U.S. Department of the Interior
Bureau of Land Management
Colorado River Valley Field Office
2300 River Frontage Road
Silt, Colorado 81652

ENVIRONMENTAL ASSESSMENT

NUMBER

DOI-BLM-CO-N040-2013-0025-EA

CASEFILE NUMBER

Federal Oil and Gas Lease COC62161

PROJECT NAME

East Parachute Field Development – Proposal to Expand Four Existing BLM Well Pads to Drill 34 Wells, Expand the Existing PA 11-35 Well Pad to Serve as a Centralized Frac Pad on Private Land, and Conduct Road and Pipeline Upgrades to Support the Drilling Activities Northeast of Parachute, Colorado.

PROJECT LOCATION

Township 6 South (T6S), Range 95 West (R95W), Section 26, Lots 3-6, SW¼; Section 27, Lots 1-8, SW¼, N½SE¼, SE¼SE¼; Section 33, NE¼NE¼; Section 34, W½NW¼, E½NE¼; Section 35, W½NW¼; Sixth Principal Meridian. The site is located approximately 5 miles northeast of Parachute, Garfield County, Colorado. Access is via the north frontage road of highway I-70 (Figure 1).

APPLICANT

WPX Energy Rocky Mountain LLC. Contact: Greg Davis, 1001 Seventeenth Street, Suite 1200, Denver, Colorado 80202.

PROPOSED ACTION

WPX Energy Rocky Mountain LLC ("WPX") proposes to drill and develop 34 new Federal oil and gas wells from four existing BLM pad locations: DOE 1-W-27 pad, DOE 2-W-27 pad, PA 543-27 pad, and PA 23-26 pad (Figure 1 and Table 1). The well pads would be expanded by varying amounts to provide safe working platforms for the additional well development. All of the well pads would be located on BLM land. The Federal wells would be directionally drilled over a 2- to 3-year period into underlying Federal lease COC62161.

The existing reclaimed PA 11-35 pad, located on private land, would be reconstructed to provide a platform to store water and support most of the well completion work planned for this project (Figure 1). The PA 11-35 "frac" (hydraulic fracturing) pad would directly support the simultaneous operations ("simops") completions planned on the DOE 2-W-27 pad, PA 543-27 pad, and PA 23-26 pad. The six new wells planned on the DOE 1-W-27 pad would be completed with water storage and frac operations after the well drilling is finished. Surface waterlines would be installed temporarily from the PA 11-35 pad to support drilling and fracing and provide for water flowback during well completions.

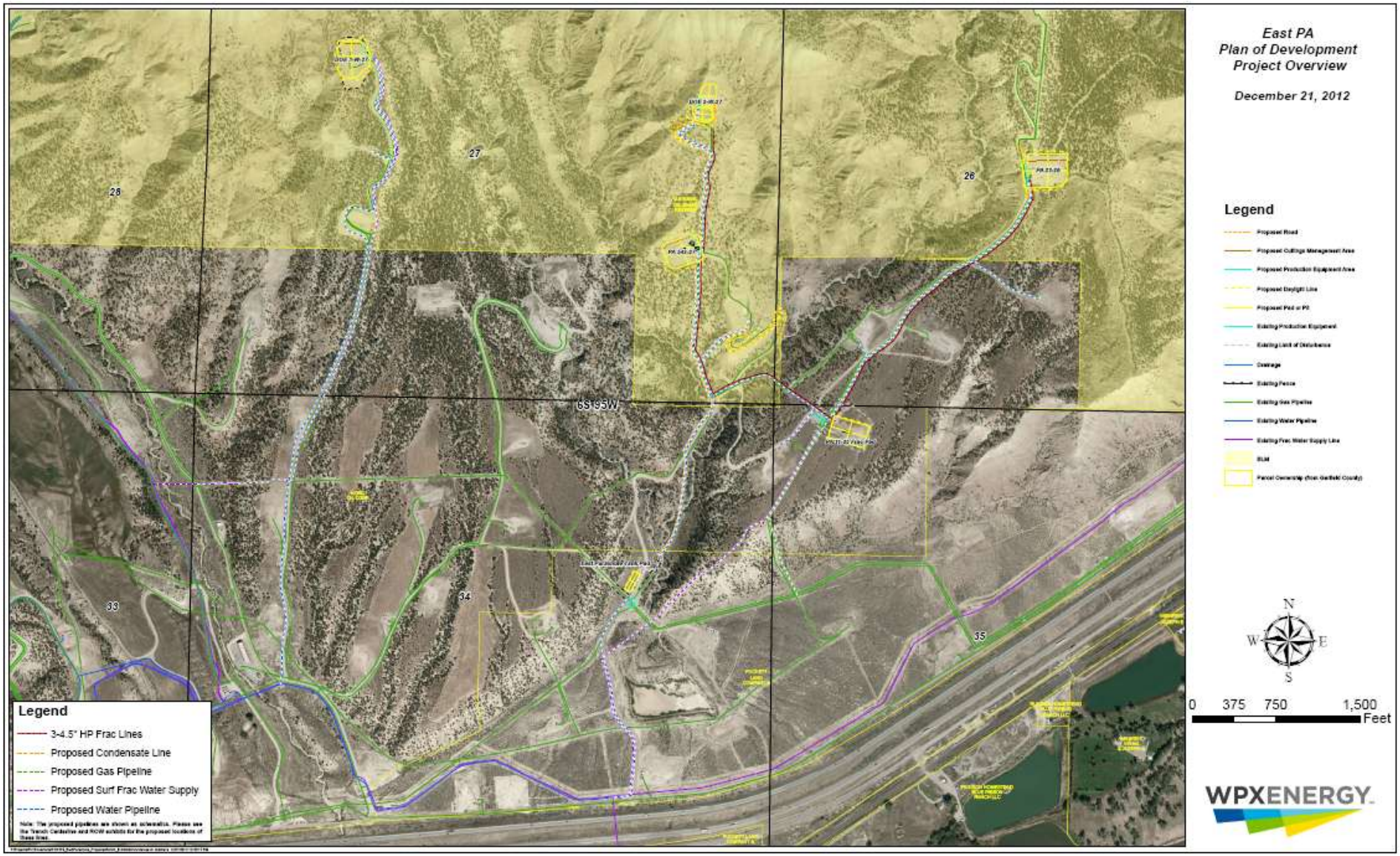


Figure 1. East Parachute Plan of Development.

Table 1. Proposed Well Pads and Wells				
Well Pad	***Surface Ownership***	***Surface Location (T6S, R95W, 6th PM)***	***Existing Wells***	***Proposed Wells***
Drill Pads				
DOE 1-W-27 Pad Expansion	Federal	Section 27, Lots 5, 6	7	**6**
DOE 2-W-27 Pad Expansion	Federal	Section 27, Lot 8	5	**8**
PA 543-27 Pad Expansion	Federal	Section 27, NE¼SE¼	4	**7**
PA 23-26 Pad Expansion	Federal	Section 26, NE¼SW¼	3	**13**
Support Pads				
PA 11-35 Pad Expansion (Frac Pad)	Private	Section 35, NW¼NW¼		
East Parachute Tank Pad	Private	Section 34, SE¼NE¼		
PA 13-27 Cuttings storage	Federal	Section 27, NE¼SW¼		
PA 44-27 Cuttings Storage	Federal	Section 27, SE¼SE¼		
DOE 1-W-26 Cuttings Storage	Federal	Section 26, Lot 6		
Well Totals			19	**34**

The new East Parachute Tank Pad would be built on private land to collect and store the produced water and oil (condensate) generated from the existing and new wells planned on the DOE 2-W-27, PA 543-27, and PA 44-27 pads (Figure 2). New water and condensate collection lines would be buried primarily within expanded pipeline corridors to the new East Parachute Tank Pad in SE¼NE¼, Section 34. In the case of the DOE 1-W-27 wells, a new buried waterline would be installed along the existing pad access road to collect produced waters from the existing well pads and transport the fluid to the existing Cottonwood Tank Pad located in SW¼NW¼, Section 34 (Figure 3). The produced water generated from the PA 23-26 wells would be piped via a new buried waterline to the East Parachute Tank Pad; condensate would be stored in tank(s) on the pad. The new water and condensate collection systems would drastically reduce the amount of truck traffic associated with collecting and hauling of these commodities from the existing and proposed new wells.

Gas gathering upgrades would be required with the installation of new 8-inch buried pipelines serving all four of the expanded well pads (Figures 2 and 3). The buried water and gas line upgrades would be conducted concurrently and placed in the same trench. Other ancillary work related to the East Parachute project would include improving nearly 0.25 mile of existing access road directly south of the PA 44-27 pad, storing cuttings on the PA 13-27, PA 44-27, and DOE 1-W-26 pads, and installing new buried waterlines for future downhole water disposal at the DOE 1-W-27, DOE 2-W-27, and DOE 1-W-26 pads.

Background

The original exploratory wells on the DOE 1-W-27 and DOE 2-W-27 pads were drilled and developed in 1989 by the Department of Energy prior to those producing wells transferring to BLM control in the late 1990s. In 2002, the Wheeler to Webster Geographic Area Plan (EA #CO140-2001-048) was prepared and approved which analyzed additional drilling on the existing DOE pads (four new wells on the DOE 1-W-27 pad and three on the DOE 2-W-27 pad) and new drilling developments on the PA 43-27 pad (aka

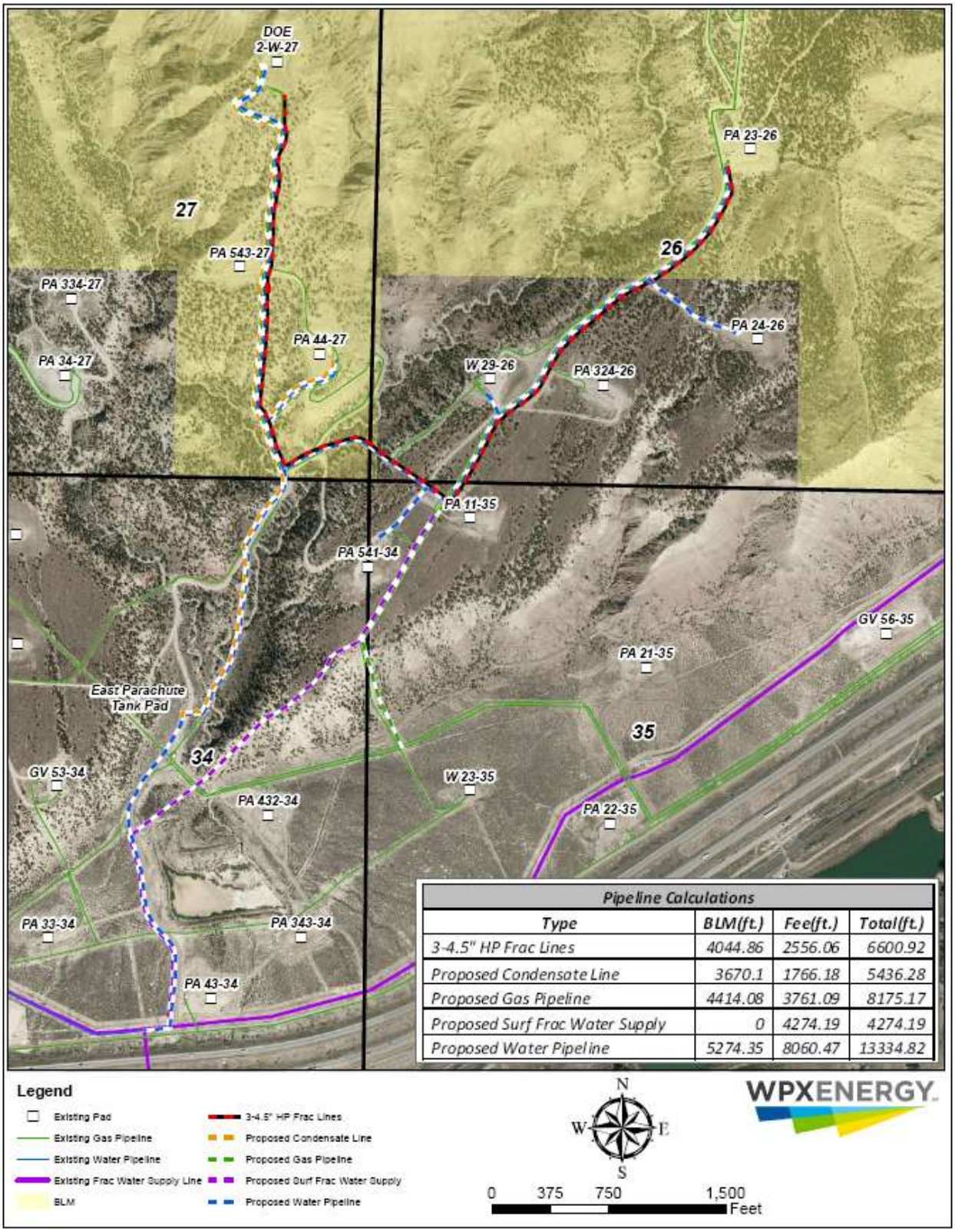


Figure 2. Plan of Development for the East-Side Components of East Parachute Field

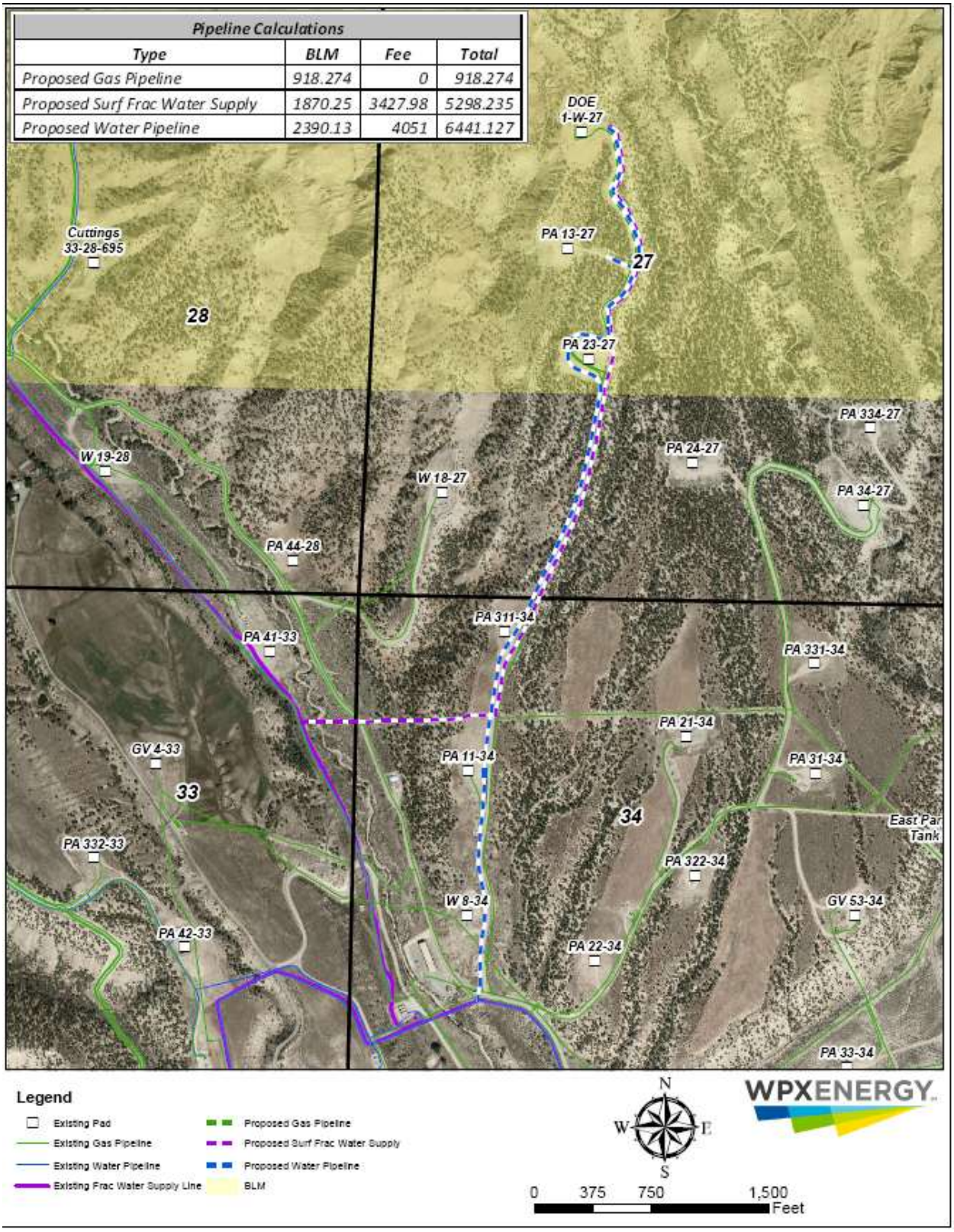


Figure 3. Plan of Development for the West-Side Components of East Parachute Field

PA 543-27 pad) and the PA 23-26 pad. Follow-up NEPA documents in 20004 (Wheeler to Webster GAP Amendment, DNA #CO140-04-034) and 2005 (Wheeler to Webster GAP EA#CO140-2005-047) identified additional well drilling with follow-up drilling visits for the four subject well pads addressed in this NEPA documents.

The proposed wells analyzed in this EA represent the final bottomhole targets based on 10-acre spacing within the Williams Fork drilling program for this portion of the field. The four pads are included in WPX's Clustered Plan of Development (CPOD) specifically identified as the Parachute CPOD – Rollover Area 4. Because two pad locations (PA 22-21 and API 21-20-695) remain to be developed in the Parachute CPOD – Rollover Area 3, WPX would forego considerations for planned year-round drilling of the four proposed pads until its commitments for Rollover Area 3 are fully satisfied. For purposes of analysis, drilling of the new wells on the DOE 1-W-27 pad planned for summer 2013 would adhere to the big game winter timing limitation (TL) period of December 1 through April 30 as stipulated in the Federal lease. Drilling on the three remaining pads planned for the 2015 season is likely to occur after the Rollover Area 3 commitment is satisfied, potentially leading to consideration by the BLM for granting of a TL exception to accommodate year-round drilling on those pads (Table 2).

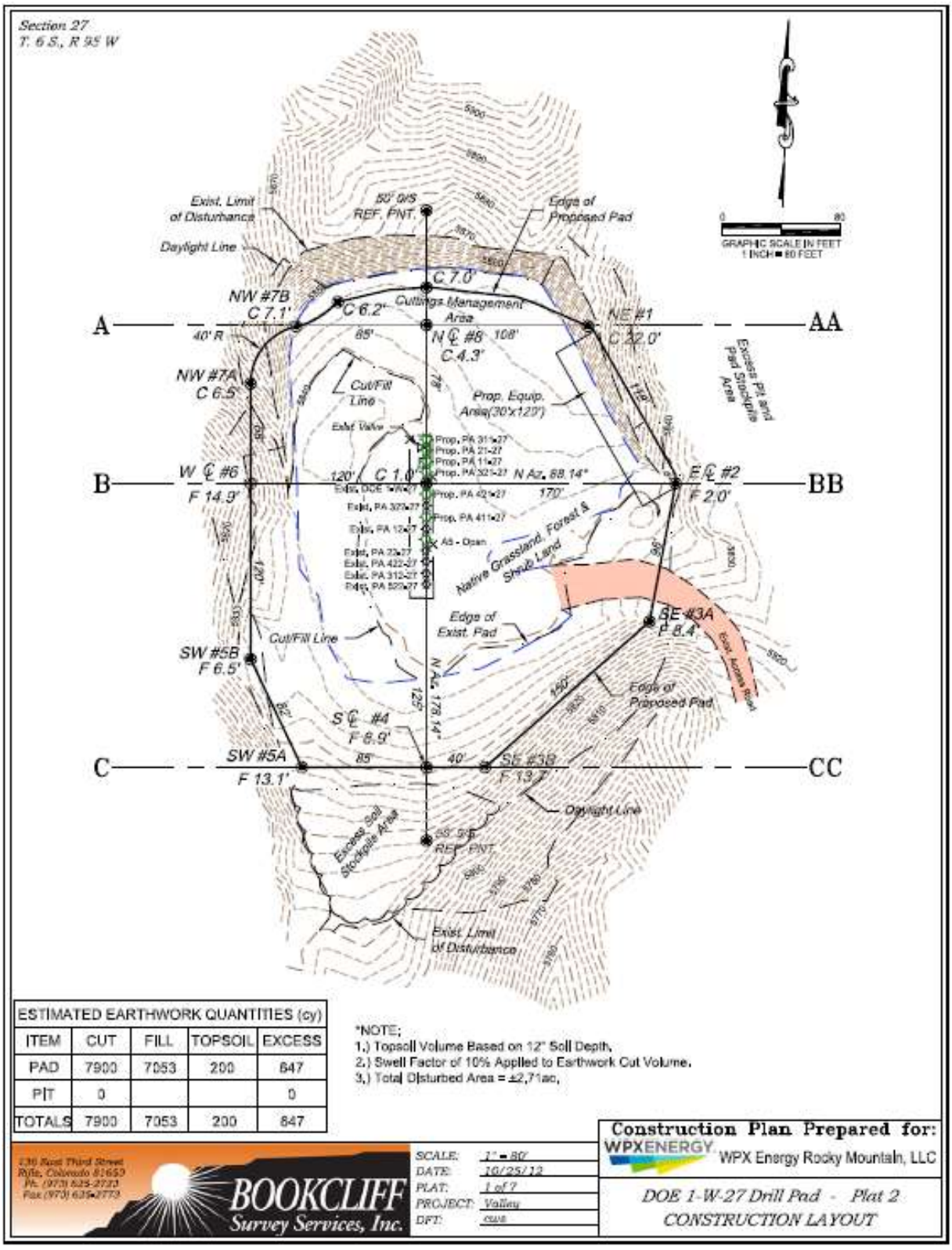
Table 2. East Parachute Drilling Schedule

Well Pad	***T6S, R95W Section #***	***Wells Drilled Per Year***		
		2013	***2014***	***2015***
DOE 1-W-27	27	6 wells	--	--
DOE 2-W-27	27	--	--	8 wells
PA 543-27	27	--	--	7 wells
PA 23-26	26	--	--	13 wells
Number of Wells Drilled/Year		6 wells	N/A	28 wells

Proposed Pad Expansions

***DOE 1-W-27 Pad*:** The existing DOE 1-W-27 pad would be expanded to 3.21 acres to support six new wells in addition to the seven existing wells (Figure 4). Only an estimated 0.25 acre of the expansion would involve new surface disturbance. The existing access road to the pad would be sufficient to serve the additional wells. The pad would have a maximum cut of 22.0 feet at the northeast edge and a maximum fill of 14.9 feet at the west edge. Cuttings that could not be stored on the DOE 1-W-27 pad against the old north cutslope would be hauled and stored on the PA 13-27 pad. Production facilities currently located on the existing PA 13-27 pad would be moved back to the DOE 1-W-27 pad and staged along the eastern edge of the pad due to a lack of space on the PA 13-27 pad. Produced water would be piped via a new 4-inch buried waterline to the existing Cottonwood Tank Pad. Condensate would be piped via an existing 2-inch buried line to the existing condensate tank at the PA 13-27 pad. A new 8-inch gas line would parallel the existing pipeline route and connect to an existing gas gathering line at the PA 23-27 pad. After drilling and well completion work in completed, the pad would be reshaped and seeded reducing the pad size to approximately 0.83 acre.

DOE 2-W-27 Pad: The existing DOE 2-W-27 pad would be expanded to 2.28 acres (including additional drilling platform described below) to accommodate the planned eight new wells in addition to the five existing wells (Figure 5). Less than 1 acre of the expansion work would involve new surface disturbance. The pad would have a maximum cut of 18.2 feet and a maximum fill slope of 0.5 feet. Excess material



ESTIMATED EARTHWORK QUANTITIES (cy)				
ITEM	CUT	FILL	TOPSOIL	EXCESS
PAD	7900	7053	200	647
PIT	0			0
TOTALS	7900	7053	200	647

*NOTE;
1.) Topsoil Volume Based on 12" Soil Depth.
2.) Swell Factor of 10% Applied to Earthwork Cut Volume.
3.) Total Disturbed Area = ±2.71ac.

230 East Third Street
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Ph. (970) 625-2723
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BOOKCLIFF Survey Services, Inc.

SCALE: 1" = 80'
DATE: 10/25/12
PLAT: 1 of 7
PROJECT: Valley
DFT: cwa

Construction Plan Prepared for:
WPXENERGY WPX Energy Rocky Mountain, LLC

DOE 1-W-27 Drill Pad - Plat 2
CONSTRUCTION LAYOUT

Figure 4. DOE 1-W-27 Pad Expansion Layout

generated from the pad construction would be stockpiled southeast of the pad. Cuttings would be managed on pad on existing disturbance and pushed back into the north cutslope. The access road would be realigned to reduce the nearly 20% grade approach to the pad. A new 180-foot by 104-foot (0.43-acre) pad platform (included in total disturbance acreage of pad) would be constructed directly south and adjacent to the DOE 2-W-27 pad that would house the drill rig power units, mud pumps, and shaker system.

The drill rig superstructure would be set up on the existing pad, and the adjacent new smaller pad would remotely provide the "power" and fluids/cuttings recycling management for the drilling process. This "split-rig" pad layout was developed after numerous field visits and a determination that expanding the drill pad was not feasible due to steep side slopes. The existing DOE 2-W-27 well would be shut-in or "hibernated," and the various production facilities on the pad would be removed to maximize the available drilling space. The new pad, supporting equipment that would provide the drilling "power," would be constructed directly south of the existing DOE 2-W-27 pad. This smaller pad would have a maximum cut of 9.1 feet and a maximum fill slope of 16.1 feet. A new 8-inch gas line, new 4-inch waterline, and two new 2-inch condensate lines would be buried in the existing access road from the production equipment to a point where they would then follow an existing pipeline corridor along the old access road. Produced water and condensate would be piped via new water and condensate lines to the East Parachute Tank Pad located in the SE¼NE¼ , Section 34 on private lands. After drilling and well completions, the pad would be reshaped and seeded, reducing the pad to approximately 0.46 acre.

PA 543-27 Pad: The existing PA 543-27 pad would be expanded to 3.76 acres to accommodate the planned seven new wells in addition to the four existing wells (Figure 6). Less than 1 acre of the expansion work would involve new surface disturbance. The existing access road to the pad would be sufficient to serve the additional wells. The pad would have a maximum cut of 18.5 feet at the northeast corner and a maximum fill of 27.4 feet at the southwest corner. Although a narrow area is available on the pad for cuttings management, most if not all of the cuttings would be hauled to the existing PA 44-27 pad for storage. A new 8-inch gas, 4-inch water, and two 2-inch condensate pipelines would buried east from the production equipment to connect with the new gas, water and condensate lines that would be installed from the DOE 2-W-27 pad. One of the condensate lines would parallel the new waterline to the new East Parachute Tank Pad in Section 34. After drilling and well completions, the pad would be reshaped and seeded, reducing the pad to approximately 0.89 acre.

PA 23-26 Pad: The existing PA 23-26 pad would be expanded to 4.17 acres to accommodate the planned 13 new wells in addition to the three existing wells (Figure 7). Less than 1 acre of the expansion work would involve new surface disturbance. The existing access road to the pad would be sufficient to serve the additional wells, although some of the excess material excavated for the pad expansion would be used to reduce the grade and drainage issues along the road in the vicinity of the pad. The pad would have a maximum cut of 19.7 feet at the northwest corner and a maximum fill slope of 15.7 feet at the southwest edge. The southeast corner of the pad would be rounded to avoid a small drainage. Cuttings would be stored along the north side of the pad, with excess cuttings hauled to the nearby DOE 1-W-26 pad. The production equipment would be staged along the west edge of the pad allowing for more space for cuttings storage at the northwest corner. A new 8-inch gas pipeline and 4-inch waterlines would be buried along the pad access road and/or along existing pipeline corridors. These lines would connect with existing pipeline gathering infrastructure at a point near the junction with the PA 44-27 access road. Produced water generated from the new wells would be transported via buried pipeline to the East Parachute Tank Pad in Section 34. Condensate would be stored in tanks on the pad. After drilling and well completions, the pad would be reshaped and seeded, reducing the pad to approximately 1.02 acres.

PA 11-35 Frac Centralized Pad: The existing reclaimed PA 11-35 pad located on private land would be redisturbed (about 2.37 acres) to create working space for completions operations to remotely frac the

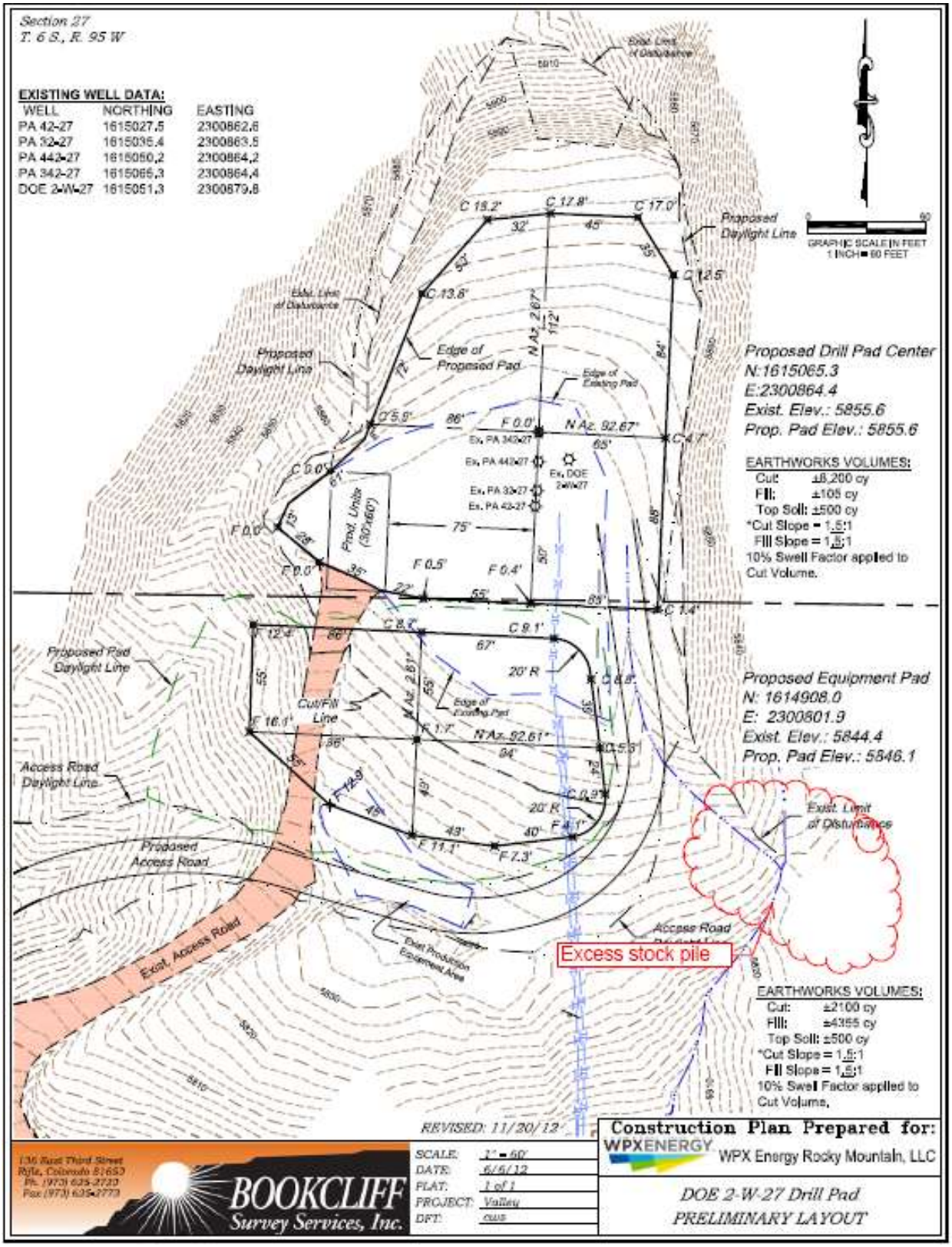

Figure 5. DOE 2-W-27 Pad Expansion Layout with Split Pad Platforms and Realigned Road

