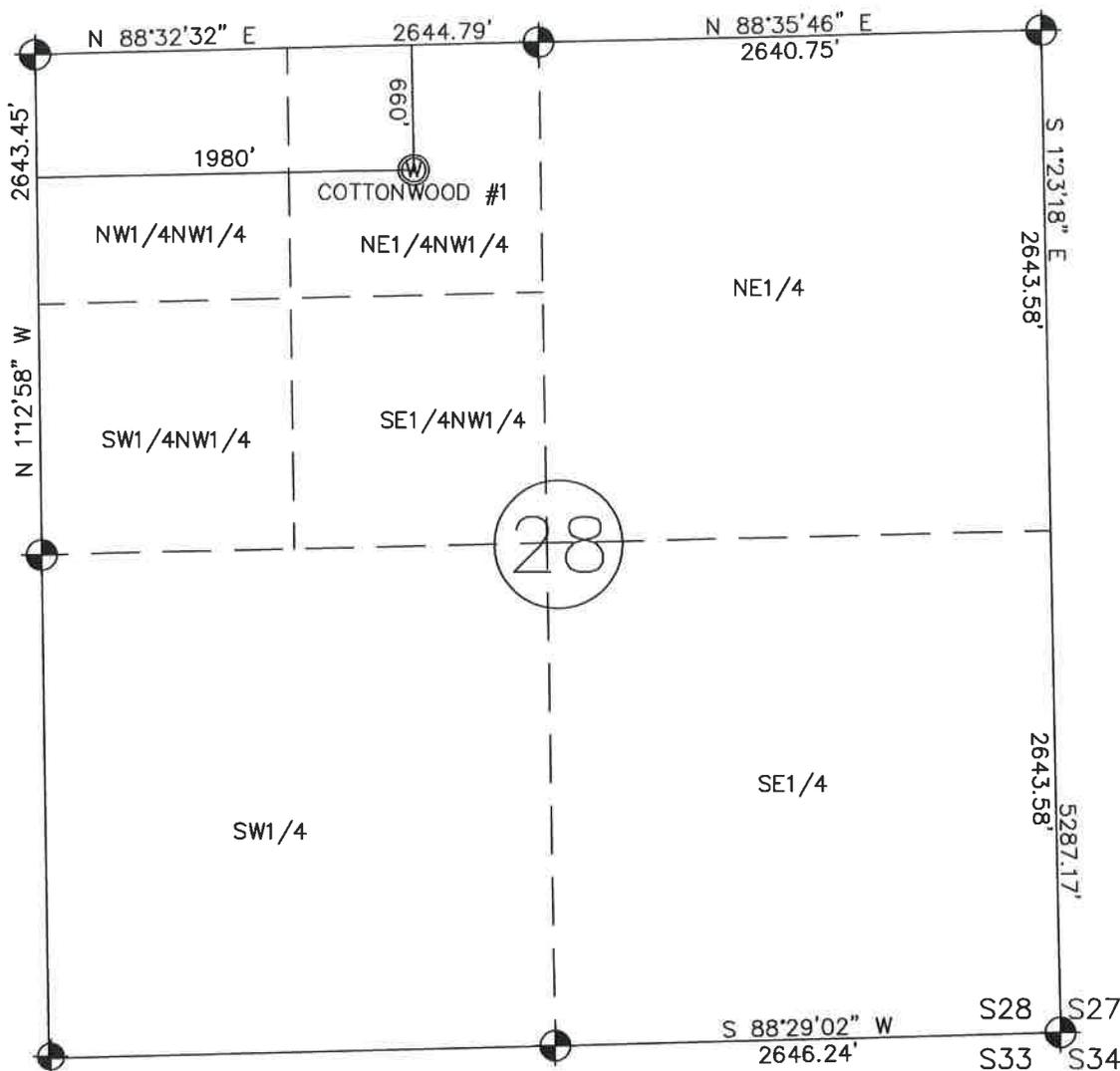


NAD 1983  
Colorado State Plane  
South (feet)

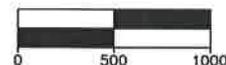
Prepared by Permits West, Inc., February 5, 2018 for  
Meadow Deep, LLC



T 34 S



SCALE 1" = 1000'



R 46 W  
LEGEND

- Well Site
- Located Brass Cap GLO, Dated 1905

PDOP  $\leq$  6  
 ELEVATION MASK  $\geq$  15°  
 OPERATOR: GARY L. TERRY

GROUND ELEVATION = 4352.7'  
 NAD83(2011) LAT/LON (DECIMAL)  
 37.05806°N  
 102.61706°W

WELL LOCATION FOR:  
 WELL NO.:

MEADOW DEEP, LLC  
 COTTONWOOD #1

LOCATION:

660 FEET FROM THE NORTH LINE AND 1980 FROM THE WEST LINE OF SECTION 28, TOWNSHIP 34 SOUTH, RANGE 46 WEST OF THE 6th P.M., COUNTY OF BACA, STATE OF COLORADO. WELL DISTANCES ARE MEASURED PERPENDICULAR TO SECTION LINES.



BEARINGS WERE OBTAINED FROM GPS OBSERVATION OF THE NORTH LINE OF THE NW1/4, SECTION 28, TOWNSHIP 34 SOUTH, RANGE 46 WEST OF THE 6th P.M., WHICH BEARS N 88°32'32" E, BETWEEN THE NORTHWEST AND NORTH 1/4, BOTH BEING GLO BRASS CAPS, DATED 1905. ALL BEARINGS RELATIVE THEREOF. VERTICAL DATUM BASED ON NGS MARKER D435, NAVD88 DATUM, HAVING AN ELEVATION OF 4321.97 FEET.

GARY L. TERRY  
 P.L.S. 12160

I GARY L. TERRY HEREBY CERTIFY THAT THIS WELL PLAT IS A ACCURATE REPRESENTATION OF A CORRECT SURVEY OF WELL NO. COTTONWOOD #1

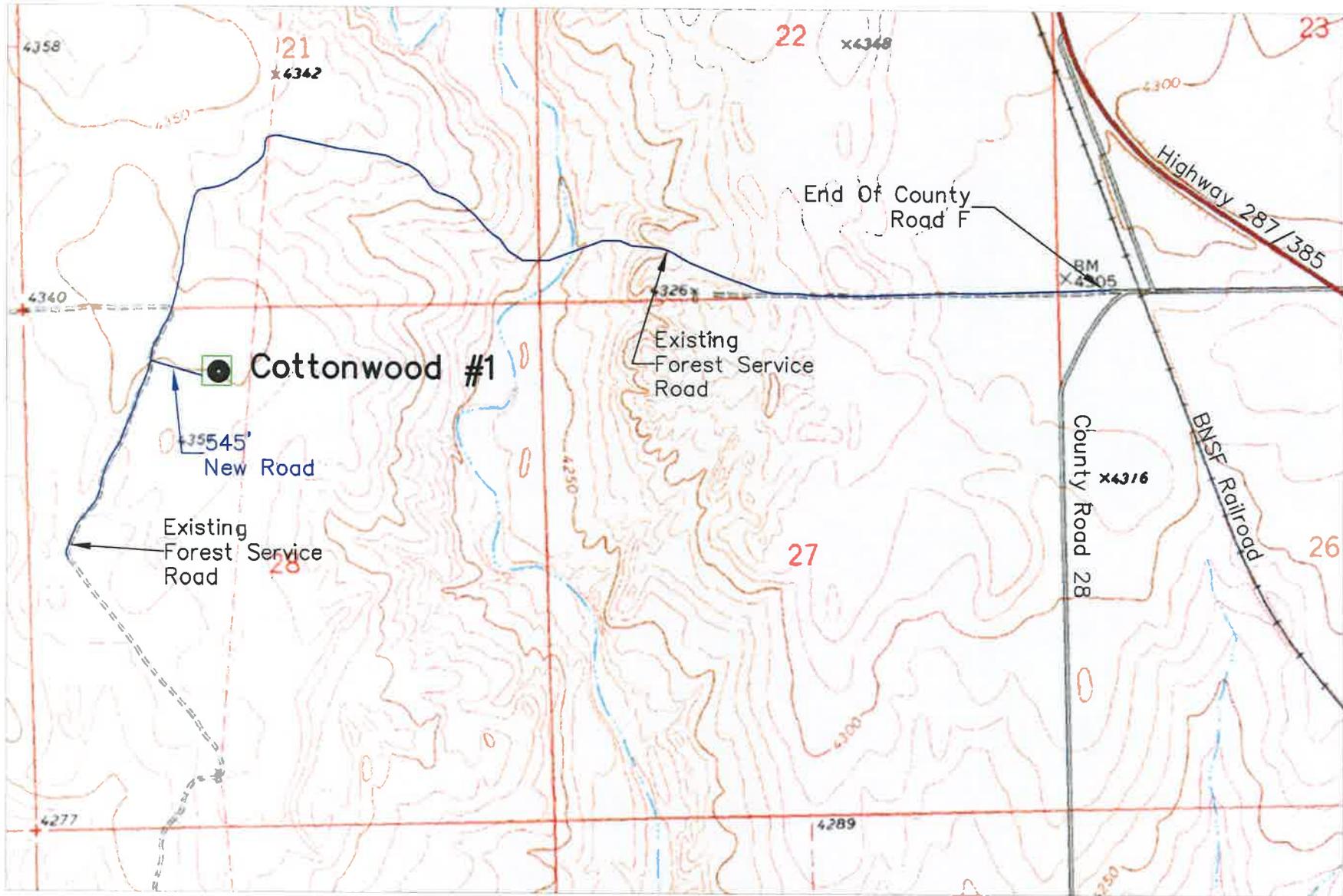
TERRY SURVEYING INC.  
 P.O. BOX 851  
 TRINIDAD, COLORADO 81082  
 (719)846-6921

NOTE: THERE ARE NO IMPROVEMENTS WITHIN 1000 FEET OF THIS WELL SITE.  
 CURRENT LAND USE: RANGE LAND  
 DATE: OCTOBER 23, 2017



