

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

## ENVIRONMENTAL ASSESSMENT

### NUMBER

DOI-BLM-CO-N040-2011-0072-EA

### CASEFILE NUMBER

Federal Leases COC50128 and COC55604.

### PROJECT NAME

“South Grass Mesa.” Proposal to Drill 14 Wells from the Existing J16W Pad, Drill 20 Wells from the Proposed M16W Pad, Construct a New Access Road to South Grass Mesa, Construct a New Road/Pipeline to the M16W Pad, and Install New Water Pipelines on BLM and Private Lands South of Rifle, Garfield County, Colorado.

### PAD LOCATIONS

**Expanded J16W Pad:** Township 7 South (T7S), Range 93 West (R93W), Section 16, NW $\frac{1}{4}$ SE $\frac{1}{4}$ , Sixth Principal Meridian

**Proposed M16W Pad:** T7S, R93W, Section 16, SW $\frac{1}{4}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ SW $\frac{1}{4}$ , Sixth P.M.

### APPLICANT

Encana Oil & Gas (USA) Inc., Attn: Miracle Pfister, 370 Seventeenth Street, Suite 1700, Denver, Colorado 80202.

### PROPOSED ACTION

Encana Oil & Gas (USA) Inc. (“Encana”) proposes to drill and develop as many as 34 oil and gas wells from the expanded J16W pad (14 new wells) and the proposed M16W pad (20 new wells) located at the south end of Grass Mesa (Table 1). The drilling and completion traffic associated with the two pads on South Grass Mesa would use a new access road to be constructed across BLM and Rose Ranch property. Figure 1 displays these various project components as well as the two route alternatives that could access the project area. The South Grass Mesa area lies directly south of the Grass Mesa Subdivision on BLM land, approximately 13 miles south of Rifle.

The new access road (5,383 feet in length) would be constructed from the existing L15W pad on Rose Ranch (private land) to a junction point on BLM with the B16W-J16W access road north of the existing B16W pad. The existing access road and buried gas pipeline to the J16W pad would continue to serve the new wells on the J16W pad. A new access road and buried gas and water pipelines (2,470 feet in length) would be constructed to serve the planned wells on the proposed M16W pad. A new 12-inch-diameter steel water pipeline would be buried alongside the new L15W-B16W access road to serve as a water supply link to South Grass Mesa. In addition, the existing 6-inch buried water pipeline between the J16W and N9W pads would be replaced with a new 12-inch buried steel water pipeline.

<b>Table 1. Details of Proposed Project Components</b>							
<i>Proposed Well Pads</i>	<i>Surface Owner</i>	<i>Surface Location<sup>1</sup></i>	<i>Existing Wells</i>	<i>Total Proposed Wells</i>	<i>Proposed Federal Wells</i>	<i>Proposed Fee Wells</i>	<i>Applicable Federal Lease</i>
J16W Pad Expansion	BLM	Sec. 16: NWSE	3	14	13	1	COC55604
M16W Pad Construction	BLM	Sec. 16: SWSW, SESW	--	20	10	10	COC55604
Well Totals			3	34	23	11	
<i>Proposed Roads &amp; Pipelines</i>	<i>Surface Owner</i>	<i>Surface Location<sup>1</sup></i>	<i>Total Length (feet)</i>	<i>Total Length on BLM (feet)</i>	<i>Total Length on Private (feet)</i>	<i>Proposed Corridor Width (feet)</i>	<i>Applicable Federal Lease</i>
L15W-B16W Access Road Construction	Private/BLM	Sec. 9:SWSE Sec. 15:NWSW Sec. 16:NWNE, E2NE, NESE	5383	2263	3120	35 <sup>2</sup>	CO50128 COC55604
M16W Access Road/Pipelines	BLM	Sec. 16:SWSE, SESW	2470	2470	--	60 <sup>3</sup>	COC55604
L15W-N9W Water Pipeline	Private/BLM	Sec. 9: SESW, SWSE Sec. 15:NWSW Sec. 16: NWNE, E2NE, NESE	6694	2469	4225	25 <sup>4</sup>	CO50128 COC55604
J16W-N9W Water Pipeline	Private/BLM	Sec. 9: SESW, SWSE Sec. 16: W2NE, NESE	5143	4185	958	25 <sup>4</sup>	CO50128 COC55604
<sup>1</sup> All of the Project Components are located within T7S, R93W, Sixth Principal Meridian. <sup>2</sup> Average width of proposed road disturbance; actual road running surface would be 24 feet including a 4-foot ditch. <sup>3</sup> Total width of proposed road and gas/water pipelines together; actual road running surface would be 24 feet including ditch. <sup>4</sup> The width of pipeline disturbance when installed alongside an existing or proposed road.							

**Background**

In recent years, truck access for oil and gas development to the South Grass Mesa area has originated from Garfield County Road 319 (CR319) south of the Garfield County Regional Airport (Interstate 70, Exit 94). Truck traffic has historically been directed to the top of Grass Mesa across the BLM’s Grass Mesa Road, constructed in 2003 by Encana solely for oil and gas traffic serving the Grass Mesa field. Once atop the mesa, vehicle access to Grass Mesa well pads including the South Grass Mesa area has occurred across the Grass Mesa Homeowner Association Road (GMHOA) system.

In November 2004, BLM approved Encana’s Grass Mesa Geographic Area Plan (GAP), which identified and analyzed an oil and gas development plan for the Federal leases located within and in proximity to the Grass Mesa Subdivision located south of Rifle, Colorado. Since 2004, Encana has developed the gas reserves on Federal and private leases in the area. From 2008-2010, Encana was granted year-round drilling approvals from the BLM as an exception to the big game winter timing limitation that typically

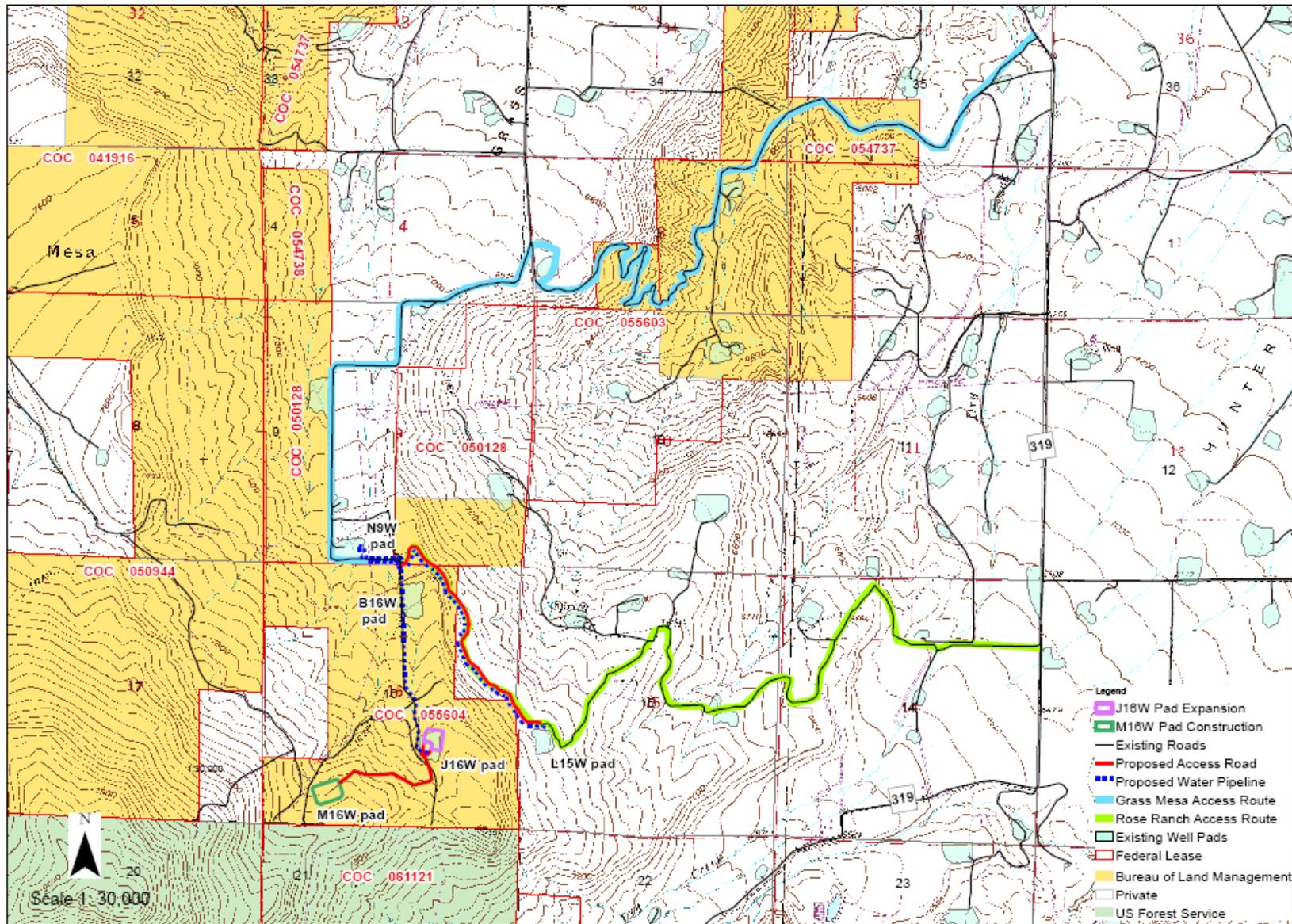


Figure 1. South Grass Mesa Project Components and Access Road Alternatives

the 2008-2010 winter months so Encana could complete its conventional Williams Fork drilling plans in a timelier manner. With the recently finished well completion work at the L26NW, K22NW and H27NW pads, the conventional development in the Mamm Creek Field was to be completed on Grass Mesa based on the conventional well development schedule outlined in 2007 during the presentation for the 2008-2010 timing limitation request. The 2008-2010 exception to the winter timing limitation has expired; any planned development work on Federal lands in the project area would be subject to the existing winter timing limitations addressed in the Federal leases.

Encana, however, has submitted Applications for Permit to Drill (APDs) to the BLM with plans to further explore deeper gas-bearing formations than what was pursued with the conventional Williams Fork drilling program. The South Grass Mesa area is targeted for further development of the Federal leases underlying BLM, private and National Forest lands. During the discussion on receiving an exception to the 2008-2010 big game winter timing limitation, Encana expressed to the Grass Mesa Homeowners that the drilling and completion traffic would cease on the GMHOA roads once the conventional Williams Fork program within the GAP was finished until such time when advances in technology, additional capital, and/or economic prospects in deeper geological zones warranted continued development of the resource.

Knowing that Encana wants to develop the deeper gas-bearing formations on South Grass Mesa, BLM suggested that an alternate South Grass Mesa access route be reviewed to limit near term traffic and road maintenance impacts on the GMHOA road system until the development of the deeper geological zones begins on Grass Mesa Ranch (private surface). Encana conducted that review and an alternate route to South Grass Mesa was surveyed, designed, and negotiated with Jim Rose (private landowner) and BLM. This route (known as the L15W-B16W Road) is the primary access route to the South Grass Mesa area as identified in the Proposed Action. The new road would remain a private oil and gas development road and would be closed to any public uses with traffic control gates since the bulk of the route to CR319 would cross Rose Ranch property. Production traffic for all Grass Mesa sites would continue to access via existing BLM's Encana Grass Mesa road.

As described in the Existing Grass Mesa Road Alternative, the planned oil and gas development components described in the Proposed Action would be implemented, except that the existing BLM Grass Mesa Road and GMHOA Road system would be used to access the development instead of the new Rose Ranch Road. Figure 1 shows the Grass Mesa Road route with a blue highlight. With the No Action Alternative described later in this document, none of the planned development components listed in the Proposed Action or the Existing Grass Mesa Road Alternative would be implemented.