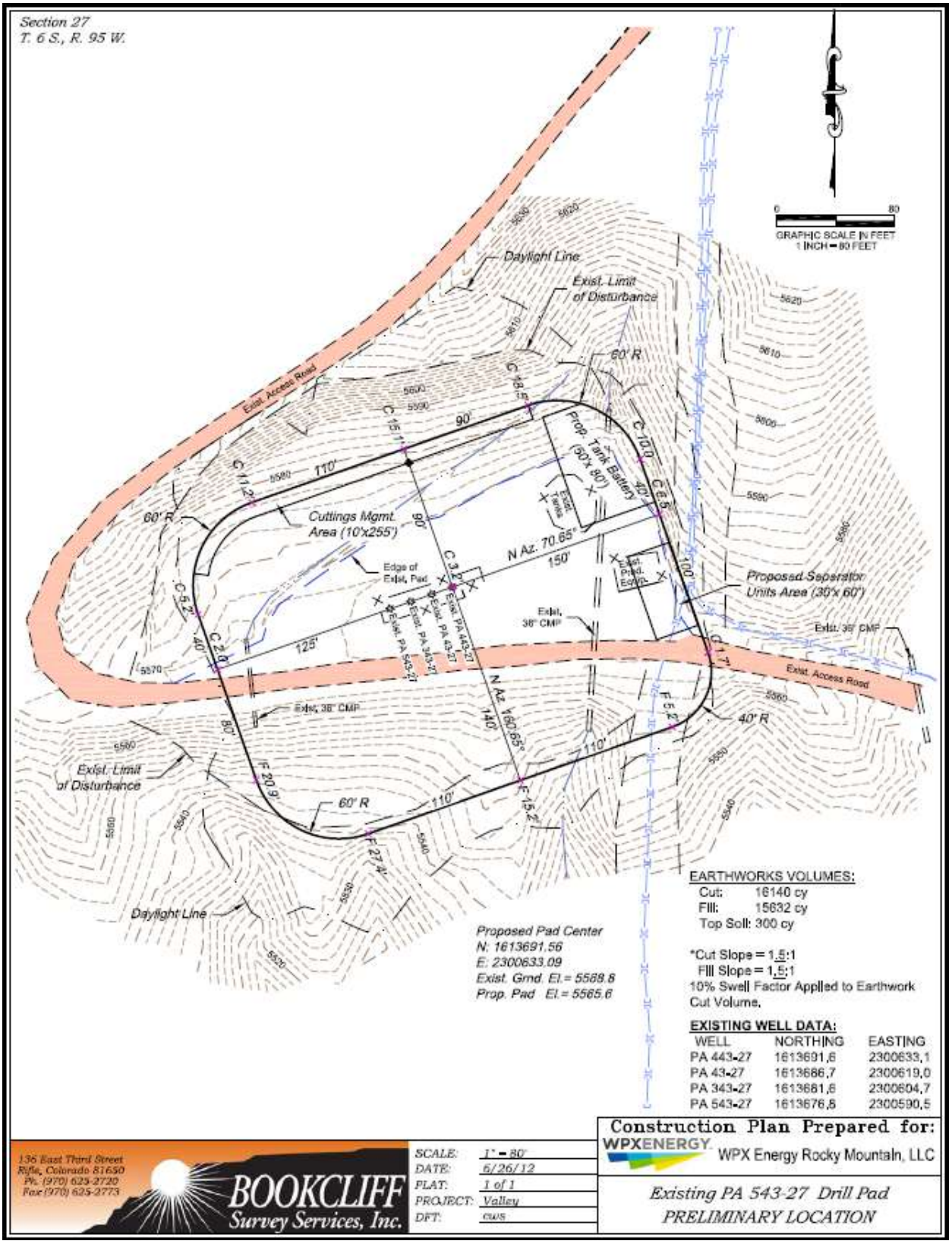

Figure 6. PA 543-27 Pad Expansion Layout

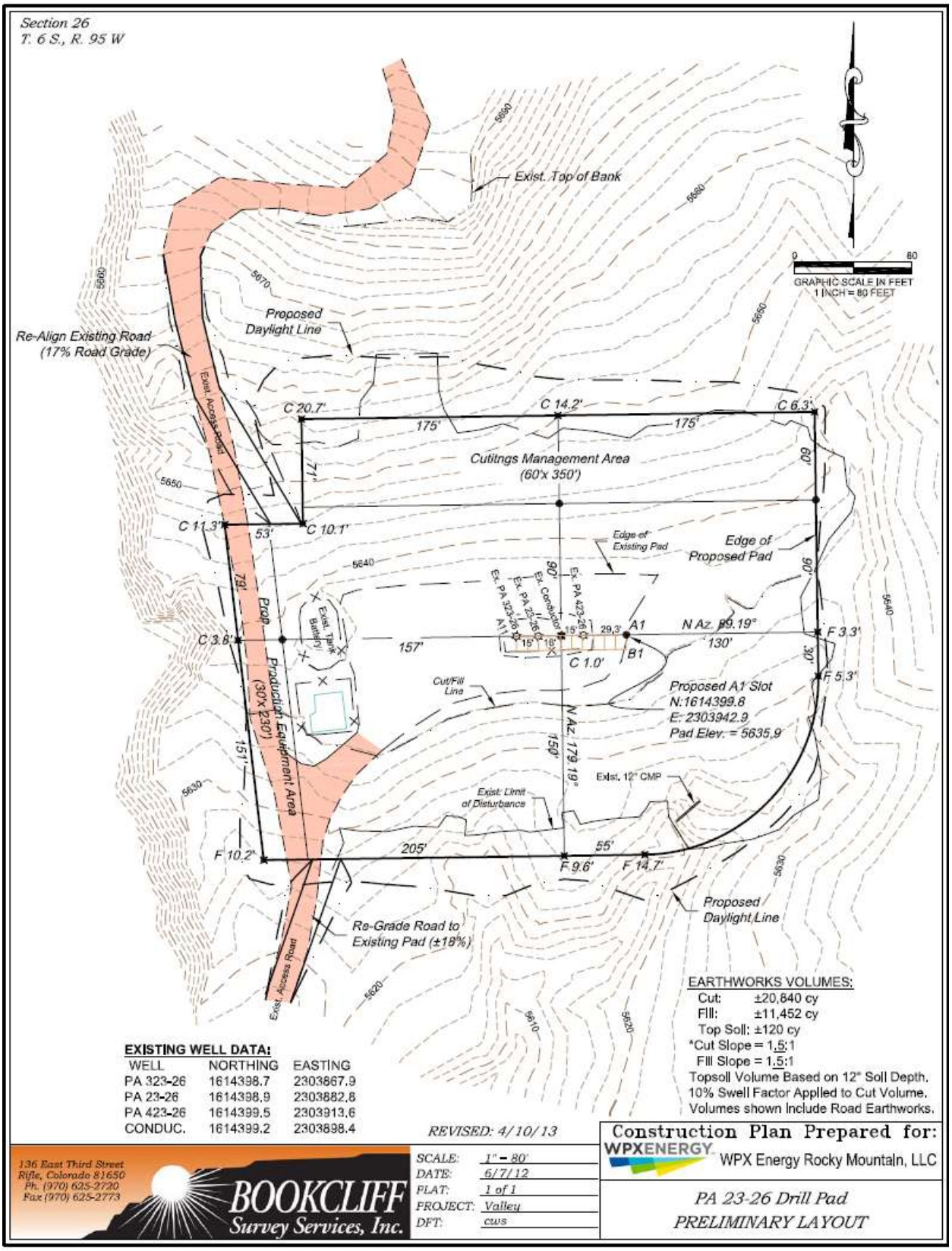

Figure 7. PA 23-26 Pad Expansion Layout

wells on the DOE 2-W-27, PA 543-27, and the PA 23-36 pads (Figure 8). None of the pad expansion work would occur outside the previously disturbed pad footprint. The existing access road to the pad would be sufficient to serve the completions operations. A 10-inch poly surface water supply line (9,572 feet total with 1,870 feet on BLM) would be installed along existing roads and pipeline corridors. Three 4.5-inch steel frac lines would run from the PA 11-35 frac pad to the respective pads where completions operations are being conducted. These lines (6,601 feet of total length with 4,045 feet on BLM) would follow existing roads and/or pipeline corridors. No disturbance quota is attributed to the temporary surface line operation since the activities would occur with an existing corridor. After drilling and well completions, the pad would be reshaped and seeded, reducing the pad to approximately 0.31 acre.

Proposed Cuttings Management

Drill cuttings would be stored on their respective well pads except where limited space on the DOE 1-W-27 pad, the PA 543-27 pad, and the PA 23-26 pad would require hauling to nearby pads for storage. The cuttings from the new wells on the DOE 1-W-27 pad and the PA 543-27 pad would be stored permanently within the reclaimed footprint on the PA 13-27 and PA 44-27 pads, respectively. The limited cutting storage space on the PA 23-26 pad would require most of the cuttings to be hauled to the DOE 1-W-26 pad, which would provide the mass needed to reclaim the steep cutslope that presently exists. The cuttings would be mixed with soil on pad and dried. Once the cuttings have passed COGCC Table 910-1 standards, they would be worked into the reclaimed slopes and covered with a minimum of 3 feet of native soil. These cuttings storage areas would redisturb about 0.64 acre on the PA 13-27 pad, 0.79 acre on the PA 44-27 pad, and 0.83 acre on the DOE 1-W-26 pad.

Proposed Road Improvements

In general, the existing access roads would be adequate to handle the traffic associated with the drilling of the new wells. However, two new road segments would need to be constructed to provide a new approach to the DOE 2-W-27 pad (Figure 9) and an improved grade on the existing alignment south of the PA 44-27 pad. The new segments would also provide safer vehicle access to the PA 543-27 and DOE 2-W-27 pads)(Figure 10). Both road jobs are intended to dramatically reduce steep road grades.

The road approach to the DOE 2-W-27 pad would be realigned with two sweeping curves, requiring approximately 767 feet of new road to reduce the existing 20% grade to mostly 12% or less. The new road would enter the pad at the southeast corner, providing improved visibility for drivers. The width of the new road driving surface would be 18 feet, requiring a 50-foot corridor and 0.88 acre of new disturbance on BLM land.

Approximately 1,233 feet of road south of the PA 44-27 pad would be slightly realigned to reduce the existing 18% grade and improve safety and maneuverability for larger truck traffic. Approximately 930 feet of the realignment would be on BLM land (Figure 10). The grade would generally be constructed at or below 10%. The width of the new section of road would be approximately 18 feet, resulting in 0.69 acre of new disturbance on BLM land out of a total disturbance of 0.76 acre.

Road construction work planned for these two road segments would follow the guidelines established in the BLM Gold Book, *Surface Operating Standards for Oil and Gas Exploration and Development* (USDI and USDA 2007). The proposed access roads to the proposed pad expansions would be graveled, if necessary, prior to drilling to ensure all-weather accessibility to the pad site. Final culvert locations would be determined during the preconstruction inspection and, if necessary, further refined after the road has been pioneered. During road pioneering, topsoil would be stripped and windrowed, where feasible, along the upper and lower sides of the road disturbance corridor to provide enhanced reclamation opportunities.

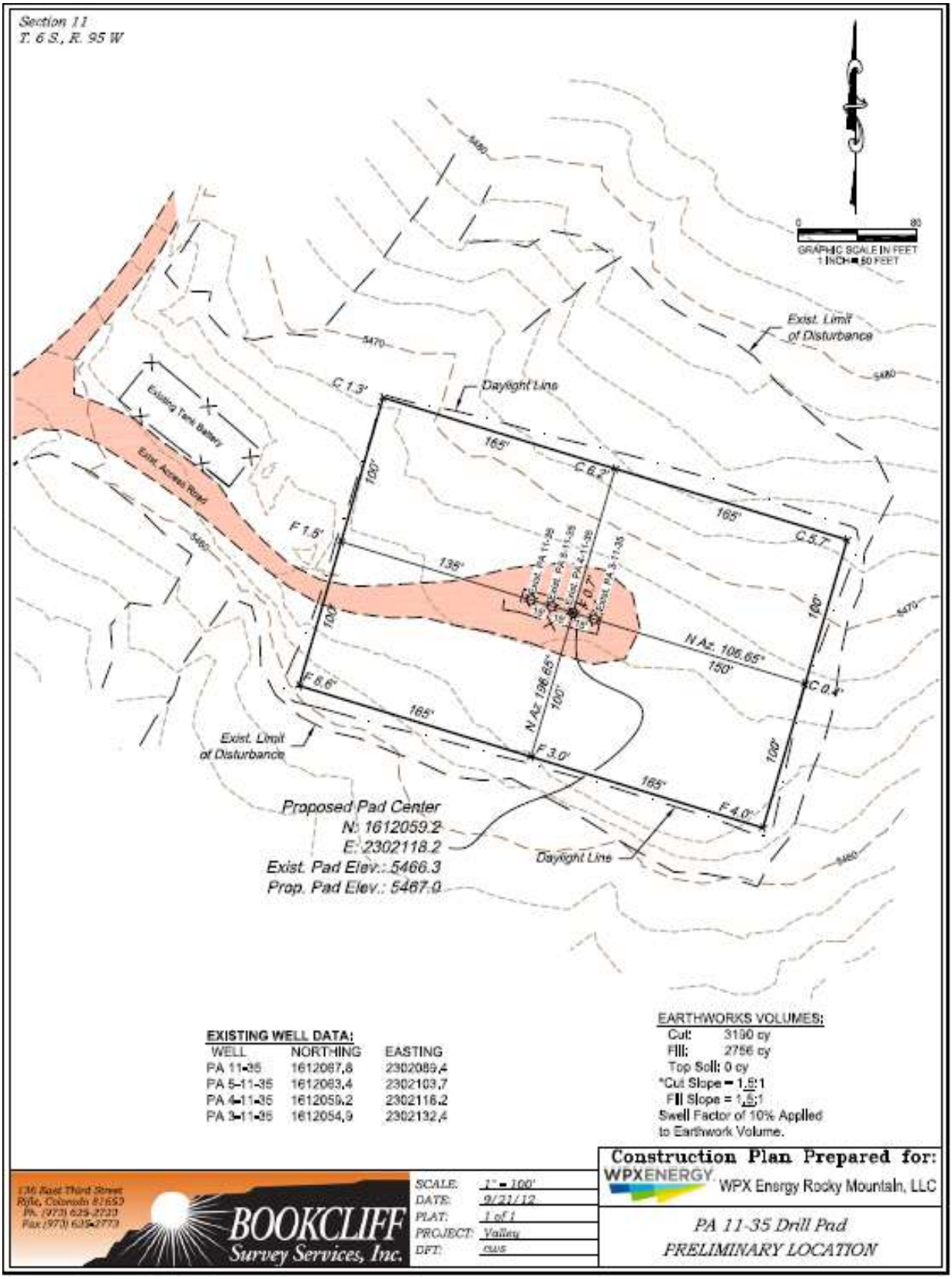

Figure 8. PA 11-35 Frac Pad Expansion

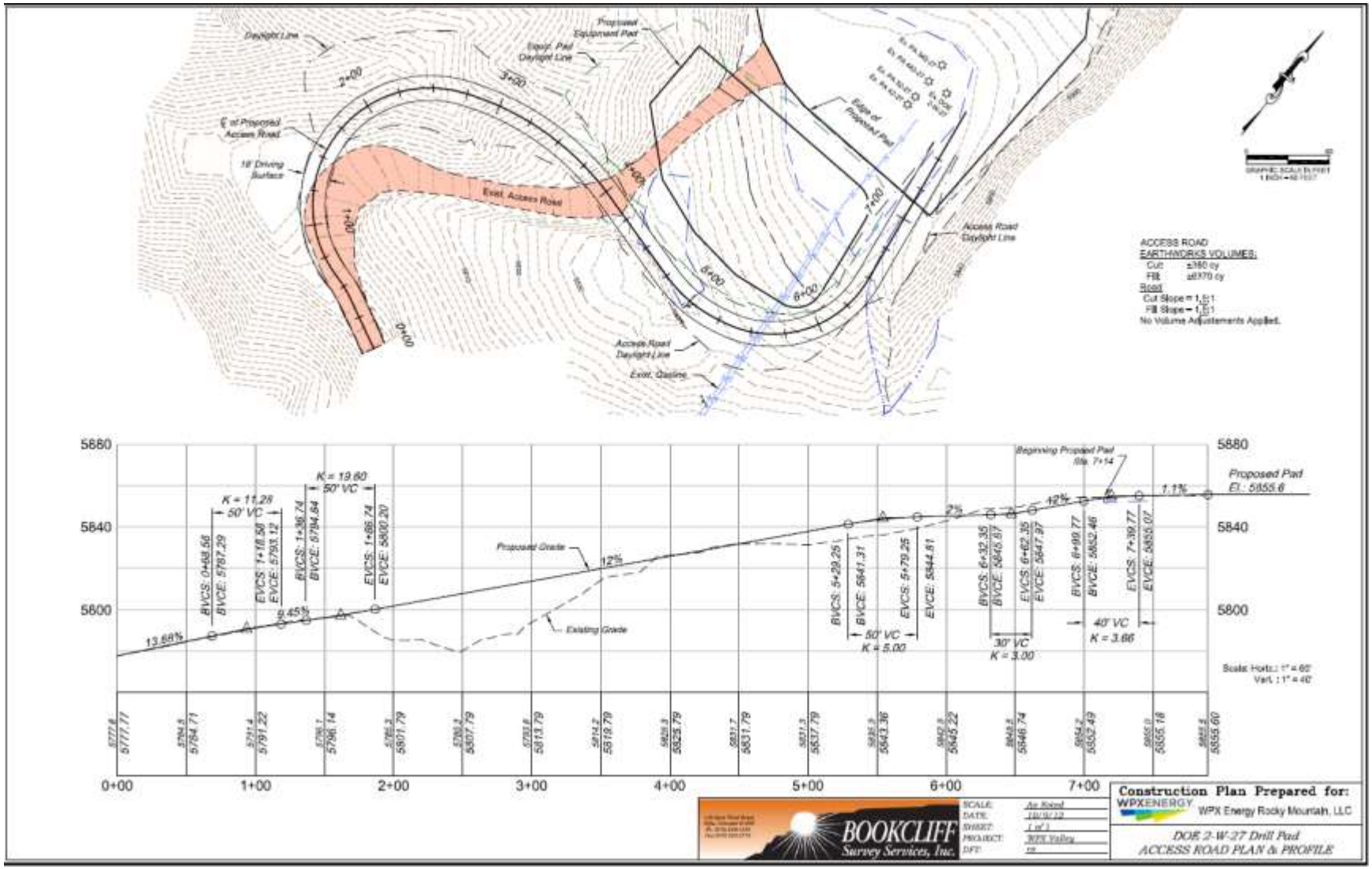

Figure 9. DOE 2-W-27 Road Realignment Plan

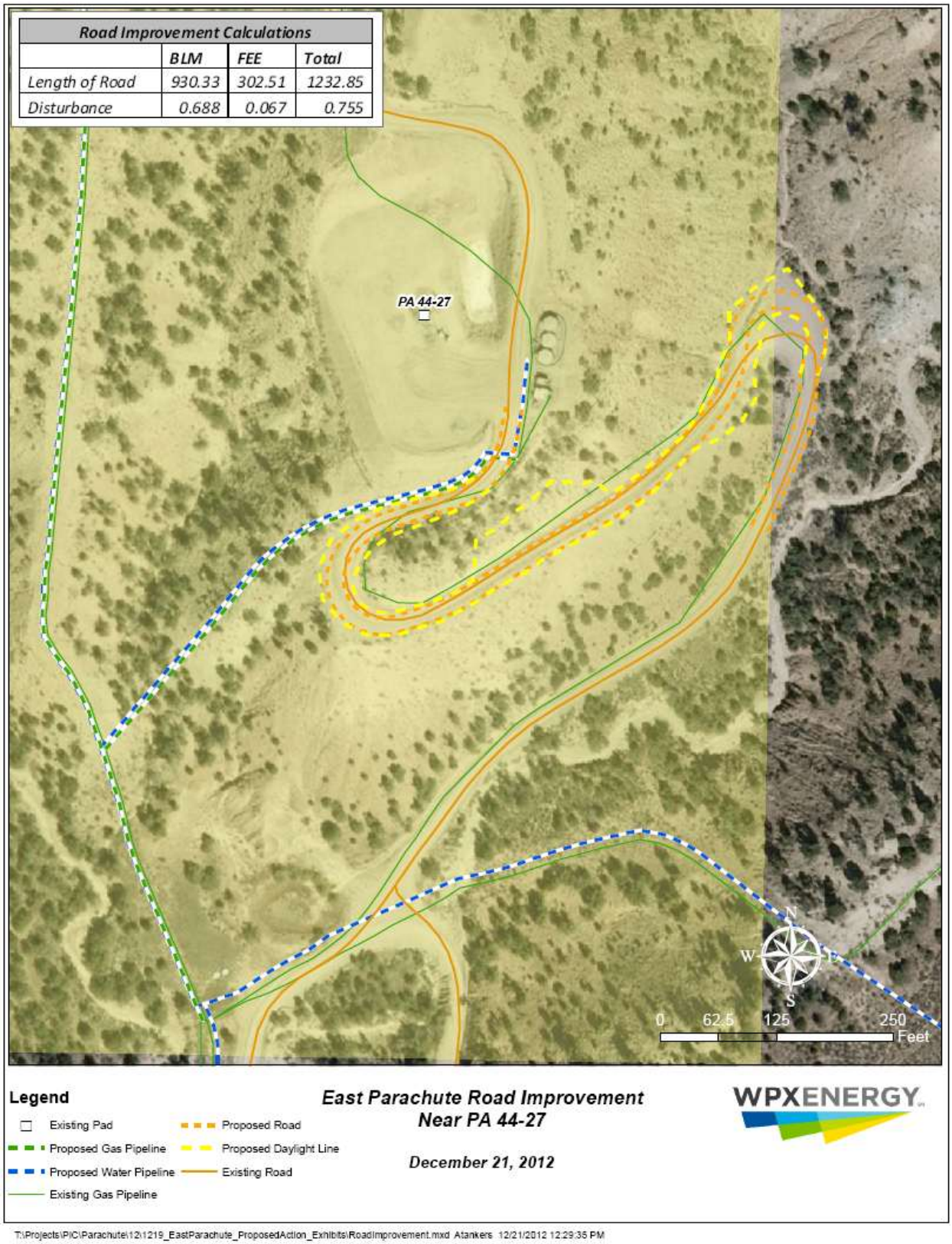

Figure 10. PA 44-27 Road Improvement Plan

A road maintenance program would be required during the production phase of the well which includes, but is not limited to blading, ditching, culvert installation and cleanout, weed control, and gravel surfacing where excessive rutting or erosion may occur. Roads would be maintained in a safe and usable condition.

Proposed Gas Gathering Upgrades

New 8-inch steel buried gas pipelines would be installed to upgrade the existing gas gathering lines to each of the four pads planned to be expanded. A 918-foot-long, 20-foot-wide segment on BLM north of the PA 13-27 pad serving the DOE 1-W-27 pad would be buried alongside the road (Figure 2). Another 4,414 feet of new 8-inch gas lines would be buried on BLM land within an expanded existing pipeline corridor (50 feet wide corridor, of which 20 feet would involve new disturbance) or along existing roads (20 feet wide along the road edge) serving the DOE 2-W-27, PA 543-27 and PA 23-26 pads (Figure 3). A new 300-foot segment of gas line would be buried (using a 50-foot wide corridor) southwest of the PA 44-27 pad to upgrade and replace the existing undersized line within the planned PA 44-27 road improvement work area (Figure 10). The total length associated with the gas pipeline upgrades for the East Parachute project would be 9,093 feet, of which 5,332 feet would be buried on BLM. The short-term disturbance associated with the gas line upgrades would amount to 7.91 acres total with 4.97 acres occurring on BLM. The gas lines on private land would create 2.94 acres in the short-term. As the pipelines would undergo reclamation work shortly after installation, there is no long-term disturbance assessment.

Proposed Water and Condensate Pipeline Installations and Ancillary Facilities

The proposed East Parachute water collection system would gather produced water from the existing and proposed well pads through new buried Flexpipe water pipelines along existing roads and pipelines. The 4-inch produced waterlines serving the DOE 2-W-27 and PA 23-26 corridors would collect and deliver water to the proposed East Parachute Tank Pad in Section 34 on private land (Figure 2). The produced waterlines serving the DOE 1-W-27 corridor would collect and deliver water to the existing Cottonwood Tank Pad (Figure 3). Where possible, the 4-inch waterlines would be installed concurrently in the same trench as the identified 8-inch gas lines and/or the 2-inch condensate lines. A total length of 4-inch waterlines to be buried would amount to 19,776 feet, with 7,664 feet crossing BLM land. The additional BLM surface disturbance attributed to the waterline installations that are separate from the co-located gas line trenches would amount to 2,133 feet in length, representing 1.44 acres of short-term disturbance. On private land, about 10,289 feet of single waterlines would be buried mostly along roads in a 20-foot wide corridor representing 5.10 acres of short-term disturbance. Total short-term disturbance attributed to the separate waterline installations (those not collocated with gas and/or condensate lines) would amount to 6.54 acres.

Condensate lines would be installed in the DOE 2-W-27 corridor in order to deliver condensate to storage tanks staged at the new East Parachute Tank Pad (Figure 2). Condensate on the west-side of the project area would remain stored in tanks on its respective pads except for the DOE 1-W-27 pad where condensate would continue to be piped to an existing tank on the PA 13-27 pad. Approximately 5,436 feet of 2-inch condensate lines would be concurrently installed with the buried water and/or gas lines with 3,670 feet of these lines occurring on BLM land. No additional disturbance estimate would be needed since the condensate lines would be trenched with the gas and/or produced waterlines.

To reduce future pipeline corridor redisturbance and coordinate planning for a possible buried water delivery line potentially serving water disposal well(s) on the DOE 1-W-27 pad, the DOE 2-W-27 pad and the DOE 1-W-26 pad, a 6-inch Flexsteel waterline would be installed across BLM lands concurrently with the East Parachute pipeline upgrades serving these identified pads. The lengths of 6-inch Flexsteel line would be 2,390 feet for the DOE 1-W-27 pad, 3,370 feet serving the DOE 2-W-27 pad and 1,720 feet

to the PA 23-26 pad (partial segment of line serving the DOE 1-W-26 pad). These future water delivery lines would be trenched, covered, and isolated with no intent to put them into service until BLM right-of-way authorization(s) for a water disposal well are granted in the future and waterline hookups to future water disposal wells are completed.

Proposed East Parachute Tank Pad

A new storage tank pad would be constructed on private land to store produced water and condensate in tanks generated from the new and existing wells on the DOE 2-W-27, PA 543-27, and PA 44-27 pads (Figure 2). It would also store produced water from the operating wells on the existing DOE 1-W-26, PA 23-26, PA 24-26, PA 32-26, PA 29-26, PA 11-35, and PA 541-34 pads. The tank pad would create approximately 0.44 acre of new surface disturbance with a maximum cut of 6.6 feet on the northernmost corner and a maximum fill slope of 4.6 feet on the southernmost corner. The tank pad would be located adjacent to the main existing road accessing this development and directly across the road from the existing DOE 360 Low Pressure Compressor. The tank pad would be in use for the life of the wells, estimated at 30 to 40 years.

Summary of Proposed Project Disturbance

As shown in Table 3, the project components would create a total short-term disturbance of 34.6 acres, with 23.7 acres occurring on BLM and 10.9 acres occurring on private land. The long-term disturbance for the project would amount to 4.9 acres, with 4.1 acres occurring on BLM and 0.8 acre on private land when the reclaimed areas satisfy BLM's reclamation standards identified in the COAs (Appendix A).

The proposed pad expansions would amount to 13.42 acres of short-term disturbance on BLM land with another 2.37 acres on private. These pad expansions would disturb less than 1 acre of new disturbance on each location as the primary objective was to utilize the existing pad footprints. After interim reclamation, the pads would be reduced to 3.51 acres over the long-term life of the producing wells. The road improvements would disturb 1.64 acres initially during construction with the long-term roadway disturbance amounting to 0.92 acre. The short-term disturbance estimates for the buried gas, produced water, and condensate (oil) gathering systems presented in this project would amount to 14.45 acres across the project area with 6.41 acres occurring on BLM land. The pipeline impact disturbance on private lands would amount to 8.04 acres. No surface impacts would result from the temporary surface pipeline installations described in the Proposed Action.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, associated road improvements, and associated gas and water pipeline upgrades would be denied. Consequently, none of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis reflects a scenario of no new work or surface disturbance.

PURPOSE AND NEED FOR THE ACTION

The purpose of the Proposed Action is to develop oil and gas resources on Federal Lease COC62161 consistent with existing Federal lease rights. The action is needed to increase the development of oil and gas resources for commercial marketing to the public.

Table 3. Disturbance Associated with Well Pads, Roads, and Ancillary Facilities (acres)					
Proposed New Construction	***Short-term Disturbance***			***Long-term Disturbance***	
	Pads	***Roads***	***Pipelines***	***Pads***	***Roads***
DOE 1-W-27 Pad	3.21			0.83	
DOE 2-W-27 Pad	2.28	0.88		0.46	0.35
PA 543-27 Pad	3.76			0.89	
PA 23-26 Pad	4.17			1.02	
PA 11-35 Frac Pad	*Pvt = 2.37*			*Pvt = 0.31*	
E. Parachute Tank Pad	*Pvt = 0.44*			*Pvt = 0.44*	
PA 13-27 Cuttings	0.64				
PA 44-27 Cuttings	0.79				
DOE 1-W-26 Cuttings	0.83				
PA 44-27 Road Improvement		0.69 *Pvt = 0.07*			0.50 *Pvt = 0.07*
Gas, Water, and Condensate Pipelines			6.41 *Pvt = 8.04*		
Disturbance Subtotals	15.68 *Pvt = 2.81*	1.57 *Pvt = 0.07*	6.41 *Pvt = 8.04*	3.20 *Pvt = 0.75*	0.85 *Pvt = 0.07*
Total BLM Impacts	**23.7 acres**			**4.1 acres**	
Total Private Impacts	**10.8 acres**			**0.8 acres**	
TOTAL Impacts	**34.6 acres**			**4.9 acres**	

[1]*Pad acreages were derived using 10% added disturbance acreage to account for stockpiles and stormwater BMPs.*
Each pad has < 1 acre of new disturbance associated with the pad expansion work.

SUMMARY OF LEASE STIPULATIONS

The Proposed Action would include drilling and completion operations, production of natural gas and associated liquid condensate, proper handling and disposal of produced water, and intermediate and final reclamation. The Proposed Action would be implemented consistent with Federal oil and gas lease, Federal regulations (43 CFR 3100), and the operational measures included in the Applications for Permit to Drill (APDs). Appendix A lists the specific Surface Use Conditions of Approval (COAs) that would be implemented as mitigation measures for this project. The operator would be responsible for continuous inspection and maintenance of the access roads, pads, wells, ancillary facilities, and pipelines.

The 34 Federal wells would be directionally drilled into underlying Federal mineral estate from four existing Federal well pads proposed for expansion. Table 4 provides a summary of the applicable Federal lease terms. Appendix A lists site-specific conditions of approval (COAs) developed during the APD/EA review and onsite field consultation that would be attached to the Federal APDs.

PLAN CONFORMANCE REVIEW

The Proposed Action and No Action Alternative are subject to and have been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Table 4. Lease Stipulations Applicable to the Proposed Action		
Lease Number	***Description of Applicable Lands***	***Lease Stipulations***
COC62161 (1999)	Specific Portions of Lands Described in Lease COC62161	**Controlled Surface Use:** Erosive Soils and Slopes Greater than 30 % -- to protect erosive soils and slopes greater than 30%, special design, construction and implementation measures would be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to ensure successful reclamation. **Controlled Surface Use:** Riparian and Wetland Zones within 500 feet of the outer edge of the riparian or wetland vegetation, oil and gas exploration and development activities may require special design, construction and implementation measures. **Controlled Surface Use:** Visual Resource Management (VRM) Class II Areas – protection may include special design requirements, relocation of operations by more than 200 meters, and other measures to retain the overall landscape character. **Timing Limitation:** Big Game Winter Habitat (December 1 – April 30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CPW. **No Surface Occupancy:** To maintain proper function of riparian zones, activities associated with oil and gas exploration and development are restricted to an area beyond the outer edge of the riparian vegetation. Lease language allows exceptions in specific circumstances. **No Surface Occupancy:** No surface use is allowed on steep slopes greater than 50% to maintain site stability and site productivity. This NSO does not apply to pipelines. Exception may be granted if lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures would protect the public interest. **No Surface Occupancy:** To protect slopes over 30% with high visual sensitivity in the I-70 viewshed. Exceptions would be granted if protective measures can be designed to accomplish VRM Class II objectives, namely that the overall landscape character would be retained. Such measures would be designed to blend the disturbance in with the natural landscape.

Name of Plan: The current land use plan is the *Glenwood Springs Resource Management Plan* (RMP), approved in 1984 and revised in 1988 (BLM 1984). Relevant amendments include the *Oil and Gas Plan Amendment to the Glenwood Springs Resource Management Plan* (BLM 1991) and the *Oil &Gas Leasing & Development Record of Decision and Resource Management Plan Amendment (*BLM 1999a).

Decision Language: The 1991 Oil and Gas Plan Amendment (BLM 1991) included the following at page 3: "697,720 acres of BLM-administered mineral estate within the Glenwood Springs Resource Area are open to oil and gas leasing and development, subject to lease terms and (as applicable) lease stipulations"

(BLM 1991, page 3). This decision was carried forward unchanged in the 1999 ROD and RMP amendment at page 15 (BLM 1999b): "In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) [currently referred to as a Master Development Plan, MDP] that describes a minimum of 2 to 3 years of activity for operator controlled leases within a reasonable geographic area."

Discussion: The Proposed Action is in conformance with the 1991 and 1999 RMP amendments cited above because the Federal mineral estate proposed for development was designated as open to oil and gas leasing and development, and Federal oil and gas lease COC62161 was duly issued pursuant thereto. In addition, the 1999 RMP amendment requires multi-year development plans known at that time as Geographic Area Plans (GAPs) for lease development over a large geographic area. The current project is within the area covered by the Wheeler to Webster GAP (CO140-2001-048) and also meets GAP exception criteria in the 1999 RMP Amendments based on its small size and location along existing access roads. Therefore, the Proposed Action is in conformance with the current land use plan.