Road Access Map  
COTTONWOOD #1  
660' FNL - 1980' FWL

MEADOW DEEP, LLC



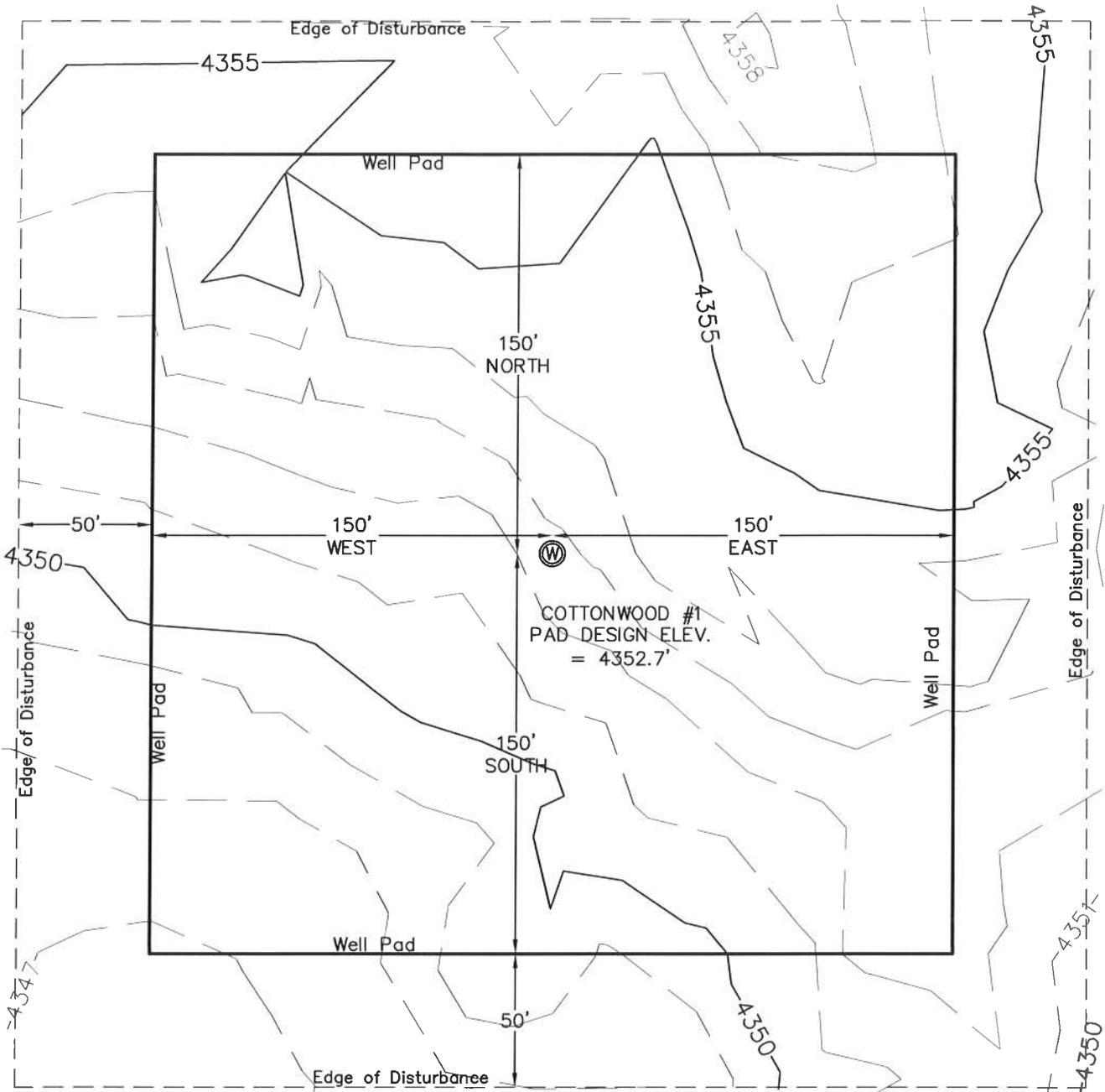
1 inch = 1500 ft

Date: OCTOBER 23, 2017

# CONSTRUCTION LAYOUT DRAWING

## COTTONWOOD #1

  
**NORTH**  
 SCALE: 1" = 60'



**NOTES:**

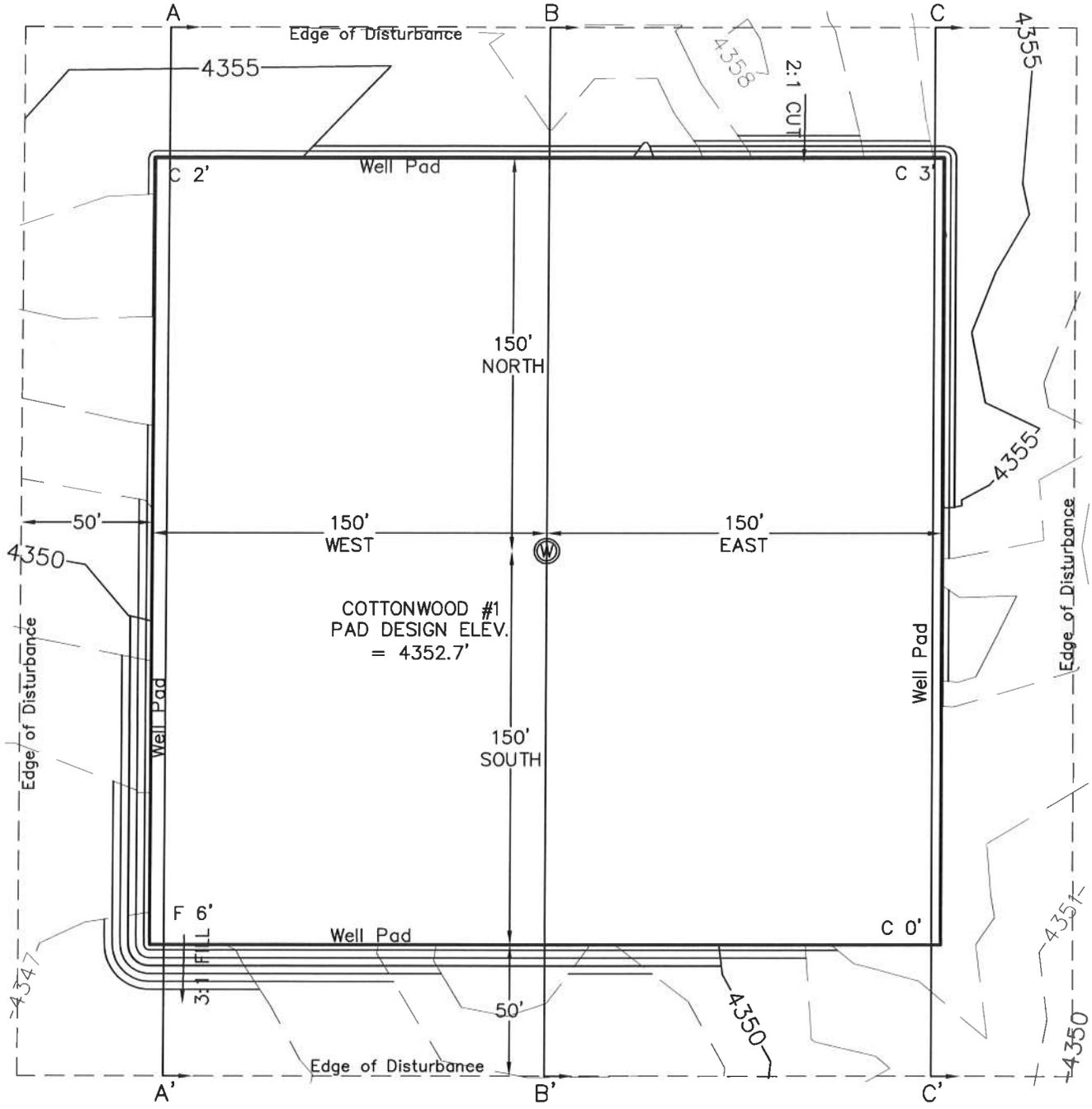
1. UNGRADED ELEVATION AT WELLHEAD: 4352.7'
2. GRADED ELEVATION AT WELLHEAD: 4352.7'

<i>DRAWN BY:</i> NLE	<b>COTTONWOOD #1</b>	<b>PAGE</b>
<i>DATE:</i> 11/01/2017	EXISTING CONDITIONS	1/3
<i>DRAWING NAME:</i> COTTONWOOD #1	MEADOW DEEP, LLC BACA COUNTY, COLORADO	<b>REV</b>
		A



# CONSTRUCTION LAYOUT DRAWING

## COTTONWOOD #1



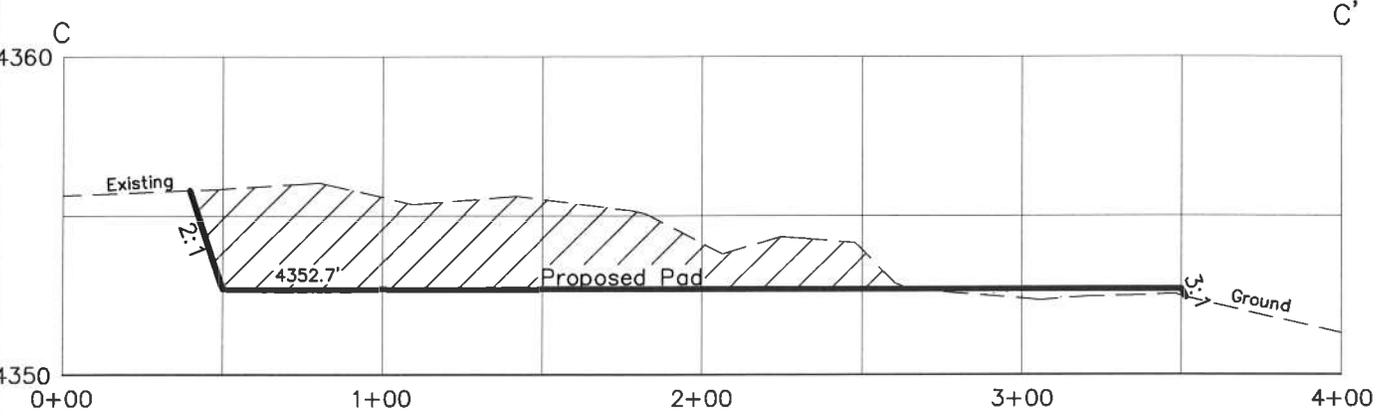
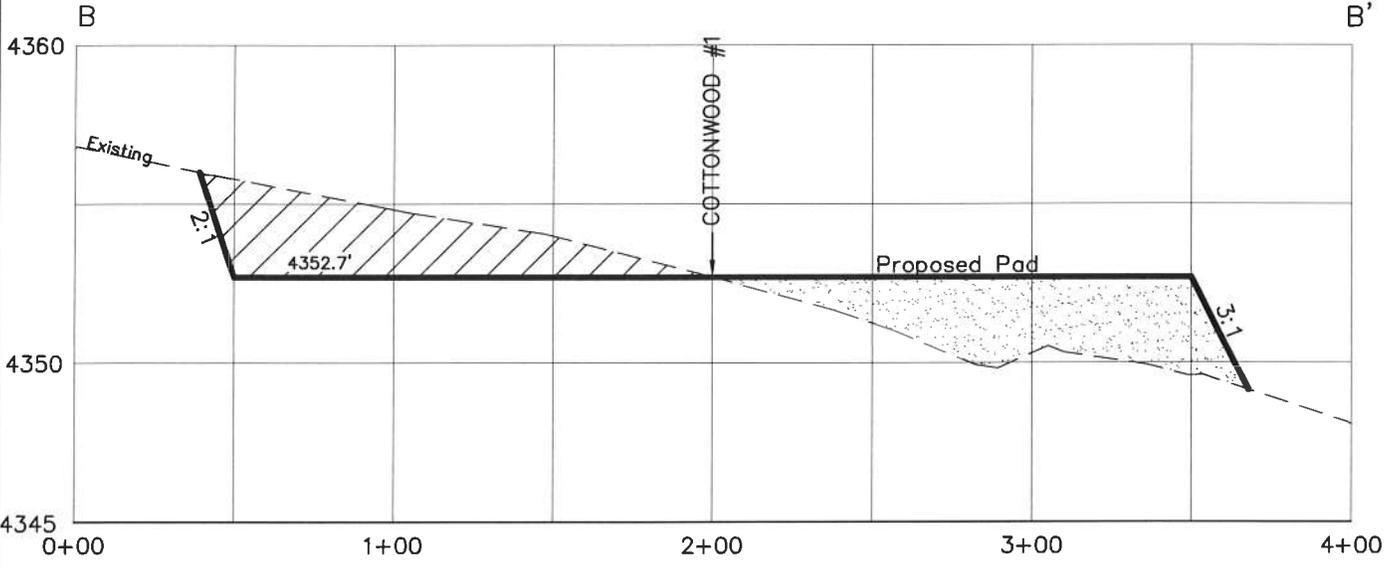
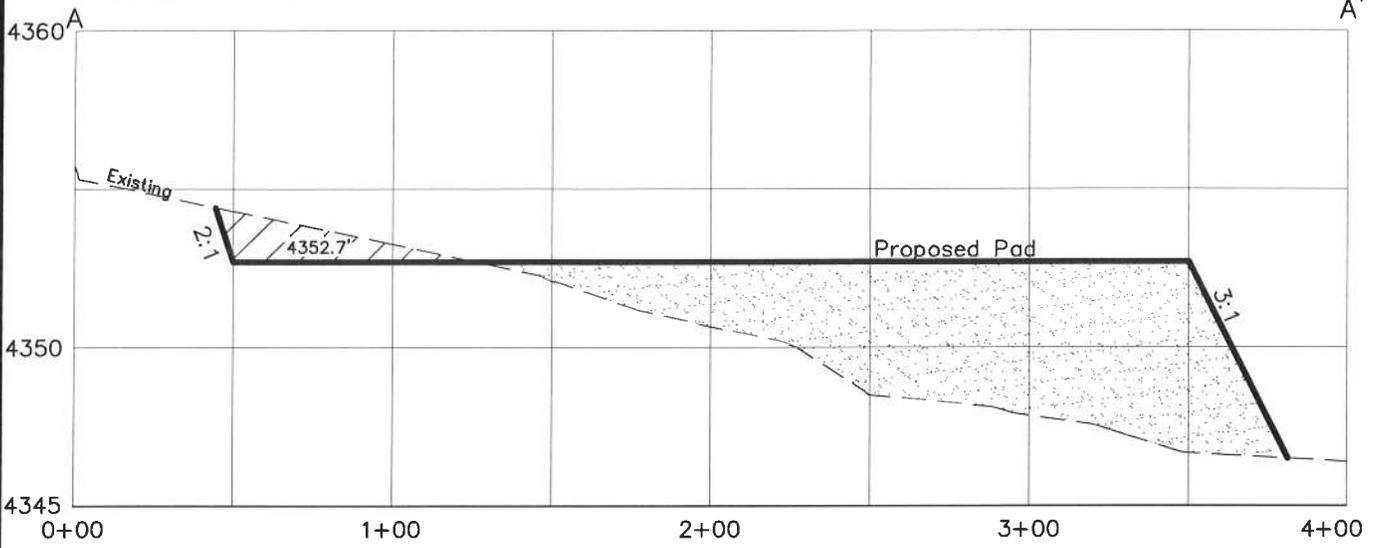
- NOTES:**
1. UNGRADED ELEVATION AT WELLHEAD: 4352.7'
  2. GRADED ELEVATION AT WELLHEAD: 4352.7'