### **Specific Project Components of the Proposed Action**

#### ***J16W Pad Expansion Plans***

The reclaimed J16W pad presently supports three producing Federal oil and gas wells. To accommodate the planned 13 Federal wells and one Fee well, the pad would be expanded by 2.5 acres from its reclaimed footprint of 5.1 acres to a proposed disturbance area of 7.6 acres (Figure 2). The expanded pad would have a maximum cut of 23.9 feet near the southeast corner and a maximum fill of 18.6 feet at the northwestern corner. The pad would be expanded east and north of its existing boundary fence. The expansion plans would feature a distinct new cellarhole alignment, which would allow the three existing wells to remain in production during the new drilling. The existing access road and buried gas pipeline serving this pad are adequate to serve the additional 14 wells.

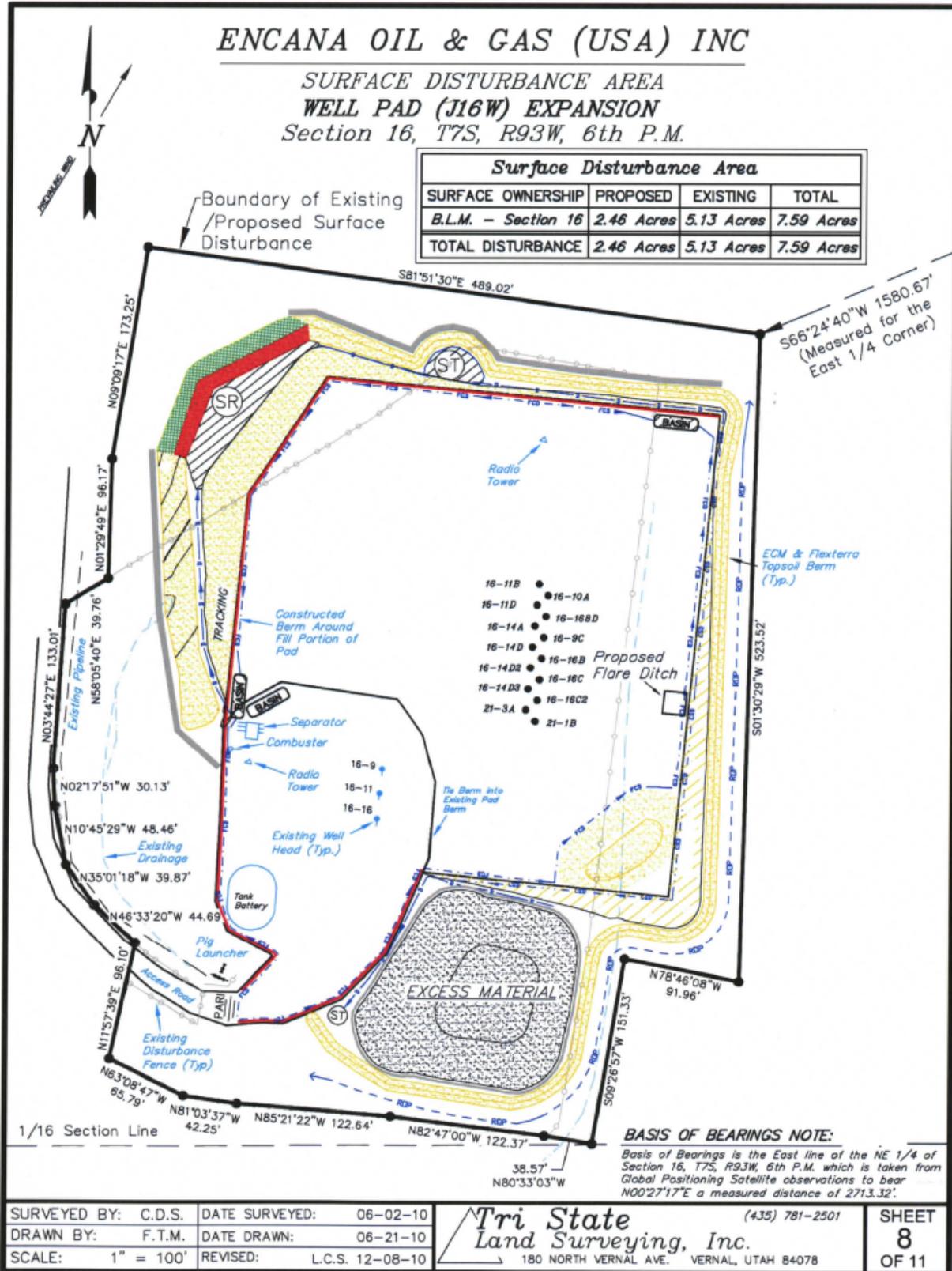


Figure 2. Proposed J16W Pad Layout

The new 2,470-foot access road would be built at a grade not to exceed 10% and would be surfaced with a minimum six inches of gravel between the J16W pad and the M16W location. A cattleguard or steel frame gate would be installed in the range allotment fence that would be bisected by the new road. The 12-inch gas-gathering pipeline and 12-inch water delivery line would be buried along the upper side of the proposed road. The average width of the road/pipeline corridor would be 60 feet. Short-term disturbance related to the road and pipeline construction would amount to 3.4 acres; after the pipeline and road slopes are reclaimed, the long-term disturbance would be 1.4 acres.

Topsoil would be stripped during the initial earthwork and windrowed around the pad perimeter and along the top of the cut and bottom of the fillslope of the road/pipeline corridor. The pad would be designed to balance the amount of excavated cut and fill material to avoid the need for excess material piles stacked off the edge of the pad. Diversion ditches would be constructed to direct surface flow around the pad perimeter. Storm water sediment ditches and ponds would be installed within the topsoil perimeter to avoid any erosion releases from the pad construction work. Since the project area lies within an active livestock grazing allotment, the perimeter of the pad disturbance area would be fenced prior to pad construction work to avoid conflicts with grazing livestock.

The proposed wells would include both directional and horizontal drilling and would be completed using closed-loop techniques. A reserve pit would not be constructed or used on the pad to deposit drill cuttings. With closed-loop drilling, fluids are recovered and reused in the drilling while cuttings are processed through a shaker system achieving a drier, more manageable consistency. These cuttings are then typically collected in a mixing pit on the pad and incorporated with a drying agent that allows the treated cuttings to be placed or stacked on the pad preferably against the pad cut slope.

The J16W pad lies within mountain brush and sagebrush vegetation with associated forbs and grasses in the understory. The pad was reclaimed in summer 2007 and is trending toward acceptable reclamation with the establishment of desirable seed species and recent reseeded of bare areas in spring 2010.

To accommodate the pad expansion, a hydroaxe would be used to mow the brushy vegetation from the planned pad expansion footprint. The topsoil would be stripped during the initial earthwork and windrowed around the pad perimeter and along the top of the cut and bottom of the fillslope of the road/pipeline corridor. The pad would be designed to balance the amount of excavated cut and fill material to avoid the need for excess material piles stacked off the edge of the pad. Diversion ditches would be constructed to direct surface flow around the pad perimeter. Storm water sediment ditches and ponds would be installed within the topsoil perimeter to avoid any erosion releases from the pad construction work. Since the project area lies within an active livestock grazing allotment, the perimeter of the pad disturbance area would be fenced prior to pad construction to avoid conflicts with grazing.

The proposed wells would be directionally drilled and completed using closed-loop drilling techniques. A reserve pit would not be constructed or used on the pad to deposit drill cuttings. With closed-loop drilling, fluids are recovered and reused in the drilling while cuttings are processed through a shaker system achieving a drier, more manageable consistency. These cuttings are then typically collected in a mixing pit on the pad and incorporated with a drying agent that allows the treated cuttings to be placed or stacked on the pad preferably against the pad cut slope. With the different Federal units and leases to be accessed by the planned wells, fluid storage for these wells would be segregated by lease in a number of different tanks for production accountability. The new tanks would be added to the existing tank containment that exists on the southwest side of the pad near the road entrance. The completion work would occur on the pad with frac water storage tanks remotely staged on the nearby B16W or N9W pads.

Total short-term surface disturbance attributed to the J16W pad expansion would be 7.6 acres occurring on public land. Long-term, after the pad is reclaimed, the disturbance would amount to 2.3 acres of reclaimed pad footprint on BLM (Table 2).

<b>Table 2. Proposed Action Disturbance Area (acres)</b>				
<i>Project Component</i>	<i>Federal Surface Disturbance</i>		<i>Total Surface Disturbance</i>	
	<i>Short-term</i>	<i>Long-term<sup>1</sup></i>	<i>Short-term</i>	<i>Long-term<sup>1</sup></i>
<b>J16W Pad Expansion</b>	<b>7.6</b>	<b>2.3</b>	<b>7.6</b>	<b>2.3</b>
<i>M16W Pad</i>	7.9	2.2	7.9	2.2
<i>M16W Road/Pipeline</i>	3.4	1.4	3.4	1.4
<b>M16W Totals</b>	<b>11.3</b>	<b>3.6</b>	<b>11.3</b>	<b>3.6</b>
<b>L15W-B16W Access Road</b>	<b>3.1</b>	<b>1.2</b>	<b>7.4</b>	<b>3.0</b>
<b>L15W-N9W Water Pipeline</b>	Included with new access road	N/A	<b>1.4<sup>2</sup></b>	N/A
<b>J16W-N9W Water Pipeline</b>	<b>2.4</b>	N/A	<b>2.4</b>	N/A
<b>Project Totals</b>	<b>24.4</b>	<b>7.1</b>	<b>30.1</b>	<b>8.9</b>
<p><sup>1</sup> Long-term disturbance figures are derived from the unreclaimed working area of the pad and the travelway area of the access road. Since the entire disturbed pipeline corridor is typically reclaimed, no long-term disturbance is attributable to pipelines.</p> <p><sup>2</sup> Short-term disturbance that would occur outside the L15W-B16W road corridor across Encana property in SESW Section 9 (1,310 feet of pipeline would be buried alongside the existing N9W access road (45-foot disturbance width; 958 feet of J16W-N9W water line would also be collocated in this corridor disturbance).</p>				

***Proposed M16W Pad Plans***

The M16W pad is located approximately 0.5 mile southwest of the existing J16W pad on public land. The site would be accessed by new a gravel road 24 feet wide (including ditch) and 2,470 feet long between the J16W and the M16W pad (Figure 3). The south edge of the pad would lie less than 400 feet north of the BLM/USFS boundary line, which runs along the section line between Sections 16 and 21. Private land (Nelson) lies to the north and west of the pad with the Nelson cabin located approximately 500 feet from the north disturbance edge of the M16W pad. Ten wells would be slated for the initial drilling with space designed into the pad to provide a separate cellarhole bank to drill ten additional wells in a second visit.

The pad, road, and pipeline would be constructed in mountain brush vegetation featuring a dense canopy of mixed mountain shrubs, with small openings of sagebrush and associated understory grasses and forbs. A hydroaxe would be used to mow the brushy vegetation from the pad, road, and pipeline construction areas. During the onsite review, the pad was rotated 90 degrees from its original north-south configuration to reduce the scope of cuts and fills and better match the pad dimensions to the topography. In addition, the pad was moved south and east to avoid potential impacts to a water spring-seep area on public land near the Nelson cabin. The proposed 550-foot by 375-foot pad would have a maximum cut of 29.3 feet near the southeastern corner and a maximum fill of 30.4 feet at the center north edge (Figure 4). The surface disturbance related to the pad construction would be 7.85 acres; the pad would be reclaimed to a long-term disturbance footprint of 2.2 acres.