STANDARDS FOR PUBLIC LAND HEALTH

In January 1997, Colorado BLM approved the Standards for Public Land Health. The five standards cover upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. The environmental analysis must address whether impacts resulting from the Proposed Action or alternatives being analyzed would maintain, improve, or deteriorate land health conditions relative to these resources. These analyses are conducted in relation to baseline conditions described in land health assessments (LHAs) completed by the BLM. The Proposed Action would include oil and gas activities in an area included in the Rifle West LHA (BLM 2005).

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

During its internal scoping process for this Environmental Assessment (EA), pursuant to the National Environmental Policy Act (NEPA), BLM resource specialists identified the following elements of the natural and human environment as present in the project vicinity and potentially affected by the project:

Access and Transportation	Migratory Birds	Special Status Species
Air Quality	Native American Religious Concerns	Vegetation
Cultural Resources		Visual Resources
Fossil Resources	Noise	Wastes, Hazardous and Solid
Geology and Minerals	Socioeconomics	Water Quality, Surface and Ground
Invasive Nonnative Plants	Soils	Wildlife, Aquatic and Terrestrial

Access and Transportation

Affected Environment

The Proposed Action area is accessible from Parachute, Colorado by traveling east on the Interstate 70 frontage road for approximately 3.5 miles to the private field development road at the north end of the I-70 overpass. The four existing BLM well pads proposed for additional drilling in the Proposed Action are accessible by driving another 1.5 to 2 miles north and east on existing roads in the East Parachute Field (Figures 1, 2, and 3). Although a sizable portion of the Proposed Action would be conducted on BLM land, the access routes to the proposed pads originate and cross private lands; no public access is available to the project area.

Environmental Consequences

Proposed Action

See the subsection on Proposed Road Improvements under the description of the Proposed Action, above. The improvements would reduce road grades, improve visibility by drivers of haul trucks and others, and improve the overall safety of the roads for accessing the well pads.

The Proposed Action would result in a substantial increase in truck traffic related to development of the 34 proposed Federal wells. The largest traffic increase would be during rig-up, drilling, and completion activities. Approximately 1,160 truck trips over a 30-day period would be required to support the drilling and completion of each well (Table 5). Once the wells are producing, traffic would dramatically decrease to occasional visits in pickups for monitoring or maintenance activities, particularly since the fluids generated by the existing and proposed wells would be piped to the two tank facilities on the valley floor. Each well may have to be recompleted once per year, requiring three to five truck trips per day for approximately 7 days. Fluids generated during the life of the wells would be stored at the tank facilities, only requiring truck visits to the in tank farms instead of to each well pad.

Table 5. Traffic Associated with Drilling and Completion Activities

Vehicle Class	***Trips per Well***	***Portion of Total***
16-wheel tractor trailers	88	7.6%
10-wheel trucks	216	18.6%
6-wheel trucks	452	39.0%
Pickup trucks	404	34.8%
Total	1,160	100.0%

Source: BLM 2006. Note: Trips by different vehicle types are not necessarily distributed evenly during the drilling process. Drilling and completion period is approximately 30 days per well.

Degradation of field development roads may occur due to heavy equipment travel and fugitive dust and noise would be created. Mitigation measures (Appendix A) would be required as Conditions of Approval (COAs) to ensure adequate dust abatement and road maintenance occur.

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, associated road improvements, and associated gas and water pipeline upgrades would be denied. None of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance. The existing well pads would remain in their current condition without suitably recontoured cut and fill slopes and interim reclamation.

Air Quality

Affected Environment

Colorado Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based criteria for the maximum acceptable concentrations of air pollutants in areas of public use. Although specific air quality monitoring has not been conducted within the project area, regional air quality monitoring has been conducted in Rifle and elsewhere in Garfield County. Air

pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), particulate matter less than 10 microns (μ) in diameter (PM_{10}), and particulate matter less than 2.5 μ in diameter ($PM_{2.5}$).

The project area lies within Garfield County, which has been described as an attainment area under CAAQS and NAAQS. An attainment area is an area where ambient air pollution quantities are below (i.e., better than) NAAQS standards. Regional background values are well below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants. The Garfield County Quarterly Monitoring Report summarizing data collected at monitoring sites in Parachute, Silt, Battlement Mesa, and Rifle in January through June 2012 (the most recent posting) confirms continuing attainment of the CAAQS and NAAQS (Garfield County 2012). Federal air quality regulations are enforced by the Colorado Department of Health and Environment (CDPHE) under its delegated authority from the U.S. Environmental Protection Agency (EPA) pursuant to the he Clean Air Act (CAA).

Federal air quality regulations under the Prevention of Significant Deterioration (PSD) program limit incremental emissions increases of air pollutants from certain sources to specific levels defined by the classification of air quality in an area. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The project area and surrounding areas are classified as PSD Class II, as is Dinosaur National Monument, located approximately 180 miles to the northwest. PSD Class I areas located within 100 miles of the project area are Flat Tops Wilderness (approximately 25 miles north), Maroon Bells – Snowmass Wilderness (approximately 35 miles south), West Elk Wilderness (approximately 60 miles southeast), Black Canyon of the Gunnison National Park (approximately 65 miles south), and Eagles Nest Wilderness (approximately 60 miles east).

Environmental Consequences

Proposed Action

The CDPHE, under CAA delegated authority from the U.S. Environmental Protection Agency (EPA) and in conformance with Colorado's State Implementation Plan (SIP), is the agency with primary responsibility for air quality regulation and enforcement in connection with industrial developments and other air pollution sources in Colorado. Unlike the conceptual "reasonable but conservative" engineering designs used in NEPA analyses, CDPHE air quality preconstruction permitting is based on site-specific, detailed engineering values, which are assessed in CDPHE's review of the permit application.

The Proposed Action includes expanding the existing DOE 1-W-27, DOE 2-W-27, PA 23-26 and PA 543-27 pads and constructing, drilling, completing, and operating six new Federal wells on DOE 1-W-27 in 2013 and 28 new Federal wells on the other three pads in 2015. The existing PA 13-27, PA 44-27, and DOE 1-W-26 pads would be partially redisturbed to accommodate overflow cuttings generated from the new wells planned on the DOE 1-W-27, PA 543-27, and PA 23-26 pads. Reconstructing the existing PA 11-35 pad to serve as a centralized frac pad would be necessary although the new earthwork would be confined within the original pad footprint. Building the East Parachute Tank Pad to stage water and condensate storage tanks, conducting road improvements to the DOE 2-W-27 and PA 44-27 pads, and burying new 8-inch gas and 4-inch water collection pipelines would cause additional disturbances. Total short-term disturbance would be 34.6 acres, and long-term disturbance after interim reclamation would be 4.9 acres (Table 3).

Each well would require approximately 7 to 10 days to drill and 5 to 15 days to complete. Air quality in the project area would decrease during construction of access roads, pads, and pipelines and drilling and completing the wells and would be spread across the 2-year timeframe for the project. Long-term air quality benefits of this project include road improvements which would decrease long-term dust generation and centralized fluids collection facilities which reduce truck traffic and fugitive emissions.

Pollutants generated during construction activities would include combustion emissions and fugitive dust associated (PM_{10} and $PM_{2.5}$) with earthwork and construction equipment. Once construction activities are complete, air quality impacts associated with construction would cease and impacts would transition to emissions associated with transportation of drilling and completion equipment. Fugitive dust and vehicle emissions from mobilization of equipment necessary for the drilling and completions phase and rigging up the drill rig would occur during the transitions between construction, drilling and completions phases. During drilling and completions work air quality impacts would be caused by emissions from generators and engines to run equipment, onsite and offsite vehicle traffic, and escaped and flared gasses during drilling and flowback phases. Following the completion of these phases, emissions would be greatly reduced to emissions associated with long-term natural gas and condensate production.

The CRVFO analyzes air quality impacts of oil and gas development projects using results of a regional air model prepared by Tetra Tech, Inc. and its subcontractor, URS Corporation, in October 2011. The modeling addressed the cumulative impacts of incremental oil and gas development in the CRVFO by assuming a range of future Federal (BLM and USFS) and private wells and associated facilities such as compressors, storage tanks, and roads. The modeled scenarios also incorporated different levels of mitigation. The "no action" scenario assumed a total of 5,106 future Federal (BLM plus USFS) wells with mitigation sufficient to meet CDPHE and EPA regulations and emissions standards. Other scenarios included as many as 6,640 Federal wells and associated facilities in a "maximum development" scenario in combination with more stringent mitigation to meet or exceed State and Federal regulations and standards. In all scenarios analyzed, impacts to air quality are estimated to be below applicable NAAQS, CAAQS, PSD increments, and visibility and deposition thresholds.

The modeling also estimated cumulative impacts from future Federal plus private wells in the CRVFO, ranging from a total of 12,072 wells in the "no action" scenario to 15,664 wells in the "maximum development" scenario. During the modeling, estimated future emissions from wells in the CRVFO were added to background air quality levels, major stationary sources, and an additional 28,843 future Federal plus private wells outside the CRVFO but within the modeling domain. These additional wells were based on estimated numbers for three other BLM field offices in the modeling domain—White River Field Office (Meeker, Colorado), Little Snake Field Office (Craig, Colorado), and Vernal Field Office (Vernal, Utah). Methods and results of the modeling are presented in an Air Resources Technical Support Document (ARTSD) (BLM 2011), available for viewing at the CRVFO in Silt, Colorado, and on its website.

The air quality model addressed impacts associated with emissions of greenhouse gases (GHGs), "criteria pollutants" (CO, NO_2, SO_2, ozone, PM_{10}, and $PM_{2.5}$), hazardous air pollutants (HAPs) including BTEX (benzene, ethylbenzene, toluene, and xylenes), formaldehyde, and n-hexane. The modeling also addressed potential impacts on visibility due to particulates and "photochemical smog" (caused by chemical reactions in the atmosphere) and on lake chemistry of selected pristine lakes due to modeled deposition rates of sulfur and resultant impacts on acid neutralizing capacity of the lake waters. The visibility analysis predicted a slight impact (one day per year with a reduction in visibility of 1deciview or greater) in the Flat Tops Wilderness and no days with 1 deciview or greater reduction in visibility at all other modeled Class I and II receptors. For the remaining pollutants analyzed, modeled levels of future oil and gas development within the CRVFO would have no or negligible long-term adverse impacts on air

quality. Since the Proposed Action is within the scope of the future development modeled, no significant adverse impacts on air quality are anticipated.

The air quality model incorporated assumptions about various development and mitigation scenarios either integrated into WPX's project design or to be applied by the BLM as COAs (Appendix A). These include use of directional drilling to reduce the number of well pads, piping instead of trucking of fluids to a centralized collection facility, flaring instead of venting of natural gas during well completions, self-contained flare units to minimize emissions to the atmosphere, and use of closed-loop drilling. Closed-loop drilling minimizes emissions by recycling drilling muds and separating fluids and drill cuttings, thus eliminating open pits containing petroleum fluids. In addition to minimizing emissions associated with drilling and completion activities, these mitigation measures would also significantly reduce fugitive dust and vehicle tailpipe emissions by greatly reducing the volume of truck traffic required to support the operations.

Generation of fugitive dust as a result of construction activities and travel on unpaved access roads would also be reduced by BLM's requirement that the operator apply gravel to a compacted depth of 6 inches on the access road, apply water to the access road during the development phase, and apply a dust suppressant surfactant approved by the BLM throughout the long-term production phase (Appendix A). In addition, construction activities for the well pad, access road, and pipelines would occur between the hours of 7:00 a.m. and 6:00 p.m. each day, a generally more favorable period for atmospheric dispersion due to warmer temperatures and less stable air. Fugitive dust emissions from vehicular traffic during drilling and completion would be further reduced if, as planned under the Proposed Action, these activities are allowed to occur during the winter season, when roads are frozen, snow-covered, or wet.

Emissions of volatile organic compounds (VOCs) such as the BTEX constituents of condensate vary depending on the characteristics of the condensate, the volume produced, and tank operations. Operators are required to control emissions of VOCs from condensate tanks under CDPHE Regulation 7. If deemed necessary by the State, the operator may be required to install a vapor recovery or thermal destruction system to further reduce VOC concentrations.

Ongoing scientific research has identified the potential impacts of "greenhouse gases" (GHGs) and their effects on global atmospheric conditions. These GHGs include carbon dioxide, methane, nitrous oxide, water vapor, and several trace gases. Through complex interactions on a global scale, these GHG emissions are believed by many experts to cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (NAS) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. In 2007, the IPCC also concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (man-made) greenhouse gas concentrations" (NAS 2007). Other theories about the effect of GHGs on global climate change exist.

An inventory and assessment of GHG emissions from oil and gas projects in the CRVFO was included in the air quality modeling completed in October 2011. In all of the modeled development scenarios, annual GHG emissions from Federal wells in the CRVFO would no more than 0.5% of Colorado emissions from natural gas projects in 2008 and 0.0009% of U.S. emissions from natural gas projects in 2005 (EPA 2010).

No Action Alternative

Under this alternative, no development of Federal wells, expansion of existing pads, improvement of road segments, or installation of new gas or waterlines would occur, avoiding new air quality impacts related to drilling, completing, servicing, or producing Federal wells or gas and liquids gathering operations as described for the Proposed Action .

Cultural Resources

Affected Environment

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take in to account the effects their actions will have on cultural resources. As a general policy, an agency must consider effects to cultural resources for any undertaking that involves Federal monies, Federal permitting/authorization, or Federal lands.

Several Class III cultural resource inventories (CRVFO# 1285, 1286, and 8396-1a&b) were conducted previously for the Naval Oil Shale Reserve and Mobil Oil Shale Properties. These previous inventories were determined to be inadequate due to their age, and a new Class III cultural resource survey (CRVFO# 1113-5) was conducted specifically for this project by Grand River Institute in December of 2012. The cultural inventory and pre-field file search of the Colorado SHPO database and BLM Colorado River Valley Field Office cultural records identified a number of cultural resources eligible for the National Register of Historic Places (NRHP) within the project area. Eligible or potentially eligible cultural sites are referred to in Section 106 of the National Historic Preservation Act as "historic properties."

Environmental Consequences

Proposed Action

Although eight historic properties (5GF654.13, 5GF917, 5GF2828, 5GF4897, 5GF4898, 5GF4899, 5GF4900, 5GF4901) are located in the project area, none are anticipated to be affected by the construction of the proposed natural gas pad expansion, access road or pipeline construction due to project design or realignment. Therefore, the BLM made a determination of "**No Historic Properties Affected**." This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the National Historic Preservation Act (16U.S.C 470f), the BLM/State Historic Preservation Officer (SHPO) Programmatic Agreement and Colorado Protocol]. As the BLM has determined that the Proposed Action would have no direct impacts to known "historic properties," no formal consultation was initiated with the SHPO.

While site 5GF4900 is outside the Area of Potential Effect and thus no negative effects to the site are anticipated, the BLM believes that the site's proximity to the expansion of well pad PA 11-35 warrants archaeological monitoring during enlargement of the pad. A site specific COA stipulating this monitoring would be attached to the APD.

Although unlikely, indirect, long-term cumulative damage from increased access and the presence of project personnel could result in a range of impacts to known or undiscovered cultural resources in the vicinity of the project location. These impacts could range from accidental damage or vandalism to illegal collection and excavation. A standard Education/Discovery COA for cultural resource protection would be attached to the EA. The importance of this COA would be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered during construction operations.

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, new road improvements, and associated gas and water pipeline upgrades would be denied. Consequently, none of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance.

Fossil Resources

Affected Environment

The predominant bedrock formations present at or near the surface within the project area are the Wasatch Formation (including the Fort Union Formation or equivalent at its base) and the Jack Rabbit Ridge and Parachute Creek members of the Green River Formation. Both formations are overlain by areas of Quaternary gravels and earthflow deposits. Occurring in varying thicknesses, these Quaternary sediments are considered Potential Fossil Yield Classification Class 2, defined as having a low probability of fossil occurrence. Class 2 geologic units are not likely to contain vertebrate or scientifically significant invertebrate fossils.

Both the Wasatch and Green River Formations are considered BLM Condition 4 formations, defined as an area that is known to contain vertebrate fossils or noteworthy occurrences of invertebrate fossils. These types of fossils are known to occur or have been documented, but may vary in occurrence and predictability. The Wasatch Formation is divided into the early Eocene Shire, and the Paleocene age Molina and Atwell Gulch members; while the Eocene aged Green River Formation is divided into the Parachute Creek, Garden Gulch, Douglas Arch, Cow Ridge, and Anvil Points members.

All members of the Wasatch Formation contain vertebrate fossils in varying abundances (Murphy and Daitch 2007). Rocks of the Wasatch Formation are lithologically very similar to one another throughout the Piceance Creek Basin as heterogeneous continental fluvial deposits with interfingering channel sandstone beds and overbank deposits consisting of variegated claystone, mudstone, and siltstone beds (Franczyk et al. 1990). Eocene mammals have been found in the lower part of the Shire member.

Fossils historically identified in the Wasatch are archaic mammals—including marsupials, representatives of two extinct orders of early mammals (pantodonts and creodonts), artiodactyls (deer-like even-toed ungulates), ancestral horses and other perissodactyls (odd-toed ungulates), carnivores, and primates—as well as birds, lizards, turtles, crocodilians, gars and other fishes, freshwater clams, gastropods (snails), and other invertebrates (BLM 1999a).

The Green River Formation consists of fine-grained lacustrine and fluvial-lacustrine rocks that were deposited in the Eocene Lake Uinta. The lake expanded early in its history, during the Long Point transgression (Johnson 1985), to cover much of the Piceance and Uinta Basins. The Green River Formation has yielded hundreds of invertebrate and plant fossils, and more than 60 vertebrate taxa have been described from the formation, including crocodiles, boa constrictors, and birds.

Environmental Consequences

Proposed Action

Although mapped as the predominant surface formation of the project area, field inspection revealed the Wasatch exposed only in a few outcrops found on cliff faces and landslide exposures. The thickness of

the Quaternary sediments cannot be accurately determined, but construction activities have the potential to adversely affect important fossils that may be present in the underlying Wasatch and Green Formations. The greatest potential for impacts is associated with excavation of shallow bedrock that may be unearthed during well pad and facilities (especially pipeline) construction. In general, alluvium, colluvium, and other unconsolidated sediments are much less likely than bedrock to contain well-preserved fossils.

An examination of the BLM paleontology database indicates that there are is one known fossil discovery site within a mile radius of the project area. The closest known site occurs in Section 29 approximately 4,900 feet southwest of the proposed pad. Areas covered with vegetation and soil cover do not usually yield fossil resources, but inspections should be conducted for proposed facilities that are located on or within 200 feet of Wasatch or Green River Formation bedrock surface exposures. In the event paleontological resources are encountered, BMPs related to the standard paleontological COA would be recommended (Appendix A).

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, new road improvements, and associated gas and water pipeline upgrades would be denied. Consequently, none of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance.

Geology and Minerals

Affected Environment

The project area is located near the eastern margin of the Colorado Plateau physiographic province (Fenneman 1946), a region characterized by dissected plateaus of strong relief. A broad, asymmetric, southeast-northwest trending structural basin, the Piceance Basin contains stratified sediments ranging in age from Cambrian through middle Tertiary up to 20,000 feet thick. The basin lies between the White River uplift to the northeast, the Gunnison uplift to the south, and the Uncompahgre swell to the west (George 1927, Weiner and Haun 1960). Table 6 lists the geologic formations within the project area.

Table 6. Geologic Formations within the East Parachute Project Area

Map Symbol	***Formation Name***	***Age***	***Characteristics***	***Location***
Tub	Uinta Formation – Unit B	Eocene	Light gray to brown sandstone	Slopes and outcrops
Tua	Uinta Formation – Unit A	Eocene	Brown to dark-orange sandstone	Slopes and outcrops.
Tgj	Green River Formation -- Jackrabbit Ridge Member	Eocene	Light gray to light brown, poorly laminated marlstone.	Slopes and outcrops.
Tgp	Green River Formation – Parachute Creek Member.	Eocene	Massive to platy marlstone.	Steep slopes and outcrops.
Source: O'Sullivan 1986				

The predominant bedrock exposures within the proposed development area are the Tertiary Green River and Uinta Formations. These formations are composed of alternating layers of fine grained sandstones and laminated to massive marlstone. They overlie the Wasatch Formation, which consists of variegated siltstone, claystone, and sandstones and ranges from 1,000 to 2,500 feet thick. The Wasatch Formation is underlain unconformably by the Mesaverde Group. The Mesaverde Group is composed of mudstones and sandstones with interlayered coal beds and ranges in thickness from about 3,000 to over 7,000 feet. The Mesaverde Group has also been referred to as the Mesaverde Formation, which includes informal subdivisions based on gas productivity characteristics.

The Iles Formation of the Mesaverde Group is the target zone of the proposed drilling program. Comprised of the Williams Fork and Iles Formations, sediments of the Mesaverde Group are marine sandstones transitional to non-marine beds of coal, shale, and sandstone. These sediments were deposited marginal to the great Cretaceous seaway. The oscillating shoreline of this sea, due to alternating rise and fall of sea level, left behind a complex of transgressive and regressive sedimentary sequences of nearshore and offshore sediments that define the Mesaverde Group.

Production is derived from three reservoir intervals, which include the Wasatch, Williams Fork, and Iles Formations. The latter two make up the Upper Cretaceous Mesaverde Group. The proposed drilling program would target the sandstone sequences of the Upper Williams Fork Formation, which provide most of the natural gas production volumes (Lorenz 1989). The upper portions of the Williams Fork include fluvial point bar, floodplain, and swamp deposits. The Lower Williams Fork Formation includes delta front, distributary channel, strandplain, lacustrine and swamp environments (Hemborg 2000), while the sandstones and coalbeds of the Iles Formation were deposited in a wave-dominated coastal setting (Johnson 1989, Lorenz 1989). The source rocks are interbedded and thermally mature gas-prone shales, mudstones, siltstones, and coals. The reservoir rocks are the fine to medium-grained Williams Fork sandstones, varying in thickness from less than 10 feet to more than 50 feet (Spencer and Wilson 1988), creating an interbedded relationship between source and reservoir. The trapping mechanism of the gas is both stratigraphic and diagenetic.

No commercial deposits of coal, oil shale, uranium, precious metals, limestone, sand and gravel, gypsum, or other leasable, locatable, or salable minerals are believed to occur within or beneath the project area.

Environmental Consequences

Proposed Action

If the proposed wells prove successful, initial production rates would be expected to be highest during the first few years of production, then decline during the remainder of the economic lives of the wells. Substantial reserves have been known to be trapped within the tight sands of these reservoirs since the late 1950s, but only within the last decade, and particularly within the last few years, has the integrated application of new technologies turned the tight gas sands of the Mesaverde Group into a profitable play (Kuuskraa 1997). Natural fracture detection, advanced log analysis, more rigorous well completions and recompletions, and denser spacing have increased the amount of recoverable gas within these reservoirs.

Natural gas production from the proposed wells would contribute to the draining of hydrocarbon-bearing reservoirs within the Mesaverde Group in this area, an action that would be consistent with BLM objectives for mineral production. Hydraulic fracturing would be utilized to create fractures within the formation to allow gas production from the wells. In recent years, public concern has been voiced regard potential impacts of hydraulic fracturing from "micro-earthquakes" and from contamination of freshwater aquifers. Potential impacts of hydraulic fracturing are addressed in the section on Water Quality-Ground.

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, new road improvements, and associated gas and water pipeline upgrades would be denied. Consequently, none of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance.

Invasive Nonnative Plants

Affected Environment

State-listed noxious weeds are designated by the Colorado Department of Agriculture, and management of these weeds is regulated under the Colorado Noxious Weed Act, Title 35, Article 5.5. Botanical surveys conducted in 2012 identified state-listed noxious weeds occurring within the East Parachute project area, as well as other nonnative plant species which can also have detrimental impacts on native plant communities. The proposed projects would occur within areas of existing well pads, pipelines, and access roads on a combination of BLM and private ownership lands. In association with these previous disturbances, noxious weeds and other nonnative plant species have established. Previously reclaimed areas on private surface ownership portions of the project area are vegetated primarily with nonnative perennial grasses. Weed infestation conditions for specific portions of the project area are described below.

DOE 1-W-27 pad: Two species of State List C noxious weeds are present around the pad and along the access road verge, cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*). In addition, several undesirable invasive nonnative plant species are common around the pad and access road. Kochia (*Bassia scoparia*), Russian-thistle (*Salsola tragus*), and yellow sweetclover (*Melilotus officinalis*) are common problematic species here. A nonnative perennial grass species, crested wheatgrass (*Agropyron cristatum*), is also present in the reclaimed areas around the existing pad. This species is widely used in dryland reclamation and dryland pastures in the region but is not approved for use on BLM lands in the CRVFO area due to its tendency to form monocultures that effectively exclude desirable native perennial grass and forbs from becoming established.

DOE 2-W-27 pad: Two species of State List C noxious weeds are present around the pad and along the access road verge, cheatgrass and halogeton. In addition, several undesirable nonnative species are common around the pad and access road. Kochia and Russian-thistle are common problematic species here. Yellow sweetclover, crested wheatgrass, and intermediate wheatgrass (*Thinopyrum intermedium*), are also present, and may date back to older reclamation seedings when these nonnative species were commonly used in seed mixes. Intermediate wheatgrass, like crested wheatgrass, has been widely used in dryland reclamation as well as dryland pastures but is undesirable for native reclamation because of its aggressiveness and, more so than for crested wheatgrass, its often large size.

PA 543-27 pad: Two species of State List C noxious weeds are present around the pad, cheatgrass and halogeton. There is also one State List B noxious weed, salt cedar (*Tamarix* sp.) located along the access road near the pad. Problematic nonnative species at this site include clasping pepperweed (*Lepidium perfoliatum*), kochia, crested wheatgrass, intermediate wheatgrass, and smooth brome (*Bromus inermis*). Smooth brome is another nonnative grass widely used in reclamation and pastures but differs from crested and intermediate wheatgrass by being rhizomatous instead of a bunchgrass. Its aggressive spread by rhizomes makes it even more hostile to the establishment of native grasses and forbs.

PA 23-26 pad: Two State List C noxious weed species are present around the existing pad. Cheatgrass is particularly abundant, while halogeton is also common. Other problematic nonnative species are also common here. Kochia is particularly abundant, but Russian thistle, yellow sweetclover, and Russian wildrye (*Psathyrostachys juncea*) are also common. Russian wildrye is yet another nonnative perennial grass widely used in reclamation and dryland pastures but unsuitable where establishment of native grasses and forbs is desired. Directly below the existing pad, evidence remains of previous juniper removal and piling, and a near-monoculture of crested wheatgrass covers this area. A small patch of cereal grain (*Secale* sp.) is also present around a culvert installed just below the existing pad.

PA 11-35 pad: This site is particularly weedy throughout the reclamation area surrounding the existing pad surface. One State List C noxious weed, cheatgrass, is common here, while halogeton is also common along the access road. The remainder of the vegetation is almost entirely a mix of undesirable nonnative species, including kochia, prickly lettuce (*Lactuca serriola*), salsify (*Tragopogon dubius*), tumble-mustard (*Sisymbrium altissimum*), crested wheatgrass, Russian wildrye, and smooth brome.

Road Realignment, New Pipelines, East Parachute Tank Pad: Presence and abundance of noxious weed and nonnative plant species in these areas generally correlates with the degree of previous disturbance. Along existing road edges, noxious weeds and other undesirable nonnative species are common. The State List C noxious weed halogeton is very common on road edges and in the wash bottoms running through the project area. Cheatgrass is also common and scattered throughout the project area.

The State List B noxious weed salt cedar occurs in small patches along the wash bottoms and in two locations along existing access roads, below the PA 543-27 pad and around a small pond where the proposed new pipeline site meets the road below the PA 44-27 pad. For State List B plants, the stated goal is to "stop the continued spread of these species," while the goal for List C plants is to "facilitate more effective integrated weed management on private and public lands."

Undesirable nonnative plant species occurring within the new road alignment, new pipeline sites, and the East Parachute Tank Pad site include all of the species identified on the well pad sites described above. These are generally absent or minimal in areas where the native vegetation is intact and both natural and human-caused disturbances are minimal. Nonnative plant densities increase with increasing disturbance levels, proximity to roads and well pads, and decreasing elevation. The common occurrences of halogeton and tamarisk along the floors of arroyos has probably resulted from flash flood events, which both scour the soil surface and carry weed seeds down from above.

Environmental Consequences

Proposed Action

Under the Proposed Action, a total of 34.6 acres would be disturbed, including 23.7 acres on BLM land and 10.9 acres on private land. Following construction and well completions, interim reclamation would occur on all areas not needed for ongoing operations. A total of 4.9 acres would remain as long-term disturbance, including 4.1 acres on BLM land and 0.8 acre on private land. Temporary reclamation on BLM land would consist of seeding with native plant species in accordance with the reclamation COAs presented in Appendix A. The composition of plant species used for reclamation on private lands would be at the discretion of the landowner.

Surface-disturbing activities, such as those proposed for this project, provide a niche for invasion and establishment of nonnative plant species particularly when these species are already present in the surrounding area. The mechanisms for this invasion and establishment are multi-fold. Removal of native

vegetation removes the competition from native plants for resources, including water and soil nutrients, opening up niches for invasive species (Parendes and Jones 2000). Linear disturbances, such as roads, provide corridors of connected habitat along which invasive plants can easily spread (Gelbard and Belnap 2003). Well pad construction and subsequent well drilling and operations activities, as well as new road construction and installation of pipelines, require construction equipment and motorized vehicles which often transport invasive plant seeds either alone or in mud clods on the vehicle undercarriage or tires and deposit them in disturbed habitats along access roads and at well pad sites (Zwaenepoel et. al. 2006; Schmidt 1989).

Noxious weeds and other invasive species are well adapted to colonize and dominate in disturbed ground. They generally do not require well-developed soils, can out-compete native species for resources, produce prodigious quantities of seeds, and have seeds which can survive for many years or even decades within the soil. When weeds establish on a site, they can also significantly alter the composition of the soil microbial community of bacteria and fungi, making it increasingly more difficult over time for native species to reestablish on the site (Hierro et. al. 2006, Reinhart and Callaway 2006, Vinton and Goergen 2006, Vogelsgang and Bever 2009). Due to the quantity and longevity of weed seeds and the effects of weeds on the soil, once these invasive species have established on a site they can be extremely difficult to eliminate.

The East Parachute project area has a history of extensive disturbance associated with oil and gas development and livestock grazing. As a result, noxious weed occurrences are common and widespread. Problematic nonnative species are also widespread in disturbed sites throughout the project area, and are well-established along existing roads and well pads where the proposed project activities would occur. With new project disturbances, the potential for increased establishment of these undesirable plants following construction activities is very high. Movement of soil by construction equipment could be expected to spread weed seeds throughout the project area, and the total area of disturbed habitat would increase. Vehicles and equipment could also transport new noxious weed species to the site, where they would have disturbed habitats in which to establish.

Installation of temporary surface pipelines would cause minimal disturbance, however workers installing the pipeline could act as vectors to spread weed seeds. Cheatgrass in particular has seeds which attach easily to clothing if personnel walk through existing occurrences. If the ground is wet and muddy, weed seeds could also be transported in mud sticking to boots. To mitigate the invasive species risk, treatment of existing noxious weed infestations would be required prior to starting construction, and the standard weed control COA would be attached to APDs to require periodic monitoring and weed control practices to ensure that these weedy plants are controlled (Appendix A). Establishment of native plant species is also crucial in preventing invasive nonnative plant species establishment and spread. Therefore, the standard reclamation COAs would also be attached to APDs to require seeding with an appropriate native seed mix and monitoring of reclamation seeding results (Appendix A).

No Action Alternative

Under this alternative, no development of Federal wells would occur, avoiding new disturbance impacts associated with the Proposed Action. This would eliminate or reduce the potential for development of invasive nonnative plants for existing or proposed project components. However, current occurrence of noxious weeds and undesirable nonnative plants would continue in existing disturbed areas except those areas for which the BLM currently has the authority to require additional weed treatments.

Migratory Birds

Affected Environment

The Migratory Bird Treaty Act (MBTA) provides protections for native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Within the context of the MBTA, "migratory" birds include non-migratory "resident" species as well as true migrants, essentially encompassing virtually all native bird species. For most bird species, nesting habitat is of special importance because it is critical for supporting reproduction in terms of nesting and foraging sites. Because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Emphasizing the need to conserve declining migratory bird species, the U.S. Fish and Wildlife Service (USFWS 2008) has published a list of Birds of Conservation Concern (BCC). This section focuses on BCC species, non-BCC species that are Neotropical (long-distance) migrants, and raptors—three groups especially vulnerable to habitat loss or modification on their breeding grounds. Species protected under the Endangered Species Act or classified by the BLM as sensitive species are addressed in the section on Special Status Species.