<i>DRAWN BY:</i> NLE	COTTONWOOD #1 PROPOSED GRADING	PAGE
<i>DATE:</i> 11/01/2017		2/3
COTTONWOOD #1	MEADOW DEEP, LLC	REV
<i>DRAWING NAME:</i>	BACA COUNTY, COLORADO	A



# CONSTRUCTION LAYOUT DRAWING

## COTTONWOOD #1



HORIZONTAL SCALE: 1" = 60'  
 VERTICAL SCALE: 1" = 20'

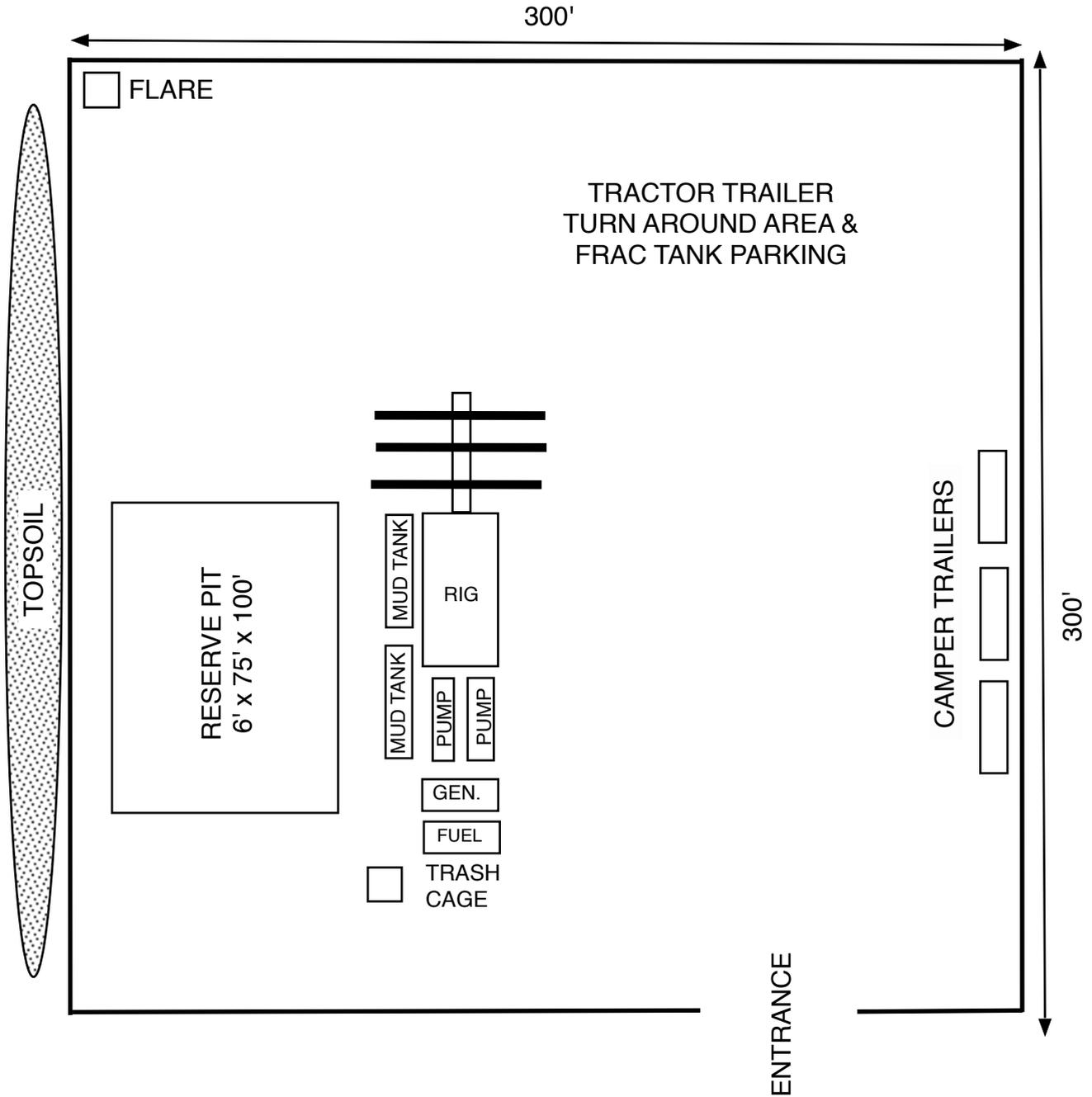
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DATE:	11/01/2017
COTTONWOOD #1	
DRAWING NAME:	

**COTTONWOOD #1**  
 CROSS-SECTION  
 MEADOW DEEP, LLC  
 BACA COUNTY, COLORADO

PAGE  
 3/3  
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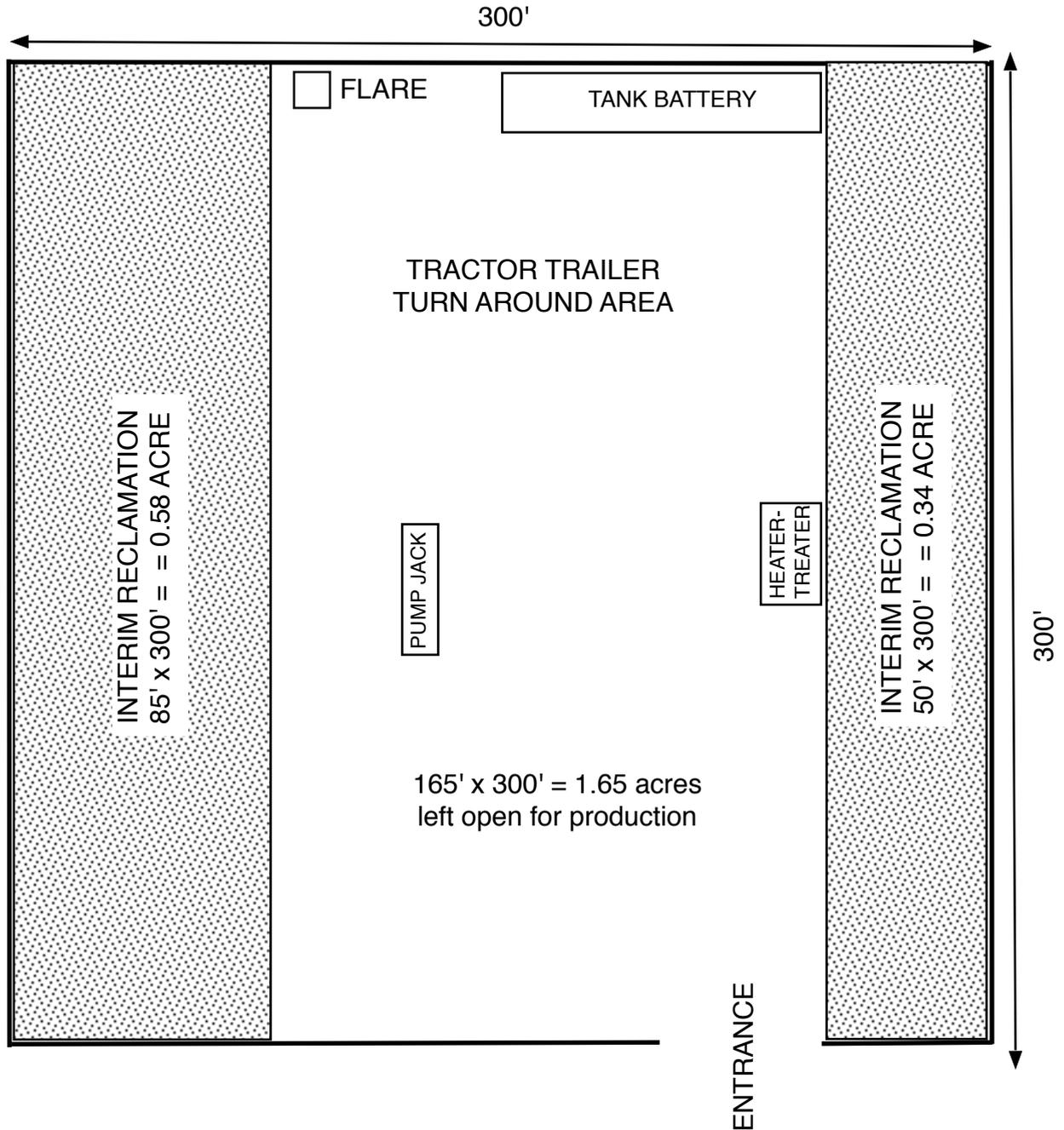
Meadow Deep  
rig diagram