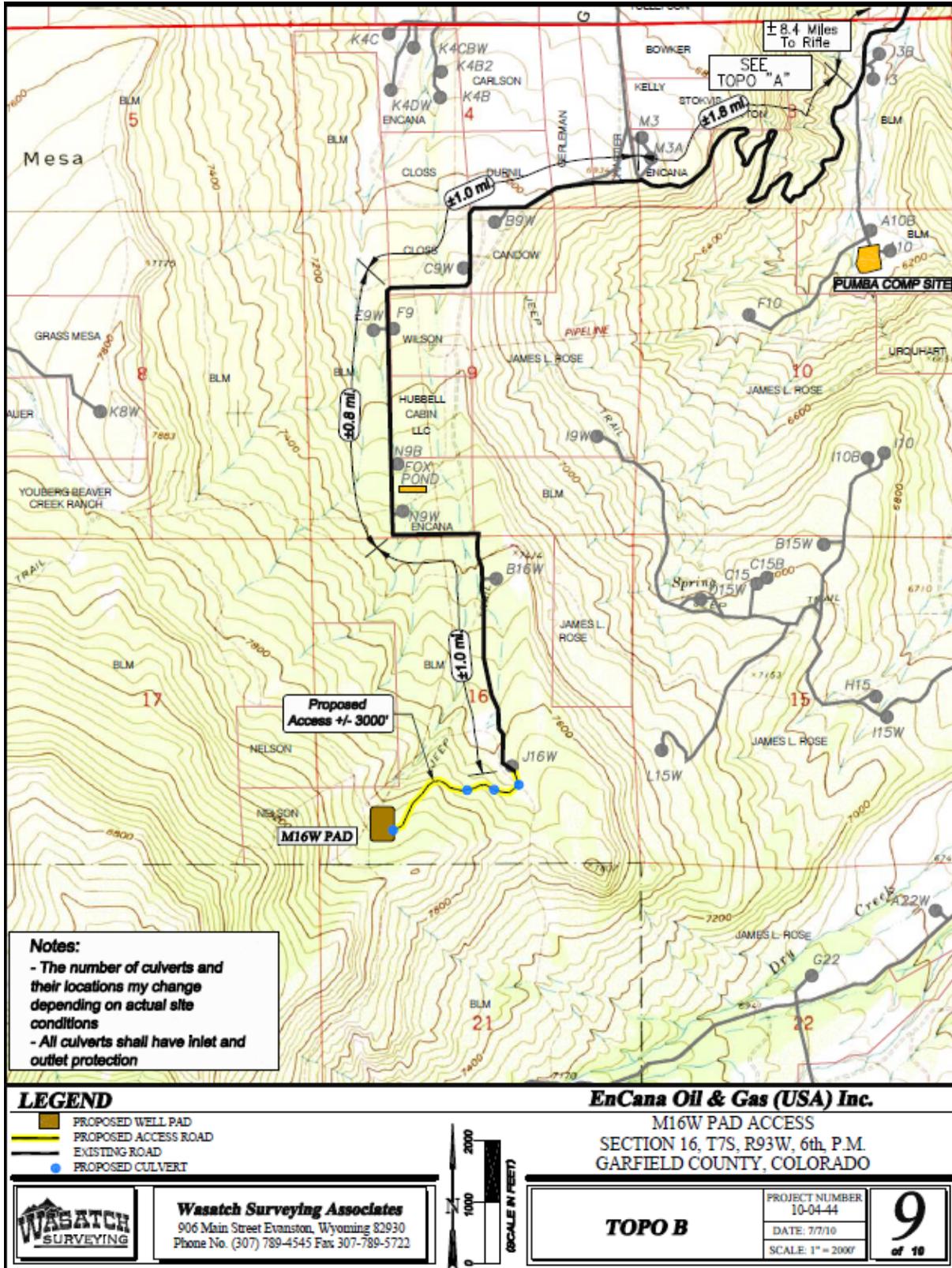


Figure 3. Proposed M16W pad & road location (gas & water pipelines to be buried along road).

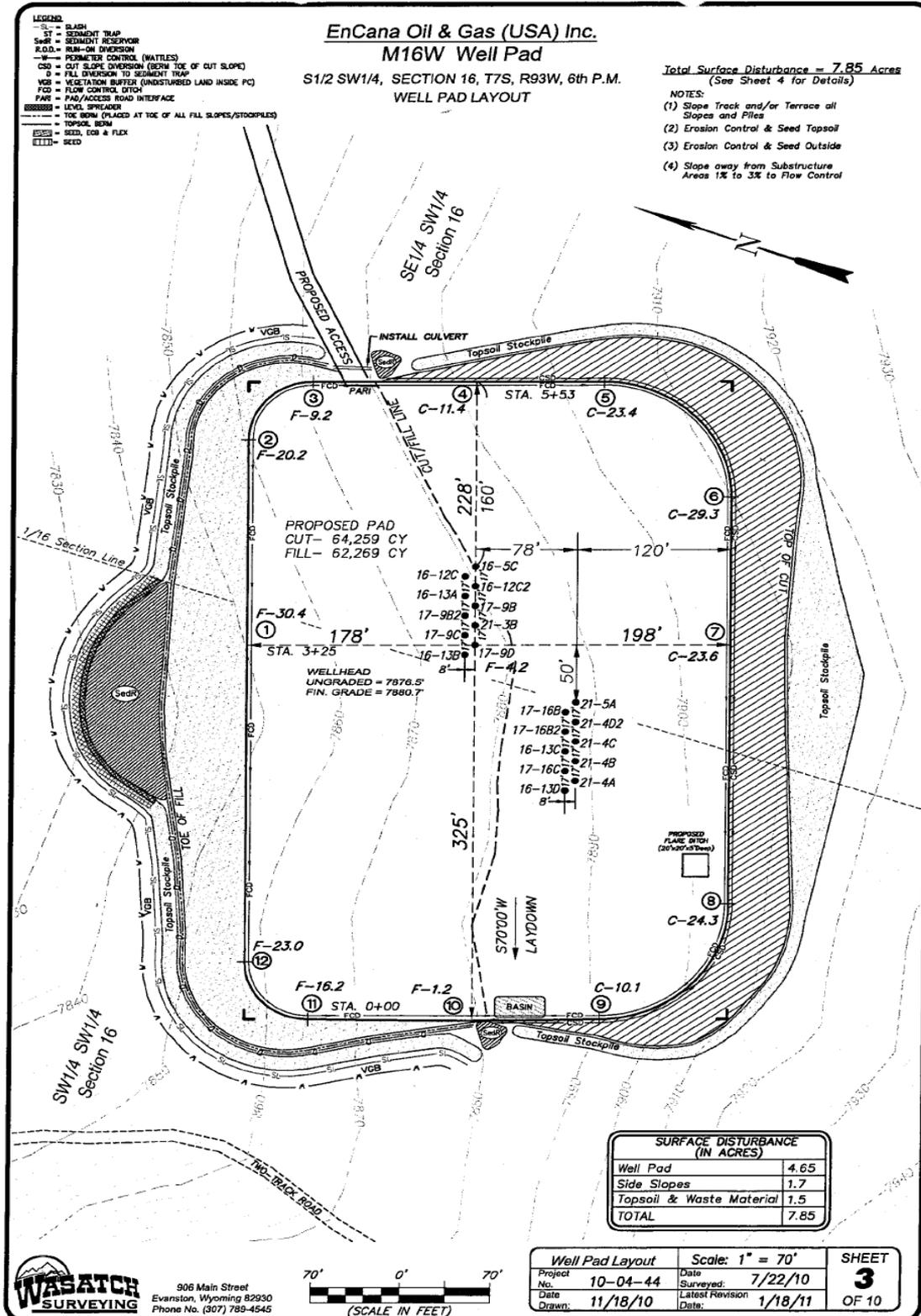


Figure 4. M16W Pad Layout

Total short-term surface disturbance for the proposed M16W pad construction would be 11.25 acres for the pad, road, and pipeline construction work, all occurring on public land. Long-term, after the pad is reclaimed, the total disturbance would amount to 3.3 acres with 2.2 acres attributed to the reclaimed pad footprint and 1.4 acres for the running surface of the road (Table 2).

#### ***L15W-B16W (Rose Ranch) Access Road Construction***

The new “Rose Ranch” access road would provide a new route for drilling and well completion traffic to serve the South Grass Mesa well pads. The route would utilize approximately 2.1 miles of existing road west of CR319 across Rose Ranch and an additional 5383 feet of new road that would be constructed on private land (Rose) and BLM as shown on Figure 5. The new road segment would have a 24-foot-wide driving surface (including the road ditch) with a minimum 6-inch bed of gravel for all-weather surfacing. Traffic control gate(s) would be installed at the edge of the mesa on BLM to limit road use to oil and gas personnel; the Rose Ranch route would be closed to public use. A traffic control gate exists on Rose Ranch property near CR 319 to provide site security at the east end of the route. The total length of the Rose Ranch route from the B16W pad east to CR319 would be approximately 3.1 miles. Approximately 2,263 feet of the new road construction would occur on public land in two separate segments.

Trucks supporting the future producing wells on the J16W and M16W pads would use the existing BLM’s Grass Mesa road.

Using a 60-foot-wide disturbance corridor for the new access road and buried water pipeline (described below), the surface disturbance associated with the new road construction would amount to 7.4 acres. After burial of the water line and reclamation of the road cuts and fills, the long-term disturbance for the new construction would total 3.0 acres. The amount of actual disturbance on BLM land would be 3.1 acres (short-term) and 1.2 acres (long-term) for the running surface of the road and road ditch (Table 2).

#### ***L15W-N9W Water Pipeline Installation***

A 12-inch-diameter steel water pipeline would be buried from the existing L15W pad on Rose Ranch to the existing N9W pad to provide a link between the Rose Ranch water delivery system and the Lake Fox facility and the Hunter Mesa water treatment plant (Figure 6). The line would be constructed concurrently and alongside the proposed L15W-B16W access road. As noted above, the water line would be installed within a 60-foot wide disturbance corridor for the planned access road. An additional 1,310-foot portion of the water pipeline would be extended west to the N9W pad in SE $\frac{1}{4}$ SW $\frac{1}{4}$  of Section 9, T7S, R93W. This segment would generally be installed alongside the existing access road south of the N9W pad with a disturbance corridor width of 45 feet.

Except for the 1,310-foot section along the existing road to the N9W pad, the disturbance for this water line has been factored into the L15W-B16W access road construction. The disturbance (on private land owned by Encana) for the 1,310-foot segment would be 1.4 acres (short-term) with no long-term disturbance allocation assuming the pipeline corridor would be acceptably reclaimed over time.

#### ***J16W-N9W Water Pipeline Replacement***

A 12-inch-diameter steel water pipeline would be buried to upgrade and replace the existing 6-inch buried water line from the existing J16W pad north to the existing N9W pad (Figure 6). The line would be constructed within the reclaimed (existing) pipeline corridor along the east side of the J16W access road. The water line would be installed within a 25-foot-wide disturbance corridor between the road and the existing range allotment fence. This line would also be collocated within the L15W-N9W water line corridor for 1,310 feet along the existing N9W road described above (with its 45-foot disturbance width)..