The current BCC list includes 12 species potentially present in or near the project area: the bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), flammulated owl (*Otus flammeolus*), yellow-billed cuckoo (*Coccyzus americanus*), Lewis's woodpecker (*Melanerpes lewis*), willow flycatcher (*Empidonax traillii*), gray vireo (*Vireo vicinior*), pinyon jay (*Gymnorhinus cyanocephalus*), juniper titmouse (*Baeolophus griseus*), Brewer's sparrow (*Spizella breweri*), and Cassin's finch (*Haemorhous cassinii*). The flammulated owl and Brewer's sparrow are also listed as BLM sensitive species and addressed in the section on Special Status Species.

Pinyon-juniper habitat provides potential nesting sites for the pinyon jay, juniper titmouse, and (less likely based on range) the gray vireo. Cassin's finch nests at higher elevations in montane and subalpine conifers but may move into pinyon-juniper in winter. Non-BCC species potentially nesting in pinyon-juniper in the project area include migrants such as the black-chinned hummingbird (*Archilochus alexandri*), western kingbird (*Tyrannus verticalis*), Say's phoebe (*Sayornis saya*), dusky flycatcher (*Empidonax oberholseri*), mountain bluebird (*Sialis currucoides*), western bluebird (*S. mexicana*), blue-gray gnatcatcher (*Polioptila caerulea*), plumbeous vireo (*Vireo plumbeus*), black-throated gray warbler (*Dendroica nigrescens*), and chipping sparrow (*Spizella passerina*).

Sagebrush shrublands in the project area provide marginal habitat for the Brewer's sparrow, a near-obligate in sagebrush shrublands. Non-BCC species associated with sagebrush shrublands include the western meadowlark (*Sturnella neglecta*) and three species of Neotropical migrants: western kingbird, vesper sparrow (*Pooecetes gramineus*), and lark sparrow (*Chondestes grammacus*). Additionally, two active golden eagle nests were found in the cliffbands north of the proposed well pads.

Raptors most likely to nest in the project vicinity and forage in or near the project area include non-BCC species such as the American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginiana*), and long-eared owl (*Asio otus*). Also nesting in the general vicinity are two BCC raptors, the golden eagle and prairie falcon.

Environmental Consequences

Proposed Action

Under the Proposed Action, removal of 34.6 acres of sparse to medium density juniper woodlands with openings of sagebrush, saltbush, and greasewood would result in loss of existing and potential nesting sites for perching birds. While habitat loss and fragmentation may affect individual birds, it is not expected to adversely impact a species as a whole. If construction, drilling, or completion activities occur during the nesting season, visual and noise disturbance near active nests could cause nest abandonment and failure, reducing the productivity of affected species. Construction activity during the nesting season could also result in the destruction of clutches and/or mortality of nestlings.

A Timing Limitation (TL) applied as a COA (Appendix A) would prohibit vegetation removal during the period May 1 to June 30 to reduce adverse impacts to migratory birds such as BCC species. Upon completion of a raptor survey, a raptor nesting TL, also described in Appendix A, would preclude construction, drilling, or completion activities to minimize disturbance to nesting raptors. In addition to these restrictions, the operator is subject to the MBTA, administered by the USFWS, which precludes the "take" of any raptor or most other native species. Under the Act, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The USFWS interprets "harm" and "kill" to include loss of eggs or nestlings due to abandonment or reduced attentiveness by one or both adults as a result of disturbance by human activity, as well as physical destruction of an occupied nest. Adherence to the 60-day TL period does not ensure compliance with the MBTA.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to migratory birds related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Native American Religious Concerns

Affected Environment

The Proposed Action is located within an area identified by the Ute Tribes as part of their ancestral homeland. Several Class III cultural resource inventories (see section on Cultural Resources) were conducted in the Proposed Action's vicinity to determine if any areas were known to be culturally sensitive to Native Americans. No sensitive areas were identified or are currently known in the proposed project area.

Environmental Consequences

Proposed Action

At present, no Native American concerns are known within the project area and none were identified during the inventories. The Ute Tribe of the Uintah and Ouray Bands, Southern Ute, and Ute Mountain Ute Tribes were notified of the proposed East Parachute Field Development Project on January 24, 2013. No responses, questions, or requests for additional information have been received by February 25, 2013. If new data regarding cultural resources are disclosed, new terms and conditions may have to be negotiated to accommodate their concerns.

Although the Proposed Action would have no direct impacts, increased access and personnel in the vicinity of the proposed project could indirectly impact unknown Native American resources ranging from illegal collection to vandalism.

The National Historic Preservation Act (NHPA) requires that if newly discovered cultural resources are identified during project implementation, work in that area must stop and the agency Authorized Officer notified immediately (36 CFR 800.13). The Native American Graves Protection and Repatriation Act (NAGPRA), requires that if inadvertent discovery of Native American Remains or Objects occurs, activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice made to the agency Authorized Officer, as well as the appropriate Native American group(s) (IV.C.2). Notice may be followed by a 30-day delay (NAGPRA Section 3(d)). Further actions also require compliance under the provisions of NHPA and the Archaeological Resource Protection Act. WXP Energy Rocky Mountain LLC will notify its staff and contractors of the requirement under the NHPA, that work must cease if cultural resources are found during project operations. A standard Education/Discovery COA for the protection of Native American values would be attached to the Federal APDs (Appendix A). The importance of these COAs shall be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered. The proponent and contractors shall also be aware of requirements under the NAGPRA.

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, associated road improvements, and associated gas and water pipeline upgrades on BLM lands would be denied. Consequently, none of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance.

Noise

Affected Environment

The project area lies northeast of Parachute, Colorado, with proposed activities adjacent to Interstate 70 and extending some 1.5 miles north of the highway. The Proposed Action incorporates expanding four existing well pads to drill 34 new Federal wells, expanding the existing PA 11-35 well pad to serve as a frac pad, and construct road and pipeline upgrades to support the project. The Proposed Action would lie within a rural setting characterized by oil and gas development activities. Noise levels in the area are presently created by I-70 and the frontage road and traffic serving existing wells and ongoing drilling and completion activities. The proposed drilling activities would be located approximately 1 mile from the nearest residence

Noise is generally described as unwanted sound, weighted and noise intensity (or loudness) is measured as sound pressure in decibels (dBAs). The decibel scale is logarithmic, not linear, because the range of sound that can be detected by the human ear is so great that it is convenient to compress the scale to encompass all the sounds that need to be measured. Each 20-unit increase on the decibel scale increases the sound loudness by a factor of 10.

Sound levels have been calculated for areas that exhibit typical land uses and population densities. In rural recreational areas, ambient sound levels are expected to be approximately 30 to 40 dBA (EPA 1974, Harris 1991). As a basis for comparison, the noise level would be 60 dBA during a normal conversation between two people standing 5 feet apart.

Environmental Consequences

Proposed Action

The project would result in increased levels of noise during the construction, drilling, and completion phases. The noise would be most noticeable along the roads used to haul equipment and at the pad location. Drilling activities are subject to noise abatement procedures as defined in the COGCC Rules and Regulations (Aesthetic & Noise Control Regulations). Operations involving pipeline or gas facility installation or maintenance, compressors, the use of a drilling rig, completion rig, workover rig, or stimulation are subject to the maximum permissible noise levels for industrial zones. The 2006 revised COGCC noise control rules call for noise levels from oil and gas operations at any well site and/or gas facility to comply with the maximum permissible levels (Table 8) at a distance of 350 feet.

Given the remote locations of the proposed project activities, with no reasonably close occupied structure or designated recreational area, the light industrial standard is applicable. The allowable noise level for periodic impulsive or shrill noises is reduced by 5 dBA from the levels shown (COGCC 2008).

Table 8. Noise Standards for Light industrial, Residential/Agriculture/Rural

Zone	*7:00 A.M. to 7:00 P.M*	*7:00 P.M. to 7:00 A.M*
Light Industrial	70 dBA	65 dBA
Residential/Agricultural/Rural	55 dBA	50 dBA

Short-term (7- to 14-day) increases in nearby noise levels would characterize road and well pad construction while the existing cuttings pit is re-opened. Based on the Inverse Square Law of Noise Propagation (Harris 1991) and an typical noise level for construction sites of 65 dBA at 500 feet (Table 9), project-related noise levels would be approximately 59 dBA at a distance of 1,000 feet, approximating active commercial areas (EPA 1974).

Table 9. Noise Levels at Typical Construction Sites and along Access Roads

Equipment	*Noise Level (dBA)*		
	50 feet	*500 feet*	*1,000 feet*
Air Compressor, Concrete Pump	82	62	56
Backhoe	85	65	59
Bulldozer	89	69	63
Crane	88	68	62
Front End Loader	83	63	57
Heavy Truck	88	68	62
Motor Grader	85	65	59
Road Scraper	87	67	61
Tractor, Vibrator/Roller	80	60	54
Sources: BLM (1999a), La Plata County (2002)			

Traffic noise would also be elevated as a consequence of the Proposed Action. The greatest increase would be along access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 9 approximately 68 dBA of noise (at 500 feet) would be created by each fuel and water truck that travels these roads. Less noise would be created by smaller trucks and passenger vehicles

such as pickup trucks and sport utility vehicles. Although the duration of increased noise from this source would be short, it would occur repeatedly during the drilling and completion phases.

Noise impacts would decrease during the production phase but would remain background noise levels. During maintenance and well workover operations, noise levels would temporarily increase above those associated with routine well production.

No Action Alternative

Under this alternative, no development of Federal wells would occur, and no new noise impacts related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Socioeconomics

Affected Environment

The project area is located entirely within Garfield County, Colorado, with a total county land area of 2,958 square miles (Garfield County 2013a). The county seat is Glenwood Springs; other towns include Carbondale, New Castle, Silt, Rifle, Battlement Mesa, and Parachute. Interstate 70 transects the county east to west with a network of county and private roads servicing the project area.

The population of the county grew by an average of approximately 2.5% per year from 2000 to 2011 but decreased by 2.6% from 2008 to 2011 due to the national economic downturn, resulting in a net increase of 27% from 44,259 to 56,270 residents (CDOLA 2013a). Population growth in Garfield County is expected to nearly double to 109,887 in 2040 (CDOLA 2012). In July 2011, the Garfield County population was 70% urban and 30% rural, with a population density of approximately 19 people per square mile (City Data 2012).

In February 2013, the total estimated civilian labor force was 34,107 with an unemployment rate of 7.8% (CDLE 2013). In the fourth quarter of 2011, the industry groups with the highest percentage of total employment were construction (14.4%), retail trade (13.7%), and Health Care and Social Assistance (13.5%). Table 10 lists the top 10 industries in Garfield County for the fourth quarter of 2011 (CDLE 2013).

Table 10. Selected Industry Sectors for Garfield County

Rank	*Job Sector*	*Employees*
1	Construction (buildings and engineered projects)	2,901
2	Retail Trade	2,782
3	Health Care and Social Assistance	2,732
4	Education Services	2,484
5	Accommodation and Food Services	2,464
6	Mineral Extraction (including mining and oil and gas)	2,426
7	Public Administration	1,717
8	Professional, Scientific, and Technical Services	1,047
9	Administration, Support, Waste Management, and Remediation	874
10	Transportation and Warehousing	782

Personal income in Garfield County has also risen, growing approximately 6% per year from $1.3 billion in 2000 to $2.1 billion in 2011. However, personal income dropped by nearly 10% from 2008 to 2011. Annual per capita income has grown in the same period approximately 3% per year, from $29,081 to $37,858, but annual per capita income dropped by nearly 11% from 2008 to 2011 (USDOC 2012).

The communities of Parachute, Rifle, Silt, and New Castle are considered to have the most affordable housing, while the communities of Glenwood Springs and Carbondale have the least affordable housing. In March 2012 the cost of living index in Garfield County was 88.6, below the U.S. average of 100 (City Data 2012).

Activities on public land in the vicinity of the project area are primarily ranching/farming, hunting, OHV travel, and the development of oil and gas resources. Hunters contribute to the economy because many require lodging, restaurants, sporting goods, guides and outfitting services, food, fuel, and other associated supplies.

Production of natural gas in Garfield County increased dramatically during recent years, from approximately 70 billion cubic feet (BCF) in 2000 to 700 BCF in 2012 (COGCC 2013a). Approximately 1,286 drilling permits were approved in Garfield County between April 2, 2012 and March 29, 2013 (COGCC 2013b). However, U.S. natural gas prices have dropped in recent years from $10.79 per thousand cubic feet (MCF) in July 2008 to $1.89/MCF in April 2012 (USDOE 2013). The U.S. price of natural gas has begun to improve, in December 2012 it was $3.35/MCF, but has not reached the prices of 2008. Natural gas development activity in Garfield County remains low.

Property tax revenue from oil and gas development is a source of public revenue in Garfield County. In 2012, oil and gas assessed valuation in Garfield County was approximately $2.8 billion, or about 73% of total property tax assessed value distribution (Garfield County 2013b). The county's largest taxpayers are in the oil and gas industry (Garfield County 2013c).

The Federal government makes Payments in Lieu of Taxes (PILT) to local governments to help offset losses in property taxes due to nontaxable Federal lands within their boundaries (USDI NBC 2013). The PILT distributions are based on acres for all Federal land management agencies. Approximately 60% of all Garfield County lands are Federally owned (Garfield County 2013a). The amount may also be adjusted based on population and as apportioned by Congress. By formula, payments are decreased as other Federal funds, such as mineral royalty payments, increase. PILT amounts to Garfield County over the last five years ranged from $1,732, 974 in 2008 to $403,176 in 2012 (USDI NBC 2013).

In addition to PILT distributions, Federal mineral royalties are levied on oil and gas production from Federal mineral leases. Oil and gas lessees pay royalties equal to 12.5% of the wellhead value of oil and gas produced from public land (BLM 2007a). Half the royalty receipts received from production are distributed to the state and county governments, which are then allocated to fund county services, schools, and local communities.

The NEPA process requires a review of the environmental justice issues as established by Executive Order 12898 (February 11, 1994). The order established that each Federal agency identify any "disproportionately high and adverse human health or environment effects of its programs, policies, and activities on minority and low-income populations." The Hispanic/Latino community is the only minority population of note in the project vicinity. In 2010, approximately 28% of the residents of Garfield County identified themselves as Hispanic/Latino, compared to 17% in 2000 (CDOLA 2013b). Statewide, the population of Hispanic/Latino residents grew 41.2% during the same 10-year period (CDOLA 2013c). African-American, American Indian, Asian, and Pacific Islander residents accounted

for a combined 1.6% of the Garfield County population in 2010, compared to a statewide level of 7% (CDOLA 2013b).

Environmental Consequences

Proposed Action

The Proposed Action would have minor positive impacts on the local economy of Garfield County through the creation of additional job opportunities in the oil and gas industry and in supporting trades and services. In addition, Garfield County would receive additional tax and royalty revenues.

The Proposed Action could result in negative social impacts including changing the character of the area, reducing scenic quality, increasing dust levels especially during construction, and increasing traffic.

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, associated road improvements, and associated gas and water pipeline upgrades would be denied. None of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance.

Soils (includes an analysis of Public Land Health Standard 1)

Affected Environment

The Proposed Action would occur in the East Parachute field on surrounding slopes that are generally south-facing or southwest-facing, at elevations between 5,000 and 6,500 feet, and with gradients ranging from less than 5% to greater than 50%. The proposed project area is covered by the Soil Survey of Rifle Area, Colorado (USDA1985, NRCS 2010). According to this survey, the project area contains the soil types described in Table 11.

Table 11. Project Area Soils

Mapping Unit Name	*Description*	*Erosion Hazard*	*Permeability*	*Proposed Infrastructure Type*
Torriorthents- - Rock Outcrop Complex 15-70%	Exposed sandstone and shale bedrock and stony basaltic alluvium. Torriorthents are on foothills and mountainsides below the rock outcrop. This complex is used for grazing, wildlife habitat, and recreation.	Moderate to Severe	Moderate	DOE 1-W-27, DOE 2-W-27, PA 23-26, PA 543-27 pads, East Parachute Tank Pad, PA 13-27 pad, PA 44-27 pad-road, gas & water pipelines
Torriorthents- - Rock Outcrop Complex, very steep 50-80%	Exposed sandstone and shale bedrock and stony basaltic alluvium. Torriorthents are on foothills and mountainsides below the rock outcrop. This complex has limited value for grazing.	Moderate to Severe	Moderate	DOE 1-W-27 & DOE 2-W-27 pads

Nihill Channery loam 6- 25%	Moderately sloping to hilly soil found on alluvial fans and sides of valleys and formed in alluvium derived from the Green River shale and sandstone. The permeability is moderately rapid, runoff is slow, and erosion hazard is severe. This soil is generally used for grazing and wildlife habitat and development is limited by steep slopes	Moderate to Severe	Moderate	East Parachute Tank farm, access road and fluids pipelines
Potts-Ildefonso Complex 3-12%	Deep well drained hilly sloping soils are on mesas, alluvial fans and valley sides from 5,000 to 6,500 feet. Potts soil is formed in sandstone, shale, or basalt. The Ildefonso soil is formed in calcareous, basaltic alluvium and eolian material. The primary uses for this soil are mainly grazing and wildlife habitat.	Moderate	Moderate	PA 11-35 Frac pad and fluids pipelines

Environmental Consequences

The Proposed Action includes expanding the existing DOE 1-W-27, DOE 2-W-27, PA 23-26, and PA 543-27 pads and constructing, drilling, completing, and operating six new Federal wells on DOE 1-W-27 in 2013 and 28 new Federal wells on the other three pads in 2015. The existing PA 13-27, PA44-27 and DOE 1-W-26 pads would be partially redisturbed to accommodate overflow cuttings generated from the new wells planned on the DOE 1-W-27, PA 543-27, and PA 23-26 pads. Reconstructing the existing PA 11-35 pad to serve as a centralized frac pad would be implemented although the new earthwork would be confined within the original pad footprint. Building the East Parachute Tank Pad to stage water and condensate storage tanks, conducting road improvements to the DOE 2-W-27 and PA 44-27 pads, and burying new 8-inch gas and 4-inch water collection pipelines would cause additional disturbances. Total short-term disturbance would be 34.6 acres, and long-term disturbance after interim reclamation would be 4.9 acres (Table 3).

Pad expansions would be designed and positioned in the optimal location to take advantage of the topography and avoid disturbances to the drainages and steep slopes. The improvements to the access road to the PA 44-27 and DOE 2-W-27 pads would cause short-term disturbance but benefit soil resources in the long term. Steep road grades would be reduced from 18% to 10% on the PA 44-27 realignment and would be reduced from 20% to 12% on the DOE 2-W-27 road approach. In addition all road sections would be maintained and newly surfaced. The area generally contains adequate vegetation buffers that would minimize the potential for sediment transport to Cottonwood Gulch and the Colorado River. However, construction activities would cause slight increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Potential for such soil loss and transport would increase as a function of slope, feature (pad, road, or pipeline route) to be constructed, and proximity to drainages.

The proposed pads, access roads, and pipeline systems would be located on areas with moderate to severe risk of erosion due to the soil characteristics and its location within alluvial fans. Particular care would be taken during construction and reclamation to ensure that proper design and BMPs, including the COAs listed in Appendix A, are utilized to prevent erosion and slope movement.

No Action Alternative

Under the No Action Alternative, no development of Federal wells would occur precluding any developments that could create new impacts to soil resources related to drilling, completing, servicing, or producing Federal wells or gas and water gathering operations.

Analysis on Public Land Health Standard 1 for Upland Soils

The Rifle-West Watershed LHA conducted in 2005 determined that all areas were meeting Standard 1 for upland soils, although some areas were found to be impacted by accelerated erosion. The Proposed Action with associated mitigation is unlikely to prevent Standard 1 from being achieved. Measures attached as COAs (Appendix A) for controlling erosion and revegetating disturbances would minimize long-term impacts to soil volume and productivity. The No Action Alternative would not result in failure of the area to achieve Standard 4 because the proposed developments on BLM land would not occur.

Special Status Species (includes an analysis on Public Land Health Standard 4)

Federally Listed, Proposed, or Candidate Species

PLANTS

Affected Environment

According to the latest species list from the USFWS, four Federally listed plant species may occur within or be impacted by actions occurring in Garfield County. Table 12 lists these species and summarizes information on their habitat associations, potential for occurrence in the project vicinity based on known geographic range and habitats present, and potential for adverse impacts from the Proposed Action. Note from Table 12 that three Federally listed plant species have the potential to occur within or adjacent to the project area. These are Parachute penstemon, DeBeque phacelia, and Colorado hookless cactus. Rare plant surveys were conducted within the proposed project area in 2001, in association with the Wheeler to Webster GAP project area, and no occurrences were found of any of these species. New surveys were conducted in 2012, with particular focus on Parachute penstemon and DeBeque phacelia.

Since 2001, suitable habitat for Parachute penstemon has been identified in wash bottoms lined with eroded Green River shale, at elevations lower than originally identified as suitable for this species. Because of this, wash bottoms below the proposed project locations were extensively surveyed in 2012. Although suitable habitat was present, no occurrences of Parachute penstemon were found. The project area is located within the upper Shire member of the Wasatch formation, at elevations ranging from 5,200 to 5,850 feet in elevation, matching the generalized habitat range for DeBeque phacelia. However, sparsely vegetated soils in the project area are generally located on greater than 60% slopes, are very hard-cemented, or have a high percentage of surface cover with loose rock fragments. These characteristics indicate that these sites are unsuitable for DeBeque phacelia (personal communication with Alicia Langton, USFWS). Surveys also failed to locate any occurrences of Colorado hookless cactus, and potentially suitable habitat was minimal.

Environmental Consequences

Proposed Action

Because there are no known occurrences of Parachute penstemon or Colorado hookless cactus within 300 meters of any proposed ground-disturbing activity within the project area, the project would have **No**

Effect on Parachute penstemon or Colorado hookless cactus. Because there are no known occurrences of DeBeque phacelia or Ute lady's tresses, and no suitable habitats for these species within 300 meters of any proposed ground-disturbing activity within the project area, the project would have **No Effect** on DeBeque phacelia and Ute lady's tresses.

Table 12. Potential for Occurrence of Threatened or Endangered Plant Species

Species and Status	***Occurrence***	***Habitat Association***	***Range or Habitat in Vicinity?***	***Potentially Affected?***
Parachute penstemon *(Penstemon debilis)* -- Threatened	Sparsely vegetated, south-facing, steep, white shale talus of the Parachute Creek Member of the Green River Formation; 8,000 to 9,000 feet	Other oil shale endemic species, such as Roan Cliffs blazing-star, Cathedral Bluffs meadow- rue, dragon milkvetch, Piceance bladderpod, and oil shale fescue	Yes	No
DeBeque phacelia *(Phacelia submutica)* – Threatened	Sparsely vegetated, steep slopes in chocolate-brown, gray, or red clay on Atwell Gulch and Shire Members, Wasatch Formation; 4,700 to 6,200 feet	Desert shrubland with fourwing saltbush, shadscale, greasewood, broom snakeweed, bottlebrush squirreltail, and Indian ricegrass, grading upward into scattered junipers	Yes	No
Colorado hookless cactus *(Sclerocactus glaucus)* – Threatened	Rocky hills, mesa slopes, and alluvial benches in salt desert shrub communities; often with well-formed microbiotic crusts; can occur in dense cheatgrass 4,500 to 6000 feet	Desert shrubland with shadscale, galleta grass, black sagebrush, Indian ricegrass grading upward into big sagebrush and sagebrush/pinyon-juniper	Yes	No
Ute lady's tresses orchid *(Spiranthes diluvialis)* – Threatened	Subirrigated alluvial soils along streams and in open meadows in floodplains; 4,500 to 7,200 feet	Box-elders, cottonwoods, willows, scouring rushes, and riparian grasses, sedges, and forbs	No	No

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to special status species related to drilling, completing, servicing, or producing Federal wells or gas gathering operations. Because no development would occur, and because there are no known occurrences of any Federally listed plant species within this area, there would be **No Effect** on any Federally listed plant species.

VERTEBRATES

Affected Environment

Federally listed, proposed, or candidate species potentially occurring within or affected by actions in Garfield County include eight species of vertebrate wildlife. Table 13 lists these species and summarizes information on their habitat associations, potential for occurrence in the project vicinity based on known

geographic range and habitats present, and potential for adverse impacts from the Proposed Action. Species indicated as potentially affected are described in more detail following the table.

Table 13. Potential for Occurrence of Threatened or Endangered Animal Species

Species and Status	Distribution in Region	Preferred Habitats	Potentially Present in Vicinity?	Potentially Adversely Affected?
Canada lynx *(Lynx canadensis)* – Threatened	Dispersed use in in upper montane and subalpine zones of Colorado mountains.	Subalpine spruce-fir forests; also lodgepole pine and aspen to as low as upper montane.	No	No
Yellow-billed cuckoo (*Coccyzus americanus*) –Candidate	Major rivers and tributaries of western, northwestern, and south-central Colorado.	Large cottonwood stands with tall shrub understory along rivers.	No	No
Mexican spotted owl (*Strix occidentalis lucida*) – Threatened	No historic occurrence in area; present in southwestern Colorado and southern Front Range.	Rocky cliffs in canyons with closed-canopy coniferous forests.	No	No
Razorback sucker (*Xyrauchen texanus*) – Endangered	Colorado River and major tributary rivers, including mainstem Colorado River upstream to town of Rifle in CRVFO.	General: Deep, slow runs, pools, and eddies. Spawning: silt to gravel substrates in shallow water and seasonally flooded overbank areas.	**Yes**	**Yes**
Colorado pikeminnow *(Ptychocheilus lucius*) – Endangered			**Yes**	**Yes**
Humpback chub (*Gila cypha*) -- Endangered	Mainstem Colorado River and major tributaries – upstream to Black Rocks near Utah state line.	Rocky runs, riffles, and rapids in swift, deep rivers.	No	**Yes**
Bonytail chub (*Gila elegans*) – Endangered			No	**Yes**
*Lineage GB cutthroat trout (*Oncorhynchus clarki* ssp.) – Threatened	Identified in 60 streams in Colorado River basin including CRVFO area.	Clean, cool headwaters streams and ponds isolated from other strains of cutthroat trout.	No	No

*Lineage GB = Relict populations of cutthroat trout indigenous to the Colorado/Gunnison/Dolores River drainages. Currently protected under the ESA pursuant to prior listing of the greenback cutthroat trout (*O. c. stomias*) pending completion of genetic and morphometric studies and taxonomic reassessment of native cutthroat trout in Colorado.

Environmental Consequences

Proposed Action

The Canada lynx, greater sage-grouse, Mexican spotted owl, and western yellow-billed cuckoo are not expected to occur in the project vicinity based on documented occurrences and habitat types present. Therefore, the Proposed Action would have "**No Effect**" on these species.

Razorback Sucker, Colorado Pikeminnow, Humpback Chub, and Bonytail Chub. These four species of Federally listed big-river fishes occur within the Colorado River drainage basin near or downstream from the project area. Designated Critical Habitat for the razorback sucker and Colorado pikeminnow includes

the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle. This portion of the Colorado River lies a few miles northeast of the project area. The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 70 miles downstream from the project area. Occasionally, the bonytail is in Colorado west of Grand Junction, but its range does not extend east from that point. Only one population of humpback chub, at Black Rocks west of Grand Junction, is known to exist in Colorado.

The endangered Colorado River fishes could potentially be affected by the consumptive use of water taken from the Colorado River basin to support activities associated with the Proposed Action. Depletions in flows in the Colorado River and major tributaries are a major source of impacts to these fishes due to changes in the flow regime that reduce the availability and suitability of spawning sites and habitats needed for survival and growth of the larvae. Principal sources of depletion in the Colorado River basin include withdrawals for agricultural or industrial uses, withdrawals for municipal water supplies, and evaporative losses from reservoirs. On average, approximately 0.77 acre-feet of Colorado River water is consumed during activities related to each oil and gas well. This is equivalent to 0.04 to approximately 0.04 cubic feet per second (cfs) of water throughout the typical 10-day drilling period for an oil and gas well in the CRVFO area.

In 2008, the BLM prepared a Programmatic Biological Assessment (PBA) addressing water-depleting activities associated with BLM's fluid minerals program in the Colorado River Basin in Colorado. In response to this PBA, the USFWS issued a Programmatic Biological Opinion (PBO) (ES/GJ-6-CO-08-F-0006) on December 19, 2008. The PBO concurred with BLM's effects determination of "**May Affect, Likely to Adversely Affect**" the Colorado pikeminnow, humpback chub, bonytail chub, or razorback sucker as a result of depletions associated with oil and gas projects. To offset the impacts, the BLM has set up a Recovery Agreement, which includes a one-time fee per well. The estimated depletions from the Proposed Action would be added to the CRVFO tracking log and submitted to the USFWS per the PBA/PBO at the end of the year to account for depletions associated with BLM's fluid mineral program. The calculated mitigation fees are used by the USFWS for mitigation projects and contribute to the recovery of these endangered species through restoration of habitat, propagation, and genetics management, instream flow identification and protection, program management, nonnative fish management, research and monitoring, and public education.

Other potential impacts to these species include inflow of sediments from areas of surface disturbance and inflow of chemical pollutants related to oil and gas activities. Construction activities would increase the potential for soil erosion and sedimentation. Although a minor temporary increase in sediment transport to the Colorado River may occur, it is unlikely that the increase would be detectable above current background levels. In any case, the Federally listed, proposed, or candidate fish species associated the Colorado River are adapted to naturally high sediment loads and would not be affected.

In contrast to inflow of sediments, the inflow of chemical pollutants could impact the endangered big-river fishes if concentrations are sufficient to cause acute effects. The potential for adverse impacts would be limited to the Colorado pikeminnow and razorback sucker, the two species known to occur within the CRVFO area. Spills or other releases of chemical pollutants as a result of oil and gas activities are infrequent in the CRVFO area due to the various design requirements imposed by BLM and the State of Colorado. In the event of a spill or accidental release into an ephemeral drainage that could flow to the Colorado River, the operator would be required to implement its Spill Prevention, Control, and Countermeasures (SPCC) plan, including such cleanup and mitigation measures as required by BLM or the State. For these reasons, and because any spills into the Colorado River would be rapidly diluted to levels below that are not deleterious, or even detectable, the potential for adverse impacts from chemical releases is not considered significant.

Based on the above, the BLM has determined that inflow of sediments and chemicals into the Colorado River would have "**No Effect**" on the endangered big river fishes. In the unlikely event of a spill with the potential to affect, or documented occurrence of an effect, the USFWS would initiate discussions with the involved parties to identify appropriate remedies.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to special status species related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

BLM Sensitive Plant and Animal Species

PLANTS

Affected Environment

BLM sensitive plant species with habitat and/or occurrence records in Garfield County are listed in Table 14, along with summaries of their habitat requirements, potential for occurrence within the project area, and potential to be impacted by the Proposed Action. Species with the potential to occur within the East Parachute project area are DeBeque milkvetch, Naturita milkvetch, Piceance bladderpod, Roan Cliffs blazing-star, and Cathedral Bluffs meadowrue. Rare plant surveys were conducted within the proposed project area in 2001, in association with the Wheeler to Webster GAP project area, and new surveys were conducted in 2012. No occurrences of any BLM sensitive plant species were found within the project area.

Table 14. Potential for Occurrence of BLM Sensitive Plant Species

Species and Status	***Occurrence***	***Habitat Association***	***Range or Habitat in Vicinity?***	***Potentially Affected?***
DeBeque milkvetch (*Astragalus debequaeus*)	Varicolored, fine-textured, seleniferous or saline soils of Wasatch Formation; 5,100 to 6,400 feet	Pinyon-juniper woodlands and desert shrub.	Yes	No
Naturita milkvetch (*Astragalus naturitensis*)	Sandstone mesas, ledges, crevices and slopes in pinyon/juniper woodlands; 5,000 to 7,000 feet	Pinyon-juniper woodlands	Yes	No
Piceance bladderpod (*Lesquerella parviflora*)	Shale outcrops of the Green River Formation, on ledges and slopes of canyons in open areas; 6,200 to 8,600 feet	Pinyon-juniper woodlands, shrublands; often with other oil shale endemic species	Yes	No
Roan Cliffs blazing-star (*Mentzelia rhizomata*)	Steep, eroding talus slopes of shale, Green River Formation; 5,800 to 9,000 feet	Pinyon-juniper woodlands, shrublands; often with other oil shale endemic species	Yes	No

Table 14. Potential for Occurrence of BLM Sensitive Plant Species				
Species and Status	***Occurrence***	***Habitat Association***	***Range or Habitat in Vicinity?***	***Potentially Affected?***
Harrington's beardtongue (*Penstemon harringtonii*)	Flats to hillsides with rocky loam and rocky clay loam soils derived from coarse calcareous parent materials or basalt; 6,200-9,200 feet	Sagebrush shrublands, typically with scattered pinyon-juniper	No	No
Cathedral Bluffs meadow-rue (*Thalictrum heliophilum*)	Endemic on sparsely vegetated, steep shale talus slopes of the Green River Formation; 6,300-8,800 feet	Pinyon-juniper woodlands and shrublands; often with other oil shale endemics, sometimes with rabbitbrush or snowberry	Yes	No

Environmental Consequences

Proposed Action

Because there are no known BLM sensitive plants or suitable habitat for these species within or adjacent to the project area, the project would have no impact on any BLM sensitive plant species.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to special status species related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

ANIMALS

Affected Environment

Table 15 lists BLM sensitive vertebrate wildlife species that are known to occur in the region and, if present, could potentially be adversely affected by the Proposed Action. Potential impacts to species indicated as present or possible in the area of potential direct or indirect effects are discussed following the table.