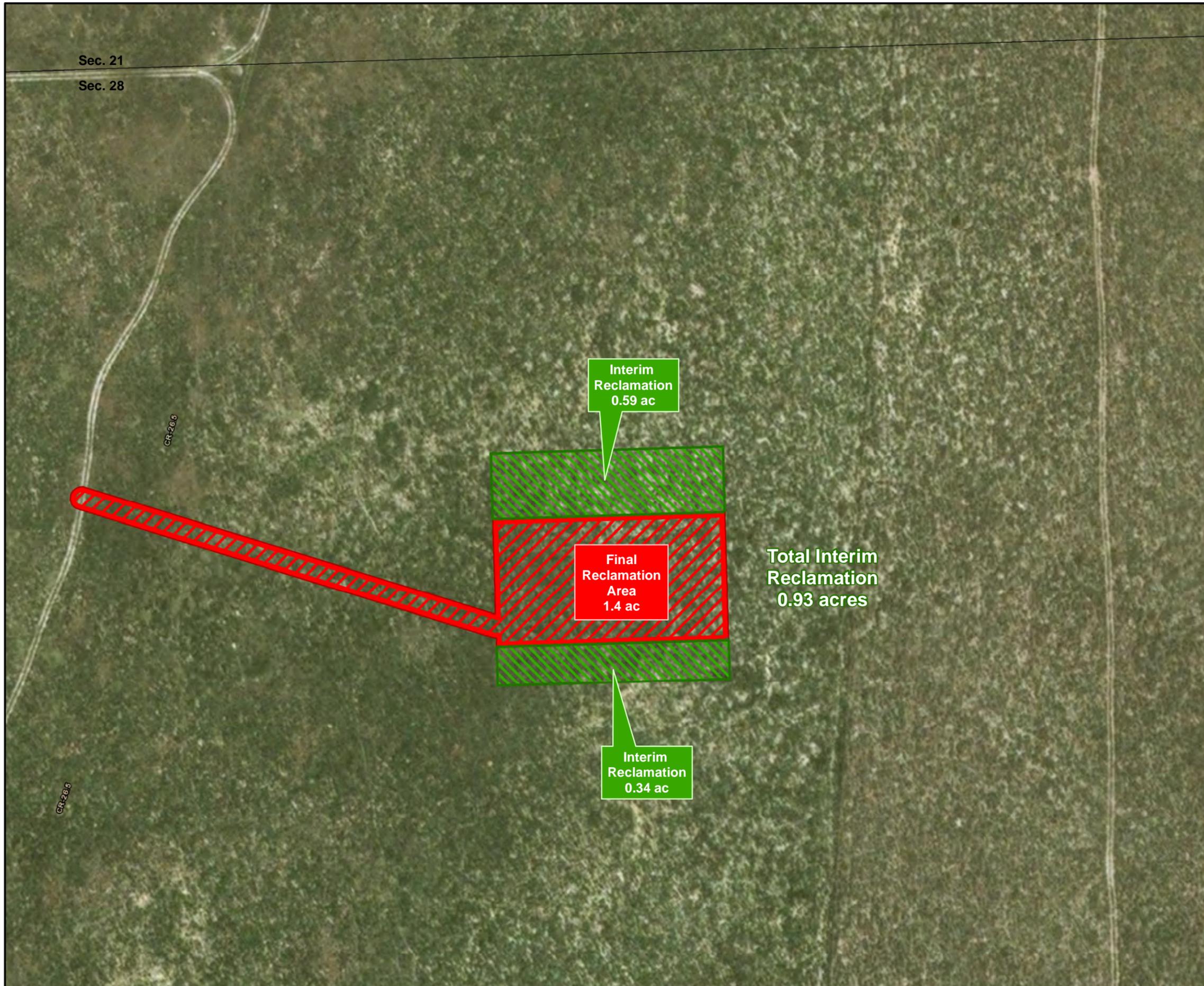
NORTH ←  
1" = 50'



Meadow Deep  
interim reclamation  
& production diagram

NORTH ←  
1" = 50'





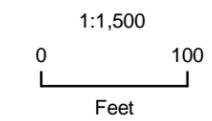
# Meadow Deep, LLC

## Proposed Cottonwood #1 Final Reclamation Map

NW/4 Section 28, Township 34S, Range 46W  
Campo, Baca County, Colorado

### Reclamation

-  Interim Reclamation
-  Final Reclamation



NAD 1983  
Colorado State Plane  
South (feet)

Prepared by Permits West, Inc., February 5, 2018 for  
Meadow Deep, LLC



**MEADOW DEEP LLC  
COTTONWOOD #1  
660' FNL & 1980' FWL, Section 28-Township 34S-Range 46W  
Baca County, Colorado**

**DRILLING PROGNOSIS**

1. ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS (Assumes KB elevation of 4,360')

<b>FORMATION</b>	<b>DEPTH</b>	<b>SUBSEA</b>	<b>LITHOLOGY</b>
Dune sand	0'	4360'	sand
Ogallala	50'	4310'	gravel
Cretaceous-Triassic	250'	4110'	limestone, sandstone, shale
Blaine	1399'	2961'	anhydrite, sandstone, shale
Glorietta	1617'	2743'	sandstone, shale
Stone Corral	1987'	2373'	anhydrite
Mid-Lower Leonardian	2003'	2357'	shale, siltstone, sandstone
Wolfcamp	2725'	1635'	sandstone, shale
Neva	3067'	1293'	limestone, shale
Wabaunsee	3124'	1236'	sandstone, shale
Shawnee (Topeka)	3368'	992'	sandstone, shale
Lansing	3556'	804'	sandstone, shale
Lansing A	3785'	575'	sandstone, shale
Lansing C	4110'	250'	sandstone, shale
Lansing D	4197'	163'	sandstone, shale
Marmaton	4291'	69'	sandstone, shale
Total Depth (TD)	4500'	(140')	

2. ESTIMATED DEPTHS OF ANTICIPATED WATER, OIL, GAS, OR MINERAL FORMATIONS (Assumes KB elevation of 4,360')

<b>Formation</b>	<b>Top (TVD)</b>	<b>Possible Contents</b>
Ogallala	50'	Water
Glorietta	1617'	Water
Lansing A	3785'	Oil/gas/water
Lansing C	4110'	Oil/gas/water
Lansing D	4197'	Oil/gas/water

### 3. PRESSURE CONTROL EQUIPMENT (Schematic Attached - Figure 1)

<b><u>A) INTERVAL</u></b>	<b><u>TYPE</u></b>
1,700' –4,500'	11" x 2,000 psi WP annular BOP with hydraulic closing unit. 11" x 7-1/16" x 3,000 psi WP tubing head.

The blowout preventer will be equipped as follows:

- a) Drilling spool with two side outlets (choke side: 2" minimum and kill side: 2" minimum).
- b) Kill line and kill line valve: Two-inch minimum.
- c) Two kill line valves, one of which will be a check valve (two-inch minimum)
- d) Choke line: Two-inch minimum.
- e) Two choke line valves: Two-inch minimum.
- f) One manually operated choke: Two-inch minimum.
- g) Pressure gauge on choke manifold.
- h) Upper kelly cock with handle readily available.
- i) Full opening internal blowout preventer or drill pipe safety valve able to fit all connections.
- j) Fillup line to be located above annular preventer.

B) Pressure Rating: 2,000 psi.

C) Testing Procedure:

At a minimum, the BOP, choke manifold, and all related equipment will be pressure tested to the approved working pressure of the BOP stack (if isolated from the surface casing by means of a test plug) or to 70% of the internal yield strength of the surface casing (if not isolated from the surface casing by means of a test plug). Pressure will be maintained for a period of at least ten minutes or until requirements of the test are met, whichever is longer.

At a minimum, this pressure test will be performed:

- 1) When the BOP is initially installed.
- 2) Whenever any seal subject to test pressure is broken.
- 3) Following related repairs.
- 4) At thirty-day intervals.

In addition to the above, the pipe rams will be activated daily, and the blind rams will be activated each trip (but not more frequently than once

each day). All BOP tests and drills will be recorded in the IADC Driller's Log (four sheets).

D) Choke Manifold Equipment:

All choke lines will be straight lines, unless turns use tee-blocks, or are targeted with running tees. These lines will be anchored to prevent whip and vibration.

E) Accumulator:

The accumulator will have sufficient capacity to close all rams (plus the annular preventer, if applicable) and retain a minimum of 200 psi above the precharge pressure without the use of the closing-unit pumps. The fluid reservoir capacity will be double the accumulator capacity and the fluid level will be maintained at the manufacturer's recommendations. The BOP system will have two independent power sources to close the preventers. Nitrogen bottles (three minimum) will be considered one of these sources and will maintain a charge equal to the manufacturer's specifications.

The accumulator precharge pressure test will be conducted prior to connecting the closing unit to the BOP stack and at least once every six months thereafter. The accumulator pressure will be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limits as specified on *Onshore Oil and Gas Order Number 2*.

F) Miscellaneous Information:

The blowout preventer and related pressure-control equipment will be installed, tested, and maintained in compliance with the specifications in and requirements of *Onshore Oil and Gas Order Number 2*. The choke manifold and BOP extension rods will be located outside the rig sub-structure. The hydraulic BOP closing unit will be located at least twenty-five feet from the wellhead, but will be readily accessible to the driller. Exact locations and configurations of the hydraulic BOP closing unit will depend upon the particular drilling rig contracted to drill this hole.

#### 4. THE PROPOSED CASING AND CEMENTING PROGRAM

A) Casing Program (all strings of casing will be new, API material):



caliper logs. TOC will be 1500'. Run pilot tests on proposed cement with actual make-up water. Cement design may be altered depending on actual bottomhole temperatures and the presence of lost circulation. Centralizers will be placed (one every joint) through productive intervals from 1500' to TD (35 total centralizers). Water from a municipal source will be used for cementing purposes.

#### 5. MUD PROGRAM:

<u>INTERVAL</u>	<u>WEIGHT (PPG)</u>	<u>VISCOSITY (cp)</u>	<u>WL (CCS)</u>
0' – 1,700'	8.3 - 9.5 ppg	NC	NC

Spud well with fresh water. Addition of lime and/or a selective flocculant may be made at the flowline to promote solids settling in the mud tanks. Keep hole full and drill pipe moving at all times. Sweep hole with gel/lime/polymer as necessary, and prior to running surface casing.

1,700' – 4,500'	9.5 – 9.6 ppg	10 - 16 cp	less than 10 ccs
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At 1,700' mud-up with low-solids, non-dispersed mud system utilizing gel, caustic soda, and PHPA polymer. Keep trip speeds down to reduce surge-swab pressure. Keep hole full at all times. Monitor mud tank volume constantly as lost circulation and water flows should be expected at all times. Check for flow after all drilling breaks. Sweep hole as dictated by hole conditions. Keep the drill pipe moving at all times. Monitor the system for the presence of bacteria and treat out accordingly. Fluid loss may be reduced with the addition of PAC material, if sloughing shales are encountered.

#### 6. EVALUATION PROGRAM:

Electric Logging: GR-CAL-SP-HD induction-CNL-CDL to be run in tandem (triple combo) from base of surface casing to TD. Run GR from surface to TD.

Mud Logging: Base of surface casing to TD.

Drillstem Testing: Potential test of any significant show (possible tests of the Lansing-Kansas City limestone). Unless otherwise indicated, recommended DST times will be as follows: **IF** (15 min.), **ISI** (60 min), **FF** (60 min, depending on blow at surface), and **FSI** (2 x **FF**). Keep length of anchor to a minimum while testing. Test string should include dual packers, top and bottom pressure recorders, jars, safety

joint, sample chamber, and reverse circulating sub (pressure and bar-activated). Have H<sub>2</sub>S monitoring and safety equipment on location for the duration of any test.

Coring: None anticipated.