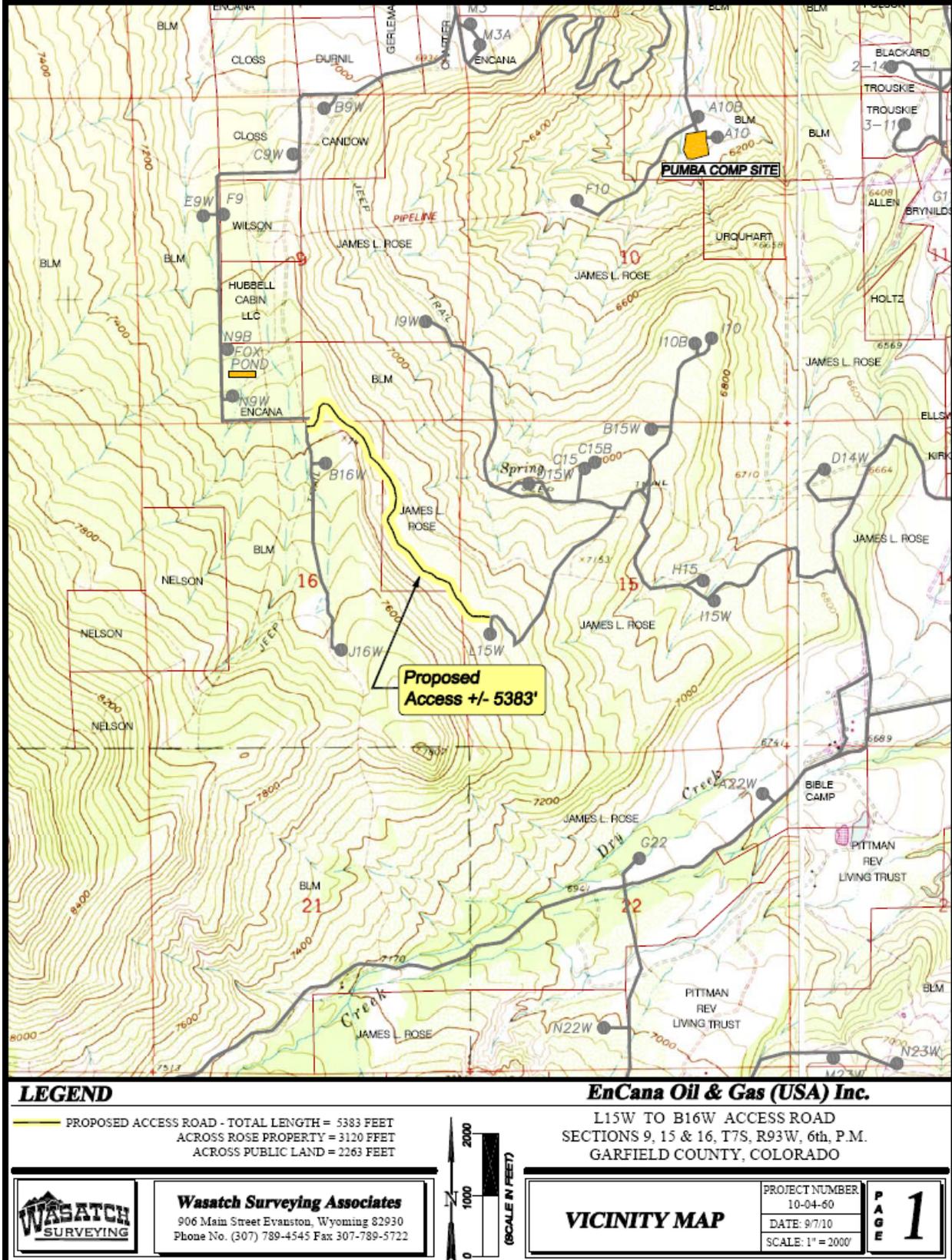


Figure 5. Proposed L15W-B16W (Rose Ranch) Road Construction Segment

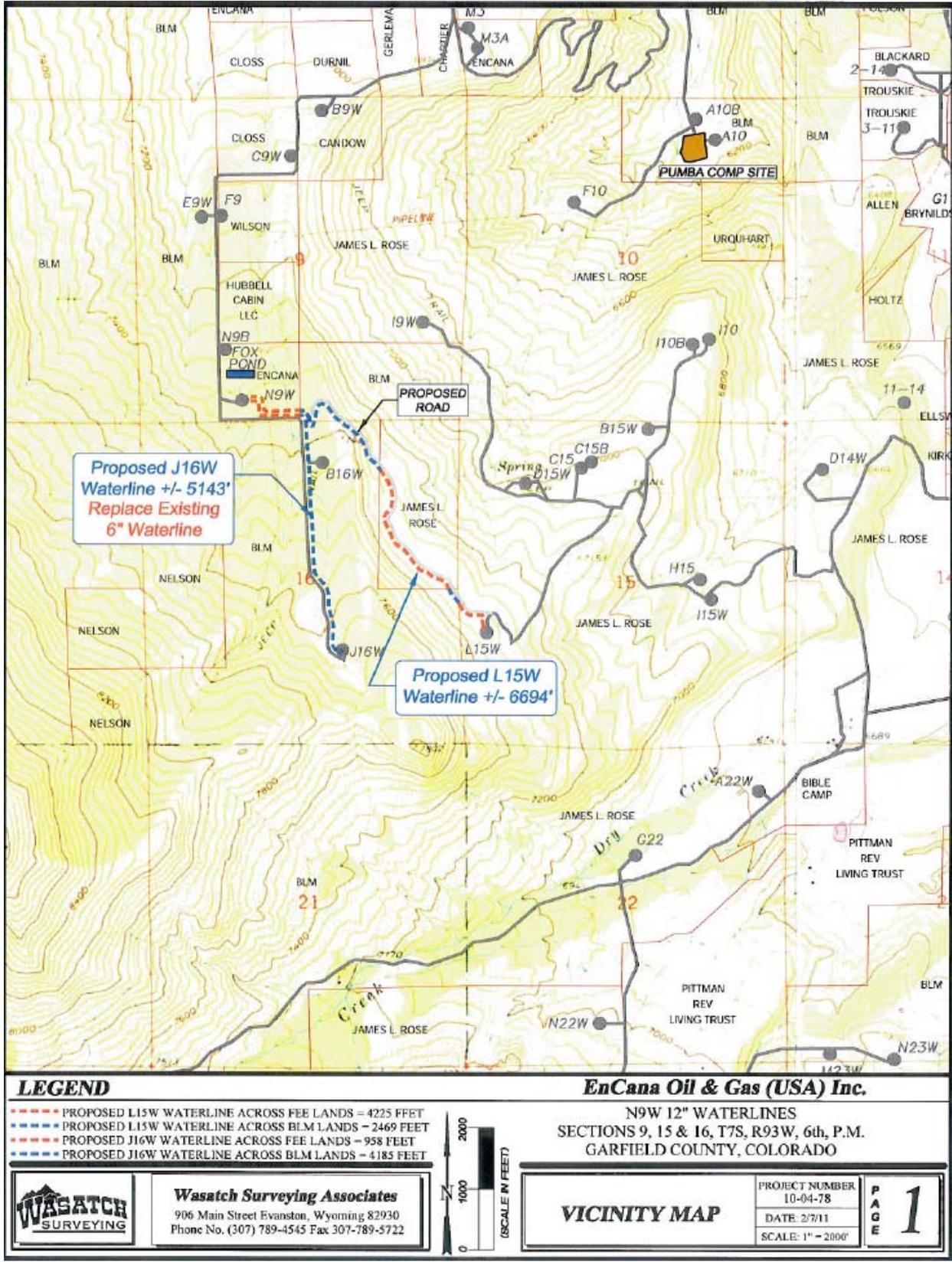


Figure 6. Proposed Water Pipeline Installations.

The existing 6-inch-diameter water flexpipe serving the B16W and J16W pads is undersized for the water delivery requirements planned for the new South Grass Mesa pads. Where possible, the flexpipe would be removed during the steel pipeline installation.

Since the 958-foot segment on private land in SE $\frac{1}{4}$ SW $\frac{1}{4}$  of Section 9 would be buried in the same corridor as the L15W-N9W water line, the disturbance associated with the installation of the J16W-N9W water line would amount to 2.4 acres (short-term) (Table 2). The 2.4-acre disturbance would occur entirely on BLM for 4,185 feet alongside the J16W access road.

### ***Surface Disturbance Summary***

As shown in Table 2, the total short-term disturbance for the J16W and M16W pads, the two segments of new road construction (L15W-B16W Access Road and M16W Access Road), the new M16W buried pipelines, the L15W-N9W water pipeline, and the J16W-N9W water pipeline would be 30.1 acres with 24.4 acres occurring on public land. Assuming acceptable vegetation would become established on the reclaimed pads, roads and pipelines, the long-term disturbance would total 7.1 acres on BLM. Total long-term disturbance for the South Grass Mesa project, regardless of surface ownership, would be 8.9 acres.

The road, pipeline, and pad construction work would follow the guidelines established in the BLM Gold Book, *Surface Operating Standards for Oil and Gas Exploration & Development* (USDI and USDA 2007). Final culvert locations and sizes 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 along the upper and lower sides of the road/pipeline disturbance corridor to provide enhanced reclamation opportunities. The brush encountered during the pad, road and pipeline construction would be cleared with a hydroaxe or brush-hog to reduce the fuel loadings associated with the brush clearing and provide organic matter into the stockpiled soils. The access roads would be built with a 20-foot running surface and an additional 4 feet for a ditch. A road maintenance program would be required during the production phase of the wells 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 throughout the life of the producing wells.

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 leases, Federal regulations (43 CFR 3100), and the operational measures included in the APDs, Sundry Notices, or BLM rights-of-way to be approved. Appendix A lists the specific Surface Use Conditions of Approval 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 and pipelines.

### **EXISTING GRASS MESA ROAD ALTERNATIVE**

This alternative would include all of the project components identified in the Proposed Action *except* for the construction of the new L15W-B16W Access Road and the L15W-N9W Water Line across BLM and Rose Ranch property. Instead of accessing the J16W and M16W pads using the new Rose Ranch access route from the L15W pad, these pads would be accessed using the existing BLM Grass Mesa Road and the Grass Mesa Homeowner Association Road (GMHOA) system from CR319. The water pipeline parallel to the L15W-B16W road would be dropped from this alternative and the upgraded water delivery line between Lake Fox and Hunter Mesa water plant would not occur.

All of the vehicle traffic supporting the well drilling, well completion and production work related to the 34 wells planned on the J16W and M16W pads would be funneled from CR319 to the top of Grass Mesa

across BLM’s Grass Mesa Road and then south across Grass Mesa using existing GMHOA Roads. The total length of existing road related to the Grass Mesa route as shown on Figure 1 is 5.7 miles. Use of this route would be contrary to spirit of the verbal statement from Encana that further drilling of conventional wells would not occur in the Grass Mesa Subdivision after 2010. Although it may be true that drilling would not occur in the Subdivision, the truck traffic and road maintenance, dust, noise, lights and safety impacts related to the drilling and operation of the J16W and M16W pads would continue on the southern portion of the Subdivision and directly impact the Grass Mesa Homeowners for the duration of the planned well drilling and completion work (estimated to run between 1-3 years depending on market conditions and results of well production tests).

In addition to the increased traffic and the associated impacts related to supporting the 34 wells on South Grass Mesa, the loss of this critical pipeline link between Lake Fox and Hunter Mesa water treatment plant would result in marked increase in water truck use to support drilling and completion work.

**Summary of Surface Disturbance**

As shown in Table 3, the total short-term disturbance for the J16W and M16W pads, the M16W road construction, the new M16W buried pipelines, and the J16W-N9W water pipeline would be 21.9 acres with 21.3 acres occurring on public land. Assuming acceptable vegetation would become established on the reclaimed pads, roads and pipelines, the long-term disturbance would total 5.9 acres.