Table 15. BLM Sensitive Vertebrate Species Present or Potentially Present in the Project Area		
Common Name	***Habitat***	***Potential for Occurrence***
Fringed myotis (*Myotis thysanodes*) Townsend's big-eared bat (*Corynorhinus townsendii*)	Roosting: Caves, trees, mines, and buildings. Foraging: Pinyon-juniper, montane conifers, and semi-desert shrubs.	**Possible**
Northern goshawk (*Accipiter gentilis*)	Montane and subalpine coniferous forests and aspen forests; may move to lower elevation pinyon/juniper woodland in search of prey during winter.	**Possible in winter**

Table 15. BLM Sensitive Vertebrate Species Present or Potentially Present in the Project Area		
Common Name	***Habitat***	***Potential for Occurrence***
Bald eagle (*Haliaeetus leucocephalus*)	Nesting/Roosting: Mature cottonwood forests along rivers. Foraging: Fish and waterfowl along rivers and lakes; may feed on carrion, rabbits, and other foods in winter.	**Nests and roosts along Colorado River**
Peregrine falcon (*Falco peregrinus*)	Nesting: Cliffs, usually near a river, large lake, or ocean. Foraging: Waterfowl on rivers and lakes; upland fowl in open grassland or steppe.	**Nests on Roan Cliffs**
Brewer's sparrow (*Spizella breweri*)	Extensive stands of sagebrush, primarily Wyoming sagebrush on level or undulating terrain.	**Possible – habitat marginal**
Midget faded rattlesnake (*Crotalus oreganus concolor*)	Cold desert of NW Colorado, SW Wyoming, and NE Utah, primarily in sagebrush with rock outcrops and exposed canyon walls.	**Possible – habitat marginal**
Great Basin spadefoot (*Spea intermontana*)	Permanent or seasonal ponds and slow-flowing streams in pinyon-juniper woodlands and semi-desert shrublands.	No suitable habitat
Northern leopard frog (*Lithobates pipiens*)	Clean, perennial waters in slow-flowing streams, wet meadows, marshes, and shallows of clean ponds and lakes.	No suitable habitat
Bluehead sucker (*Catostomus latipinnis*)	Primarily smaller streams with a rock substrate and mid to fast- moving waters; also shallows of larger rivers.	Not present
Flannelmouth sucker (*Catostomus discobolus*)	Runs, riffles, eddies, and backwaters in large rivers.	**Present in Colorado River**
Roundtail chub (*Gila robusta*)	Slow-moving waters adjacent to fast waters in large rivers.	
"Lineage CR" cutthroat trout (*Oncorhynchus clarki* ssp.)	Headwaters streams and ponds with cool, clear waters isolated from populations of nonnative cutthroats and rainbow trout.	Not present
*Lineage CR = Relict populations of cutthroat trout indigenous to the Yampa/Green River drainages but widely transplanted throughout the state. Managed as a BLM sensitive species pursuant to prior designation of the Colorado River cutthroat trout (*O. c. pleuriticus*) pending completion of genetic and morphometric studies and taxonomic reassessment of native cutthroat trout in Colorado.		

Environmental Consequences

Proposed Action

Fringed Myotis and Townsend's Big-eared Bat. No caves or other suitable roosting sites occur in the project area. Loss of large trees, potentially also used for roosting, would be negligible. Loss of habitat above which the bats could search for aerial prey would also be minimal, and disturbance due to construction activities would not occur at night when the bats are feeding.

Northern Goshawk. This large accipiter nests and is mostly a year-round resident in upper montane and subalpine forests in the region, including both coniferous and aspen forests, where it feeds primarily on birds and diurnal small mammals (e.g., chipmunks, squirrels). Vagrant goshawks sometimes move into lower elevation conifers, including pinyon-juniper woodlands, in winter to search for prey.

Bald Eagle. Although bald eagles nest and roost along the Colorado River just southeast of the project area, the potential for use of the actual project area is moderate. Any such use would most likely be by an individual hunting across large expanses of open upland habitats during winter. The project area would represent a small portion of such potential winter hunting habitat, and the reclaimed grass-forb community would provide better habitat for prey than the current shrubland types.

Peregrine Falcon. Peregrine falcons nest along cliffbands south and north of the project and hunt for waterfowl along the Colorado River or other birds across open terrain. Use of the project area is unlikely, except for infrequent, transitory overflights while traveling between the Colorado River and the cliff bands to the south.

Brewer's Sparrow. Although the habitat is marginal in the project area, the possibility exists of nesting by this species. The 60-day TL to prohibit removal of vegetation during the period May 1 to July 1 (see Appendix A) would avoid or minimize the potential for impacts to nesting Brewer's sparrows. Construction activities outside this period could cause individuals to avoid the disturbance while feeding. However, this impact would be limited in duration at any point along the corridor, and individuals are expected to feed across very large home ranges outside the nesting season, thus minimizing the severity of this potential indirect impact.

Midget Faded Rattlesnake. This small viper is considered a small, pale-colored subspecies of the common and widespread western rattlesnake, although some authorities consider it and another western subspecies, the Great Basin rattlesnake (*C. v. nuntius*) to be genetically distinct species. Although movement patterns of midget faded rattlesnakes are not well known, they are believed to be limited to a few hundred meters from den sites. The limited distribution and small home range make this snake susceptible to impacts from human disturbance (USGS 2007). Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, capture by collectors, and livestock grazing. As access increases into previously undeveloped areas, the risk of encounters with humans would increase, resulting in some cases of mortality or collection.

Flannelmouth Sucker and Roundtail Chub. As with the ecologically similar Colorado River endangered fishes described above, the flannelmouth sucker and roundtail chub are adapted to naturally high sediment loads and therefore would not be affected by increased sediment transport to the Colorado River. Furthermore, protective COAs for water quality would minimize this potential (Appendix A). However, these species are vulnerable to alterations in flow regimes in the Colorado River (including evaporative loses from dams and depletions from withdrawal of water for irrigation or municipal water supplies) that affect the presence of sandbars and seasonally flooded overbank areas needed for reproduction. The amount of depletion in flows associated with this project is not expected to have a significant adverse impact on the survival or reproductive success of these species.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to special status species related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Analysis on Public Land Health Standard 4 for Special Status Species

Based on the Health Assessment Report, Rifle-West Watershed (2005) and species status updates which have occurred since 2005, three federally listed plant species and three BLM sensitive plant species are known to occur within this this watershed area. The federally listed plant species are Colorado hookless cactus, Parachute penstemon, and DeBeque phacelia, and the BLM sensitive plant species are DeBeque milkvetch, Harrington's penstemon, and Roan Cliffs blazingstar. As of 2005, Standard 4 was being met for these species. However, continued oil and gas development was noted as a risk factor for reduction of potential habitat and habitat quality for special status plant species. There are no known occurrences of any special status plant species with the proposed project area, and potentially suitable habitat is minimal. The Proposed Action would create new ground disturbance, increase the risk of noxious weeds, and

potentially impact marginally suitable habitat for special status plant species. This could contribute to the movement away from meeting Standard 4 for special status plants.

According to a recent land health assessment, habitat conditions within this area appear suitable for special status animal species known or likely to occur (BLM 2005). However, large portions of the landscape are being fragmented due to extensive natural gas development. Continued habitat fragmentation is of concern as large blocks of contiguous intact habitat are required by many species. Sustained development and the proliferation of roads, well pads, pipelines, compressor stations, tank farms and other surface facilities will continue to reduce habitat patch size and affect both habitat quality and quantity. The potential to impact some species would increase as development continues. The Proposed Action in conjunction with similar activities throughout this watershed would increase fragmentation and could increase sediment loads. Although the contribution of the Proposed Action is in itself small, it may further trend the area away from meeting Standard 4 for special status wildlife.

The No Action Alternative would not result in a failure of the area to achieve Standard 4 because the proposed developments on BLM land would not occur.

Vegetation (includes an analysis on Public Land Health Standard 3)

Affected Environment

The project area lies primarily within pinyon-juniper (*Pinus edulis-Juniperus osteosperma*) habitat at the upper elevations, grading into sagebrush and salt desert scrub habitats at the lower elevations. Overall, the elevations within the East Parachute project area range from 5,200 to 5,850 feet. The topography includes deeply incised drainages and increasingly steep ridges and drainage walls moving upward towards Cottonwood Point and the Roan Plateau. The dramatic topography and varied soils create a variety of microhabitats for a diversity of plant species. Patches of bare ground are also common, and occur naturally due to the soils, topography, and climate.

Within denser areas of pinyon-juniper woodland, the understory plant community is dominated by prickly phlox (*Phlox hoodii*), rock goldenrod (*Petradoria pumila*), and rose heath (*Chaetopappa ericoides*), Indian ricegrass (*Achnatherum hymenoides*), and saline wildrye (*Leymus salina*). In areas where pinyon and juniper trees are spaced farther apart, the understory species diversity increases. Common species include small woody plants such as broom snakeweed (*Gutierrezia sarothrae*), fourwing saltbush (*Atriplex canescens*), longflower rabbitbrush (*Chrysothamnus depressus*), Mormon-tea (*Ephedra viridis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), rubber rabbitbrush (*Ericameria nauseosa*), shadscale (*Atriplex confertifolia*), and siltbush (*Zuckia brandegeei*). Native perennials include galleta grass (*Pleuraphis jamesii*), slender wheatgrass (*Agropyron trachycaulus*), wild-buckwheat (*Eriogonum* sp.), yellow milkvetch (*Astragalus flavus*), and Harriman's yucca (*Yucca harrimaniae*).

Moving down in elevation, sagebrush and salt desert scrub community species intergrade with pinyon-juniper community species. Common species here include mountain big sagebrush, fourwing saltbush, greasewood (*Sarcobatus vermiculatus*), rubber rabbitbrush, saline wildrye, claret cup cactus (*Echinocereus triglochidiatus*), and prickly pear cactus (*Opuntia* sp.).

Disturbed areas around existing well pads and along roads are vegetated predominantly with nonnative species and noxious weeds. These are described in greater detail in the Invasive Nonnative Plants section above. Native species also occupying these areas include the perennial grasses basin wildrye (*Leymus cinereus*), Indian ricegrass, saline wildrye, slender wheatgrass, and western wheatgrass (*Pascopyrum smithii*) and the woody plants broom snakeweed, fourwing saltbush, greasewood, mountain big sagebrush, rubber rabbitbrush, and shadscale.

Floors of ephemeral washes separating the project well pad locations typically have additional species, including the native forbs California brickellbush (*Brickellia californica*), Fendler's sandmat (*Chamaesyce fendleri*), Osterhout's penstemon (*Penstemon osterhoutii*), sharpleaf twinpod (*Physaria acuminata*), and western aster (*Symphyotrichum ascendens*). Two noxious weed species also common along the wash bottoms are halogeton (an annual forb) and salt-cedar (a large shrub or small tree).

A small seasonal pond located beside the access road and adjacent to the proposed pipeline junction with this road below the PA 44-27 pad supports additional disturbance tolerant riparian species growing along its periphery. These include two natives—broadleaf cattail (*Typha latifolia*) and rough cocklebur (*Xanthium strumarium*)—and non-native salt-cedar.

Environmental Consequences

Proposed Action

Under the Proposed Action, a total of 34.6 acres of interim reclamation areas and pinyon-juniper, sagebrush, and desert scrub habitats would be disturbed, of which 23.7 acres would be on BLM land, with an additional 10.9 acres on private land. Following construction and well completion, interim reclamation would occur on all areas not needed for ongoing operations. A total of 4.9 acres would remain as long-term disturbance, with 4.1 acres would be on BLM land and 0.8 acre on private land. Temporary reclamation on BLM land would consist of seeding with native plant species in accordance with the reclamation COAs presented in Appendix A, and using species mixes appropriate for pinyon-juniper and sagebrush plant communities. The composition of plant species used for reclamation on private lands would be at the discretion of the landowner. Installation of the temporary surface pipelines would have minimal impact to the existing vegetation, causing surface crushing of plants immediately below the pipeline, and mortality of smaller plants. These areas could be expected to recover following surface line removal without supplemental seeding.

Adjacent native vegetation would not be directly impacted, but could be indirectly impacted by increased dust deposition on leaves. Dust levels could be expected to increase above ambient levels in the short term from pad expansion, well drilling, new road construction, and new pipeline installation. Increased dust levels can negatively impact plants by clogging stomatal openings in the leaves, impeding gas exchange and reducing the ability of plants to take in carbon dioxide. Dust on the leaf surface can also effectively reduce light availability at the leaf surface. Light and carbon dioxide are both critical for plants to conduct photosynthesis, and reductions in either can reduce the quantity of carbohydrates plants can produce through photosynthesis, and thereby reduce plant growth and seed production. Dust on leaf surfaces can also facilitate plant tissue uptake of toxic pollutants (Thompson et. al. 1984, Farmer 1993, Sharifi et. al. 1997). Dust can also affect snowmelt patterns and resulting hydrology and soil moisture availability, alter soil pH and nutrient availability, and result in plant community composition changes (Angold 1997, Auerbach et. al. 1997, Johnston and Johnston 2004, Field et. al. 2010, Gieselman 2010).

Cumulative impacts from the proposed project development and plant habitat loss, in combination with previous oil and gas development in this area, could also indirectly impact adjacent vegetation through negative effects on pollinators. Pollinators depend on both appropriate floral communities and on appropriate nesting habitat. Many pollinators show fidelity to specific habitat areas, and if these sites become isolated from contiguous habitat by disturbances such as roads, pollinators may be reluctant to cross these barriers to utilize other habitats (Bhattacharya et. al. 2002, Osborne and Williams 2001). Roads and well pad construction can negatively impact pollinators by creating barriers, by removing habitat as a result of new construction, and by direct mortality through collisions with vehicles.

Additional indirect impacts to adjacent vegetation could occur from noxious weeds and other nonnative plants associated with project area disturbances. The proposed removal of native vegetation would increase the site vulnerability to invasion and establishment of noxious weeds and other nonnative invasive plant species, particularly with the existing widespread establishment of noxious weeds and other nonnative species. Neighboring vegetation would also become more vulnerable to invasion by noxious weeds and other nonnative species. Ground disturbance combined with vehicle traffic and construction equipment provides both excellent habitat and vectors for invasive species, particularly when these species are already present within the soil seed bank (Schmidt 1989, Parendes and Jones 2000, Gelbard and Belnap 2003, Larson 2003, Zaenepoel et. al. 2006). These nonnative species can negatively impact native plant communities, both directly through competition for resources, and indirectly through alteration of soil microbial communities (Klironomos 2002, Hierro et. al. 2006, Reinhart and Callaway 2006, Vogelsang and Bever 2009). Herbicide treatments of noxious weeds can also result in negative effects or mortality to native plants if they are co-occurring or located nearby (BLM 2007b). Implementation of standard COAs for noxious weeds and temporary reclamation (Appendix A) would reduce the risk of noxious weed and invasive species establishment and spread through the combination of chemically treating noxious weeds while also reintroducing native vegetation through seeding of native plant species.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to vegetation related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Analysis on Public Land Health Standard 3 for Plant and Animal Communities (partial, see also Wildlife, Aquatic and Wildlife, Terrestrial)

Based on the Rifle West Land Health Assessment (2005), different portions of this area were meeting the standard, marginally meeting the standard, or not meeting the standard. Problems noted included widespread cheatgrass dominance, particularly at lower elevations and on south-facing slopes, with a corresponding loss of perennial grasses and forbs. Also noted was dominance of sagebrush communities by old shrubs with poor seedling recruitment. Noxious weeds are present at varying levels throughout the assessment area. Appendix A includes provisions to revegetate the disturbances with native species and to control noxious weeds. If successfully revegetated, the Proposed Action should not contribute to the failure of the area to meet Standard 3. The No Action Alternative would have no bearing on the ability of the area to meet the public land health standard for plant and animal communities because no new development would occur on BLM land.

Visual Resources

Affected Environment

The Proposed Action is located on private land and BLM land approximately 5 miles northeast of Parachute, Colorado. The proposed well pad expansions would occur on four existing BLM surface well pad locations (DOE 1-W-27, DOE 2-W-27, PA 543-27, and PA 23-26). The proposed frac pad location (PA 11-35) and East Parachute tank pad would be located on private land. Temporary surface pipelines and buried pipelines for gas gathering, completions, and production support would occur on both private and BLM land.

The BLM land is classified as Visual Resource Management (VRM) Class II as identified by the 2006 Roan Plateau RMPA/EIS (BLM 2006). The objective of VRM Class II, as defined in the BLM's Manual H-8410-1 – Visual Resource Inventory (BLM 1986), is described below.

- The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Visual resource management (VRM) objectives do not apply to non-BLM lands, and visual values for those lands are protected by land owner discretion. The BLM can only make recommendations to mitigate impacts to scenic values.

The Proposed Action is located within Visual Resource Inventory (VRI) Class II, Scenic Quality B, Sensitivity Level High, and within the Foreground/Middle Ground Distance Zone.

The characteristic landscape is a panoramic expanse of dramatic finger-like ridges extending south and east from the rim of the Roan Plateau cliffs. The ridges are separated by drainages that terminate immediately north of the I-70 corridor. The Roan Plateau Cliffs are a dominant landscape feature within the viewshed of the I-70 corridor and adjacent communities including Parachute, Battlement Mesa, and Morrisania Mesa. Vegetation consists of open sagebrush-salt desert scrub shrublands intermixed with scattered patches of dense juniper on the ridgeline/mesa tops with stippled juniper on the ridgeline/mesa slopes with exposed tan and coral/salmon-colored soils. The area is characteristic of oil and gas development and associated production facilities.

The visual resource analysis area includes the I-70 corridor, US Hwy 6, and County Road 309 (Rulison-Parachute Road) on Morrisania Mesa. This viewshed is important, as it is viewed by people who live, work, commute, and recreate in the area, and who constitute the typical casual observer. The Proposed Action is within the foreground/middle ground (3-5 miles) of these travel corridors. BLM guidance states that lands with high visual sensitivity are those within 5 miles of a primary travel corridor and of moderate to very high visual exposure, where details of vegetation and landform are readily discernible and changes in visual contrast are easily noticed by the casual observer.

The visual impact analysis for this project is based on the views from 4 Key Observation Points (KOPs) representing 4 linear view locations representing the viewing angle and direction with the highest frequency of viewers (Figure 11).

KOP 1 (Figure 12) is located on the existing WPX GV 56-35 well pad directly north of I-70. KOP 1 represents the first location where viewers traveling westbound along I-70 would view the project area.

KOP 2 (Figure 13) is located on the private oil and gas development field road directly north of I-70. KOP 2 represents the location where viewers traveling eastbound or westbound along I-70 would view the project area.

KOP 3 (Figure 14) is located on US Hwy 6. KOP 3 represents the first location where viewers traveling eastbound along I-70 would view the project area.

KOP 4 (Figure 15) is located on County Road 309 (Rulison-Parachute Road) on Morrisania Mesa. KOP 4 represents the location where viewers traveling eastbound or westbound along County Road 309 would view the project area and the view that Morrisania Mesa residents would have looking north.

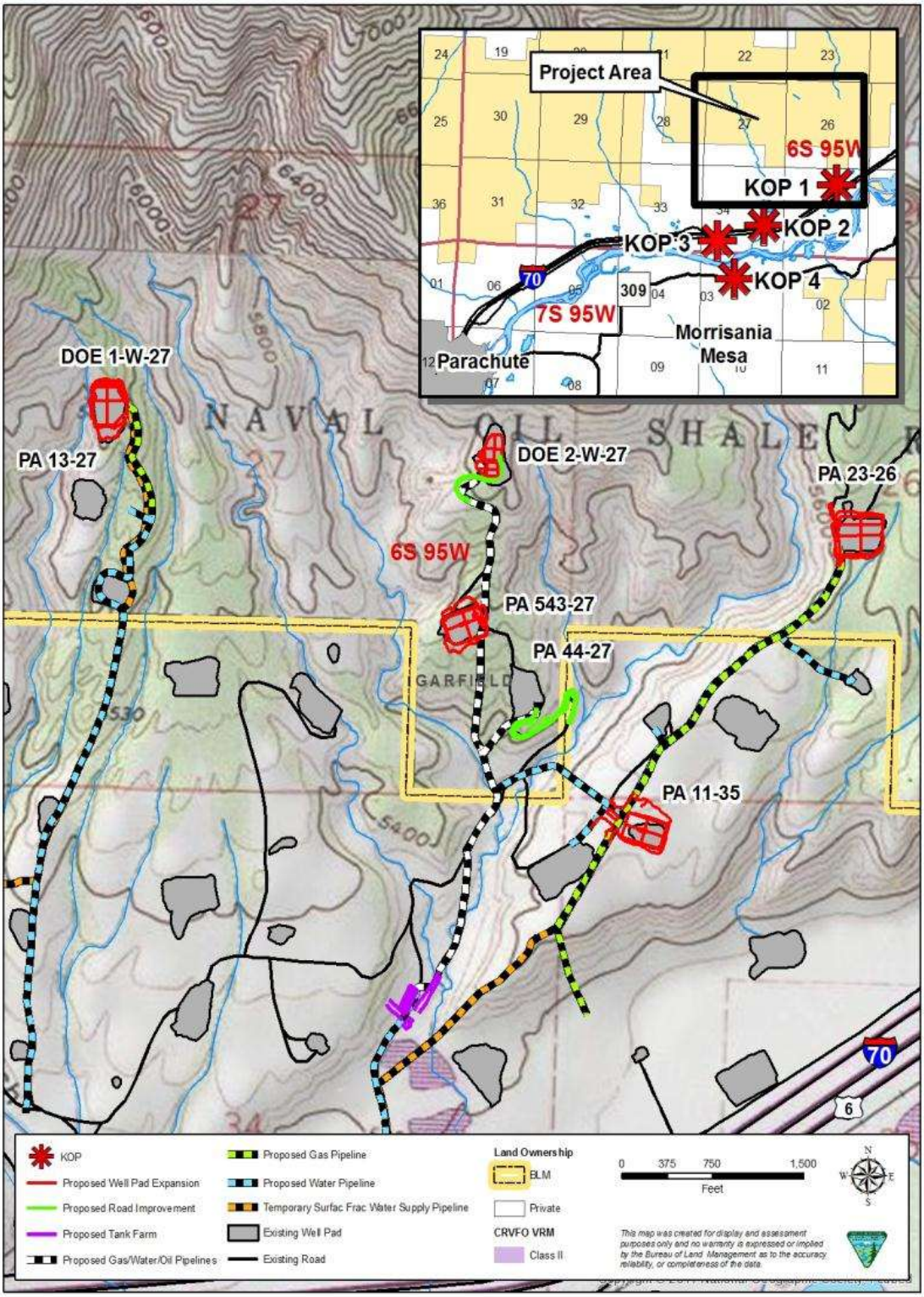

Figure 11. Proposed Action in Relation to VRM Class Designations.

Figure 12. KOP 1 – View Northwest from Existing WPX GV56-35 Pad Directly North of I-70. A viewer at this location would be lower than the Proposed Action. Travelers on I-70 would not see the Proposed Action because of intervening topography in the immediate foreground.

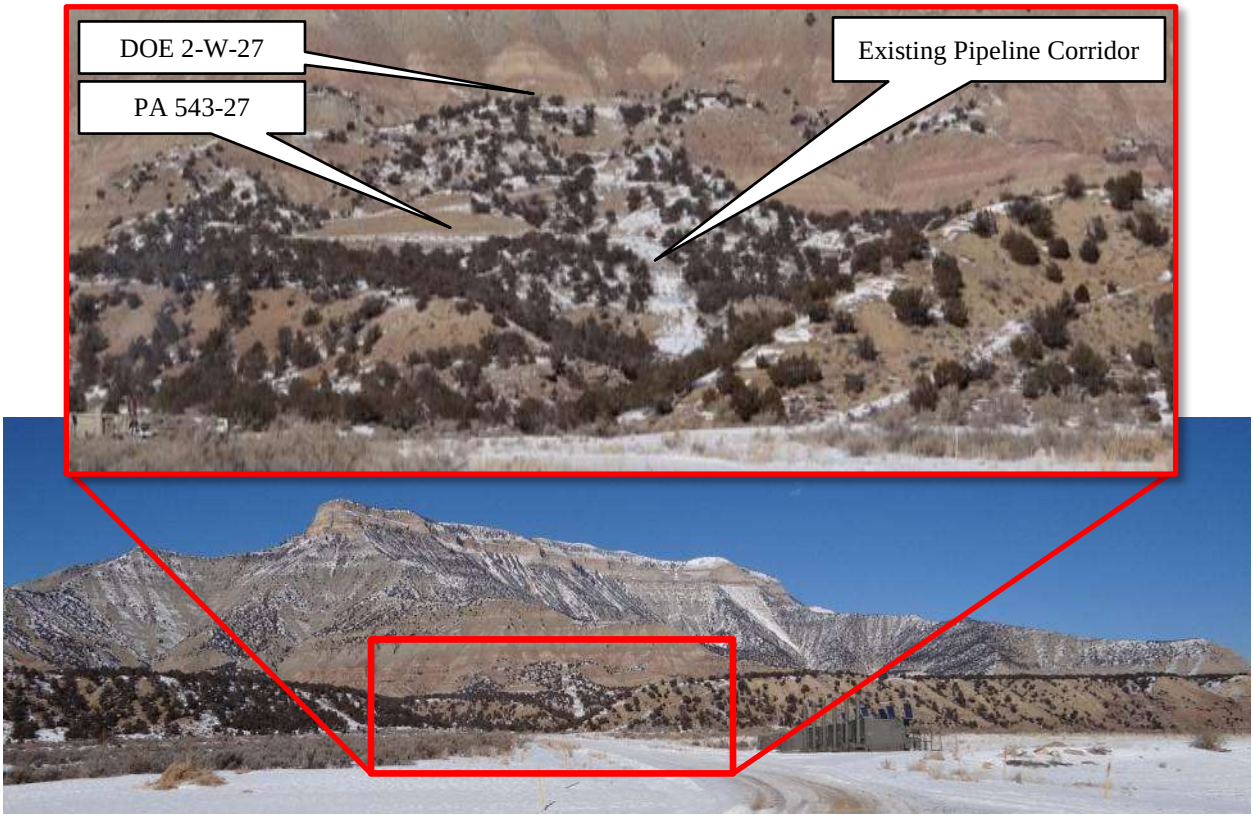

Figure 13. KOP 2 – View North from Private Field Development Road Directly North of I-70. A viewer at this location would be lower than the Proposed Action. Travelers on I-70 would have a brief viewing window (as illustrated above) during which components of the Proposed Action would be visible. This viewing window occurs where topography in the immediate foreground that provides screening from KOP 1 and KOP 3 opens up.

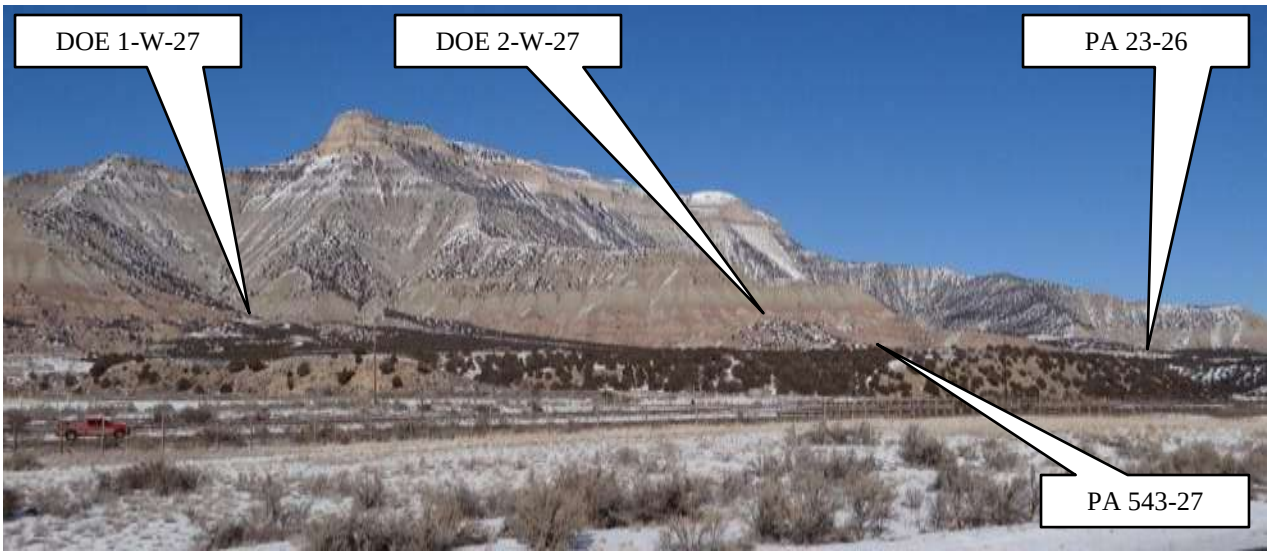

Figure 14. KOP 3 – View Northeast from US Hwy 6. A viewer at this location would be lower than the Proposed Action. Travelers on US Hwy 6 and I-70 would have limited visibility into the project area because of topography in the immediate foreground.

Environmental Consequences

Proposed Action

The planning process involved several site visits where the proposed pad expansions, production facilities, cuttings management, access road upgrades, and pipelines were reviewed. Modifications were made to address resource concerns, including visual resources.

PROPOSED PAD EXPANSIONS (DOE 1-W-27, DOE 2-W-27, PA 543-27, AND PA 23-26 PADS)

The proposed pad expansions would improve the current condition of the well pads because these pads were designed and built without consideration of maximizing the ability to reshape the cut-and-fill slopes so that they emulate the slopes seen in the adjacent landscape and to facilitate vegetation establishment during interim reclamation. Because of the challenging terrain, large cut-and-fill slopes were required to accommodate the space needed for the well pads, but did not account for the volume of dirt needed to properly recontour the cut and fill slopes. Production facilities are located in proximity to the cut slopes, which to this day remain and are too steep for vegetation to become established.

Short-term visual impacts due to pad construction, drilling, and completion activities would occur within in the project area. Expansion of the well pads would create contrast within the landscape by removing existing vegetation, exposing bare ground, and creating distinct lines and forms in the landscape. The well pad expansions would increase the presence of drilling rigs, heavy equipment (e.g. dozers, graders, trackhoes), and vehicular traffic with an increase in dust and light pollution.

Long-term visual impacts would be less dramatic because the proposed pad expansions are designed and would be constructed to maximize the area available for reshaping the cut-and-fill slopes and for interim reclamation. Production facilities would be located away from the cut-and-fill slopes and the amount of production equipment on the pad working surface would be reduced. In most cases, well completions would be employ remote fracing, and produced water, condensate, and natural gas would be piped off the pad locations, reducing truck traffic and allowing for a smaller working surface footprint once reclaimed.

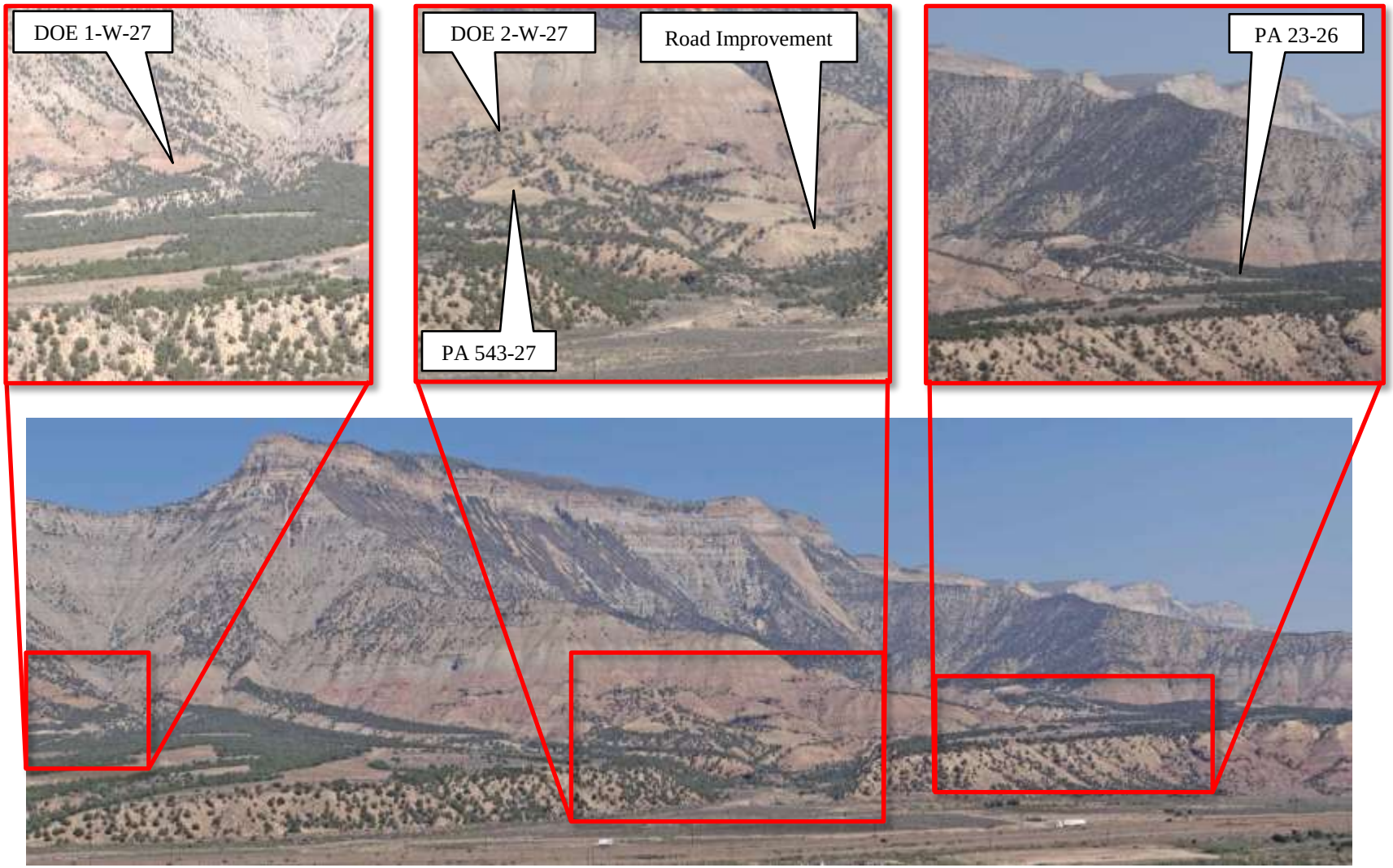

Figure 15. KOP 4 – View Northeast from County Road 309 (Rulison-Parachute Road) on Morrisania Mesa. A viewer at this location would be slightly lower than or equal to the Proposed Action. KOP 4 provides the best vantage point for viewing the project area without the obstruction of intervening topography between I-70 and the Proposed Action project components.