Stimulation: No stimulation has been formulated for this test at this time. The drill site, as proposed, will be of sufficient size to accommodate all completion activities.

The proposed Evaluation Program may change at the discretion of the well site geologist, with approval from the Authorized Officer, Canon City Field Office, Bureau of Land Management.

Whether the well is completed as a dry hole or as a producer, *Well Completion and Recompletion Report and Log Form #3160-4*) will be submitted to the Canon City Field Office not later than thirty (30) days after the completion of the well or after completion of operations being performed, in accordance with 43 CFR 3164.

Two (2) copies of all logs, core descriptions, core analyses, well test data, geologic summaries, sample descriptions, and all other surveys or data obtained and compiled during the drilling, workover, and/or completion operations will be filed with Form #3160-4. Samples (cuttings, fluids, and/or gases) will be submitted when requested by the District Manager, of the Canon City Field Office.

#### 7. ABNORMAL CONDITIONS

No abnormal temperatures or pressures are anticipated. A maximum bottomhole pressure gradient of 0.43 psi per ft (8.3 ppg) is expected.

#### 8. ANTICIPATED STARTING DATES AND MISCELLANEOUS

<b>Drilling and Completion Step</b>	<b>Approximate Duration</b>
Build Location (roads, pad, and other initial infrastructure)	7 days
Mobilize Rig	3 days
Drilling Operations (24/7)	10-12 days
Demobilize Rig	2 days
Dress Location for Completion	1 day
Completion	8-15 days
Construct Tank Battery and Install Artificial Lift	10-15 days

## B. Miscellaneous:

There shall be no deviation from the proposed drilling and/or workover program as approved. Safe drilling and operating practices must be observed.

All wells, whether drilling, producing, suspended or abandoned shall be identified in accordance with 43 CFR 3162.6. There shall be a sign or marker with the name of the operator, the lease serial number, the well number and the surveyed description of the well.

Any changes in operation must have prior approval from the Authorized Officer (AO), Canon City Field Office, Bureau of Land Management. Pressure tests are required before drilling out from under all casing strings set and cemented in place. Blowout preventer controls will remain in use until the well is either completed or abandoned. Preventers will be inspected and operated at least daily to insure good mechanical working order, and this inspection will be recorded on the daily drilling report. All BOP tests must be recorded in the daily drilling report.

The spud date will be orally reported to the Canon City Field Office within forty-eight (48) hours after spudding. If spudding occurs on a weekend or holiday, this report will be called in on the next regular workday following spudding of the well.

In accordance with *Onshore Oil & Gas Order Number 1*, this well will be reported on MMS Form #3160-6, *Monthly Report of Operations and Production*, starting with the month in which operations commence and continuing each month until the well is physically plugged and abandoned. This report will be filed directly with the Royalty Management Program, Minerals Management Service, P. O. Box 17110, Denver, Colorado 80217.

All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in NTL-3A will be reported to the Canon City Field Office. Major events will be reported verbally within twenty-four (24) hours and will be followed with a written report within fifteen (15) days. "Other than Major Events" will be reported in writing within fifteen (15) days. "Minor Events" will be reported on the *Monthly Report of Operations and Production* (Form #3160-6).

No well abandonment operations will be commenced without the prior approval of the Authorized Officer. In the case of newly-drilled dry holes or failures, and in emergency situations, oral approval will be obtained from the Canon City Field Office Petroleum Engineer. A *Notice of Intention to Abandon* (Form 3160-5) will be filed with the Authorized Officer within fifteen (15) days following the granting of oral approval to plug and abandon.

Upon completion of approved plugging, a regulation marker will be erected in accordance with 43 CFR 3162.6. The following information will be permanently placed on the marker with a plate, cap, or beaded-on with a welding torch: Company Name, Well Name and Number, Location by Quarter/Quarter, Section, Township, Range, and the Federal Lease Number.

A *Subsequent Report of Abandonment* (Form #3160-5) will be submitted within thirty (30) days following the actual plugging of the well bore. This report will indicate where plugs were placed and the current status of surface restoration operations. If surface restoration has not been completed at that time, a follow-up report on Form #3160-5 will be filed when all surface restoration work has been completed and the location is considered ready for final inspection.

Pursuant to NTL-4A, lessees and operators are authorized to vent/flare gas during initial well evaluation tests, not exceeding a period of thirty (30) days or the production of fifty (50) MMCF of gas, whichever occurs first. An application must be filed with the Authorized Officer, and approval received, for any venting/flaring of gas beyond the initial (30) day or otherwise authorized test period.

Not later than the 5<sup>th</sup> business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than ninety (90) days, the operator shall notify the Authorized Officer by letter or “*Sundry Notice*”, of the date on which such production has begun or resumed. The notification shall provide as a minimum, the following informational items:

- a. Operator name, address, and telephone number.
- b. Well name and number.
- c. Well location “1/4, 1/4, Section, Township, Range, P.M.”
- d. Date well was placed in a producing status.
- e. The nature of the wells production, i.e.: crude oil casing gas, or natural gas and entrained liquid hydrocarbons.
- f. The OCS, Federal or Indian lease prefix and number on which the well is located. Otherwise, the non-Federal or non-Indian land category, i.e.: state or private.

Within sixty (60) days following construction of a new tank battery, a site facility diagram of the battery showing actual conditions and piping must be submitted to the Authorized Officer. Facility diagrams shall be filed within sixty (60) days after existing facilities are modified. For complete information as to what is required on these diagrams, please refer to 43 CFR 3162.7-4 (d).

Pursuant to *Onshore Oil & Gas Order Number 1*, lessees and operators have the responsibility to see that their exploration, development, production, and construction operations are conducted in such a manner which conforms with

applicable Federal laws and regulations and with State and Local laws and regulations to the extent that such State and local laws are applicable to operations on Federal and Indian lands.

Date:

Prepared by:

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Dan Hall

Please direct all correspondence regarding this permit to:

Dan Hall  
ENERGY OPERATING COMPANY, INC.  
7114 W. Jefferson Ave., Suite 206  
Lakewood, CO 80235

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**Reclamation Plan**

**for**

**Meadow Deep LLC's**

**PROPOSED COTTONWOOD #1 WELL and**

**ACCESS ROAD**

**NE/4 Section 28,**

**S/2 Section 21,**

**S/2 Section 22,**

**N/2 Section 27,**

**NWNW Section 26**

**T. 34 S. N., R. 46 W.,**

**Baca County, Colorado**

November 21, 2017

**Appendix 5-1**

Prepared by:  
Daniel Gibson-Reinemer  
for



Permits West, Inc.  
37 Verano Loop  
Santa Fe, NM 87508

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## **1. INTRODUCTION**

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Meadow Deep is providing this Surface Reclamation Plan to U.S. Forest Service as part of the Surface Use Plan of Operations (SUPO) for the Meadow Deep Cottonwood #1 Well Project.

The project involves drilling a well pad, constructing a new section of road, and expanding and upgrading an existing road on lands managed by the U.S. Forest Service.

### **1.1 Vegetation Reclamation**

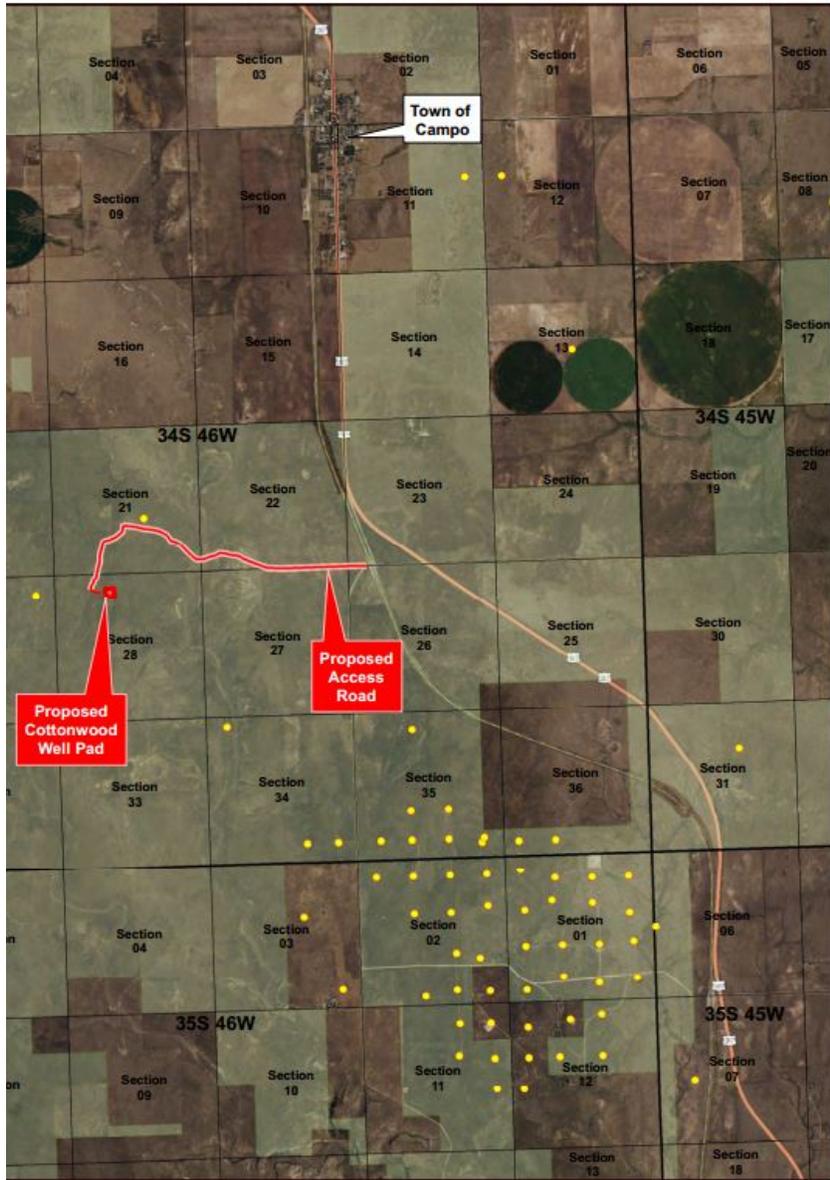
The plan for revegetation of the well pad and road will follow Procedure B of the BLM Farmington Field Office (BLM-FFO) Bare Soil Reclamation Procedures (BLM 2013a). Choice of Procedure B is based on the land use acreage, which will not exceed 11.28 acres.

## **2. PROJECT SITE DESCRIPTION**

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The terrain in the proposed project area occurs in the gently sloping plain of eolian deposits and sand dunes overlying formerly productive mixed grass and shortgrass prairie soils in the Southern High Plains Section of the Western Great Plains Division. Soils within the project area are composed of Valent sand, 1 to 9 percent slopes, warm, and are derived from eolian sands (NRCS 2017). Vegetation in the project area is classified as sandhill shrubland (CNHP 2017c). The elevation within the project area ranges from approximately 4,310 feet to 4,350 feet.

An overview of well pad and the route is provided in Figure 1. A photograph of the site is provided in Figure 2.



**Meadow Deep, LLC**

**Proposed Cottonwood #1  
Project Location Map**

Sections 21, 22, 23, & 28,  
Township 34S, Range 46W  
Campo, Baca County, Colorado

**Surface Owner**

Comanche National Grasslands

**Proposed Facilities**

- Proposed 300' x 300' Pad
- New Road
- Road to be Upgraded

**Existing Oil & Gas Wells**

- Existing O&G Well (any status)



Prepared by Permits West, Inc., October 2, 2017 for Meadow Deep, LLC



Figure 1. Overview of proposed well site and road



Figure 2. Photograph taken looking north along a fence line located to the east of the proposed well site.