<b>Table 3. Existing Road Alternative Disturbance Area (acres)</b>				
<i>Project Component</i>	<i>Federal Surface Disturbance</i>		<i>Total Surface Disturbance</i>	
	<i>Short-term</i>	<i>Long-term<sup>1</sup></i>	<i>Short-term</i>	<i>Long-term<sup>1</sup></i>
<b>J16W Pad Expansion</b>	<b>7.6</b>	<b>2.3</b>	<b>7.6</b>	<b>2.3</b>
<i>M16W Pad</i>	7.9	2.2	7.9	2.2
<i>M16W Road/Pipeline</i>	3.4	1.4	3.4	1.4
<b>M16W Totals</b>	<b>11.3</b>	<b>3.6</b>	<b>11.3</b>	<b>3.6</b>
<b>J16W-N9W Water Pipeline</b>	<b>2.4</b>	<b>N/A</b>	<b>3.0</b>	<b>N/A</b>
<b>Project Totals</b>	<b>21.3</b>	<b>5.9</b>	<b>21.9</b>	<b>5.9</b>

<sup>1</sup> Long-term disturbance figures are derived from the unreclaimed working area of the pad and the travel way area of the access road. Since the entire disturbed pipeline corridor is typically reclaimed, there is no long-term disturbance attributable to pipelines.

**NO ACTION ALTERNATIVE**

Under the No Action Alternative, any action requiring Federal approval would be denied. The No Action Alternative constitutes denial of the 23 Federal APDs and the 11 Fee wells that would require sundry notice and right-of-way approvals to occupy the Federal surface for drilling. The J16W pad expansion and M16W pad construction and associated road and pipeline (water and gas) improvements would not occur on BLM land. The BLM portions of the L15W-B16W access road would be excluded from this alternative; with the lack of any new well drilling on the two well pads, the need for such an alternate access road would be eliminated. The two segments of water lines (L15W-N9W and J16W-N9W) would also be excluded from this alternative.

Production activities and traffic related to the existing three J16W wells would continue using the existing Grass Mesa route for the producing life of the wells.

No new surface disturbance or additional impacts to the GMHOA residents or their road system the No Action Alternative

**PURPOSE AND NEED FOR THE ACTION**

The purpose of the action is to develop oil and gas resources on Federal leases COC50128 and COC55604 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.

**SUMMARY OF LEASE STIPULATIONS**

The 23 Federal wells would be directionally drilled from the J16W and M16W pads into the underlying Federal leases: COC50128 and COC55604. The applicable Federal lease terms are presented in Table 4. Since the 11 Fee wells would be drilled from the two BLM pads, the lease stipulations listed in Table 4 would also be enforced on those Fee wells using Surface Use Condition of Approval attached to the Sundry Notices (Section 16 Fee wells) or the Rights-of Way (Section 17 Fee wells) that would authorize Encana to occupy the BLM surface locations. The Colorado Oil and Gas Conservation Commission (COGCC) would remain the permitting authority for the 11 Fee wells. Appendix A presents standard or site-specific Conditions of Approval (COAs) applicable to the Federal APDs and the 11 Fee wells occupying Federal surface.

<b>Table 4. Lease Stipulations Applicable to the Proposed Action</b>		
<i>Lease Number</i>	<i>Applicable Lands</i>	<i>Lease Stipulations</i>
<b>COC50128 (1989)</b>	T7S, R93W, Sec. 9: E2E2, SWNE, W2SE	<b>Timing Limitation:</b> Big Game Winter Habitat (1/16 - 4/29). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.
<b>COC55604 (1996) <u>Proposed Pads</u> J16W M16W</b>	All lands within the Proposed Action	<b>Controlled Surface Use:</b> Fragile Soils – to protect erosive soils and slopes greater than 35%, 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. <b>Timing Limitation:</b> Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.
	T7S, R93W, Sec. 16: E2SE, SWNE	<b>Controlled Surface Use:</b> 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.

**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):

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.” 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 is open to oil and gas leasing and development. The 1999 RMP amendment requires multi-year development plans known at that time as GAPs for lease development over a large geographic area. However, the 1999 RMP amendment also provides exceptions to that requirement for individual or small groups of exploratory wells drilled in relatively undrilled areas outside known high production areas. The Proposed Action is in conformance with the exception to the requirement for operators to submit MDPs/GAPs.

### **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 two land health assessments (LHAs) completed by the BLM. The Proposed Action would be located in an area that straddles the boundaries of the Rifle West LHA (BLM 2005) and the Divide Creek LHA (BLM 2009).

### **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 elements of the natural and human environment listed below as present in the project vicinity and potentially affected by the project. The following subsections describe these environmental elements in the project area and summarize BLM’s analysis of potential impacts resulting from implementation the Proposed Action.

Access and Transportation	Realty Authorizations
Air Quality	Socio-Economics
Cultural Resources	Soils
Geology and Minerals	Special Status Species
Invasive Non-Native Plants	Vegetation
Migratory Birds	Visual Resources
Native American Religious Concerns	Wastes, Hazardous and Solid
Noise	Water Quality, Surface and Ground
Paleontological Resources	Wildlife, Aquatic and Terrestrial
Range Management	

## Access and Transportation

### Affected Environment

The South Grass Mesa area is accessed from Rifle, Colorado at I-70, Exit 90 (Rifle) by traveling east on the south side of the highway on CR319 (West Mamm Creek Road) approximately 3 miles toward the Garfield County Airport, and then turning 3 miles south on CR319 to the junction with the BLM Grass Mesa Access Road which was constructed in 2003 to provide oil and gas development access to Grass Mesa. Public access is not allowed within the project area, since access roads to the area cross private lands. The South Grass Mesa area is accessed by vehicles serving the oil and gas development, including traffic related to construction, drilling, completion, and well production. As mentioned in the Background section of the Proposed Action, the primary access route serving the residents of Grass Mesa Subdivision is the Grass Mesa Homeowners Road; oil and gas traffic is not allowed on the Homeowners Road per COGCC ruling.

As shown on Figure 1, two distinct road systems could access the South Grass Mesa project area from CR319: (1) the existing Grass Mesa Road system, which represents the road system currently used by Encana to access their field development through and within the Grass Mesa Subdivision; and (2) the Rose Ranch route which, with the construction of approximately 1 mile of new road, would provide a new, more direct access route to the project area. The Rose Ranch route, presented in the Proposed Action, would direct all construction, drilling and completion traffic around the Grass Mesa Subdivision. Should this route be selected, it would only serve the South Grass Mesa well pads. The Rose Ranch route is not intended to serve production traffic related to the producing wells within the Grass Mesa Subdivision. The Grass Mesa route would continue to serve as the primary route for all production-related traffic on Grass Mesa and South Grass Mesa based on the access agreement Encana has executed with Jim Rose.

The existing Grass Mesa route would involve a 5.7-mile haul route as measured from CR319 to the existing B16W pad; the Rose Ranch access route would entail a 3.1-mile haul distance from CR319 to the B16W pad. Both routes would have similar road standards (24-foot wide roads including road ditch with minimum 6-inch gravel surface). Regardless of the route chosen to access the project area, Encana would be responsible for periodic road maintenance on the all-weather routes for the life of the producing gas wells.

### Environmental Consequences

#### *Proposed Action*

The Rose Ranch route would utilize approximately 2.1 miles of existing road west of CR319 across Rose Ranch and an additional 5383 feet of new road that would be constructed on private land (Rose) and BLM to connect the existing L15W access road with the J16W access road on South Grass Mesa (Figure 5). The new road segment would have a 24-foot wide driving surface (including the road ditch) with a minimum 6-inch bed of gravel for all-weather surfacing. Traffic control gate(s) would be installed at the edge of the mesa on BLM to limit road use to oil and gas personnel; the Rose Ranch route would be closed to public use. A traffic control gate exists on Rose Ranch property near CR 319 to provide site security at the east end of the route.

The proposed road segment would be constructed within an average disturbance corridor 60 feet wide, reduced to 24 feet of finished road surface (including bar ditches) after interim reclamation. A hydroaxe or similar brush mowing equipment would be used to initially clear vegetation from the proposed disturbance corridor. Earth-moving equipment would be used to segregate and windrow the topsoil along

the edges of the proposed road corridor. The equipment would be used to excavate the road prism focusing on achieving balanced cut and fill material volumes. Culverts would be installed per field identification during or after the prework meeting.

The road would be constructed using standard equipment and techniques as described in the *Surface Operating Standards for Oil & Gas Exploration & Development – The Gold Book* (USDI and USDA 2007) and BLM Handbook 9113 - *Roads Manual*. Such measures would include ditching, draining, crowning, surfacing, sloping, and dipping the roadbed as necessary. A minimum 6-inch layer of gravel would be applied to the road surface to provide an all-weather travelway.

The average road grade would be 10% or less, wherever possible. The 10% grade would only be exceeded in areas where physical terrain or unusual circumstances require it. Minimum horizontal curve radii would be 100 feet. Where terrain would not allow a 100-foot curve radius, the curve would be widened. Drainage crossings would be designed to minimize siltation and the accumulation of debris. Water diversions including culverts and ditch cut-outs would be placed at frequent intervals along access roads to prevent the erosion of drainage ditches.

The new road segment, along with the new buried water pipeline, would create a 60-foot wide disturbance corridor; the new surface disturbance for this corridor would amount to 7.4 acres. After burial of the water line and reclamation of the road cuts and fills, the long-term disturbance for the new construction would total 3.0 acres. The amount of actual surface disturbance on BLM land would be 3.1 acres (short-term) and 1.2 acres (long-term) for the road running surface and road ditch (Table 2).

The Rose Ranch route would support all drilling and completion traffic associated with the planned wells on the J16W and M16W well pads. This route would also provide access for all construction equipment related to the gas and water pipeline upgrades outlined in the Proposed Action. This traffic would be expected to occur for a 1- to 2-year window once the drilling commences depending on the time lapse, if any, between drill rig visits to the well pads. Winter timing limitations on the Federal leases (Table 4) dictate a drilling and completion shutdown between December 1 and April 30 annually. Once the wells on the J16W and M16W pads are placed into production, the Grass Mesa route would be the primary road system to support the related well production traffic.

The Proposed Action would result in a substantial temporary increase in truck traffic and a less substantial long-term increase when compared to the existing traffic associated with the three existing Federal wells on the J16W pad. An estimated 1,160 truck trips over a 30-day period would be required to support the drilling and completion of a proposed Federal well (Table 5).

<b>Table 5. Traffic Associated with Drilling and Completion Activities</b>		
<i>Vehicle Class</i>	<i>Number of Trips per Well</i>	<i>Percentage of Total</i>
16-wheel tractor trailers	88	7.6%
10-wheel trucks	216	18.6%
6-wheel trucks	452	39.0%
Pickup trucks	404	34.8%
<b>Total</b>	<b>1,160</b>	<b>100.0%</b>
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.		

Once the well is in production, traffic would decrease to occasional visits for monitoring or maintenance activities. The well is assumed to require recompletion once per year. Each recompletion would require 3 to 5 truck-trips per day for approximately 7 days. Fluids (condensate and produced water) generated during the life of the well would be stored in tanks onsite and periodically removed from the tanks and trucked offsite.

Degradation of field development roads from travel by heavy vehicles is expected to require periodic road maintenance. Both road maintenance activities and vehicular travel would create fugitive dust and noise (see sections on air quality and noise). Mitigation measures to be applied as COAs (Appendix A) would ensure adequate dust abatement and road maintenance occur.

#### *Existing Grass Mesa Road Alternative*

The existing Grass Mesa route (Figure 1) would be used to access the planned gas developments in the South Grass Mesa Area. The traffic related to the various development components presented in the Proposed Action would use the 5.7 miles of existing roads funneling the construction, drilling, and completion traffic for the J16W and M16W pads through the southern portion of the Grass Mesa Subdivision. Additionally the new water line slated for burial alongside the Rose Ranch Road segment would be deleted from this alternative since the new Rose Ranch Road would not be considered. This alternative would have direct impacts to the residents of the Grass Mesa Subdivision, particularly those living in proximity to the existing haul route.