The DOE 1-W-27 well pad working surface would have production facilities (separators), but they would be located along the eastern edge of the pad away from the steeper cut and fill slopes, allowing enough space so that the slopes can be reshaped to facilitate vegetation growth and to blend in with the adjacent natural slopes. The separators would be adequately screened from view by the trees located below the well pad. The produced water, condensate, and gas would be piped off the pad by buried pipelines installed along the existing access road to the existing Cottonwood Tank Farm. The two narrow ridges on the western and eastern edges of the pad would be leveled off to accommodate the necessary pad width and to provide material for the pad fill slope. Most of the cuttings generated during drilling would be placed against the cut slope along the north side of the well pad to help with recontouring the slope to a more natural appearance. The location of this well pad is remote and would require completions to occur on site which would create short-term visual impacts from associated fracing equipment and truck traffic. Once drilling and completion work is finished, the pad would be reclaimed to a production working surface footprint of less than one acre. Overall, the proposed expansion of the DOE 1-W-27 would visually improve the current condition and to meet VRM class II objectives, mitigation requirements are applied as standard COAs (Appendix A).

The DOE 2-W-27 well pad would require more earthwork than the other proposed pad expansions. The access road would be improved to reduce the current steep grade approach to the pad and a new pad (south of the existing well pad) would be constructed to accommodate drill rig equipment and production equipment once drilling is finished. During the onsite surveys, the new "split pad" design was discussed and preferred because it avoided steep slope issues by expanding the pad to the east or west. In addition, the lower pad was shifted slightly to the north and east to avoid losing visually screening trees and opening the ridge to views from below. Cuttings generated during drilling would be placed against the cut slope (as space allows) along the north side of the well pad to help with recontouring the slope to a more natural appearance. Production equipment (separators) would be staged on the new pad once drilling and completions are complete. The new wells would employ remote fracing with a temporary surface frac line and the produced water, condensate, and gas would be piped off the pad by buried pipelines installed alongside an existing pipeline corridor or access road. The produced water, condensate, and gas pipelines deviate from the existing pipeline corridor and access road southwest of the PA 44-27 well pad. However, the location where the alignment deviates is screened from view by topography from the KOPs. Once drilling and completion work is finished, the pad would be reclaimed to a working surface footprint of less than a half-acre. Overall, the proposed expansion of the DOE 2-W-27 well pad would visually improve the current condition and to meet VRM Class II objectives, mitigation requirements are applied as standard COAs (Appendix A).

The PA 543-27 well pad would be expanded slightly beyond its original disturbance footprint along the south end. Most of the cuttings generated from the new wells would be placed against the cut slope (as space allows) which would help fill the existing void for interim reclamation and to recontour the slope so it has a more natural appearance. The remaining cuttings would be hauled and stored permanently within the reclaimed footprint of the PA 44-27 well pad. The new wells employ remote fracing with a temporary surface frac line and the produced water, condensate, and gas would be piped off the pad by buried pipelines installed alongside an existing pipeline corridor or access road. Once drilling and completion work is finished, the pad would be reclaimed to a working surface footprint of less than one acre. Overall, the proposed expansion of the PA 543-27 well pad would visually improve the current condition and to meet VRM Class II objectives, mitigation requirements are applied as standard COAs (Appendix A).

The PA 23-26 well pad is the least visible pad from all of the KOPs because it is located on flatter terrain and is further away. The pad would be expanded slightly beyond its original disturbance footprint. Some of the excess material excavated for the pad expansion would be used to reduce the grade and drainage issues along the road in the vicinity of the well pad. Cuttings generated during drilling would be placed

against the cut slope to help recontour the slope to a more natural appearance. The new wells would employ remote fracing with a temporary surface frac line and the produced water and gas would be piped off the pad by buried pipelines installed alongside an existing pipeline corridor or access road. Condensate would be stored in tanks on the pad. Once drilling and completion work is completed, the pad would be reclaimed to a production working surface footprint of approximately one acre. Overall, the proposed expansion of the PA 23-26 well pad would visually improve the current condition and to meet VRM Class II objectives, mitigation requirements are applied as standard COAs (Appendix A).

PROPOSED PA 11-35 FRAC PAD

The Proposed PA 11-35 Frac Pad is an existing reclaimed well pad located on private land. The well pad would be redisturbed to accommodate the completion working space for the DOE 2-W-27, PA 543-27, and PA 23-36 well pads. The location of the PA 11-35 well pad is within an open sagebrush park on flatter terrain and would not be as visible as some of the other Proposed Action components from the KOPs. Since the frac pad occurs entirely on private land, the standard Best Management Practices (BMPs) related to reclamation, facility paint colors, and screening the production facilities from view would mitigate the visual impacts of the project.

PROPOSED ROAD IMPROVEMENTS

In general, the existing roads serving the well pads would be adequate to handle the traffic associated with the drilling of the new wells. However, there are two new road upgrades that would be constructed to provide a new access approach to the DOE 2-W-27 well pad and an improved road grade along the existing road alignment south of the PA 44-27 well pad with both intended to reduce steep road grades. Improving the road grades would provide safer access and better drainage that would help prevent further rutting and road degradation and associated visual impacts, such as from fugitive dust and erosion. Overall, the proposed road improvements would have minimal impact to visual resources. The proposed DOE 2-W-27 road improvement would be screened by the slope and vegetation located immediately south of the well pad. Views of the proposed PA 44-27 well pad road improvement would not be easily seen from the KOPs. The existing character of the road location has bare exposed soils (as seen from KOP 4) with minimal upright vertical vegetation. Constructing the road improvement would not create contrast with the surrounding topography or soils. To meet VRM Class II objectives, mitigation requirements are applied as standard COAs (Appendix A).

PROPOSED EAST PARACHUTE TANK PAD

The proposed tank pad would be located on private land where the topography begins to open up (as illustrated in KOP 2 and KOP 4). The location of the tank pad is also flatter which would require minimal cut-and-fill slopes. Viewers traveling along I-70 would be able to see the proposed tank pad but they would only have a small viewing window because of travel speed and viewing angle. Since the tank pad occurs entirely on private land, the standard Best Management Practices (BMPs) related to reclamation, facility paint colors, and screening the production facilities from view would mitigate the visual impacts of the project.

SUMMARY OF DISTURBANCE IN VRM CLASS II AND APPROVED MITIGATION

The Proposed Action would result in 23.7 acres of short-term disturbance and 4.1 acres of long-term disturbance within VRM Class II area of BLM surface lands. Short-term disturbance would be mostly associated with well pads (approximately 14.9 acres) followed by pipelines (6.4 acres) and pipelines (1.6 acres). Long-term disturbance would be associated almost entirely with the working area of the pads following interim reclamation (3.2 acres), with only 0.9 acre of additional new

surface disturbance. Table 16 presents mitigation measures identified by the BLM, and agreed to by the operator, expected to be sufficient to meet VRM Class II objectives. As noted above, this means measures sufficient to retain the existing character of the landscape and result in only a low level of change to the characteristic landscape. While the Proposed Action components may be seen, they are not expected to attract the attention of the casual observe over the long term.

Table 16. Summary of Mitigation Measures to Meet VRM Class II Objectives

Project Component	***Mitigation***
Proposed Well Pad Expansions, Road Improvements, and Buried Pipelines.	Construction • All woody vegetation (live and dead) shall remain standing at the toe of the fill slopes to provide visual screening. Woody vegetation shall remain undamaged when fill material is pulled back to recontour the pad. • Rocks and woody debris shall be saved during the construction process; care shall be taken to preserve the canopy of the woody material while storing and transporting. • Facilities shall be located to maximize area for interim reclamation. • All facilities shall be painted Shadow Gray, a color found in the surrounding natural vertical elements. • Excavated material from construction shall not be side cast and shall be used in areas short of fill. Interim Reclamation • To the extent practicable, cut and fill slopes shall not exceed 2:1 to provide stability and to facilitate vegetation establishment. • Rocks and woody debris saved during construction and not used for stormwater management shall be replaced on recontoured cut/fill slopes to emulate the texture closer to that of the surrounding natural landscape and to encourage vegetation growth.

No Action Alternative

Under the No Action Alternative, the Federal APDs allowing the pad expansions, directional drilling into Federal minerals, associated road improvements, and associated gas and water pipeline upgrades would be denied. Consequently, none of the project components identified in the Proposed Action would be implemented. The No Action Alternative analysis would reflect a scenario of no new work or surface disturbance. The existing well pads would remain in their current condition without suitably recontoured cut and fill slopes and interim reclamation.

Wastes, Hazardous or Solid

Affected Environment

The affected environment for hazardous materials includes air, water, soil, and biological resources that may potentially be affected by an accidental release of hazardous materials during transportation to and from the project area, storage, and use in construction and operations. Sensitive areas for hazardous materials releases include areas adjacent to water bodies, above aquifers, and areas where humans or wildlife would be directly impacted.

BLM Instruction Memoranda numbers WO-93-344 and CO-97-023 require that all National Environmental Policy Act documents list and describe any hazardous and/or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. The Glenwood Springs Resource Area, Oil & Gas Leasing & Development, Draft Supplemental Environmental Impact Statement (June 1998), Appendix L, Hazardous Substance Management Plan, contains a comprehensive list of materials that are commonly used for oil and gas projects. It also includes a description of the common industry practices for use of these materials and disposal of the waste products. These practices are dictated by various Federal and State laws and regulations, and the BLM standard lease terms and stipulations that would accompany any authorization resulting from this analysis. The most pertinent of the Federal laws dealing with hazardous materials are as follows:

- The Oil Pollution Act (Public Law 101-380, August 18, 1990) prohibits discharge of pollutants into Waters of the U.S., which by definition would include any tributary, including any dry wash that eventually connects with the Colorado River.

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Public Law 96-510 of 1980) provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. It also provides national, regional, and local contingency plans. Applicable emergency operations plans in place include the National Contingency Plan (40 CFR 300, required by section 105 of CERCLA), the Region VIII Regional Contingency Plan, the Colorado River Sub-Area Contingency Plan (these three are Environmental Protection Agency produced plans), the Mesa County Emergency Operations Plan (developed by the Mesa County Office of Emergency Management), and the BLM Grand Junction Field Office Hazardous Materials Contingency Plan.

- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580, October 21, 1976) regulates the use of hazardous substances and disposal of hazardous wastes. Note: While oil and gas lessees are exempt from RCRA, right-of-way holders are not. RCRA strictly regulates the management and disposal of hazardous wastes.

Emergency response to hazardous materials or petroleum products on BLM lands are handled through the BLM Grand Junction Field Office contingency plan. BLM would have access to regional resources if justified by the nature of an incident.

Environmental Consequences

Proposed Action

Possible pollutants that could be released during the construction phase of this project would include diesel fuel, hydraulic fluid, and lubricants. These materials would be used during construction of the pads, roads, and pipelines, and for refueling and maintaining equipment and vehicles. Potentially harmful substances used in the construction and operation phases would be kept onsite in limited quantities and trucked to and from the site as required. No hazardous substance, as defined by 40 CFR 355 would be used, produced, stored, transported, or disposed of in amounts above threshold quantities. Waste generated by construction activities would not be exempt from hazardous waste regulations under the oil and gas exploration and production exemption of RCRA. Exempt wastes include those associated with well production and transmission of natural gas through the gathering lines and the natural gas itself.

With the exception of produced hydrocarbons, ethylene glycol (antifreeze), lubricants, and amine compounds, chemicals subject to reporting under Title III of the Superfund Amendments and Reauthorization Act in quantities of 10,000 pounds or more would not be used, produced, stored,

transported, or disposed of during construction or operation of the facilities. None of the chemicals that would be used in construction meet the criteria for an acutely hazardous material/substance, or meet the quantities criteria per BLM Instruction Memorandum No. 93-344. In addition, no extremely hazardous substance, as defined in 40 CFR 355, in amounts above threshold planning quantities would be produced, used, stored, transported, or disposed of during construction or operation of the facilities.

Solid waste (human waste, garbage, etc.) would be generated during construction activities and, to a larger extent, during drilling and completion operations since the workforce would increase during those activities. Trailers housing workers would be outfitted with self-contained sewage collection system; regular trash collection would occur throughout the drilling and well completion process.

Surface water or groundwater could be affected under the Proposed Action. Pollutants that might be released during the operational phase of the project could include condensate, produced water (if the wells in the area produce water) and glycol (carried to the site and used as antifreeze). While uncommon, an accident could occur that could result in a release of any of these materials. A release could result in contamination of surface water or soil. Improper casing and cementing procedures could result in the contamination of groundwater resources. In the case of any release, emergency or otherwise, the responsible party would be liable for cleanup and any damages. Depending on the scope of the accident, any of the above referenced contingency plans would be activated to provide emergency response. At a minimum, the BLM Grand Junction Field Office contingency plan would apply.

These laws, regulations, standard lease stipulations, and contingency plans and emergency response resources are expected to adequately mitigate any potential hazardous or solid waste issues associated with the Proposed Action.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts from waste, hazardous or solid, related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Water Quality, Surface and Ground (includes an analysis on Public Land Health Standard 5)

Surface Water

Affected Environment

The project lies approximately 5 miles northeast of Parachute, Garfield County, Colorado east of the Cottonwood Gulch drainage and within numerous unnamed ephemeral watersheds that flow directly to the Colorado River . The proposed activities all occur within Colorado River below Rifle Creek 6th code watershed unit which empties directly into the Colorado River approximately 0.5 mile north of the project. According to the *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission [WQCC] Regulation No. 37) (CDPHE 2007), unnamed ephemeral drainages that drain most of the project vicinity are within segment 4a, which includes tributaries to the Colorado River from its confluence with the Roaring Fork River to a point immediately below its confluence with Parachute Creek. Following is a brief description of segment 4a.

- Segment 4a – This segment has been classified aquatic life cold 2, recreation N, water supply, and agriculture. Aquatic life cold 2 indicates that this water course is not capable of sustaining a wide variety of cold or warm water biota due to habitat, flows, or uncorrectable water quality conditions. Recreation class N refers to waters that are not suitable or intended to become

suitable for primary contact recreation. This segment is suitable or intended to become suitable for potable water supplies and agricultural purposes that include irrigation and livestock use.

All streams within segment 4a are on the State of Colorado's *303(d) List of Impaired Waters and Monitoring and Evaluation List* (CDPHE, WQCC Regulation No. 93) (CDPHE 2010) for naturally high levels of selenium. *Colorado's Monitoring and Evaluation List* identifies waterbodieswhere there is reason to suspect water quality problems, but uncertainty also exists regarding one or more factors. The tributaries to the Lower Colorado River which include the project area are on the State of Colorado's *Monitoring and Evaluation List* for sediment load

The USGS has collected surface water flow and quality data from the Colorado River below the project area near Rulison in 1977 and 1978 (Table 17).

Table 17. Selected Water Quality Data for Two Sampling Locations near the project area

Parameter	***Colorado River below Rulison CO, USGS Site #09092570 01/18/1978***	***Colorado River below Rulison CO, USGS Site #09092570 4/8/1977***
Instantaneous discharge (cfs)	1,500	1,560
Temperature, water (°C)	2.5	11
Field pH (standard units)	7.9	8.1
Specific conductance (µS/cm/cm at 25°C)	1,320	1,200
Total Dissolved Solids (mg/L)	756	733
Hardness as CaCO3 (mg/L)	280	250
Chloride (mg/L)	230	230
Selenium (µg/L)	2	1
Dissolved oxygen (mg/L)	11.2	10

NA = Data not available
Source: USGS 2007

No sediment measuring stations are present on the Colorado River or its tributaries near the pad location. The closest downstream station on the Colorado River is near DeBeque, Colorado. A summary of USGS data collected at this station indicates that the mean sediment load was 1,817 tons per day during the period of 1974 to 1976. The maximum and minimum for this location during the same period was 41,300 and 8 tons/day respectively (USGS 2007).

Environmental Consequences

Proposed Action

The Proposed Action includes expanding the existing DOE 1-W-27, DOE 2-W-27, PA 23-26 and PA 543-27 pads and constructing, drilling, completing, and operating 6 new Federal wells on DOE 1-W-27 in 2013 and 28 new Federal wells on the other three pads in 2015. The existing PA 13-27, PA44-27 and DOE 1-W-26 pads would be partially redisturbed to accommodate overflow cuttings generated from the new wells planned on the DOE 1-W-27, PA 543-27, and PA 23-26 pads. Reconstructing the existing PA 11-35 pad to serve as a centralized frac pad would be implemented although the new earthwork would be confined within the original pad footprint. Building the East Parachute Tank Pad to stage water and

condensate storage tanks, conducting road improvements to the DOE 2-W-27 and PA 44-27 pads, and burying new 8-inch gas and 4-inch water collection pipelines would cause additional disturbances. Total short-term disturbance would be 34.6 acres, and long-term disturbance after interim reclamation would be 4.9 acres (Table 3).

Direct impacts to Cottonwood Gulch and the Colorado River would occur but be minimized by many design features of the pad expansions, access road improvements, cuttings storage placements, and buried or surface pipeline installations. The improvements to the access road to DOE 2-W-27 and PA 44-27 pads would cause short-term disturbance but benefit water resources in the long-term. The road grades would be considerably reduced in both instances which would reduce the sediment transport to nearby drainages. In addition, all road sections would be maintained and newly surfaced. The pad expansions would be designed and positioned in the optimal location to take advantage of the topography and avoid disturbances to the drainages and steep slopes

Potential impacts to surface water associated with the Proposed Action occur from surface-disturbing activities, traffic, waste management, and the use, storage and transportation of fluids (i.e., chemicals, condensate, and produced water). Surface-disturbing activities associated with well and facility pads, roads, and pipelines cause loss of vegetation cover, soil compaction and displacement, increased volume and velocity of runoff, and increased sedimentation and salinity in surface waters. Impacts can be minimized by implementing stormwater management BMPs, stockpiling topsoil, controlling erosion, and rehabilitating disturbed surfaces quickly. Long-term soil protection could be achieved by continued road and pad maintenance to reduce erosion, remediation of contaminated soils, and minimizing the size of the long-term pad footprints through interim reclamation measures. As proposed, these measures would include limiting cut slope steepness, step-cutting, crowning road surfaces, installing culverts and drainage systems, and applying gravel to all upgraded BLM roads in the project area to a compacted thickness of 6 inches (Appendix A).

Oil and gas waste management practices have the potential to contaminate soils and surface water. Contamination of soils could cause long-term reduction in site productivity resulting in increased erosion and potential sediment and contaminant delivery to nearby waterways during runoff. Use, storage, and transportation of fluids such as produced water, hydraulic fracturing fluids, and condensate have the possibility of spills that could migrate to surface or groundwater. Elements of the Proposed Action are designed to mitigate risks to surface waters associated with the release and migration of drilling fluids, produced water, and condensate. A closed-loop drilling system would be implemented which recycles drilling fluids; cuttings would be dried through the use of a shaker system, decontaminated to COGCC standards and be stacked against the cutslope on the pad. A traditional reserve pit would not be constructed. Completions may be conducted either onsite or remotely and fluids may be stored in surface containment or a pit.

In addition to individual containment measures, the entire pad would be bermed to contain an accidental release on the pad. In the event of an accidental release, produced water and condensate would be confined for cleanup in a containment area and would not migrate to surrounding soils or surface waters. Pipelines associated with the transport of these liquids would be pressure tested to detect leakage prior to use. Implementation of the standard COAs for mitigating impacts to surface waters (Appendix A) would minimize risks of adverse impacts associated with construction and ongoing production activities.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to surface waters related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Waters of the U.S.

Affected Environment

Waters of the U.S. located in the project vicinity include Cottonwood Gulch and unnamed ephemeral tributaries to the Colorado River. Section 404 of the Clean Water Act requires a Department of the Army permit from the U.S. Army Corps of Engineers (USACE) prior to discharging dredged or fill material into waters of the U.S. as defined by 33 CFR Part 328.

Environmental Consequences

Proposed Action

Impacts to waters of the U.S., the rerouting of the drainages and any upgrades to the road and pipeline crossings of drainages within the project would be authorized by the USACE. A COA listed in Appendix A required that the operator obtain a formal jurisdictional determination by USACE prior to any construction that could affect waters of the U.S. and verification that the impacts do not require a permit.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to waters of the U.S. related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Groundwater

Affected Environment

The Lower Piceance Basin contains both alluvial and bedrock aquifers (Colorado Geological Survey 2003). Unconsolidated alluvial aquifers are the most productive aquifers in the region (USEPA 2004) and are defined as narrow, thin deposits of sand and gravel formed primarily along stream courses, in this case, along the Colorado River and its tributaries. Alluvial well depths are generally less than 200 feet and water levels typically range between 100 to 150 feet. Well yield is dependent upon the intended use of the well, well construction design, sediment type and saturated thickness. Domestic use wells are limited to 15 gallons per minute (gpm) administratively, while municipal wells are designed and constructed for maximum potential yield.

The principal bedrock aquifers of the Piceance Basin are the Uinta Formation and the Parachute Creek Member of the Green River Formation, and are defined as the upper and lower Piceance Basin aquifer systems. The Uinta Formation consists of discontinuous layers of sandstone, siltstone, and marlstone and is less permeable than the hydrologically connected upper Parachute Creek Member (Robson and Saulnier 1981). The uppermost Uinta Formation also contains a shallow, perched aquifer that is separate from the upper aquifer unit (Cole et al. 1995). The upper Piceance Basin aquifer is underlain by the Mahogany confining unit, and correlates with the Mahogany Zone, the principal oil shale unit of the Piceance Basin. The Mahogany Zone separates the upper aquifer from the lower. The lower aquifer consists of the fractured marlstone of the lower part of the Parachute Creek Member. The thickness of the upper and lower aquifer units average 700 and 900 feet, respectively (CGS 2003). Both upper and lower aquifer systems are found within the surrounding cliffs of the project area, but no water wells are completed within either the upper or lower bedrock aquifers units as described above. Beneath these two aquifer systems is a confining unit consisting of the Wasatch Formation and the lower two members of the overlying Green River Formation. Some fresh-water wells are completed in localized water-bearing

intervals within this unit. Below the Wasatch Formation is the Cretaceous-aged Mesaverde aquifer. The depth to the top of this aquifer beneath the project area is more than 5,000 feet below ground surface (bgs), far too deep for economic development. The Mesaverde aquifer is of regional importance, but does not provide recharge into the fresh water system within the shallower groundwater system of the area.

Water quality of the upper Piceance Basin aquifer unit is relatively good, ranging in Total Dissolved Solid (TDS) levels from 500 to 1,000 milligrams per liter (mg/L). In the lower unit, TDS concentrations increase from 1,000 to 10,000 mg/L along basin flow paths. Waters with TDS values in excess of 1,000 mg/L are generally unsuitable for potable supply. Water suitable for drinking has a Federal secondary standard set at 500 mg/L or less (USEPA 2006). The quality of the water in the Mesaverde aquifer is highly variable, with concentrations of dissolved solids ranging from less than 1,000 mg/L in many of the basin-margin areas to more than 10,000 mg/L in the central part of the Piceance Basin (USEPA 2004). In general, areas of the aquifer that are recharged by infiltration from precipitation or surface water sources contain relatively fresh water. However, water quality in the Piceance Basin is generally poor overall due to the presence of nahcolite deposits and salt beds throughout the basin. Only very shallow waters such as those from the surficial Wasatch Formation are used for drinking water (USEPA 2004).

According to the CDWR database, there is one monitoring well located within a 1-mile radius of the proposed well site. The well located approximately ¾ mile west of the proposed well site, is listed as having a depth of 55 feet, and static water level of 37 feet below ground surface.

Environmental Consequences

Proposed Action

Potential impacts to groundwater resources from the proposed development would include contamination of the groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing would be incorporated to create additional pathways to facilitate gas production. Agents called proppants" used to prop open the fractures are mixed with both fresh water and produced water. Typical proppants include sand, aluminum, glass, or plastic beads, with less than 1% of other compounds such as corrosion-, friction-, and scale-inhibitors (EnerMax Inc. 2007). Fracing techniques are used to create secondary porosity fractures, held open by proppants, allowing the otherwise trapped gas to migrate up the borehole for production.

Hydraulic fracturing would be conducted at 5,000 feet or more bgs. Drilling scenarios are developed to prevent fluids and produced hydrocarbons from migrating upward into fresh water zones. Also see the discussion of hydraulic fracturing on groundwater resources in the section of this EA on Geology and Minerals. Geologic and engineering reviews are conducted to ensure that the cementing and casing programs are adequate to protect all downhole resources. With proper construction practices, drilling practices, and BMPs, no significant adverse impact to groundwater aquifers is anticipated to result from the project (see Downhole COAs in Appendix A).

Potential Impacts of Hydraulic Fracturing During Oil and Gas Well Completions

For decades, oil and gas companies and independent geophysicists have used state of the art equipment to monitor microseismic activity—defined as a "faint" or "very slight" tremor—during hydraulic fracturing to optimize well completions and to gather information about fracture dimensions and propagation (Warpinski 2009). These data give an indication about the magnitude of seismic activity associated with hydraulic fracturing, dimensions of resultant fractures in geologic formations, and probability for induced fractures to extend into nearby aquifers, if present. Research indicates that microseismic activity created by hydraulic fracturing occurs at Richter magnitude 1 or less (Warpinski and Zimmer 2012). In

comparison, a magnitude 3 earthquake is the threshold that can be felt at the ground surface. The Richter magnitude scale is base-10 logarithmic, meaning that a magnitude 1 tremor is 1/100th the amplitude of a magnitude 3 tremor. The National Academy of Sciences reviewed more than 100,000 oil and gas wells and waste water disposal wells around the world and concluded that "incidences of felt induced seismicity appear to be very rare," with only one such documented occurrence (NAS 2012).

The dimensions of induced fractures have been measured with field monitoring equipment (including microseismic "listeners") and in laboratory tests and have been compared to three-dimensional (3D) hydraulic fracture models. Researchers have successfully validated these models for fracturing in "tight gas" reservoirs including those in the Piceance Basin. The analyses show that fractures resulting from completions of oil and gas wells can be predicted (Zhai and Sharma 2005, Green et al. 2009, Palisch et al. 2012) and that the length of fractures in relation to depth of the well can be estimated.

Hydraulically induced fracture orientation in relation to the wellbore depends upon the downhole environment (i.e., rock mechanics, minimum and maximum principle stress directions, rock physical properties, etc.) and the wellbore trajectory. In vertical or normal directional wells such as in the Mesaverde formation—the predominant hydrocarbon-producing formation in the CRVFO area—fracture growth is primarily lateral or outward from the wellbore, with minimal secondary fractures extending at some angle away from the lateral fractures.

In horizontal wells such as being used to develop deep marine shales, fracture growth from the wellbore is mainly determined by the orientation of the wellbore in relation to the principal stresses of the rock. Fracture growth toward the surface is limited by barriers such as variations in stress and lithology, as is also the case in vertical and normal directional wells. In some horizontal wells, fracture growth is similar to that in vertical or normal directional wells due to wellbore trajectory along the maximum principal stress direction. Analysis of data from thousands of wells indicates fracture extent (length) of less than 350 feet in the vast majority of cases, with outliers of 1,000 to 2,000 feet (Maxwell 2011, Davies et al. 2012). The extreme outlier lengths are associated with fractures in thick deposits of lithologically uniform marine shales.

The potential height of hydraulically induced fractures in horizontal drilling is reduced in layered sediments in which a propagating fracture encounters a change in rock type or a bedding plane within a formation or a contact between formations. When these features are encountered, the fracture either terminates or to a lesser extent reorients along the generally horizontal bedding plane or formation contact instead of continuing upward across it. In the CRVFO area, natural gas production is primarily from vertically stacked, lenticular tight sands of the Mesaverde formation using vertical and directional wells. These tight-sand lenses are a few tens of feet thick or less. More recently, advances in horizontal drilling technology have allowed enhanced development of deeper marine shales such as the Niobrara formation. These tight-shale deposits are a few hundreds to thousands of feet thick in the CRVFO area compared to many hundreds or thousands of feet in some other gas-producing regions. The thickness of hydrocarbon-bearing strata in this area limits the vertical growth of primary and secondary fractures resulting from hydraulic stimulation.

Based on a review of available information on microseismic monitoring and fracture dimensions, Fisher and Warpinski (2011) concluded that fractures from deep horizontal wells are not a threat to propagate across the long distances (thousands of feet) needed to reach fresh-water aquifers much closer to the surface. This conclusion applies to the CRVFO area, and is also applicable to much shallower potable groundwater sources consisting of unconsolidated alluvium (streambed deposits) associated with the Colorado River and major tributaries. In general, alluvial water wells in the CRVFO extend to depths of less than 200 feet, with few in the range of 400 feet. Typical water levels in these wells range from

50 to 100 feet deep. Impacts to water quality of these shallow fresh-water wells is highly improbable as a result of hydraulic fracturing, which occurs at depths of 5,000 to 11,000 feet below ground surface.

In addition to vertical separation of several thousand feet between the upper extent of fractures and fresh-water aquifers are requirements by the BLM and COGCC for proper casing and cementing of wellbores to isolate the aquifers penetrated by a wellbore. BLM requires that surface casing be set from 800 to 1,500 feet deep, based on a geological review of the formations, aquifers, and groundwater. Cement is then pumped into the space between the casing and surrounding rock to prevent fluids from moving up the wellbore and casing annulus and coming in contact with shallow rock layers, including fresh-water aquifers. BLM petroleum engineers review well and cement design and final drilling and cementing logs to ensure that the cement has been properly placed. When penetration of groundwater and freshwater aquifers is anticipated, BLM inspectors may witness the cementing of surface casing and subsequent pressure testing to ensure that the annular space between the casing and borehole wall is properly sealed.

No single list of chemicals currently used in hydraulic fracturing exists for western Colorado, and the exact combinations and ratios used by operators are considered proprietary. However, the general types of compounds and relative amounts used are well known and relatively consistent (Table 18). Since fracture jobs are tailored to the downhole environment and companies are aware of the concerns involving hydraulic fracturing, the chemicals listed in Table 18 may or may not be used, and the information is provided solely as general information. Although a variety of chemicals additives are used in hydraulic fracturing—the examples in Table 18 being drawn from a total of 59 listed on the FracFocus website—the vast bulk of fluid injected into the formation during the process is water mixed with sand, representing 99.51% of the total by volume in the typical mixture shown in Table 18. The sand is as a proppant, or propping agent, to help keep the newly formed fractures from closing.

Following completion of fracturing activities, the pressure differential between the formation—a result of several thousand feet of overlying bedrock—and the borehole that connects with the surface causes most of the injected fluids to flow toward the borehole and then upward to the surface along with the hydrocarbon fluids released from the formation. The composition of this mixture, called flowback water, gradually shifts over a period of several days to a few months as injected fluids that have not yet migrated back to the wellbore or reacted with the native rock are carried out of the formation.

In 2011, the COGCC published an analysis of hydraulic fracturing technology use in the state and potential risks to human health and the environment. The introduction to that report included the following paragraph:

> "Hydraulic fracturing has occurred in Colorado since 1947. Nearly all active wells in Colorado have been hydraulically fractured. The COGCC serves as first responder to incidents and complaints concerning oil and gas wells, including those related to hydraulic fracturing. To date, the COGCC has not verified any instances of groundwater contaminated by hydraulic fracturing."