## 2.1 Estimated Disturbance

Disturbances associated with this project are the well pad and access route (Table 1).

Table 1. Disturbance and permitted acres for the Cottonwood #1 well project

Land use component	Dimensions (feet)	Area (acres)
Well site	300'x300'	2.57
New road construction	30'x545'	0.38
Upgraded road	30'x12,102'	8.33
<b>TOTAL</b>		<b>11.28</b>

## 3. PRE-DISTURBANCE EVALUATION

### 3.1 Vegetation Community

Vegetation in the project area is classified as sandhill shrubland (CNHP 2017c). Dominant species observed throughout the project area included a variety of tall, mixed, and shortgrass species interspersed with sand sagebrush (*Artemisia filifolia*) and soapweed yucca (*Yucca glauca*).

Tall warm-season grass species such as sand bluestem (*Andropogon hallii*), prairie sandreed (*Calamovilfa longifolia*), and switchgrass (*Panicum virgatum*), were observed within the proposed project area,

though none of these species occur in large, continuous stands. Dominant grass species observed during the botanical survey included blue grama (*Bouteloua gracilis*), sideoats grama (*B. curtipendula*), little bluestem (*Schizachyrium scoparium*), needle and thread (*Hesperostipa comata*), Indian ricegrass (*Achnatherum hymenoides*), three-awn (*Aristida purpurea* var. *longiseta*), western wheatgrass (*Pascopyrum smithii*), sand dropseed (*Sporobolus cryptandrus*). Native forbs included Cuman ragweed (*Ambrosia psilostachya*), prairie clovers (*Dalea* spp.), bush morning-glory (*Ipomoea leptophylla*), dotted gayfeather (*Liatris punctata*), and snakeweed (*Gutierrezia sarothrae*).

### 3.2 Proposed Reclamation Seed Mixtures

Disturbed areas will be re-contoured, the topsoil redistributed and the land prepared for seeding by the construction contractor. The construction contractor will use Forest Service approved seed mixes. The seed must be certified. Proof of certification must be provided the Forest Service prior to seeding. The proposed seed mix listed below (Table 2) was developed directly from consultation with the Forest Service office in Elkhart, KS. Seeding for interim reclamation and final reclamation will be conducted during the time period of January 15 through April 15.

**Table 2. Proposed Comanche National Grassland Seed Mixture**

Common Name	% of Mix	Pure Live Seed (PLS) lbs/acre*
Sand dropseed	2.8%	0.25
Prairie sandreed grass	11.1%	1.00
Blackwell switchgrass	27.8%	2.50
Sand bluestem	11.1%	1.00
Indian grass	19.4%	1.75
Little bluestem	11.1%	1.00
Blue grama	5.6%	0.50

Western wheatgrass	11.1%	1.00
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*\* Based on 60 pure live seeds (PLS) per square foot, drill seeded. This rate will be doubled to 120 PLS per square foot if broadcast or hydro seeded.*

## **4. RECLAMATION TECHNIQUES FOR SUCCESSFUL REVEGETATION**

### **4.1 Vegetation and Site Clearing**

Vegetation located on the area to be disturbed will be removed. Shrubs, sub-shrubs and brush will be removed using a brush hog. Some slash/brush will be retained for further use (see Section 5. Interim Reclamation). Large woody debris, tree stumps and root-balls will be removed for off-site disposal at an approved disposal facility. All plant material less than three inches in diameter including grasses and forbs will be chipped and incorporated into the soil through scraping, ripping or tilling the soil.

### **4.2 Topsoil Stripping, Storage and Replacement**

Where possible, the upper six inches of topsoil will be stripped from any ground disturbance and. The top 6 inches of soil will be bladed and discretely stockpiled separated from other excavated materials around the perimeter of the pad (as described in the Appendix C: Drilling Rig Layout). Pit subsoil will be piled west of the pit, separate from the topsoil. The topsoil piles will be sufficiently shallow to avoid sterilization. Best Management Practices (BMP) will be employed to prevent wind and water erosion of the piles. Equipment traffic and vehicles will not be allowed on the topsoil piles.

Construction and maintenance activities will not occur if the ground is frozen and/or the soil is highly saturated with water. Activities will also cease when the vehicles cause ruts that are equal to or deeper than 6 inches in the soil. The topsoil will never be used to create berms or other construction facilities.

Once construction is complete and the site has been recontoured, the topsoil will be applied uniformly to cut and fill slopes and also evenly spread on disturbed areas that will be involved in the interim reclamation effort. There it will be raked, dragged, or harrowed to create a firm seedbed. During final reclamation, the topsoil will be stripped from the cut and fill slopes to use in the final reclamation activities.

If topsoil remains piled longer than 90 days, soil testing may be recommended. A site stabilization plan (SSP) may be implemented in cooperation with the BLM-FFO if no activities occur on the site for 120 days after the land has been disturbed and interim reclamation has not been accomplished.

### **4.3 Recontouring**

After operations are completed and surface facilities have been constructed, the disturbed land will be recontoured to original contours.

### **4.4 Seedbed Preparation**

All compacted areas in the project area will be ripped to a depth of at least 18 inches with a maximum furrow spacing of two feet. Where practicable, ripping will be conducted in two passes at perpendicular directions. If disking is necessary, it will be conducted along the contour of any slopes at a depth of one-half (1/2) inch.

### **4.5 Seed Application/Re-seeding and Timing**

It is proposed that seed will be sown using a seed drill. Drill will be a disk type with  $\geq 2$  compartments for separate seed sizes. Drill will have agitators to uniformly distribute seeds. Drills will be spaced no further than 8" apart. In the event that broadcast or hydro-seeding is utilized as a method of seed distribution, the rate of seed application will be doubled from 60 pure live seeds (PLS) per square foot to 120 PLS per square foot. Seeding of disturbed areas at the site will be conducted between January 15 and April 15.

### **4.6 Weed Management**

Noxious weeds will be controlled during the life of the proposed project or until a Final Abandonment Notice. If noxious weeds are observed during onsite visits, the operator will provide written notice to the Forest Service.

### **4.7 Erosion Control**

Erosion control measures will be taken as the needs arise or as identified by Forest Service representatives during onsite visits. A 48-60 inch culvert will be installed where Forest Road 2484 crosses a wash in Section 21 to minimize erosion.

### **4.8 Challenges**

No challenges to successful revegetation specific to the project site have been identified for the project area. However, a general challenge to successful revegetation in the area is the receipt of adequate precipitation after seeding. If there is a prolonged drought after seeding, reseedling may be necessary after precipitation has occurred.

## **5. INTERIM RECLAMATION**

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Interim reclamation will be applied once production equipment is installed and the well pad can be reduced in size. The unneeded areas of the well pad will be revegetated according to Procedure B of the BLM-FFO Bare Soil Reclamation Procedures within 90 days of completing the well (BLM 2013a).

Disturbed areas will be contoured to a natural shape and no steeper than 3:1 grade. Soil and some brush from the initial clearing will be spread evenly over the disturbed areas. A relatively sparse brush/plant fragment cover on the ground will still provide microhabitat niches that encourage both seed catchment and seedling establishment. It also has the potential for long-term natural decomposition by microbes, macro-fungi, and arthropods, which benefits the soil.

## **6. FINAL RECLAMATION**

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### **6.1 Final Abandonment/Relinquishment**

Meadow Deep will be responsible for disturbance related to the Cottonwood #1 Well Project under the approved APD until relinquished or final abandonment approval is granted or the ownership is transferred.

Best management practices (BMPs) will be utilized from pre-disturbance to final abandonment or relinquishment in order to minimize disturbance and erosion. Activities will be conducted to maximize the potential for the recovery of pre-disturbance vegetation cover and ecological function.

### **6.2 Final Reclamation Activities**

Final reclamation and revegetation activities will be completed within one year of plugging the well. Meadow Deep will contact the Forest Service 48 hours prior to employing earth moving equipment on the site. The long term goal of the final reclamation effort is to lay a foundation so that natural species succession can occur and ecological function is restored to pre-disturbance conditions.

Meadow Deep will perform the following reclamation activities:

- Anchors, deadmen, tie downs and risers will be cut off at least two feet below ground level.
- All disturbed areas will be scarified. All imported gravel or caliche on the well pad surface will be removed from the location.
- Fill material on the well pad will be used to mimic natural topography, and the cut and fill slopes will be recountoured to original contours.
- The entire disturbed area will then be backfilled with topsoil, landscaped, seeded, mulched, and fenced to exclude livestock. The fence will remain in place until vegetation has been established. It will be removed prior to approval of final abandonment.
- On slopes greater than 4% waterbars (contour ditches) will be constructed on the contour at seventy-five (75) foot intervals beginning at the top of the disturbed slope. They should be at least on (1) foot deep, with approximately two (2) feet of drop per one hundred (100) feet and with the berm on the downhill side.
- The well pad will be ripped to reduce compaction.
- All disturbed areas will be mulched at the rate of 20 tons of manure/acre or 2 tons/acre of native weed free grass hay/straw. The mulch must be crimped into the surface. Weed free certification must be submitted to Forest Service .
- Vegetation slash and/or brush will be placed at areas where there is expected water discharge to minimize sediment transport.
- Seed will be sown using a seed drill. If conditions do not allow the use of a seed drill, seed will be broadcast or hydro seeded. Seed mixtures will be certified weed-free and the seeding records (bag labels) or other official documentation made available to the Forest Service. Seeding will be done in accordance with the BLM-FFO Bare Soil Reclamation Procedures.
- Temporary and/or permanent erosion control techniques may be employed around the pad depending upon local drainage patterns and the potential for soil erosion. Techniques may include but are not limited to straw wattles, diversion ditches, mulch, and soil blankets. BMPs will be used in all cases.
- The existing road will remain intact but the final 545 feet that needed to be built to the well pad will be revegetated and reclaimed in a similar way to the pad. The existing road may be returned to its original condition at the discretion of the Forest Service.
- Weed management to control the introduction and spread of noxious weeds will be implemented if necessary. The operator may have to mow weeds the first year after vegetation is established. An alternative is to control weeds by chemical means until they are exterminated. All herbicides are to be approved for use by the Forest Service and applied by a certified applicator.

- All surface equipment and trash will be removed from the site and disposed of in an approved disposal facility.

- Bureau of Land Management (BLM) subsurface plugging/casing requirements will be implemented. A permanent abandonment marker inscribed with operator, well number, and location (quarter section, township, range) is required. This marker will be 24 inches below the surface level so that it has 24 inches of soil cover after final reclamation. Leave a small weep hole in welded top of casing. The hole serves as a seepage indicator.

## **7. MONITORING, REPORTING AND ATTAINMENT OF RECLAMATION STANDARDS**

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### **7.1 Reclamation Monitoring**

#### **7.1.1. Initial Monitoring**

After the well, access road and pipeline have been constructed and a seeding inspection has been conducted the Forest Service will establish monitoring sites. These sites will be documented by the Forest Service using global positioning system (GPS) data and recorded in an appropriate datum. Photopoints will be established to provide the following photographs: Three photographs will be taken from each of three photopoints to illustrate the general condition of the overall site, two photographs will be taken of each ROW line point intercept transect (looking from each stake to the opposite stake), and one photograph will be taken of each vegetation cage (following procedures in BLM 2013).