The traffic impacts identified in Table 5 would apply to this alternative. Degradation of field development roads from travel by heavy vehicles is expected to require periodic road maintenance. Both road maintenance activities and vehicular travel would create fugitive dust and noise (see sections on air quality and noise). Mitigation measures to be applied as COAs (Appendix A) would ensure that adequate dust abatement and road maintenance occur.

The primary drawback with this alternative would be the effects on the residents of the southern portion of the Grass Mesa Subdivision from the noise, dust, lights, road congestion, and increased road maintenance related to the truck traffic using the existing roads. The Grass Mesa route would involve a longer haul length to South Grass Mesa (5.7 miles vs. 3.1 miles) when comparing the haul distances off the county road system. However, there would be no new construction needed with this road alternative to access the J16W pad. No new surface disturbance would be necessary.

#### *No Action Alternative*

Since no new developments would occur in the South Grass Mesa area, this alternative would not affect access or transportation. The existing production and maintenance traffic servicing the three existing Federal wells on the J16W pad would continue for the producing life of the wells.

### **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<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns (μ) in diameter (PM<sub>10</sub>) and less than 2.5 μ in diameter (PM<sub>2.5</sub>), and sulfur dioxide (SO<sub>2</sub>).

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. As shown in Table 6, regional background values are well below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants. Federal air quality regulations are enforced by the Colorado Department of Public Health and Environment (CDPHE). The Prevention of Significant Deterioration (PSD) Program within CDPHE is designed to limit incremental increases for specific air pollutant concentrations above a legally defined baseline level, as defined by an area's air quality classification. Incremental increases in PSD Class I areas are strictly limited.

<i>Pollutant/Averaging Time</i>		<i>Measured Background</i>	<i>CAAQS and/or NAAQS</i>	<i>Incremental Increase Above Legal Baseline</i>	
Carbon Monoxide (CO) <sup>1</sup>	1-hour	1,160 μg/m <sup>3</sup>	40,000 μg/m <sup>3</sup> (35 ppm)	n/a	n/a
	8-hour	1,160 μg/m <sup>3</sup>	10,000 μg/m <sup>3</sup> (9 ppm)	n/a	n/a
Nitrogen Dioxide (NO <sub>2</sub> ) <sup>2</sup>	Annual Arithmetic Mean	10 μg/m <sup>3</sup>	100 μg/m <sup>3</sup> (0.053 ppm)	2.5 μg/m <sup>3</sup>	25 μg/m <sup>3</sup>
Ozone <sup>3</sup>	8-hour	0.076 ppm (highest)	0.075 ppm	n/a	n/a
Particulate Matter (PM <sub>10</sub> ) <sup>1</sup>	24-hour	114 μg/m <sup>3</sup> (highest)	150 μg/m <sup>3</sup>	8 μg/m <sup>3</sup>	30 μg/m <sup>3</sup>
Particulate Matter (PM <sub>2.5</sub> ) <sup>4</sup>	24-hour	40 μg/m <sup>3</sup> (highest)	35 μg/m <sup>3</sup>	n/a	n/a
	Annual	11.2 μg/m <sup>3</sup>	15 μg/m <sup>3</sup>	n/a	n/a
Sulfur Dioxide (SO <sub>2</sub> ) <sup>5,6</sup>	3-hour	24 μg/m <sup>3</sup>	1,300 μg/m <sup>3</sup> (0.5 ppm)	25 μg/m <sup>3</sup>	512 μg/m <sup>3</sup>
	24-hour	13 μg/m <sup>3</sup>	365 μg/m <sup>3</sup> (0.14 ppm)	5 μg/m <sup>3</sup>	91 μg/m <sup>3</sup>
	Annual	5 μg/m <sup>3</sup>	80 μg/m <sup>3</sup> (0.03 ppm)	2 μg/m <sup>3</sup>	20 μg/m <sup>3</sup>

<sup>1</sup> Background data collected in Rifle, 2008; highest levels recorded in April (Air Resource Specialists 2009).  
<sup>2</sup> Background data collected by EnCana at site north of Parachute, 2007 (CDPHE 2008).  
<sup>3</sup> Background data collected in Rifle, 2008; highest levels recorded in July (Air Resource Specialists 2009).  
<sup>4</sup> Background data collected in Rifle, September – December 2008; highest levels recorded in December (Air Resource Specialists 2009).  
<sup>5</sup> Background data collected at Unocal site, 1983-1984 (CDPHE 2008).  
<sup>6</sup> Colorado 3-hour AAQS = 700 μg/m<sup>3</sup>.

Air pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns (μ) in diameter (PM<sub>10</sub>) and less than 2.5 μ in diameter (PM<sub>2.5</sub>), and sulfur dioxide (SO<sub>2</sub>). Federal air quality regulations adopted and enforced by CDPHE limit incremental emissions increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. 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. The PSD Class I areas located within 100 miles of the South Grass Mesa 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 Monument (approximately 65 miles south), and Eagles Nest Wilderness (approximately 60 miles east). Dinosaur National

Monument (approximately 80 miles northwest) is listed as a Federal Class II area but is regulated as a Class I area for SO<sub>2</sub> by CDPHE. Regional background pollutant concentrations and applicable standards or limits are listed in Table 6.

### Environmental Consequences

#### *Proposed Action*

CDPHE, under its EPA-approved State Implementation Plan (SIP), is the primary air quality regulatory agency responsible for determining potential impacts once detailed industrial development plans have been made; those development plans are subject to applicable air quality laws, regulations, standards, control measures, and management practices. CDPHE has the ultimate responsibility for reviewing and permitting any project's air quality impacts prior to its operation. Unlike the conceptual "reasonable but conservative" engineering designs used in NEPA analyses, any CDPHE air quality preconstruction permitting required would be based on site-specific, detailed engineering values, which would be assessed in CDPHE's review of the permit application.

Air quality would decrease during disturbance of approximately 30.1 acres from construction of the M16W pad, expansion of the J16W pad, wells, road and pipelines. Pollutants generated during these activities would include combustion emissions and fugitive dust associated with construction equipment and vehicles. 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 for a period of nine weeks. Once construction activities are complete, air quality impacts associated with these activities would also cease. Fugitive dust from mobilization and rigging up the drill rig would also occur, however impacts associated would be minor and short lived.

Volatile organic compound (VOC) emissions are dependent on the characteristics of the condensate, tank operations, and production. The air impacts associated with the condensate tanks are anticipated to be minor, but VOC emissions would be controlled under CDPHE Regulation 7. This includes capture and thermal disruption of VOCs from condensate tanks.

The Roan Plateau RMPA/EIS describes potential effects from oil and gas development (BLM 2006a:4-26 to 4-37). Analysis was completed with regard to greenhouse gas emissions, a near-field and far-field analysis for "criteria pollutants" (particulate matter [PM<sub>10</sub> and PM<sub>2.5</sub>], carbon monoxide, sulfur dioxide, and nitrogen oxides) and hazardous air pollutants (benzene, ethylbenzene, formaldehyde, hydrogen sulfide, toluene, and xylenes). Sulfur and nitrogen deposition, acid neutralizing capacity, and a visibility screening analysis were also completed in the Roan Plateau RMPA and EIS. Because the visibility screening analysis showed potential impacts at one or more Class I areas, a refined visibility analysis was also completed. The refined visibility analysis indicated a "just noticeable" impact on visibility for one day each at two Class I areas (Black Canyon of the Gunnison National Park and the Mt. Zirkel Wilderness). For the other pollutants analyzed, the implementation of oil and gas development under the Roan Plateau RMPA/EIS was calculated as having no or negligible long-term adverse impacts on air quality.

At present, the CRVFO has approved fewer APDs than the number used in air quality modeling for the Roan Plateau RMPA/EIS, although that number (1,582) is being approached and may be reached in Fiscal Year 2011. The BLM does not consider 1,582 wells to represent a cap on the number of APDs that can be approved pursuant to the Roan air modeling but instead views that number as merely an assumption used in developing inputs to the model, just as several other assumptions were used as inputs. However, to ensure that air quality impacts associated with continuing oil and gas activities are not significant, the CRVFO is currently approving only time-critical APDs and deferring approval of other APDs until

publication of a new air quality model recently completed in conjunction with an RMP revision currently underway.

Oil and gas activities described in the Proposed Action would result in localized short-term increases in pollutant emissions from vehicles and drilling equipment and fugitive dust emissions from construction and use of the well pad and access road. Concentrations would be below applicable ambient air quality standards as analyzed in the Roan Plateau RMPA/EIS. To mitigate dust generated by the construction activities and vehicular traffic on unpaved access roads, Encana operator would be required to implement dust abatement strategies as needed by watering the access road and construction areas and/or by applying a surfactant approved by the BLM (Appendix A). Additionally, Encana would be required to apply gravel to the access road to a compacted depth of 6 inches, further reducing fugitive dust emissions (Appendix A).

Since the current land use plan was approved BLM (1999a), 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 (2007) supports these predictions but has acknowledged the existence of 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.

The assessment of GHG emissions and climate change remains in its formative phase. Therefore, it is not yet possible to know with certainty the net impact to climate from GHGs produced globally over the last century or from those produced today. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts of climate change on the specific area of the Proposed Action. In addition, while oil and gas projects may contribute GHGs to the atmosphere, these contributions would not have a significant effect on a phenomenon occurring at the global scale believed by some to be due to more than a century of human activities.

#### *Existing Grass Mesa Road Alternative*

The alternative action would result in 8.2 fewer acres of road construction and pipeline installation than the Proposed Action. There would be less short-term emissions from construction of the road and pipeline. The pads that would be constructed, the number of wells that would be drilled and the associated emissions that would be realized would remain the same as what is analyzed in the Proposed Action.

#### *No Action Alternative*

Under the No Action Alternative, none of the proposed development described in the Proposed Action would occur. Therefore, emissions of pollutants from pad construction, vehicle and equipment engines or fugitive dust from disturbed surfaces that would accompany the Proposed Action would not occur.

## Cultural Resources

### Affected Environment

Ten Class III cultural resource investigations (intensive pedestrian inventories) identified as GSFO #16909-1, 5404-19, 5404-16, 5404-15, 5403-5, 14503-1, 5401-8, 5400-12, 1175 and CRVFO #5411-10 have been conducted in the proposed South Grass Mesa Project area. Four prehistoric Isolated Finds, three prehistoric, one multi-component (both prehistoric and historic artifacts or features) and two historic sites were identified during these inventories. One prehistoric and the multi-component site are considered “historic properties.” In this context, “historic properties” are cultural resources that are eligible or potentially eligible for inclusion on the National Register of Historic Properties (NRHP).

### Environmental Consequences

#### *Proposed Action*

Implementation of the Proposed Action would have no direct impacts to known “historic properties,” as none is present in areas of proposed ground disturbance. 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 (16USC 470f), the BLM/State Historic Preservation Officer (SHPO) Programmatic Agreement (1997) and Colorado Protocol (1998)]. Because 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.

Indirect, long-term cumulative impacts from increased access and the presence of project personnel could result in a range of impacts to known and undiscovered cultural resources in the vicinity of the location. These impacts could range from illegal collection and excavation to vandalism.

A standard Education/Discovery COA for cultural resource protection would be attached to the APD(s) (Appendix A). The importance of this COA should be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered during construction, drilling, completion, and maintenance operations.