Based on the information summarized above, the CRVFO has concluded that properly implemented hydraulic fracturing of oil and gas wells drilled within its boundaries for the purpose of accessing Federal fluid minerals or for accessing private fluid minerals from BLM surface lands does not represent a significant adverse impact to human health and the environment.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new groundwater impacts related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Table 18. Constituents of Typical Hydraulic Fracturing Operation in Tight Gas Formations				
Additive Type*	***Typical Example****	***Percent by Volume*** **	***Function****	***Common Use of Example Compound***
Acid	Hydrochloric acid	0.123	Dissolves mineral cement in rocks and initiates cracks	Swimming pool chemical and cleaner
Biocide	Glutaraldehyde	0.001	Eliminates bacteria in the water that produce corrosive or poisonous by-products	Disinfectant; sterilizer for medical and dental equipment
Breaker	Ammonium persulfate	0.010	Allows delayed breakdown of the gel	Used in hair coloring, as a disinfectant, and in manufacture of household plastics
Clay stabilizer	Potassium chloride	0.060	Creates a brine carrier fluid that prohibits fluid interaction with formation clays	Used in low-sodium table salt substitutes, medicines, and IV fluids
Corrosion inhibitor	Formic acid	0.002	Prevents corrosion of the well casing	Used as preservative in livestock feed; used as lime remover in toilet bowl cleaners
Crosslinker	Borate salts	0.007	Maintains fluid viscosity as temperature increases	Used in laundry detergents, hand soaps, and cosmetics
Friction reducer	Polyacrylamide	0.088	"Slicks" the water to minimize friction	Used as a flocculant in water treatment and manufacture of paper
Gelling agent	Guar gum	0.056	Thickens the water to help suspend the sand propping agent	Used as a thickener, binder, or stabilizer in foods
Iron control	Citric acid	0.004	Prevents precipitation of metal oxides	Used as flavoring agent or preservative in foods
Surfactant	Lauryl sulfate	0.085	Increases the viscosity of the fluid	Used in soaps, shampoos, detergents, and as foaming agents
pH adjusting agent	Sodium hydroxide, acetic acid	0.011	Adjusts pH of fluid to maintain the effectiveness of other components	Sodium hydroxide used in soaps, drain cleaners; acetic acid used as chemical reagent, main ingredient of vinegar
Scale inhibitor	Sodium polycarboxylate	0.043	Prevents scale deposits in the pipe	Used in dishwashing liquids and other cleaners
Winterizing agent	Ethanol, isopropyl alcohol, methanol	--	Added as necessary as stabilizer, drier, and anti-freezing agent	Various cosmetic, medicinal, and industrial uses
Total Additives		**0.49**		
Total Water and Sand		**99.51**		

*FracFocus Chemical Disclosure Registry, fracfocus.org/chemical-use/what-chemicals-are-used
**USDOE 2009

Analysis on Public Land Health Standard 5 for Water Quality

The Rifle-West LHA conducted in 2004-2005 included the Cottonwood Gulch drainage and the East Parachute project area. The assessment indicated that road encroachment and improperly functioning culverts were causing increased sedimentation resulting in a failure to meet Standard 5 in the lower Cottonwood Gulch area. Although the East Parachute project is located east of the Cottonwood Gulch drainage, the onsite review of these proposed project components were reviewed and culverts were found to be functioning. Furthermore, the road surfacing, road realignments, and pad reclamation plans along with their associated best management practices outlined in this EA would reduce erosion and sedimentation levels within the ephemeral drainages that are found within the project area.

The Proposed Action would unlikely prevent Standard 5 from being achieved because direct impact to ephemeral drainages and the limited riparian areas are being avoided. Waterbodies, riparian areas, and erosive soils are protected by lease stipulations, COAs, and requirements set for permitting by the COGCC and USACE. Therefore, the Proposed Action is not expected to contribute to a failure of the area to meet standards.

The No Action Alternative would have no bearing on the ability of the area to meet the public land health standard for plant and animal communities because no new development would occur on BLM land.

Wildlife, Aquatic (includes an analysis on Public Land Health Standard 3)

Affected Environment

The Proposed Action would occur in an area of highly dissected terrain containing a number of ephemeral drainages. Due to the short stream lengths and small watersheds of ephemeral streams potentially affected by the Proposed Action, fish species do not occur. Aquatic macroinvertebrates most likely to occur include water striders, water boatmen, predaceous diving beetles, and the aquatic larvae of caddisflies and true flies such as biting midges, nonbiting midges, and mosquitoes. Amphibians, if present, would probably be limited to spadefoots and true toads, which are adapted to seasonal flow regimes in arid environments.

Environmental Consequences

Proposed Action

Implementation of the Proposed Action could result in increases in erosion and sedimentation into nearby drainages and eventually the Colorado River. Because the Proposed Action includes summer use of the project areas, it is likely that roads and pads would not be muddy for extended periods of time. Roads are generally drier and in better condition during the non-winter months and consequently are less prone to erosion. Vehicular use during muddy road conditions could contribute to increased erosion of sediments into nearby ephemeral washes and eventually the Colorado River. The potential increase of sedimentation into the Colorado River would probably be nominal given background sediment loads currently carried by the river. Sediment -intolerant aquatic wildlife could be negatively affected, as increased erosion potential would persist and impair water and habitat quality. Measures to minimize erosion and sedimentation of aquatic environments are included among the COAs (Appendix A).

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to aquatic wildlife related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Analysis on Public Land Health Standard 3 for Plant and Animal Communities (partial, see also Vegetation and Wildlife, Terrestrial)

According to a recent land health assessment, habitat conditions within this area appear suitable for aquatic species known or likely to occur (BLM 2005). Sustained development and the proliferation of roads, well pads, pipelines, compressor stations, tank farms, and other surface facilities would continue to reduce habitat size and affect both habitat quality and quantity. The potential to impact some species would increase as development continues. Although the contribution of the Proposed Action is in itself small, it may further trend the area away from meeting Standard 3 for aqautic wildlife.

The No Action Alternative would not result in a failure of the area to achieve Standard 3 because the proposed developments would not occur.

Wildlife, Terrestrial (includes an analysis on Public Land Health Standard 3)

Affected Environment

The project area would be located in medium density pinyon-juniper woodlands with openings of sagebrush, saltbush, and greasewood. Understory vegetation consists of mostly native grasses and forbs with some cheatgrass. Given these vegetation types, the area provides cover, forage, breeding, and nesting habitat for a variety of big game, small game, and nongame species.

MAMMALS

The project area is within overall ranges of mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elaphus nelsonii*). Because of its low elevation the project area is primarily winter range which means deer and elk populations increase during the winter months when animals migrate to lower elevations from the Battlements to the south. Winter densities of big game animals in a given area are dependent on the type of habitat present and the severity of the winter. Deeper snows and colder temperatures result in increase in the number of big game animals using the area.

The project area contains winter range and severe winter range for mule deer (*Odocoileus hemionus*) and a smaller amount of winter range for Rocky Mountain elk (*Cervus elaphus nelsoni*) as mapped by the Colorado Parks and Wildlife (CPW) (CPW 2011). The mule deer is a recreationally important species that are common throughout suitable habitats in the region. Although most of the area is mapped as mule deer winter range, the project area also receives use by deer during the summer. Rocky Mountain elk are also recreationally important, but the project area contains relatively little suitable habitat for this species. Most winter use by elk north of I-70 in the project vicinity is along Parachute Creek and tributary canyons, or along Piceance Creek north of the Roan Plateau.

Large carnivores potentially present in the project vicinity include the mountain lion (*Felis concolor*), which moves seasonally with its preferred prey, the mule deer, and the black bear (*Ursus americanus*). Black bears are uncommon in the lowlands north of I-70 due to the scarcity of sufficient forest cover and suitable foods (including acorns and berries). Two smaller carnivores, the coyote (*Canis latrans*) and bobcat (*Lynx rufus*), are also present throughout the region in open habitats and broken or wooded terrain, respectively, where they hunt for small mammals, reptiles, and ground-dwelling birds.

Small mammals present within the planning area include rodents such as the rock squirrel (*Otospermophilus variegatus*), golden-mantled ground squirrel *(Callospermophilus lateralis)*, least chipmunk (*Neotamias minimus*), and packrat (bushy-tailed woodrat)(*Neotoma cinerea*) and lagomorphs such as the desert cottontail (*Sylvilagus audubonii*) and black-tailed jackrabbit (*Lepus californicus*). Rodents and lagomorphs are the primary prey for a variety of avian and mammalian predators.

BIRDS

The highest quality raptor nesting habitat in the project vicinity is along the foot of the Roan Cliffs, outside the survey boundary. Raptors potentially nesting in the large pinyon or juniper trees on nearby slopes include two small hawks, Cooper's hawk and sharp-shinned hawk, which build stick nests in the tree canopies. Another raptor potentially nesting in the area, the American kestrel is a small falcon that commonly nests in abandoned woodpecker holes or other tree cavities. Two larger raptors that are common throughout the region—the red-tailed hawk and great horned owl—also nest in trees as well as rock ledges. The sandstone bluffs are suitable for redtails and great horned owls, as well as American kestrels and a large non-raptor, the common raven (*Corvus corax*). Although these species are potentially present, no nests or individuals were observed during site surveys.

Passerine (perching) birds commonly found in the area in addition to the common raven and the species addressed previously under Migratory Birds and Special-Status Species include residents or short-distance migrants such as the western scrub-jay (*Aphelocoma californica*), black-billed magpie (*Pica hudsonia*), American robin (*Turdus migratorius*), Townsend's solitaire (*Myadestes townsendi*), mountain chickadee (*Poecile gambeli*), and house finch (*Carpodacus mexicanus*). A nonnative gallinaceous species widely introduced as a gamebird, the chukar (*Alectoris chukar*), is present in relatively low numbers on the nearby slopes below the Roan Cliffs.

See the sections on Migratory Birds and Special Status Species for discussions of other birds in the area.

REPTILES AND AMPHIBIANS

The project area is within elevational range of most reptile species known to occur in Garfield County. Species most likely to occur include the short- horned lizard, (*Phrynosoma hernandesi*), western fence lizard (*Sceloporus undulatus*), tree lizard (*Urosaurus ornatus*), and gopher snake (bullsnake) (*Pituophis catenifer*) in pinyon-juniper woodlands, sagebrush shrublands, or grassy clearings. Other reptiles potentially present along riparian areas are the milk snake (*Lampropeltis triangulum*), western terrestrial garter snake (*Thamnophis elegans*), and smooth green snake (*Liochlorophis vernalis*).

The area is also within the known range of the Great Basin spadefoot [toad] (*Spea intermontana*), Woodhouse's toad (*Anaxyrus woodhousii*), and western chorus frog (*Pseudacris triseriata*). Within the CRVFO and vicinity, the spadefoot toad and the true toad occur primarily along ephemeral washes that do not support fish and contain pools of water for a period of at least a few weeks every spring. The chorus frog occurs primarily in cattail and bulrush wetlands and along the vegetated margins of seasonal or perennial ponds and slow-flowing streams.

Environmental Consequence

Proposed Action

Direct impacts to terrestrial wildlife from the Proposed Action may include mortality, disturbance, nest abandonment/nesting attempt failure, or site avoidance/displacement from otherwise suitable habitats. These effects could result from the 34.6 acres of habitat loss or modification, increased noise from

vehicles and operation of equipment, increased human presence, and collisions between wildlife and vehicles. Impacts would be more substantial during critical seasons such as winter (deer and elk) or the spring/summer breeding season (raptors, songbirds, amphibians).

Deer and elk are often restricted to smaller areas during the winter months and may expend high amounts of energy to move through snow, locate food, and maintain body temperature. Disturbance during the winter can displace wildlife, depleting much-needed energy reserves and may lead to decreased over winter survival. Additional, indirect habitat loss may occur if increased human activity (e.g., traffic, noise) associated with infrastructure causes intolerant species to be displaced or alter their habitat use patterns. The extent of indirect habitat loss varies by species, the type and duration of the disturbance, and the amount of screening provided by vegetation and topography. In general, disturbance-related impacts are temporary, with patterns of distribution and habitat use returning to predisturbance conditions rather quickly when disturbance stops.

No Action Alternative

Under this alternative, no development of Federal wells would occur precluding any new impacts to terrestrial wildlife related to drilling, completing, servicing, or producing Federal wells or gas gathering operations.

Analysis on Public Land Health Standard 3 for Plant and Animal Communities (partial, see also Vegetation and Wildlife, Aquatic)

According to a recent land health assessment, habitat conditions within this area appear suitable for aquatic species known or likely to occur (BLM 2005). Sustained development and the proliferation of roads, well pads, pipelines, compressor stations, tank farms and other surface facilities would continue to reduce habitat size and affect both habitat quality and quantity. The potential to impact some species would increase as development continues. Although the contribution of the Proposed Action is in itself small, it may further trend the area away from meeting Standard 3 for terrestrial wildlife.

The No Action Alternative would not result in a failure of the area to achieve Standard 3 because the proposed developments would not occur.

SUMMARY OF CUMULATIVE IMPACTS

Historically, habitat loss or modification in the CRVFO areas was characteristic of agricultural, ranching lands, rural residential, with localized industrial impacts associated with the railroad and I-70 corridors and the small communities. More recently, the growth of residential and commercial uses, utility corridors, oil and gas developments, and other rural industrial uses (e.g., gravel mining along the Colorado River) has accelerated the accumulation of impacts in the area. Cumulative impacts have included (1) direct habitat loss, habitat fragmentation, and decreased habitat effectiveness; (2) increased potential for runoff, erosion, and sedimentation; (3) expansion of noxious weeds and other invasive species; (4) increased fugitive dust from construction of oil and gas pads, roads, and pipelines and associated truck travel; (5) increased noise, especially along access and haul roads; (6) increased potential for spills and other releases of chemical pollutants; and (7) decreased scenic quality.

Although none of the cumulative impacts was described in the 1999 FSEIS (BLM 1999a) as significant, and while new technologies and regulatory requirements have reduced the impacts of some land uses, nonetheless past, present, and reasonably foreseeable future actions have had and would continue to have adverse effects on various elements of the human and natural environment. Anticipated impacts for

existing and future actions range from negligible to locally major, and primarily negative, for specific resources.

The primary bases for this assessment are twofold: First, although the rate of development, including oil and gas development, has slowed in recent years due to the general economic downturn and depressed natural gas prices, some development continues to occur, adding to the previous residential, commercial, and industrial growth and to the previous habitat loss, modification, and fragmentation. Second, residential and commercial expansion, as well as most of the oil and gas development, has occurred on private lands where mitigation measures designed to protect and conserve resources may not be in effect to the same extent as on BLM lands. However, COGCC regulations enacted in recent years have closed considerably the former gap between the potential environmental impacts associated with development of private versus Federal fluid mineral resources.

Based on the above, the Proposed Action would contribute to the collective adverse impact for some resources. Although the contribution would be minor, the Proposed Action would contribute incrementally to the collective impact to air quality, native vegetation, migratory birds, terrestrial wildlife, and other resources.

PERSONS AND AGENCIES CONSULTED

Colorado Oil and Gas Conservation Commission – Dave Kubeczko

Colorado Parks and Wildlife – Jim Komatinsky, Michael Warren

WPX Energy: April Mestas, Adam Tankersley, Kris Meil, Wally Hammer, Joe Weaver Jr., Eric DeKam

INTERDISCIPLINARY REVIEW

BLM staff from the CRVFO who participated in the preparation of this EA, including review of survey results submitted by the operator's consultants, evaluation of impacts likely to occur from implementation of the Proposed Action, and identification of appropriate COAs to be attached and enforced by BLM, are listed in Table 20.

Table 19. BLM Interdisciplinary Team Authors and Reviewers

Name	*Title*	*Areas of Participation*
DJ Beaupeurt	Realty Specialist	Lands Actions, Rights-of-Way Permitting
John Brogan	Archaeologist	Cultural Resources, Native American Religious Concerns
Jim Byers	Natural Resource Specialist	EA Project Lead, Access & Transportation, Socioeconomics, Wastes-Hazardous or Solid
Allen Crockett, Ph.D.	Supervisory Natural Resource Specialist	Technical Review, NEPA Review
Shauna Kocman, Ph.D., P.E.	Petroleum Engineer	Downhole COAs Air Quality, Noise, Soils, Surface Water, Waters of the U.S.
Julie McGrew	Natural Resource Specialist	Visual Resources
Judy Perkins, Ph.D.	Botanist	Invasive Nonnative Species, Special Status Plants, Vegetation
Sylvia Ringer	Wildlife Biologist	Migratory Birds, Special Status Species Animals, Aquatic and Terrestrial Wildlife
Todd Sieber	Geologist	Geology and Minerals, Groundwater, Paleontology

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APPENDIX A

SURFACE-USE CONDITIONS OF APPROVAL
for the
East Parachute Project

Including Site-Specific COAs for following project components

DOE 1-W-27 Pad
DOE 2-W-27 Pad
PA 543-27 Pad
PA 23-26 Pad
PA 11-35 Frac Pad
Pipelines

DOWNHOLE CONDITIONS OF APPROVAL
for the
DOE 1-W-27 Wells

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SURFACE-USE CONDITIONS OF APPROVAL
EAST PARACHUTE PROJECT
DOI-BLM-CO-N040-2013-0025-EA

GENERAL SURFACE-USE CONDITIONS OF APPROVAL

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction. If requested by the BLM representative, the operator shall schedule a pre-construction meeting, including key operator and contractor personnel, to ensure that any unresolved issues are fully addressed prior to initiation of surface-disturbing activities or placement of production facilities. No construction activities shall commence without staking of pad construction limits, pad corners, and road/pipeline centerlines and disturbance corridors.

2. Road Construction and Maintenance. Roads shall be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Initial gravel application shall be a minimum of 6 inches. The operator shall provide timely year-round road maintenance and cleanup on the access roads. A regular schedule for maintenance shall include, but not be limited to, blading, ditch and culvert cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than 6 inches, blading and/or gravelling shall be conducted as approved by the BLM.

3. Drill Cuttings Management. Cuttings generated from the numerous planned well bores shall be worked through a shaker system on the drill rig, mixed with a drying agent, if necessary, and deposited in the planned cuttings trench or piled on location against the cut slope for later burial during the interim reclamation earthwork. The cuttings shall be remediated per COGCC regulations (Table 910-1 standards) prior to earthwork reshaping related to well pad interim reclamation.

4. Dust Abatement. The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The BLM may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient to prevent fugitive dust.

5. Drainage Crossings and Culverts. Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g. burying pipelines, installing culverts) shall be timed to avoid high flow conditions. Construction that disturbs any flowing stream shall utilize either a piped stream diversion or a cofferdam and pump to divert flow around the disturbed area.

   Culverts at drainage crossings shall be designed and installed to pass a 25-year or greater storm event. On perennial and intermittent streams, culverts shall be designed to allow for passage of aquatic biota. The minimum culvert diameter in any installation for a drainage crossing or road drainage shall be 24 inches. Crossings of drainages deemed to be jurisdictional Waters of the U.S. pursuant to Section 404 of the Clean Water Act may require additional culvert design capacity. Due to the flashy nature of area drainages and anticipated culvert maintenance, the U.S. Army Corps of Engineers (USACE) recommends designing drainage crossings for the 100-year event. Contact the USACE Colorado West Regulatory Branch at 970-243-1199 ext. 17.

   Pipelines installed beneath stream crossings shall be buried at a minimum depth of 4 feet below the channel substrate to avoid exposure by channel scour and degradation. Following burial, the channel grade and substrate composition shall be returned to pre-construction conditions.

6. Jurisdictional Waters of the U.S. The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers (USACE) prior to discharging fill material into Waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent impacts to Waters of the U.S. may require mitigation. Contact the USACE Colorado West Regulatory Branch at 970-243-1199 ext. 17. Copies of any printed or emailed approved USACE permits or verification letters shall be forwarded to the BLM.

7. Reclamation. The goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS (DSEIS). Specific measures to follow during interim and temporary (pre-interim) reclamation are described below.

   a. Reclamation Plans. In areas that have low reclamation potential or are especially challenging to restore, reclamation plans would be required prior to APD approval. The plan shall contain the following components: detailed reclamation plats, which include contours and indicate irregular rather than smooth contours as appropriate for visual and ecological benefit; timeline for drilling completion, interim reclamation earthwork, and seeding; soil test results and/or a soil profile description; amendments to be used; soil treatment techniques such as roughening, pocking, and terracing; erosion control techniques such as hydromulch, blankets/matting, and wattles; and visual mitigations if in a sensitive VRM area.

   b. Deadline for Interim Reclamation Earthwork and Seeding. Interim reclamation to reduce a well pad to the maximum size needed for production, including earthwork and seeding of the interim reclaimed areas, shall be completed within 6 months following completion of the last well planned to be drilled on that pad as part of a continuous operation. If a period of greater than one year is expected to occur between drilling episodes, BLM may require implementation of all or part of the interim reclamation program.

      Reclamation, including seeding, of temporarily disturbed areas along roads and pipelines, and of topsoil piles and berms, shall be completed within 30 days following completion of construction. Any such area on which construction is completed prior to December 1 shall be seeded during the remainder of the early winter season instead of during the following spring, unless BLM approves otherwise based on weather. If road or pipeline construction occurs discontinuously (e.g., new segments installed as new pads are built) or continuously but with a total duration greater than 30 days, reclamation, including seeding, shall be phased such that no portion of the temporarily disturbed area remains in an unreclaimed condition for longer than 30 days. BLM may authorize deviation from this requirement based on the season and the amount of work remaining on the entirety of the road or pipeline when the 30-day period has expired.

      If requested by the project lead NRS for a specific pad or group of pads, the operator shall contact the NRS by telephone or email approximately 72 hours before reclamation and reseeding begin. This would allow the NRS to schedule a pre-reclamation field visit if needed to ensure that all parties are in agreement and provide time for adjustments to the plan before work is initiated.

      The deadlines for seeding described above are subject to extension upon approval of the BLM based on season, timing limitations, or other constraints on a case-by-case basis. If the BLM approves an extension for seeding, the operator may be required to stabilize the reclaimed surfaces using hydromulch, erosion matting, or other method until seeding is implemented.

c. Topsoil Stripping, Storage, and Replacement. *All* topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. In areas of thin soil, a minimum of the upper 6 inches of surficial material shall be stripped. The BLM may specify a stripping depth during the onsite visit or based on subsequent information regarding soil thickness and suitability. The stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to final seedbed preparation. The BLM best management practice (BMP) for the Windrowing of Topsoil (COA #16) shall be implemented for well pad construction whenever topography allows.

d. Seedbed Preparation. For cut-and-fill slopes, initial seedbed preparation shall consist of backfilling and recontouring to achieve the configuration specified in the reclamation plan. For compacted areas, initial seedbed preparation shall include ripping to a minimum depth of 18 inches, with a maximum furrow spacing of 2 feet. Where practicable, ripping shall be conducted in two passes at perpendicular directions. Following final contouring, the backfilled or ripped surfaces shall be covered evenly with topsoil.

Final seedbed preparation shall consist of scarifying (raking or harrowing) the spread topsoil prior to seeding. If more than one season has elapsed between final seedbed preparation and seeding, and if the area is to be broadcast-seeded or hydroseeded, this step shall be repeated no more than 1 day prior to seeding to break up any crust that has formed.

If directed by the BLM, the operator shall implement measures following seedbed preparation (when broadcast-seeding or hydroseeding is to be used) to create small depressions to enhance capture of moisture and establishment of seeded species. Depressions shall be no deeper than 1 to 2 inches and shall not result in piles or mounds of displaced soil. Excavated depressions shall not be used unless approved by the BLM for the purpose of erosion control on slopes. Where excavated depressions are approved by the BLM, the excavated soil shall be placed only on the downslope side of the depression.

Seedbed preparation is not required for topsoil storage piles or other areas of temporary seeding.

For all interim reclamation work on the pads and reclamation of temporarily disturbed areas of pipelines and roads in the East Parachute project, the operator shall conduct soil testing prior to reseeding to identify if and what type of soil amendments will be required to enhance revegetation success. At a minimum, the soil tests shall include texture, pH, organic matter, sodium adsorption ratio (SAR), cation exchange capacity (CEC), alkalinity/salinity, and basic nutrients (nitrogen, phosphorus, potassium [NPK]). Depending on the outcome of the soil testing, the BLM may require the operator to submit a plan for soil amendment. Any requests to use soil amendments not directed by the BLM shall be submitted to the CRVFO for approval.

e. Seed Mixes. A seed mix consistent with BLM standards in terms of species and seeding rate for the specific habitat type shall be used on all BLM lands affected by the project (see Attachment 1 of the letter provided to operators dated October 23, 2012).. Note that temporary seeding no longer allows the use of sterile hybrid nonnative species.

For private surfaces, the menu-based seed mixes are recommended, but the surface landowner has ultimate authority over the seed mix to be used in reclamation. The seed shall contain no prohibited or restricted noxious weed seeds and shall contain no more than 0.5% by weight of other weed seeds. Seed may contain up to 2.0% of "other crop" seed by weight, including the seed of other agronomic crops and native plants; however, a lower percentage of other crop seed is recommended. Seed tags or other official documentation shall be submitted to BLM at least 14

days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands.

f. Seeding Procedures. Seeding shall be conducted no more than 24 hours following completion of final seedbed preparation.

Where practicable, seed shall be installed by drill-seeding to a depth of 0.25 to 0.5 inch. Where drill-seeding is impracticable, seed may be installed by broadcast-seeding at twice the drill-seeding rate, followed by raking or harrowing to provide 0.25 to 0.5 inch of soil cover or by hydroseeding and hydromulching. Hydroseeding and hydromulching shall be conducted in two separate applications to ensure adequate contact of seeds with the soil.

If interim revegetation is unsuccessful, the operator shall implement subsequent reseedings until interim reclamation standards are met.

g. Mulch. Mulch shall be applied within 24 hours following completion of seeding. Mulch may consist of either hydromulch or of certified weed-free straw or certified weed-free native grass hay crimped into the soil.

NOTE: Mulch is not required in areas where erosion potential mandates use of a biodegradable erosion-control blanket (straw matting).

h. Erosion Control. Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the BLM. Cut-and-fill slopes along drainages or in areas with high erosion potential shall also be protected from erosion using hydromulch designed specifically for erosion control or biodegradable blankets/matting, bales, or wattles of weed-free straw or weed-free native grass hay. A well-anchored fabric silt fence shall also be placed at the toe of cut-and-fill slopes along drainages or to protect other sensitive areas from deposition of soils eroded off the slopes. Additional BMPs shall be employed as necessary to reduce soil erosion and offsite transport of sediments.

i. Site Protection. The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species would be considered firmly established when at least 50% of the new plants are producing seed. The BLM would approve the type of fencing.

j. Monitoring. The operator shall conduct annual monitoring surveys of all sites categorized as "operator reclamation in progress" and shall submit an annual monitoring report of these sites to the BLM by **December 31** of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the BLM.

8. Weed Control. The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Field Office *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, dated March 2007. A Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides. Annual weed monitoring reports and Pesticide Application Records (PARs) shall be submitted to BLM by **December 1 annually**.

9. Big Game Winter Range Timing Limitation. To minimize impacts to wintering big game, no construction, drilling or completion activities shall occur during a Timing Limitation (TL) period from **December 1 through April 30 annually**.

10. Bald and Golden Eagles. It shall be the responsibility of the operator to comply with the Bald and Golden Eagle Protection Act (Eagle Act) with respect to "take" of either eagle species. Under the Eagle Act, "take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest and disturb. "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. Avoidance of eagle nest sites, particularly during the nesting season, is the primary and preferred method to avoid a take. Any oil or gas construction, drilling, or completion activities planned within 0.5 mile of a bald or golden eagle nest, or other associated activities greater than 0.5 miles from a nest that may disturb eagles, shall be coordinated with the BLM project lead and BLM wildlife biologist and the USFWS representative to the BLM Field Office (970-876-9051).

11. Raptor Nesting. To protect nesting raptors, a survey shall be conducted prior to construction, drilling, or completion activities that are to begin during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility. Results of the survey shall be submitted to the BLM. If a raptor nest is located within the buffer widths specified above, a 60-day raptor nesting TL will be applied by the BLM to preclude initiation of construction, drilling, and completion activities during the period of **March 1 to May 1**. The operator is responsible for complying with the MBTA, which prohibits the "take" of birds or of active nests (those containing eggs or young), including nest failure caused by human activity (see COA for Migratory Birds).

12. Migratory Birds – Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all vegetation removal or surface disturbance in previously undisturbed lands providing potential nesting habitat for Birds of Conservation Concern (BCC) is prohibited from **May 1 to June 30**. An exception to this TL may be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting within 30 meters (100 feet) of the area to be disturbed. Nesting shall be deemed to be occurring if a territorial (singing) male is present within the distance specified above. Nesting surveys shall include an audial survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 1 and continue into the 60-day period at the same location.

13. Migratory Birds – General. It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act (MBTA) with respect to "take" of migratory bird species, which includes injury and direct mortality resulting from human actions not intended to have such result. To minimize the potential for the take of a migratory bird, the operator shall take reasonable steps to prevent use by birds of fluid-containing pits associated with oil or gas operations, including but not limited to reserve pits, produced-water pits, hydraulic fracturing flowback pits, evaporation pits, and cuttings trenches. Liquids in these pits—whether placed or accumulating from precipitation—may pose a risk to birds as a result of ingestion, absorption through the skin, or interference with buoyancy and temperature regulation.

Based on low effectiveness of brightly colored flagging or spheres suspended over a pit, the operator shall install netting with a mesh size of 1 to 1.5 inches, and suspended at least 4 feet above the fluid surface, on all pits into which fluids are placed, except for storage of fresh water in a pit that contains no other material. The netting shall be installed within 24 hours of placement of fluids into a pit. The requirement for netting does not apply to pits during periods of continuous, intensive human activity at the pad, such as drilling and hydraulic fracturing phases or, as pertains to cuttings trenches, during periods of active manipulation for cuttings management, remediation of contaminated materials, or other purposes.

14. Fossil Resources. All persons associated with operations under this authorization shall be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered the operator shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM of the findings. The discovery must be protected until notified to proceed by the BLM.

    Where feasible, the operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM of any finds. The BLM would, as soon as feasible, have a BLM-permitted paleontologist check out the find and record and collect it if warranted. If ground-disturbing activities cannot be immediately suspended, the operator shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.

15. Cultural Education/Discovery. All persons in the area who are associated with this project shall be informed that if anyone is found disturbing historic, archaeological, or scientific resources, including collecting artifacts, the person or persons would be subject to prosecution.

    Pursuant to 43 CFR 10.4(g), the BLM shall be notified by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4 (c) and (d), activities shall stop in the vicinity of the discovery, and the discovery shall be protected for 30 days or until notified by the BLM to proceed.

    If in connection with operations under this contract, the operator, its contractors, their subcontractors, or the employees of any of them discovers, encounters, or becomes aware of any objects or sites of cultural value or scientific interest such as historic ruins or prehistoric ruins, graves or grave markers, fossils, or artifacts, the operator shall immediately suspend all operations in the vicinity of the cultural resource and shall notify the BLM of the findings (16 USC 470h-3, 36 CFR 800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the BLM. Approval to proceed would be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the BLM from a Federal agency insofar as practicable. When not practicable, the operator shall bear the cost of the services of a non-Federal professional.

    Within five working days, the BLM would inform the operator as to:

    - whether the materials appear eligible for the National Register of Historic Places
    - what mitigation measures the holder would likely have to undertake before the site can be used (assuming that *in-situ* preservation is not necessary)

- the timeframe for the BLM to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the SHPO State Historic Preservation Officer that the findings of the BLM are correct and that mitigation is appropriate

The operator may relocate activities to avoid the expense of mitigation and delays associated with this process, as long as the new area has been appropriately cleared of resources and the exposed materials are recorded and stabilized. Otherwise, the operator shall be responsible for mitigation costs. The BLM would provide technical and procedural guidelines for relocation and/or to conduct mitigation. Upon verification from the BLM that the required mitigation has been completed, the operator would be allowed to resume construction.

Antiquities, historic ruins, prehistoric ruins, and other cultural or paleontological objects of scientific interest that are outside the authorization boundaries but potentially affected, either directly or indirectly, by the Proposed Action shall also be included in this evaluation or mitigation. Impacts that occur to such resources as a result of the authorized activities shall be mitigated at the operator's cost, including the cost of consultation with Native American groups.

Any person who, without a permit, injures, destroys, excavates, appropriates or removes any historic or prehistoric ruin, artifact, object of antiquity, Native American remains, Native American cultural item, or archaeological resources on public lands is subject to arrest and penalty of law (16 USC 433, 16 USC 470, 18 USC 641, 18 USC 1170, and 18 USC 1361).

16. Visual Resources. Production facilities shall be placed to avoid or minimize visibility from travel corridors, residential areas, and other sensitive observation points—unless directed otherwise by the BLM due to other resource concerns—and shall be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad.

    All woody vegetation (live and dead) shall remain standing at the toe of the fill slopes to provide visual screening. All woody vegetation left standing at the toe of the fill slopes shall be protected and remain standing and undamaged when fill material is pulled back to recontour the well pad.