#### **7.1.2. Annual Monitoring**

Annual monitoring will begin two calendar years after seeding. As for the initial set up, photographs from each photo point, two photographs of each ROW line point intercept transect (looking from each stake to the opposite stake) and a photograph of each vegetation cage will be taken (BLM 2013).

#### **7.1.3. Attainment Goals**

Reclamation will be approved (minimum timeframe of two growing seasons) when the established vegetative cover is equal to 80% of the adjacent areas. The operator's bond will not be released until the area has been successfully reclaimed. If the attainment goals are not met, the Forest Service can request a conference to discuss the situations. Remedial plans and actions depend upon the specific situation.

## **9. REFERENCES**

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BLM [Bureau of Land Management] (2013a). Farmington Field Office Bare Soil Reclamation Procedures. USDI Bureau of Land Management, Farmington Field Office. Available online at: [http://www.blm.gov/style/medialib/blm/nm/field\\_offices/farmington/farmington\\_planning/surface\\_us\\_e\\_plan\\_of.Par.69026.File.dat/FFO%20Bare%20Soil%20Reclamation%20Procedures%202-1-13.pdf](http://www.blm.gov/style/medialib/blm/nm/field_offices/farmington/farmington_planning/surface_us_e_plan_of.Par.69026.File.dat/FFO%20Bare%20Soil%20Reclamation%20Procedures%202-1-13.pdf)

U.S. Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS), U.S. Department of Agriculture. 2017. Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>, accessed October 15 and 22, 2017.

# **ROAD PLAN OF DEVELOPMENT**

## **Meadow Deep Cottonwood #1 Road**

*November 10,  
2017*

**NE/4 Section 28,  
S/2 Section 21,  
S/2 Section 22,  
N/2 Section 27,  
NWNW Section 26  
T. 34 S. N., R. 46 W.,  
Baca County, NM**

**Meadow Deep, LLC**

# ROADS

## PLAN OF DEVELOPMENT

### 1. Purpose and Need

#### a. purpose and need for the road

The purpose of the proposed road is to provide access to Meadow Deep, LLC's proposed Cottonwood #1 oil well. The road would be used by Meadow Deep to access, develop and maintain the Cottonwood #1 oil well.

#### b. what will be constructed

The proposed 12,647.66-foot long road will consist of 12,102.66 feet of upgraded road and 545 feet of newly built road. The new road would extend west-northwest from the southwest corner of the well pad (NENW Sec. 28, T. 34 S., R. 5 W.) in a straight line for 545 feet within a 20-foot width to an existing Forest Service road (Forest Road 2484B). The 12,102.66 feet within a 20-foot width of Forest Roads 2484B and 2484 would be upgraded from the intersection of the proposed new road to the intersection of County Road F and County Road 28 (NWNW Sec. 26, T. 34 S., R. 5 W.). The total proposed road ROW would cover a total of 5.82 acres. The road and well pad are located entirely on Forest Service surface lands. The requested special use term will be determined by the District Ranger. Contingent upon production, an oil and/or gas pipeline may be installed within the road Right-of-Way at a later date.

#### c. Does the proposal involve new construction, reconstruction or improvement of an existing road?

The proposal involves new construction of 545 feet of well access road and improvement of 12,102.66 feet of existing road for a total ROW length of 12,647.66 feet. The new and improved road sections will be built and maintained to *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (BLM Gold Book) and BLM Handbook 9113 standards, as well as consulting with the U.S. Forest Service and Baca County for specifications. Meadow Deep will be responsible for the final 545-feet of new road to be built that would connect Forest Road 2484B to the proposed well pad. Meadow Deep will defer to the Baca County Road Department and U.S. Forest Service for maintenance determinations of County Road F, Forest Road 2484B, and Forest Road 2484. If these and other existing roads require reconstruction due to activity associated with this project, or if required by the Forest Service, the operator will upgrade the existing non-county road(s) to the most recent Gold Book standards and BLM Handbook 9113. To minimize impacts to Forest Service surfaces, Meadow Deep initially will use a "primitive" road construction approach, following Gold Book procedures for "exploration drilling locations where it is not certain if the well will be productive" (BLM Gold Book 2007). This approach has the "advantage of reducing construction, maintenance, and reclamation costs and reducing resource impacts" (BLM Gold Book 2007). If the well is productive, the road would then be upgraded to a constructed road of Gold Book standards.

**d. is the use temporary or permanent?**

This road is permanent and will be used to access the Cottonwood #1 well for the life of the well. The use of a primitive road would be temporary; it would be returned to the original condition if the well is unproductive or converted to a constructed road if the well is productive.

**e. Length and width of the right-of-way and the area needed for related facilities**

The road ROW on existing forest roads will be 20 feet wide and will extend 12,102.66 feet for a total of 5.56 acres. The new well access road would be 20 feet wide and will extend for 545 feet covering 0.26 acres. Both roads (existing and new) together measure 12,647.66 feet and cover 5.82 acres and are entirely on U.S. Forest Service land. The proposed well would be placed on a 300-foot by 300-foot well pad (1.14 acres after drilling and interim reclamation is complete).

**f. is this ancillary to an existing right-of-way**

No.

**g. list alternative routes or locations**

An alternative route would be to place the road in a shorter, straighter path from an existing well can in the NENW Sec. 21, but this would require a greater amount of new disturbance.

**h. estimated start date and duration of road construction activities**

The estimated start date is upon approval. The duration of road construction activities is anticipated to be two weeks.

**i. type and volume of traffic that is anticipated**

Once construction has completed, anticipated traffic volumes during the drilling period (approx. 30 days) is 10-15 trucks per day. Approximately 50% of these vehicles will be heavy trucks. Once drilling operations have completed traffic will reduce to 2-3 tanker trucks per day (oil hauling). This will decrease over time, as production slows and fewer trucks are needed. Average long term traffic volumes are estimated to be 1 small pickup truck per day (lease operator) and 3-5 trucks per week for misc. facility servicing and oil hauling.

**j. season of use**

Year-round during dry conditions.

**k. origination and destination of the road**

The proposed road would begin at the proposed Cottonwood #1 well in the NENW Section 28 and end at the junction of County Road F and County Road 28 in the NWNW Section 26.

**2. Right-of-Way Location (Survey map required)**

A map of the project is contained in Attachment 1. Survey plats are contained in Attachment 2.

**a. legal description (Include map and directions to project site)**

The proposed road begins in the NW/4 Section 28, extends through the S/2 Section 21, the S/2 Section 22, the N/2 Section 27, and terminates in the NWNW Section 26, T. 34 S., R. 5 W. in Baca County, Colorado. A map and directions to the proposed road and associated Cottonwood #1 well pad is contained in Attachment 3.

**b. centerline survey for complete project (required)**

Plats are contained in Attachment 2.

**c. additional site specific engineering surveys for critical areas**

None.

**d. maps and drawings showing river crossings**

None.

**e. acre calculation of the right-of-way by land status and ownership (federal, state, private)**

The project is located entirely on U.S. Forest Service surface land ownership. Road ROW = 12,647.66 feet length x 20 feet width = 5.82 acres. Only 0.26 acres of new road disturbance would be outside an existing forest road ROW.

### **3. Government Agencies Involved**

**a. FIMO, USFWS, BIA, USFS, ACE (others)**

Government agencies involved in this project include: the U.S. Forest Service.

**b. Are Corps of Engineers Section 404 permits needed.**

No.

**c. state and local agencies that may be involved**

Colorado Parks and Wildlife will be involved to coordinate and advise on issues related to Lesser Prairie Chicken. Drilling approval will be subject to Colorado Oil & Gas Conservation Commission (COGCC) review and consultation with the Comanche National Grassland is required as part of this process.

### **4. Facility Design Factors**

**a. minimum and maximum engineering standards**

The road will be designed and upgraded *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (BLM Gold Book) and BLM Handbook 9113 standards, under consultation with the U.S. Forest Service and Baca County.

**1) construction standards of the road**

Design standards will follow Gold Book guidelines. The road will be crowned ( $\approx 0.04$  ft/ft), ditched, and have a  $\approx 14$ -foot wide running surface. Maximum cut or fill = 3'. Maximum grade = 8%.

**2) maximum grade and pitch of the road**

Maximum grade of the road is 8%.

**3) requirements and location of drainage ditches, culverts, bridges and low-water crossings**

A 48"-60" culvert will be installed where Forest Road 2484 crosses a wash in Section 21.

**4) if the road will be surfaced, what surfacing material will be used**

The road will be surfaced with gravel where required during the drilling phase. If well is productive and a permanent road is to be built, the entirety of the surface will be graveled.

**5) length and width of road (specify running surface and total width and length)**

The total length of the road will be 12,647.66 feet within a 20-foot ROW, using a 14-foot-wide travelway.

**6) cut and fill diagram**

See diagram with well plat

**b. detailed engineering plans and specifications for major structures**

No major structures will be built.

**1) major culverts, bridges, retaining walls**

A 48"-60" culvert will be installed where Forest Road 2484 crosses a wash in Section 21.

**c. location, purpose, dimensions, and acreage of any temporary use areas**

No temporary use areas are required.

**d. required or proposed upgrades to existing access roads (BLM serial number or local road name)**

545 feet will be built and 12,102.66 feet of road will be upgraded and maintained to *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (BLM Gold Book) and BLM Handbook 9113 standards. Meadow Deep will defer to Baca County Road Department for county roads and the Forest Service for forest roads. If existing roads require reconstruction due to activity associated with this project, or if required by the BLM-FFO, the operator will upgrade existing non-county road(s) the most recent Gold Book stands and BLM Handbook 9113.

**5. Additional Components of the Right-of-Way**

**a. facilities at each end of the road (local road, BIA road, well pad etc. include authorization)**

The proposed access road will connect Meadow Deep's proposed Cottonwood #1 oil well (fee lease) to an existing county road that accesses US Highway 287/385.

**b. connection to an existing right-of-way (include BLM serial number)**

None.

**1) existing components on or off public land**

All existing components are on U.S. Forest Service surface lands.

**2) possible future components**

Contingent upon production, an oil and/or gas pipeline and/or other linear facilities may be laid parallel to the existing roads at a later date.

**c. Need for sand gravel and where it will be obtained (will it come from public lands)**

Gravel from private, off-grassland sources will be used for road surfacing.

**1) other pipelines within the corridor**

None.

**2) off-set requirements**

Offset requirements is 15-feet from the nearest parallel pipeline.

- d. location of staging or equipment storage, and include areas that may need remediation (i.e.; road, stream crossings, erosion etc.; include written approval for sites or issues involving other entities)**

Equipment will be stored within the ROW. The road will be crowned (= 0.04 ft/ft), ditches, and will have a 14' wide running surface. A borrow ditch will be placed on the west side of the road. The front slope of the borrow ditch will be left bare. Topsoil and brush will be retrieved from grading and will be spread on the back slope of the borrow ditch.

A 48"-60" culvert will be installed where Forest Road 2484 crosses a wash in Section 21.

- e. will any communication facilities be necessary or included (call boxes etc.)?**

No.

## **6. Construction of the Facilities**

Please see Attachments 1 and 2 for maps, drawings and diagrams (required in items f, h, I below)

**a. construction description**

Road construction will follow Gold Book standards or those of the U.S. Forest Service and Baca County to upgrade existing road sections.

**1) major facilities (including vehicles and number of tons and loads)**

The total number of vehicles is estimated at three- to four and will depend on the component being constructed.

**2) ancillary facilities (including vehicles and number of tons and loads)**

The total number of vehicles is estimated at three- to four and will depend on the component being constructed.