#### *Existing Grass Mesa Road Alternative*

This alternative would include all of the project components identified in the Proposed Action *except* for the construction of the new L15W-B16W Access Road and the L15W-N9W Water Line across BLM and Rose Ranch property. Indirect, long-term cumulative impacts to known and undiscovered cultural resources in the Proposed Action area would be reduced under this alternative due to the reduction in ground disturbance and decreased access and presence of project personnel.

#### *No Action Alternative*

The No Action Alternative constitutes denial of the APDs and denial of the BLM right-of-way associated with the Proposed Action. Under the No Action Alternative, none of the proposed developments described in the Proposed Action would take place.

## Geology and Minerals

### Affected Environment

The South Grass Mesa geographic area is located approximately 9 miles south of Rifle, approximately 13 miles S75°W of the Grand Hogback homoclinal ridge, and within the Piceance 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).

In the proposed development area, the Wasatch Formation is mantled by unconsolidated sedimentary surface deposits of Quaternary age in the form of alluvium and earth flow deposits. The thickness of these unconsolidated sediments is uncertain, but the depth to the underlying Wasatch Formation may be determined during construction excavation. Table 7 lists the geologic formations present within the area of the existing J16W well pad and the proposed M16W well pad.

<b>Table 7. Geologic Formations within the Study Area</b>				
<i>Map Symbol</i>	<i>Formation Name</i>	<i>Age</i>	<i>Characteristics</i>	<i>Location</i>
Qes	Quaternary earth flow deposits	Holocene	Boulders, cobble and pebble gravel.	Stream valleys, cliff and mountain bases.
Qoa	Quaternary alluvial terrace	Pleistocene	Boulders, cobble and pebble gravels.	Streams, flood plains and fans.
Qop	Quaternary pediment-gravel deposits	Pleistocene	Subangular to subrounded pebble, cobble and boulder gravel.	Derived from erosional surfaces near Battlement Mesa.
Tws	Shire Member - Wasatch Formation	Eocene	Variegated purple, lavender, red, gray and brown claystone.	Mesas and cliffs.

Source: Yeend 1969, Donnell et al. 1989.

The Mesaverde Group is the target zone of the proposed drilling program. Made up of the Williams Fork and Iles Formations, sediments of the Mesaverde Group are composed of marine sandstones and 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 the 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 Formation, the 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 oil and 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, lake, 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, 1988), creating an interbedded relationship between source and reservoir. The trapping mechanism of the oil and gas is both stratigraphic and diagenetic.

### Environmental Consequences

#### *Proposed Action*

If the proposed wells are proven to be feasible, 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 or “fracing” would be utilized to create fractures within the formation to allow gas production from the wells. Tight gas sands refer to low permeability sandstone reservoirs that produce primarily dry natural gas. Typically, these reservoirs cannot be produced at economic flow rates or volumes unless the well is stimulated by hydraulic fracture treatment (Holditch 2006). The amount of natural gas that may be potentially produced can only be estimated based on production rates from nearby wells and adjacent fields. Reserves have been estimated to approach 2 billion cubic feet (bcf) of natural gas per well (Vargas 2006).

Casing programs are designed to specifically prevent hydrocarbon migration from gas-producing strata penetrated by the wellbore during drilling, initial production and after completion of the well. Identification of potential fresh water bearing zones, aquifers, gas producing zones, and over- and under-pressured zones are incorporated into drilling scenarios for the proposed wells. Estimates of what depth these zones would be encountered are used to determine drilling fluids, fluid densities, surface casing depths, and production planning. If one of these identified zones is encountered during drilling, cement volumes would be adjusted to isolate that zone. This is designed to prevent accidental contamination or leakage of hydrocarbons or fracturing fluids into other productive zones within the wellbore.

#### *Existing Grass Mesa Road Alternative*

Under the Existing Grass Mesa Road Alternative, impacts to geologic and mineral resources would be the same as identified in the Proposed Action.

#### *No Action Alternative*

Under the No Action Alternative, no new impacts to geologic and mineral resources would occur in relation to Federal minerals.

### **Invasive Non-Native Plants**

#### Affected Environment

The project area is relatively free of invasive, non-native species. The weedy forbs plumeless thistle (*Carduus acanthoides*) and houndstongue (*Cynoglossum officinale*) are scattered throughout the area in low densities, as is cheatgrass (*Anisantha tectorum*).

## Environmental Consequences

### *Proposed Action*

Surface-disturbing activities provide a niche for the invasion and establishment of invasive non-native species, particularly when these species are already present in the surrounding area. Because invasive, non-native species are present in the project area, the potential for invasion following construction activities is moderate. Mitigation measures designed to minimize the spread of these species would be attached to well APDs as conditions of approval (see Appendix A).

### *Existing Grass Mesa Road Alternative*

The alternative action would result in 8.2 fewer acres (3.1 fewer BLM acres) of disturbance to vegetation than the Proposed Action, which would result in a lower risk of weed invasion.

### *No Action Alternative*

Under the No Action Alternative, none of the proposed ground disturbance on BLM land would occur; therefore, the potential for weed invasion on Federal land would be much less than under the Proposed Action. However, production-related activities associated with the existing Fee wells would continue, as would upgrades to the roads and pipelines for the existing Fee wells on private land, which could create a potential source of weed introductions, and invasive, non-native species would spread if left untreated.

## **Migratory Birds**

### Affected Environment

The Migratory Bird Treaty Act (MBTA) includes 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 migrant and resident species, nesting habitat is of special importance because it is critical for supporting reproduction in terms of both nesting sites and food. In addition, 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.

Numerous migratory bird species occupy, or have the potential to occupy, the Grass Mesa geographic area. Migratory bird species that are Federally listed under the Endangered Species Act of 1973, as amended, or classified by the BLM as sensitive species, are addressed under the section on Special Status Wildlife and Fish Species. The current section addresses migratory birds that may inhabit the proposed project area. Emphasizing the need to conserve declining species, the U.S. Fish and Wildlife Service (USFWS) has published a list of more than 100 Birds of Conservation Concern (BCC) that deserve prompt conservation attention to stabilize or increase populations or to secure threatened habitats. This section also addresses species within the Grass Mesa area that listed by the USFWS as BCC species (USFWS 2008). This analysis focuses on BCC species, on non-BCC species that are Neotropical (long-distance) migrants, and raptors—three groups highly vulnerable to habitat loss or modification on their breeding grounds.

Species on the BCC list that are potentially present in the South Grass Mesa project area, based on habitat preferences and known geographic ranges, include the flammulated owl (*Otus flammeolus*), Lewis’s

woodpecker (*Melanerpes lewis*), pinyon jay (*Gymnorhinus cyanocephalus*), juniper titmouse (*Baeolophus griseus*), Brewer's sparrow (*Spizella breweri*), and Cassin's finch (*Carpodacus cassinii*). The flammulated owl and Brewer's sparrow are also listed as BLM sensitive species and are therefore addressed in the section on Special Status Wildlife and Fish. The potential for occurrence of Lewis's woodpecker is low due to its close association with riparian woodlands and to pinyon-juniper habitats with a component of ponderosa pine—neither of which is a major habitat type within the project vicinity.

Among the other BCC species listed above, the pinyon jay and juniper titmouse are almost totally associated with extensive stands of pinyon pine (*Pinus edulis*) and junipers (Rocky Mountain juniper [*Juniperus scopulorum*] and Utah juniper [*J. utahensis*]), which are not prevalent in the project area but extensive in the project vicinity. Cassin's finch nests at higher elevations, primarily in ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), or mixed stands of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies latifolium*). However, Cassin's finches often disperse to lower elevations following the breeding season and may remain there until the following spring. Mixed mountain shrub habitats containing large, tree-like Gambel's oaks (*Quercus gambeli*) are among the vegetation types sometimes supporting winter use by Cassin's finch.

Non-BCC species likely to occur in the project area or vicinity include several Neotropical migrants associated with mixed mountain shrub habitats. These include the common nighthawk (*Chordeiles minor*) (not a raptor), common poorwill (*Phalaenoptilus nuttallii*), broad-tailed hummingbird (*Selasphorus platycercus*), dusky flycatcher (*Empidonax oberholseri*), western scrub-jay (*Aphelocoma californica*), Virginia's warbler (*Oreothlypis virginiae*), orange-crowned warbler (*O. celata*), MacGillivray's warbler (*Oporornis tolmiei*), lazuli bunting (*Passerina amoena*), lesser goldfinch (*Spinus psaltria*), black-headed grosbeak (*Pheucticus melanocephalus*), and spotted towhee (*Pipilo maculata*). The western wood-pewee (*Contopus sordidulus*), cordilleran flycatcher (*Empidonax difficilis*), warbling vireo (*Vireo gilvus*), Bullock's oriole (*Icterus bullockii*), and blue grosbeak (*Passerina caerulea*) are associated primarily with trees but may occur in mixed mountain shrub habitats containing tree-form Gambel's oaks or species protruding above shrub layer.

Non-BCC species likely to occur in the minor pinyon-juniper within the project area or venturing into the area from more extensive habitats nearby include Neotropical migrants such as the black-chinned hummingbird (*Archilochus alexandri*), western kingbird (*Tyrannus verticalis*), Say's phoebe (*Sayornis saya*), mountain bluebird (*Sialis currucoides*), western bluebird (*S. mexicana*), plumbeous vireo (*V. plumbeus*), black-throated gray warbler (*Dendroica nigrescens*), and chipping sparrow (*Spizella passerina*). Two other Neotropical migrants, the ash-throated flycatcher (*Myiarchus cinerascens*) and gray flycatcher (*Empidonax wrightii*) are potentially present, although the project area is at the eastern edge of their range.

Raptors use the Grass Mesa area for nesting and hunting activities. Nesting habitat is primarily found in the pinyon-juniper woodlands of the project vicinity. Species most likely to nest within or near the project areas include the American kestrel (*Falco sparverius*), sharp-shinned hawk (*Accipiter striata*), Cooper's hawk (*A. cooperi*), red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginiana*), and northern pygmy-owl (*Glaucidium gnoma*). Two raptor nest structures were found within the 0.25-mile buffer south of the proposed M16W well pad location during project-specific surveys. One of the nests appeared to have been used in the 2010 nesting season; it could not be identified as to species. The status of the second nest could not be determined.

## Environmental Consequences

### *Proposed Action*

Direct impacts to migratory birds from the Proposed Action include the loss or fragmentation of approximately 30.1 acres of foraging/hunting and nesting habitat. Removal of sagebrush and mixed mountain shrub species would result in a loss of existing and potential nesting sites. Loss of habitat and impacts on populations would be more severe for high-priority species such as BCC species, other Neotropical migrants, and raptors. While project impacts 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 spring/summer season, equipment operations and noise near active nests could cause nest failure or nest abandonment and a reduction in productivity. Construction activity during the nesting season could also result in the destruction of clutches and/or mortality of nestlings/fledglings.

Throughout the project life, Encana remains subject to the MBTA, administered by the USFWS, which precludes the “take” of any raptor or most other native species. The MBTA prohibits the “take” of a protected 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.

Therefore, as a result of the raptor survey, a 60-day timing limitation (TL) would be applied as a COA to any activities authorized pursuant to this EA. Because the nests are most likely those of an accipiter (sharp-shinned or Cooper’s hawk), the COA would be applied to prohibit construction, drilling, or completion activities during the period May 1 to June 30. A separate TL but with the same dates of May 1 to June 30 would be applied to prohibit any vegetation removal as a means of reducing adverse impacts to other migratory birds such as BCC species. Appendix A provides details of these COAs and describes potential bases for the granting of an exception to the TLs.