    Rocks and woody debris shall be saved during the construction process; care shall be taken to preserve the canopy of the woody material while storing and transporting. Rocks and woody debris saved during construction and not used for stormwater management shall be replaced on recontoured cut/fill slopes to emulate the texture closer to that of the surrounding natural landscape and to encourage vegetation growth.

    Excavated material from construction shall not be side cast and shall be used in areas short of fill.

    Above-ground facilities shall be painted **Shadow Gray** to minimize contrast with existing surrounding vegetation or rock outcrops.

    To the extent practicable, cut and fill slopes shall not exceed 2:1 (horizontal to vertical) to provide stability and to facilitate vegetation establishment.

    During construction, the BLM and WPX representatives shall jointly review construction measures to determine effectiveness in meeting visual resource mitigation measures, and if subtle changes in construction techniques are warranted, they could be directed by the BLM Authorized Officer.

17. Windrowing of Topsoil. Topsoil shall be windrowed around the pad perimeter to create a berm that limits and redirects stormwater runoff and extends the viability of the topsoil per BLM Topsoil Best

Management Practices (BLM 2009 PowerPoint presentation available upon request from Glenwood Springs Field Office). Topsoil shall also be windrowed, segregated, and stored along pipelines and roads for later spreading across the disturbed corridor during final reclamation. Topsoil berms shall be promptly seeded to maintain soil microbial activity, reduce erosion, and minimize weed establishment.

18. Interim Reclamation Related to Drilling Phases. Within 1 year of completion of all exploratory wells proposed on a pad or within one year of completion of all development wells on a pad (whichever the situation may be), the operator would stabilize the disturbed area by recontouring, mulching, providing run-off and erosion control, replacing topsoil as directed, and seeding with BLM-prescribed native seed mixes (or landowner requested seed mix on Fee surface), and conducting weed control, as necessary. In cases where the exploratory drilling and development drilling on a single pad occur more than 1 year apart, slopes shall be recontoured to the extent necessary to accommodate seeding, and seed mixes required by BLM or requested by the private landowner shall be applied to stabilize the soil between visits per direction of the BLM.

SITE-SPECIFIC CONDITIONS OF APPROVAL

DOE 1-W-27 Well Pad, Road, and Pipeline

The following site-specific surface use COAs are in addition to the standard COAs listed above and all relevant stipulations attached to the respective Federal leases.

1. Project Construction Details.

Pad Construction Items: Trees cleared during the pad construction, particularly along the western side of the pad, shall be removed, broken down by earthwork equipment and placed along the outside edge of the topsoil windrow.

Road Surfacing: The entire access road serving the DOE 1-W-27 pad shall be surfaced with a minimum 6-inch depth of gravel.

Road Construction Details. The existing road entrance onto DOE 1-W-27 pad shall be shifted north toward Corner #2 and east (possibly into the existing pipeline corridor) in a manner that improves the road grade transition onto the pad, maintains adequate curve radius and provides better curve widening, and increases the driver's sight distances as they approach or leave the location. Such work could include generating additional material from the pad construction to place on the road approach to lessen the steep road grade and/or sloping the road grade into the pad footprint between Corners #2 and #3A. Furthermore, the new flowlines and gas, water, and condensate pipelines shall be aligned in a manner that allows, and not hinders, these access road improvements.

Production Equipment Placement: The production units staged on the PA 13-27 pad that are currently serving the DOE 1-W-27 operating wells shall be re-positioned to the DOE 1-W-27 pad (east-side of pad) as shown on Production Detail in the APD. However, the production unit footprint as shown in APD shall be modified slightly to allow space behind the facilities (units and tanks) to accommodate a minimum 2:1 cut slope suitable for interim reclamation and revegetation. The current flow lines that appear to run south of the producing wells shall be removed, where feasible, during the new well hook-ups, so the southern fillslope of the pad can be cut down and re-sloped during the reclamation earthwork. All facilities including the metal containment rings shall be painted Shale Gray.

Pad containment berm-spill prevention measures: With the pad being in direct proximity to drainages on all but the north side, there shall be special attention to installing a solid containment berm system around the perimeter of the pad working area. Sediment basins shall be located and designed to readily accept pad drainage with focus of locating these basins near the cut/fill balance line of the pad surface. Using windrowed topsoil as sediment controls and/or basin catchments shall be incorporated into the storm water control plan. Sediment basin outlets with drop-down black piping are discouraged and, if used, such piping shall not feed directly into the nearby drainages. As a minimum, a hand-drawn schematic on Plat #2 shall provide the details for the storm water control plan for this pad. This plan shall be presented to the BLM and approved prior to completion of pad construction earthwork.

Interim Reclamation – Earthwork Reshaping Considerations. At the time of earthwork related to the interim reclamation of the DOE 1-W-27 pad as shown on Plat 7 in the APD, the objective of the slope reshaping work shall be to move as much dirt volume from the fillslope on the south side of the pad to the north end of the pad to cover the stored cuttings generated from the new wells and establish the new reclaimed slope to the upper reaches of the cutslope or headwall scar. This earthwork shall be accomplished while preserving the defined working area of the pad (shown in blue on Plat 7). If suitable dirt volume is not available from the fillslope side of the pad to reshape the upper reaches of the headwall scar, then the area above or north of the headwall shall be excavated and recontoured to create a natural, continuous slope along the north side of the pad. Topsoil shall be stripped away prior to any excavation above the headwall and respread across the reshaped slope after the earthwork has been finished.

2. Changes on the PA 13-27 Pad. The north cutslope of the DOE 1-W-27 pad will be the primary cuttings storage location for the six new wells. The PA 13-27 pad shall be the backup storage location for cuttings from DOE 1-W-27 wells only if space on the DOE pad becomes scarce. If the PA 13-27 site is used for cuttings storage, the unreclaimed area on the NE side of the PA 13-27 pad shall be reclaimed and seeded as part of the reclamation work for the cuttings storage. The production facilities on the PA 13-27 pad shall be reconfigured to satisfy combustible source setbacks within the existing facility footprint after the separators are moved to the DOE 1-W-27 pad. Any tree branches within 15 feet of the PA 13-27 production units shall be trimmed from the tree and removed.

3. Written Authorization Prior to DOE 1-W-27 Pipeline Upgrades. The buried gas and water pipeline installations along the private land segments of the DOE 1-W-27 access road shall not commence until BLM has received and reviewed the pending botany report and BLM has directed WPX, in writing, to commence surface-disturbing operations with any special requirements resulting from the recommendations of the botany report.

DOE 2-W-27 Well Pad, Road, and Pipeline

The following site-specific surface use COAs are in addition to the standard COAs listed above and all relevant stipulations attached to the respective Federal leases.

1. Project Construction Details.

Pad Construction Items: Excess material generated from the construction of either of the pad drilling platforms shall be stockpiled in a small saddle directly southeast of the lower pad as directed by the Authorized Officer. The existing trees located directly south of the existing production facilities for the DOE 2-W-27 pad shall remain undamaged during the road, pad, and pipeline construction.

Road Construction Details. The new access road approach to the DOE 2-W-27 pad shall be constructed per specifications shown on the Road Construction Plat in the APD. Prior to construction, the road centerline shall be staked and limits of the road disturbance corridor shall be flagged to outline the road work area. Culverts shall be installed along the new road alignment based on joint field review by BLM and WPX personnel. The culverts shall be minimum 18 inches in diameter. Trees cleared during the road construction shall be removed, broken down by earthwork equipment, and placed for sediment control and stabilization as directed by the Authorized Officer.

Road Surfacing: The entire access road serving the DOE 2-W-27 pad shall be surfaced with a minimum 6-inch depth of gravel.

Gas Pipeline Realignment: The upgraded gas pipeline serving the DOE 2-W-27 pad shall not follow the old pipeline corridor south of the pad, but shall be realigned and buried west of the lower pad alongside the new access road and shall take advantage of the existing road platform near the first switchback below the pad.

Production Equipment Placement: The separators for the DOE 2-W-27 pad shall be re-located onto the upper pad and staged at the western edge. The water and condensate tanks serving these wells shall be staged at the East Parachute Tank Pad; the location for the blowdown tank(s), if slated for the DOE 2-W-27 pad, shall be determined prior to tank placement by BLM and WPX representatives.

Pad containment berm-spill prevention measures: With the pad being in direct proximity to drainages on all but the north side, there shall be special attention to installing a solid containment berm system around the perimeter of the pad working area. Sediment basins shall be located and designed to readily accept pad drainage with focus of locating these basins near the cut/fill balance line of the pad surface. Using windrowed topsoil as sediment controls and/or basin catchments shall be incorporated into the storm water control plan. Sediment basin outlets with drop-down black piping are discouraged and, if used, such piping shall not feed directly into the nearby drainages. As a minimum, a hand-drawn schematic on Plat #2 shall provide the details for the storm water control plan for this pad. This plan shall be presented to the BLM and approved prior to completion of pad construction earthwork.

Interim Reclamation – Earthwork Reshaping Considerations. At the time of earthwork related to the interim reclamation of the DOE 2-W-27 pad as shown on Plat 7 in the APD, the objective of the slope reshaping work shall be to move as much dirt volume from the fillslope on the south side of the pad to the north end of the pad to cover the stored cuttings generated from the new wells and establish the new reclaimed slope to the upper reaches of the cutslope or headwall scar. This earthwork shall be accomplished while preserving the defined working area of the pad. If suitable dirt volume is not available from the fillslope side of the pad to reshape the upper reaches of the headwall scar, then the area above or north of the headwall shall be excavated and recontoured to create a natural, continuous slope along the north side of the pad. Topsoil shall be stripped away prior to any excavation above the headwall and respread across the reshaped slope after the earthwork has been finished.

PA 543-27 Well Pad and Road

1. Project Construction Details.

Pad Construction Items: Trees cleared during the pad construction, particularly along the southern edge of the pad, shall be removed, broken down by earthwork equipment, and placed along the outside edge of the topsoil windrow along south side of the pad footprint.

Road Surfacing: The entire access road serving the PA 543-27 pad shall be surfaced with a minimum 6-inch depth of gravel.

Production Equipment Placement: Produced water and condensate tanks serving the PA 543-27 wells shall be staged at the East Parachute Tank Pad. The planned settings for the production units and blowdown tank(s) at the PA 543-27 pad are problematic since the current locations have been impacted by seasonal storm water and debris flow over the years. The final locations for the facilities on this pad including the storage tanks and separators shall be determined by BLM and WPX representatives prior to any facility installations.

Pad containment berm-spill prevention measures: The road ditching and storm water runoff from the access road directly above the PA 543-27 pad shall be directed in a manner that avoids depositing water onto the pad. Pad drainage at time of interim reclamation shall focus on directing surface flows on the pad away from the well heads and the pass-through road. To further avoid surface ponding of water, the pad shall be sloped and water shall be directed with a berm system around the perimeter of the pad working area.

The existing 36" culvert located underneath the east-end of the pad shall undergo field review by BLM and WPX representatives prior to pad re-construction to determine effectiveness of the culvert and long-term plan for routing the drainage around the pad instead of the existing culvert under the pad.

Existing 36" diameter culvert near center-west pad corner shall be removed from road prior to pad construction. A low depression (water dip) shall be installed across the road at southwest pad corner to direct storm water away from the pad and avoid the historic ponding issues on the west side of this pad and roadway.

Sediment basins shall be located and designed to readily accept pad drainage with focus of locating these basins near the cut/fill balance line of the pad surface. Using windrowed topsoil as sediment controls and/or basin catchments shall be incorporated into the storm water control plan. Sediment basin outlets with drop-down black piping are discouraged and, if used, such piping shall not feed directly into the nearby drainages. As a minimum, a hand-drawn schematic on Plat #2 shall provide the details for the storm water control plan for this pad. This plan shall be presented to the BLM and approved prior to completion of pad construction earthwork.

2. Cuttings Storage on the PA 44-27 Pad. Prior to hauling cuttings to the PA 44-27 pad (designated as the overflow storage site for PA 543-27 cuttings), every effort shall be made to store cuttings against the PA 543-27 cutslope to provide the mass volume to place against the cutslope and improve the overall pad reshaping at time of interim reclamation. If necessary, the existing pad footprint inside the road switchback near the northwest pad corner can be used to stockpile cuttings.

   If cuttings are hauled to the PA 44-27 pad, they shall be placed against the cutslope on the north side of the pad as shown in APD plat. Topsoil on the PA 44-27 pad shall be stripped to the side of the cuttings storage envelope prior to placing on the pad slope and used as final cover material afterwards.

PA 23-26 Well Pad and Road

1. Project Construction Details.

   Pad Construction Items: Trees cleared along the north and south sides of the pad during the pad expansion work shall be removed, broken down by earthwork equipment, and placed along the outside edge of the topsoil windrow. The southeast pad corner shall be rounded to avoid the existing woody debris stockpiled in the vicinity. The existing drainage at the east end of the proposed pad shall be routed around the southeast pad corner; the woody debris stockpile can serve as sediment control for this drainage.

   Road Surfacing: The entire access road serving the PA 23-26 pad shall be surfaced with a minimum 6-inch depth of gravel.

   Roadway and Culvert Installation(s): During the pad expansion work, BLM and WPX representatives shall review the road entrance onto the pad and the designated roadway across the pad which serves the DOE 1-W-26 pad specifically to improve road drainage, identify culvert installations, and discuss interface of the access road with the planned facility placements. A new culvert shall be installed about 400 feet southwest of the pad entrance at low point in the access road.

   Production Equipment Placement: The final locations for the facilities on this pad, including the storage tanks and separators serving the nearby DOE 1-W-26 pad, shall be determined by BLM and WPX representatives prior to any facility installations.

   Pad containment berm-spill prevention measures: With the pad being in direct proximity to drainages on its east and west edges, there shall be special attention to installing a solid containment berm system around the perimeter of the pad working area. Sediment basins shall be located and designed to readily accept pad drainage with focus of locating these basins near the cut/fill balance line of the pad surface. Using windrowed topsoil as sediment controls and/or basin catchments shall be incorporated into the storm water control plan. Sediment basin outlets with drop-down black piping are discouraged and, if used, such piping shall not feed directly into the nearby drainages. As a minimum, a hand-drawn schematic on Plat #2 shall provide the details for the storm water control plan for this pad. This plan shall be presented to the BLM and approved prior to completion of pad construction earthwork.

2. Cuttings Storage on the DOE 1-W-26 Pad. The north cutslope of the DOE 1-W-26 pad will be the primary cuttings storage location for the new wells planned on the PA 23-26 pad. After cuttings are no longer planned for storage at the DOE 1-W-26 pad, the pad footprint shall undergo interim reclamation. The objective of the slope reshaping work at the DOE 1-W-26 pad shall be to move dirt volume from the east and west side of the existing cutslope to cover the stored cuttings with a minimum 3-foot cap. If suitable dirt volume is not available from the cutslope side of the pad to reshape and cover the cuttings stockpile, then the area above or north of the headwall shall be excavated and recontoured to create a natural, continuous slope along the north side of the pad. Topsoil shall be stripped away prior to any excavation above the headwall and respread across the reshaped slope after the earthwork has been finished.

PA 11-35 Remote Frac Pad

1. Cultural Monitoring. Archaeological monitoring will be required of a cultural resource firm qualified and permitted to do this type of archaeological work within the Colorado River Valley Field Office area during all phases of construction of the PA 11-35 well pad expansion in Section 35, T6S R95W

and the surface water delivery line installation in Section 34, T6S R95W. Maps with the exact location of the area to be monitored will be provided to the archaeological contractor by the CRVFO Archaeologist.

No ground-disturbing construction activities (topsoiling, grading, etc.) will begin prior to the archaeologist's arrival. WPX Energy Rocky Mountain, LLC is responsible for notifying the archaeological firm at least 72 hours in advance of any proposed ground disturbance in the specified areas. The operator is responsible for any and all construction delays and/or damage to cultural manifestations due to insufficient notification of the Archaeological Contractor, and or noncompliance with the procedures.

Archaeological monitoring will involve on-the-ground visual inspection of all construction for the well pad expansion. The archaeologists will follow all the ground disturbing equipment at a cautionary distance, allowing time for the construction dust to settle and for visible detection of buried cultural features to occur. If cultural resources are discovered, all ground disturbing activities in the vicinity of identified feature(s) will be halted and a buffer area at least 100 feet from the identified feature(s) will be protected from any additional disturbance until which time as the feature(s) is mitigated via data recovery. Appropriate samples for analysis to determine cultural/temporal affiliation, and subsistence will be collected and analyzed as appropriate. At least one stratigraphic profile will be made for each feature identified, and samples for paleoenvironmental reconstructions shall be taken as appropriate. Periodic reporting to the BLM archaeologist of progress and findings will be completed as deemed necessary by the BLM authorized officer.

2. Installation of Site Protection Fencing. Prior to any construction activities, a barrier fence (orange plastic webbed type) shall be installed along the south and east boundaries of the PA 11-35 frac pad (T6S R95W, Section 35, NW¼NW¼) and the surface water delivery pipeline (T6S R95W, Section 34, SE¼NE¼) to prevent accidental incursion into the nearby NRHP eligible site by mechanized equipment or their operators. The barrier fence will be maintained by WPX until such time that BLM determines it is no longer needed to protect the site.

   The extension of Federal protection to cultural resources on affected portions of private land is specified in BLM Manual 8100.07 (Responsibility for Non-Federal Cultural Resources). (*Disclosure of site location information is prohibited under 43 CFR 7.18).*

Buried Gas, Water, and Condensate Pipelines within the East Parachute Field

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction. If requested by the BLM representative, the operator shall schedule a pre-construction meeting, including key operator and contractor personnel, to ensure that any unresolved issues are fully addressed prior to initiation of surface-disturbing activities.

2. Cultural Resource Monitoring and Fencing. See special monitoring requirements under PA 11-35 Frac Pad that shall apply to the cultural site protection for the surface water delivery pipeline in SE¼NW¼, Section 34, T6S, R95W. A barrier fence (orange plastic webbed type) shall be installed around the 20 meter buffer of the cultural site prior to the installation of the surface water delivery pipeline to prevent accidental incursion into the nearby NRHP eligible site by mechanized equipment or their operators.

3. Pipeline Construction and Maintenance. The pipelines (natural gas, condensate, and water for production or injection purposes) shall be installed to industry and BLM "Gold Book" standards.

The pipeline(s) shall be buried with a minimum depth of 48 inches from the top of the pipe to the surface. As shown below, various described pipelines shall be installed concurrently in the same trench. The centerline and disturbance limits of the proposed pipeline(s) shall be clearly staked and/or flagged prior to any commencement of operations. No equipment or vehicle use shall be allowed outside the staked disturbance corridor of the pipeline ROW unless authorized by BLM personnel. Overall construction width is dependent upon location of the planned pipelines. "Figures" references relate to detailed Project maps available for review in the East Parachute Project EA #DOI-BLM-CO-NO40-2013-0025.

Gas pipelines shall be installed as follows*:* New 8-inch steel buried gas pipelines shall be installed to upgrade the existing gas gathering lines to each of the four pads planned to be expanded. A 918-foot-long, 20-foot-wide segment on BLM north of the PA 13-27 pad serving the DOE 1-W-27 pad shall be buried alongside the road (Figure 2). Another 4,414 feet of new 8-inch gas lines shall be buried on BLM land within an expanded existing pipeline corridor (50 feet wide corridor, of which 20 feet shall involve new disturbance) or along existing roads (20 feet wide along the road edge) serving the DOE 2-W-27, PA 543-27 and PA 23-26 pads (Figure 3). The uppermost portion of the new gas line serving the DOE 2-W-27 pad shall follow the new road alignment around the last switchback to the pad. A new 300-foot segment of gas line shall be buried (using a 50-foot wide corridor) southwest of the PA 44-27 pad to upgrade and replace the existing under-sized line within the planned PA 44-27 road improvement work (Figure 10).

The old gas pipeline buried under or within the PA 44-27 access road shall be decommissioned and removed during the planned PA 44-27 road excavation work.

Water (production) pipelines shall be installed as follows*:* The proposed East Parachute water collection system shall gather produced water from the existing and proposed well pads through new buried Flexpipe water pipelines along existing roads and pipelines. The 4-inch produced waterlines serving the DOE 2-W-27 and PA 23-26 corridors shall collect and deliver water to the proposed East Parachute Tank Pad in Section 34 on private land (Figure 2). The produced waterlines serving the DOE 1-W-27 corridor shall collect and deliver water to the existing Cottonwood Tank Pad (Figure 3). Where possible, the 4-inch waterlines shall be installed concurrently in the same trench as the identified 8-inch gas lines and/or the 2-inch condensate lines.

Condensate (production) pipelines shall be installed as follows*:* Condensate lines (2-inch diameter) shall be installed in the DOE 2-W-27 corridor in order to deliver condensate to storage tanks staged at the new East Parachute Tank Pad (Figure 2). Condensate on the west-side of the project area shall remain stored in tanks on its respective pads except for the DOE 1-W-27 pad where condensate shall continue to be piped to an existing tank on the PA 13-27 pad. . No additional disturbance estimate shall be needed since the condensate lines shall be trenched with the gas and/or produced waterlines.

4. Pre-installation of Water Delivery Lines. To reduce future pipeline corridor redisturbance and coordinate planning for a possible buried water delivery line potentially serving water disposal well(s) on the DOE 1-W-27 pad, the DOE 2-W-27 pad and the PA 23-26 pad, a 6-inch Flexsteel waterline would be installed concurrently across BLM lands in the planned pipeline line trench serving these identified pads. The lengths of 6-inch Flexsteel line would be 3,370 feet serving the DOE 2-W-27 pad, 2,390 feet for the DOE 1-W-27 pad, and 1,720 feet for the PA 23-26 pad. These future water delivery lines would be trenched, covered, and isolated with no intent to put them into service until BLM right-of-way authorization(s) for a water disposal well are granted in the future and waterline hookups to future water disposal wells are completed.

5. Welding of Pipeline. Visual inspections shall be performed on 100% of all pipeline welds. All welders shall be appropriately certified. (43CFR109.227) *Qualification of welders.* 49CFR192.241*) Inspection and test of welds.*

   (a) Welding must be performed by a qualified welder in accordance with welding procedures qualified under section 5 of API 1104 (incorporated by reference, *see* §192.7) or section IX of the ASME Boiler and Pressure Vessel Code " Welding and Brazing Qualifications" (incorporated by reference, *see* §192.7) to produce welds meeting the requirements of this subpart. The quality of the test welds used to qualify welding procedures shall be determined by destructive testing in accordance with the applicable welding standard(s).

4. Pipeline Testing. The entire pipeline shall be tested in compliance with United States Department of Transportation (DOT) Code of Federal Regulations (CFR) (49 CFR Part 192). (Ref. 49 CFR 192.500.Subpart J entitled "Test Requirements"). (49CFR 192.225 Welding procedures.)

5. Fire Suppression. Welding with acetylene or other open-flame torch shall be operated in an area barren or cleared of all flammable materials at least ten feet on all sides of equipment. Internal combustion engines must be equipped with approved spark arrestors which meet either (a) Department of Agriculture, Forest Service Standard 5100-la, or (b) Society of Automotive Engineers (SAE) recommended practices J335(b) and J350(a).

6. Saturated Soil Conditions. When saturated soil conditions exist on or along the proposed right-of-way, construction shall be halted until soil material dries out or is frozen sufficiently for construction to proceed without undue damage and erosion to soils.

7. Warning Signs. Pipeline warning signs shall be installed within 5 days of completion of construction and prior to use of the pipeline for transportation of product. Pipeline warning shall be installed at all road crossings and shall be visible from sign to sign along the ROW. For safety purposes each sign shall be permanently marked with the operator's name and shall clearly identify the owner (emergency contact) and purpose (product) of the pipeline.

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BUREAU OF LAND MANAGEMENT

Colorado River Valley Field Office
2300 River Frontage Road
Silt, CO 81652

DOWNHOLE CONDITIONS OF APPROVAL
Applications for Permit to Drill

Operator:	WPX Energy Rocky Mountain LLC
Lease Number:	COC62161
Pad(s):	DOE 1-W-27
Surface Location:	Garfield County; Lot 6, Sec. 27 T6S R95W
Engineer:	Shauna Kocman

See list of wells following the COAs.

1. Twenty-four hours *prior* to (a) spudding, (b) conducting BOPE tests, (c) cementing/running casing strings, and (d) within 24 hours *after* spudding, the CRVFO shall be notified. One of the following CRVFO inspectors shall be notified by phone. The contact number for all notifications is: 970-876-9064. The BLM CRVFO inspectors are Julie King, Lead PET; David Giboo, PET; Greg Rios, PET; Tim Barrett, PET; Alex Provstgaard, PET; Brandon Jamison, PET.

2. A CRVFO petroleum engineer shall be contacted for a verbal approval prior to commencing remedial work, plugging operations on newly drilled boreholes, changes within the drilling plan, sidetracks, changes or variances to the BOPE, deviating from conditions of approval, and conducting other operations not specified within the APD. Contact Shauna Kocman or Peter Cowan for verbal approvals (contact information below).

3. If a well control issue or failed test (e.g. kick, blowout, water flow, casing failure, or a bradenhead pressure increase) arises during drilling or completions operations, Shauna Kocman or Peter Cowan shall be notified within 24 hours from the time of the event. IADC/Driller's Logs and Pason Logs (mud logs) shall be forwarded to CRVFO – Petroleum Engineer, 2300 River Frontage Road, Silt, CO 81652 within 24 hours of a well control event.

4. The BOPE shall be tested and conform to Onshore Order No. 2 for a **3M** system and recorded in the IADC/Driller's log. A casing head rated to 3,000 psi or greater shall be utilized.

5. Flexible choke lines shall meet or exceed the API SPEC 16C requirements. Flexible choke lines shall be effectively anchored, have flanged connections, and configured to the manufacturer's specifications. Manufacturer specifications shall be kept with the drilling rig at all times and immediately supplied to the authorized officer/inspector upon request. Specifications at a minimum shall include acceptable bend radius, heat range, anchoring, and the working pressure. All flexible choke lines shall be free of gouges, deformations, and as straight/short as possible.

6. An electrical/mechanical mud monitoring equipment shall be function tested prior to drilling out the surface casing shoe. As a minimum, this equipment shall include a pit volume totalizer, stroke counter, and flow sensor.

7. Prior to drilling out the surface casing shoe, gas detecting equipment shall be installed in the mud return system. The mud system shall be monitored for hydrocarbon gas/pore pressure changes, rate of penetration, and fluid loss.

8. A gas buster shall be functional and all flare lines effectively anchored in place, prior to drilling out the surface casing shoe. The discharge of the flare lines shall be a minimum of 100 feet from the wellhead and targeted at bends. The panic line shall be a separate line (not open inside the buffer tank) and effectively anchored. All lines shall be downwind of the prevailing wind direction and directed into a flare pit, which cannot be the reserve pit. The flare system shall use an automatic ignition. Where noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and maintain a continuous flare.

9. After the surface/intermediate casing is cemented, a Pressure Integrity Test/Mud Equivalency Test/FIT shall be performed on the first well drilled in accordance with OOGO No. 2; Sec. III, B.1.i. to ensure that the surface/intermediate casing is set in a competent formation. This is not a Leak-off Test, but a formation competency test, insuring the formation at the shoe is tested to the highest anticipated mud weight equivalent necessary to control the formation pressure to the next casing shoe depth or TD. Submit the results from the test via email (skocman@blm.gov) on the first well drilled on the pad or any horizontal well and record results in the IADC log. Report failed test to Shauna Kocman or Peter Cowan. A failed pressure integrity test is more than 10% pressure bleed off in 15 minutes.

10. As a minimum, cement shall be brought to 200 feet above the Mesaverde. After WOC for the production casing, a CBL shall be run to verify the TOC and an electronic copy in .las and .pdf format shall be submitted to CRVFO – Petroleum Engineer, 2300 River Frontage Road, Silt, CO 81652 within 48 hours. If the TOC is lower than required or the cement sheath of poor quality, a CRVFO petroleum engineer shall be notified for remedial operations within 48 hours from running the CBL and prior to commencing fracturing operations,

    A greater volume of cement may be required to meet the 200-foot cement coverage requirement for the Williams Fork Formation /Mesaverde Group. Evaluate the top of cement on the first cement job on the pad (Temperature Log). If cement is below 200-foot cement coverage requirement, adjust cement volume to compensate for low TOC/cement coverage.

11. On the first well drilled on this pad, a triple combo open-hole log shall be run from the base of the surface borehole to surface and from TD to bottom of surface casing shoe. This log shall be in submitted within 48 hours in .las and .pdf format to: CRVFO – Todd Sieber, 2300 River Frontage Road, Silt, CO 81652. Contact Todd Sieber at 970-876-9000 or asieber@blm.gov for clarification.

12. Submit the (a) mud/drilling log (e.g. Pason disc), (b) driller's event log/operations summary report, (c) production test volumes, (d) directional survey, and (e) Pressure Integrity Test results within 30 days of completed operations (i.e. landing tubing) per 43 CRF 3160-9 (a).

13. Prior to commencing fracturing operations, the production casing shall be tested to the maximum anticipated surface treating/fracture pressure and held for 15 minutes without a 2% leak-off. If leak-off is found, Shauna Kocman or Peter Cowan shall be notified within 24 hours of the failed test, but prior to proceeding with fracturing operations. The test shall be charted and set to a time increment as to take up no less than a quarter of the chart per test. The chart shall be submitted with the well completion report.

14. During hydraulic frac operations, monitor the bradenhead/casing head pressures throughout the frac job. Frac operations shall be terminated upon any sharp rise in annular pressure (+/- 40 psi or greater) in order to determine well/wellbore integrity. Notify Shauna Kocman or Peter Cowan immediately.

15. Per 43 CFR 3162.4-1(c), no later than the 5th 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 a case of a well which has been off production for more than 90 days, the operator shall notify the authorized

officer by letter or sundry notice, Form 3160-5, or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed.

Contact Information:

Shauna Kocman, PhD, PE
Petroleum/ Environmental Engineer

Office: (970) 876-9061
Cell: (970) 456-5602
skocman@blm.gov

Peter Cowan
Petroleum Engineer

Office: (970) 876-9049
Cell: (970) 309-8548
picowan@blm.gov

List of Wells			
Proposed Pads	***Proposed Wells***	***Surface Locations***	***Bottomhole Locations***
DOE 1-W-27 (Federal Surface)	Federal PA 11-27	T6S R95W, Sect. 27 Lot 6	T6S R95W, Sect. 27 Lot 4
	Federal PA 21-27	T6S R95W, Sect. 27 Lot 6	T6S R95W, Sect. 27 Lot 3
	Federal PA 311-27	T6S R95W, Sect. 27 Lot 6	T6S R95W, Sect. 27 Lot 4
	Federal PA 321-27	T6S R95W, Sect. 27 Lot 6	T6S R95W, Sect. 27 Lot 3
	Federal PA 411-27	T6S R95W, Sect. 27 Lot 6	T6S R95W, Sect. 27 Lot 4
	Federal PA 421-27	T6S R95W, Sect. 27 Lot 6	T6S R95W, Sect. 27 Lot 3

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FONSI
DOI-BLM-CO-N040-2013-0025-EA

The Environmental Assessment (EA) analyzing the environmental effects of the Proposed Action has been reviewed. The project design and approved mitigation measures result in a Finding of No Significant Impact (FONSI) on the human environment. Therefore, an Environmental Impact Statement (EIS) is not necessary to further analyze the environmental effects of the Proposed Action.

DECISION RECORD

DECISION: It is my decision to approve the Proposed Action as described and analyzed in this EA. This decision would provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on a valid Federal oil and gas lease.

RATIONALE: The bases for this decision are as follows:

1. Approval of the Proposed Action is validating the rights granted with the Federal oil and gas leases to develop the leasehold to provide commercial commodities of oil and gas.

2. The environmental impacts would be avoided, minimized, or offset with the mitigation measures incorporated into the Proposed Action or attached and enforced by BLM as Conditions of Approval (COAs).

3. This Decision does not authorize the initiation of surface-disturbing activities on BLM lands or of drilling activities associated with any Federal oil and gas well. Initiation of activities related to the new Federal oil and gas wells to be added to the existing well pad may commence only upon approval by BLM of the Application for Permit to Drill (APD).

MITIGATION MEASURES: Mitigation measures presented in Appendix A of the EA will be incorporated as Surface-Use COAs for both surface and drilling operations and attached to APDs for Federal wells added to the existing DOE 1-W-27, DOE 2-W-27, PA 543-27 and PA 23-26 well pads. Because no APDs have yet been submitted by WPX for the DOE 2-W-27, PA 543-27, and PA 23-26 pads, this EA has analyzed impacts based on information provided with the Notice of Staking (NOS) and does not include Downhole COAs for wells on the DOE 2-W-27, PA 543-27, and PA 23-26 wells. Surface-Use and Downhole COAs consistent with CRVFO's standard practices and with those attached to APDs for the DOE 1-W-27 pad (Appendix A) will be attached to APDs for the DOE 2-W-27, PA 543-27, and PA 23-26 pad at such time as those APDS may be approved by the BLM.

NAME OF PREPARER: Jim Byers, Natural Resource Specialist

SIGNATURE OF AUTHORIZED OFFICIAL:

Allen B. Crockett, Ph.D., J.D.
Supervisory Natural Resource Specialist

DATE: April 16, 2013