**3) methods of construction and types of equipment to be used on the road right of way**

Construction of the proposed access road and improvements to the existing access road are expected to take approximately 7 to 15 days to complete. The proposed access road will be cleared of vegetation. The vegetation (including stems of brush less than 3 inches in basal diameter and slash/brush) would be chipped or mulched through scraping, ripping or tillage and incorporated into the topsoil as additional organic matter. The proposed access road would be leveled with a D-8 bulldozer to provide a level surface for vehicles and equipment.

**b. work force (number of people and vehicles)**

The project will require up to six (6) workers and up to four (4) vehicles.

**c. flagging or staking the right-of-way**

The route will be re-staked prior to construction to clearly mark the project centerline and the edge of the ROW.

**d. clearing and grading**

Brush will be cleared during construction of the trench. The topsoil will be stockpiled separately from spoils for later use as a seedbed in reclamation.

**e. description of construction process and facilities (include seasonal restrictions)**

The construction process will consist of: 1. Surveying and staking; 2. Clearing of brush; 3. Stripping of topsoil from ROW; 4. Replace topsoil, final cleanup; and 5. Revegetation seeding.

- f. access to, and along, right-of-way during construction (map, include BLM serial number)**  
Access will be from existing roads. Travel will be overland along route within ROW. Please see Attachments 1 and 2 for maps of the access to the project.
- g. traffic control**  
In cases where roads must be crossed, signage will be placed 500 feet from construction to notify the public of construction activity.
- h. engineering drawings and specifications for site-specific problems relating to surface use or special mitigation (5f)**  
None.
- i. diagrams, drawings, and cross sections to help visualize the scope of the project**  
Please see Attachments 1 and 2.
- j. special equipment that will be utilized**  
A bulldozer will be used in road construction.
- k. contingency planning**  
In case of emergency or for contingency planning, contact the following:
  - 1) holder contacts**  
Jeff Brame, representative for Meadow Deep LLC, 970.259.3037 (cell)
  - 2) US Forest Service contacts**  
Shiloh Benton (BLM): 620.697.3578
- l. safety requirements**  
All construction, operation, and maintenance will be conducted according to Occupational Safety and Health Administration (OSHA) standards and requirements.
- m. industrial wastes and toxic substances (collection and disposal methods)**  
No industrial wastes or toxic substances will be stored on-site, produced by this project, or conveyed to or from this site.
- n. post-construction requirements and activities**  
Please see Section B. Reclamation Plan, below

## **7. Resource Values and Environmental Concerns (include photos)**

Photos included at the end of this document.

- a. address at level commensurate with anticipated impacts and location with regard to existing corridors**  
The proposed Cottonwood #1 access road route connects to an existing Forest Road in a straight line to minimize new disturbance; from that point to its terminus, the road access would occur within existing roads to minimize new disturbance.  
Potential impacts are anticipated for air quality, cultural resources, vegetation, special status species, migratory birds, wildlife, and water resources; and from invasion of noxious weeds due to vegetation removal, trenching, scraping, overland travel, and construction of berms and installation of a borrow ditch along a portion of the proposed access road.
- b. potential issues and/or conflicts regarding livestock grazing, public health and safety, and resources (air, noise, geologic hazards, mineral and energy resources, paleontological resources, cultural resources, soils, water, vegetation, forest resources, wildlife, threatened and endangered species, cultural resources, visual resources, noxious weeds, livestock grazing, BLM projects, recreation activities, wilderness, etc. )**  
Potential issues may arise related to: air quality – dust and engine exhaust from construction; cultural resources – potential to uncover buried resources during

construction; vegetation – crushing, burying, and removal during construction; migratory birds, and wildlife – temporary loss of habitat and slight short-term fragmentation while reclamation vegetation establishes; threatened and endangered species – potential for Lesser Prairie Chicken to occur within project area; water quality – related to earth work during construction of the berms and borrow ditch; and noxious weeds – potential establishment following soil disturbance.

**c. project design features to mitigate the above issues and/or conflicts (include seasonal restrictions)**

Project design features for mitigating the above issues and/or conflicts include: cultural resources – reducing the size of the construction area, and site monitoring; vegetation – restoration and reseeded; special status species, migratory birds and wildlife – siting the project area near existing disturbances (e.g., between an existing road and an existing fenceline), reducing the size of the disturbance, and best management practices (BMPs) and consultation with biologists at Colorado Parks and Wildlife; water – BMPs including laying back slopes, earthwork grading, surface roughening, straw wattles, revegetation seeding, mulching; noxious weeds – inspecting construction equipment for mud and debris, cleaning construction equipment prior to initiating work on the work site, monitoring for weeds, and treatment as needed.

## **8. Operation and Maintenance**

**a. will new or expanded access be needed for operation and maintenance**

No.

**b. placement of control, warning, and directional traffic signs**

Yes, signs will be placed 500 feet from construction to notify the public of construction activity.

**c. Maintenance of special needs such as snow removal, seasonal closure, and controlled access**

No.

**d. will all maintenance activities be confined within the right-of-way**

Yes.

**e. safety**

All OSHA safety standards and requirements will be followed for construction, operation, and maintenance.

**f. will industrial wastes and toxic substances be generated or stored on right-of-way**

No.

**g. inspection and maintenance schedules**

The road will be inspected on an annual basis and will be maintained as needed.

**1) will these be conducted on-the-ground and/or by aircraft**

Inspection and maintenance will be conducted on the ground.

**2) if by aircraft, will the aircraft require landing strips and/or heliports**

n/a

**h. work schedules**

Maintenance will be carried out as necessary to allow for safe travel and to reduce impacts to the environment from erosion and run-off. All maintenance will be performed during daylight hours Monday through Friday.

**i. fire control**

The road corridor will be cleared of coarse woody debris.

**j. contingency planning**

Contingency planning will be conducted by Meadow Deep on a case-by case basis, and is dependent on the potential risks/threats requiring additional planning effort.

**B. RECLAMATION PLAN\*\*\* (Required)**

**1. Pre-Construction (include Photos)**

Photos of the proposed project area are included below.

**a. vegetative community – list grasses, forbs, shrubs, and trees present in project area**

**Shrubs and Subshrubs**

<i>Artemisia filifolia</i>	Sand sage
<i>Gutierrezia sarothrae</i>	Broom snakeweed
<i>Rhus trilobata</i>	Threeleaf sumac

**Grasses and Grass-like Plants**

<i>Achnatherum hymenoides</i>	Indian ricegrass
<i>Andropogon gerardii</i>	Big bluestem
<i>Andropogon hallii</i>	Sand bluestem
<i>Aristida purpurea</i> var. <i>longiseta</i>	Fendler threeawn
<i>Bouteloua curtipendula</i>	Sideoats grama
<i>Bouteloua dactyloides</i>	Buffalograss
<i>Bouteloua gracilis</i>	Blue grama
<i>Cyperus</i> sp.	Flatsedge sp.
<i>Hesperostipa comata</i>	Needle and thread
<i>Muhlenbergia torreyi</i>	Ring muhly
<i>Pascopyrum smithii</i>	Western wheatgrass
<i>Redfieldia flexuosa</i>	Blowout grass
<i>Schizachryium scoparium</i>	Little bluestem
<i>Sporobolus cryptandrus</i>	Sand dropseed
<i>Sporobolus flexuosus</i>	Mesa dropseed

**Forbs and Succulents**

<i>Ambrosia psilostachya</i>	Cuman ragweed
<i>Asclepias speciose</i>	Showy milkweed
<i>Bassia scoparia</i>	Burning bush
<i>Chamaesyce maculate</i>	Prostrate spurge
<i>Croton pottsii</i>	Croton
<i>Dalea candida</i>	White prairie clover
<i>Dyssodia papposa</i>	Fetid marigold
<i>Eriogonum annuum</i>	Annual buckwheat
<i>Eriogonum effusum</i>	Spreading buckwheat
<i>Helianthus annuus</i>	Common sunflower
<i>Helianthus pauciflorus</i>	Stiff sunflower
<i>Heterotheca subaxillaris</i>	Camphorweed
<i>Ipomea longifolia</i>	Bush morning glory

<i>Liatris punctate</i>	Gayfeather
<i>Mentzelia nuda</i>	Bractless blazingstar
<i>Opuntia imbricate</i>	Cane cholla
<i>Opuntia polyacantha</i>	Plains prickly pear
<i>Packera cana</i>	Woolly groundsel
<i>Physalis longifolia</i>	Common ground cherry
<i>Psoralidium lanceolatum</i>	Lemon scurpea
<i>Ratibida columnifera</i>	Prairie coneflower
<i>Sphaeralcea coccinea</i>	Globe mallow
<i>Symphyotrichum ericoides</i> var. <i>ericoides</i>	White heath aster
<i>Verbesina encelioides</i>	Golden crownbeard
<i>Yucca glauca</i>	Plains yucca

**b. noxious weeds**

No noxious weeds listed by the state of Colorado (list effective March 31, 2017) were present in the project area.

**c. existing facilities, uses, previous surface disturbance**

The proposed project area contains an existing two-track road used for grazing operations and hunting; existing surface disturbance is largely contained to these purposes.

**d. proposed surface disturbance acreage**

Total surface disturbance acreage is 8.34 acres on Forest Service managed land.

**e. address existing conditions that may need remediation (road and stream crossings, erosion etc.)**

Presently, there no existing condition that may need remediation.

**2. Interim Reclamation\*\*\***

**a. soil replacement and stabilization (include erosion-control and water management features)**

Any areas within the road ROW but outside of the 14-foot-wide running surface will have topsoil stockpiled and reserved for later use as a seedbed in reclamation. Disturbed soil will be stabilized by the application of an approved revegetation seed mix at the prescribed seeding rate.

**b. disposal of vegetation removed during construction (i.e., trees, shrubs, etc.)**

Vegetation removed during the construction will be hauled to an approved landfill or scattered along the ROW.

**c. seed mix selection**

The seed mix selection will follow the Comanche National Grassland Seed Mixture.

**d. seedbed preparation and seeding method**

Topsoil will be spread on bare soils to form a seedbed, then seeded using the approved seed mix outlined in the Revegetation Plan provided as Attachment 4. Seeds will be sown within 90 days of construction completion. Seeds will be drilled at 60 pure live seeds (PLS) per square foot or doubled to 120 PLS per square foot if broadcast or hydro-seeded.

**e. weed control**

Meadow Deep will control the introduction of weeds and their spread by inspecting and cleaning construction equipment prior to initially starting work on the work site, by

monitoring the site for weeds establishment, and by contacting the U.S. Forest Service for guidance regarding treatment and eradication, if required.

**f. limiting access to the right-of-way or temporary use areas (barriers and signs etc.)**

No temporary use areas are anticipated for this project.

**g. reclamation of temporary roads and temporary use areas**

No temporary use areas or roads will be built.

**h. monitoring**

Please see the Revegetation Plan included as Attachment 4.

**3. Termination (partial relinquishment) and Restoration**

**a. removal of structures (including signs, above and below ground structures etc.)**

No

**b. determine if road will be totally obliterated**

The newly constructed road will be reclaimed. Meadow Deep will defer to the Forest Service and Baca County regarding the reclamation of the upgraded, existing roads.

**c. stabilization and re-vegetation of disturbed areas (see c through h under Interim Reclamation)**

Stabilization and revegetation of disturbed area will be conducted according to the Revegetation Plan included as Attachment 4.



Photo 1. Looking south at new access road start on Forest Road 2484B, west of proposed well pad



Photo 2. Looking north towards Forest Road 2484 near cattle gate off of County Road F



Photo 3. Vegetation at the proposed well pad site.