### *Existing Grass Mesa Road Alternative*

Under the Existing Grass Mesa Road Alternative, direct impacts to migratory birds include the loss/fragmentation of approximately 21.9 acres of foraging/hunting and nesting habitat. The impacts to migratory birds identified in the Proposed Action discussion hold true for this alternative. The primary difference with impacts related to this alternative is that the new Rose Ranch road and water pipeline would not be constructed and used. This would result in 8.2 fewer acres of habitat loss and disturbance when compared to the Proposed Action.

### *No Action Alternative*

Under the No Action Alternative, any action requiring Federal approval would be denied and there would be no new surface disturbance. This would eliminate new impacts to migratory birds. However, impacts associated with ongoing production activities and traffic for the three existing J16W wells would continue.

## **Native American Religious Concerns**

### Affected Environment

The proposed South Grass Mesa Project area is located within a larger area identified by the Ute Tribes as part of their ancestral homeland. Cultural resource inventories (see section on Cultural Resources) were conducted to determine if there were any areas that might be culturally sensitive to Native Americans. No sensitive areas were identified during the inventories and none is currently known in the project area.

### Environmental Consequences

#### *Proposed Action*

At present, no Native American concerns are known within the project area and none was identified during the inventories. The Ute Tribe of the Uintah and Ouray Bands, the primary Native American tribe in this area of the CRVFO, have indicated that they do not wish to be consulted for small projects or projects where no Native American areas of concern have been identified either through survey or past consultations. Therefore, formal consultation was not undertaken. If new data 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.

Encana is required to 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 APDs (Appendix A). The importance of these COAs should be stressed to the operator and its contractors, including informing them of their responsibilities to protect and report any cultural resources encountered. The operator and its contractors would be made aware of the requirements under the NAGPRA.

#### *Existing Grass Mesa Road Alternative*

This alternative would include all of the project components identified in the Proposed Action except for the construction of the new L15W-B16W access road and the L15W-N9W water pipeline across BLM and Rose Ranch property. Indirect, long-term cumulative impacts to known and undiscovered cultural resources in the Proposed Action area would be reduced under this alternative due to the reduction in ground disturbance and decreased access and presence of project personnel.

#### *No Action Alternative*

The No Action Alternative constitutes denial of the APDs and denial of the BLM right-of-way associated with the Proposed Action. Under the No Action Alternative, none of the proposed developments described in the Proposed Action would take place.

## Noise

### Affected Environment

Noise is generally described as unwanted sound. Weighted and noise intensity (or loudness) is measured as sound pressure in units of 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 sounds that need to be measured. Each 20-unit increase in 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 area, ambient sound levels are expected to be approximately 30 to 40 dBA (EPA 1974, Harris 1991). As a basis for comparison, the noise level during normal conversation of two people 5 feet apart is 60 dBA. The project would be located in a rural, unpopulated area with few potential noise sources. Noise levels from human activity in the project vicinity are mostly mechanical, consisting mainly of existing oil and gas wells, new exploration activities, and ranching/farming operations. These noises are widely dispersed throughout the area, with localized impacts from vehicular traffic.

### 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 construction and maintenance; the use of a drilling rig, completion rig, or workover rig; or hydraulic fracturing 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.

<b>Table 8. Noise Standards for Light industrial, Residential/Agriculture/Rural</b>		
<i>Zone</i>	<i>7:00 A.M. to 7:00 P.M</i>	<i>7:00 P.M. to 7:00 A.M</i>
Light Industrial	70 dBA	65 dBA
Residential/Agricultural/Rural	55 dBA	50 dBA

M16W pad was moved south and east to avoid potential impacts to the Nelson cabin, which lies approximately 800 feet from the pad and is not currently occupied. Given the remote locations of the proposed project activities, with no reasonably close continually 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 2006).

Short-term (7- to 14-day) increases in nearby noise levels would characterize road and well pad construction while the existing cuttings trench 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).

<b>Table 9. Noise Levels at Typical Construction Sites and along Access Roads</b>			
<i>Equipment</i>	<i>Noise Level (dBA)</i>		
	<i>50 feet</i>	<i>500 feet</i>	<i>1,000 feet</i>
Air Compressor, Concrete Pump	82	62	56
Backhoe	85	65	59
Bulldozer	89	69	63
Crane	88	68	62
Front End Loader	83	83	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. However, since no residences occur within several miles of the project area or access road, noise impacts associated with the Proposed Action would be negligible.

*Existing Grass Mesa Road Alternative*

Noise related to construction, drilling, and completion activities at the J15W and M16W pads would be the same as under the Proposed Action. The existing Grass Mesa route (Figure 1) would be used to access the planned gas developments in the South Grass Mesa Area. The traffic related to the various development components presented in the Proposed Action would use the 5.7 miles of existing roads funneling the construction, drilling, and completion traffic for the J16W and M16W pads through the southern portion of the Grass Mesa Subdivision. The noise associated with traffic would have direct impacts to the residents of the Grass Mesa Subdivision, particularly those living near the existing haul route.

*No Action Alternative*

This alternative would not have an impact on existing noise levels, because the development activities would not occur. Although noise associated with the existing production and maintenance traffic servicing the three existing Federal wells on the J16W pad would continue for the life of the wells.

## **Paleontological Resources**

### Affected Environment

The current classification system utilized by the BLM for assessing impacts to fossil resources is the Potential Fossil Yield Classification System (PFYC). This system classifies geologic units based on the relative abundance of vertebrate fossils or scientifically important invertebrate and plant fossils and their sensitivity to adverse impacts. This classification is applied to a geologic formation, member, or other distinguishable unit. This classification system recognizes that although significant fossil localities may occasionally occur in a geologic unit, a few widely spaced localities do not necessarily indicate a higher class. The primary purpose of the PFYC is to assess the possible impacts from surface disturbing activities and help determine the need for pre-disturbance surveys and monitoring during construction.

The only significant surface formation found within the proposed development, as well as the area directly underlying the proposed well pad is the Tertiary Shire Member of the Wasatch Formation (Tws). The Wasatch Formation is divided into the early Eocene Shire Member and the Paleocene Molina and Atwell Gulch Members. 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 Wasatch Formation is ranked under the PFYC system as a Class 4/5 formation. Class 5 units predictably and consistently produce significant fossils. Although the Wasatch Formation is ranked high under the PFYC system—classes 4 and 5—lack of bedrock exposure and the thickness of the overlying alluvium greatly lowers the risk of human-caused adverse impacts and natural degradation within the proposed new well pad area.

### Environmental Consequences

#### *Proposed Action*

There are no paleontological discovery sites identified within a 2-mile radius of the proposed well sites. The nearest identified sites are located in Section 30, T6S, R93W - 2.5 miles northwest of the Proposed Activities. Paleontological resources should not be impacted; therefore, no new surveys would be required. If any fossils are noticed at anytime, the Authorized Officer must be notified so the resource can be recorded, evaluated, stabilized, or mitigated. The standard paleontology condition of approval identified in Appendix A shall be applied to these APDs.

#### *Existing Grass Mesa Road Alternative*

Implementation of the Grass Mesa Road Alternative would not increase or decrease the impacts on possible paleontological resources.

#### *No Action Alternative*

Under the No Action Alternative, any action requiring Federal approval would be denied and there would be no new surface disturbance. This would effectively eliminate impacts to possible paleontological resources.

**Range Management**

Affected Environment

The project area lies within the boundaries of the Beaver-Mamm and Grass Mesa Allotments. Table 10 summarizes the permitted grazing use on the allotments.

<b>Table 10. Grazing Allotments within the Project Area</b>					
<i>Allotment</i>	<i>Authorization Number</i>	<i>Livestock &amp; Number</i>	<i>Season of Use</i>	<i>% PL</i>	<i>AUMs</i>
Beaver Mamm # 08104	0500001	Cattle 79	05/15 – 10/15	100	400
	0503869	Cattle 45	05/15 – 10/15	100	228
Grass Mesa #08112	0507561	Cattle 32	05/15 – 06/30	100	49
		Cattle 40	07/01 – 08/15	15	9

Environmental Consequences

*Proposed Action*

Oil and gas development within the project area would result in approximately 30.1 acres of total short-term surface disturbance. This disturbance and resulting loss of vegetation would last for approximately 3 to 5 years or until grasses and forbs seeded during interim reclamation became productive. Rehabilitation of the short-term disturbance areas would replace some of the livestock forage. Long-term vegetation loss from the working areas of well pads and roadways, amounting to 8.9 acres, would be expected to last 20 to 30 years until the wells lost their productivity. With final reclamation of the wells sites and access roads, the full productivity of the rangeland would be reestablished.

Production of grasses and forbs on successfully rehabilitated sites is often greater than on sites prior to disturbance, which would mitigate some of the initial loss of forage. Since the oil and gas development would take place over time, the reduction in available livestock forage at any one time would be less than the total reduction in forage if the Proposed Action were to be implemented all at once.

Additional effects from oil and gas development on livestock grazing could include increased human activity, spread of noxious weeds, and livestock mortality as a result of collisions with vehicles. Biological stress could be induced on the grazing cattle from the increased development activities and result in changes in use patterns and trailing routes.

An increase in human activity related to development and maintenance of the developments would cause cattle to avoid certain areas of the allotments. However, livestock may also benefit from improved access. New roads and pipelines would open access to areas of the allotments that are difficult for livestock to access because of thick brush cover. Improvement in livestock distribution could improve forage utilization throughout the allotment.

Effects from increased human activity also could include the introduction and spread of noxious weeds and the subsequent degradation of rangeland health. The section on Invasive Non-native Species describes in detail the effects of invasive species and lists mitigation measures related to the Proposed Action.

It is not anticipated that the impacts from implementation of the Proposed Action would require adjustment of the livestock stocking rate. The level of forage utilization would be monitored on the allotment and if necessary, adjustments in livestock use would be made to protect land health.

Range improvements (fences, gates, reservoirs, pipelines, etc.) would be avoided during development of oil and gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator would be responsible for repairing or replacing the damaged range improvements. A new steel frame gate would be installed into the existing allotment boundary fence between the J16W and M16W pads located along the proposed M16W access road. A perimeter fence capable of holding grazing livestock would be installed around newly constructed well pads prior to pad construction to help provide a barrier to grazing livestock during the drilling/completion phase and mitigate potential surface impacts to surrounding special status plant species and habitat (Appendix A).

#### *Existing Grass Mesa Road Alternative*

Using a different route to access the project area would not effectively alter any if the impacts to livestock grazing. The impacts in this alternative would remain essentially identical as that identified in the Proposed Action.

#### *No Action Alternative*

The No Action Alternative would result in no additional developments on public land that would affect the Federal grazing program.

### **Realty Authorizations**

#### Affected Environment

Aside from the two Federal oil and gas leases (COC50128 and COC55604) depicted on Figure 1 and listed in Table 4, no existing realty authorizations have been issued in the immediate vicinity of the South Grass Mesa area. The Federal leases give Encana the right to explore and develop the Federal fluid minerals. There are components of the Proposed Action, which would require realty authorizations by the BLM.

As shown on Figure 7, the seven Fee wells, which have bottomhole locations in Section 17 that lies outside the Middleton Creek Unit, would be drilled from the M16W pad (located on BLM within the Middleton Creek Unit). Consequently, these seven Fee wells would be authorized with individual BLM rights-of-way (ROWS) to occupy the Federal surface on the M16W pad. The wells would be permitted for drilling by COGCC. Although not a specific realty authorization, the other three Fee wells in Section 16 would be authorized to occupy the M16W pad with a Sundry Notice approval since the downhole location for these wells would be within the Middleton Creek Unit.

#### Environmental Consequences

##### *Proposed Action*

Aside from the two Federal mineral leases that authorize oil and gas development in the project area, there are no existing realty authorizations in the project vicinity. The leases authorize oil and gas development, which is the objective of the Proposed Action.

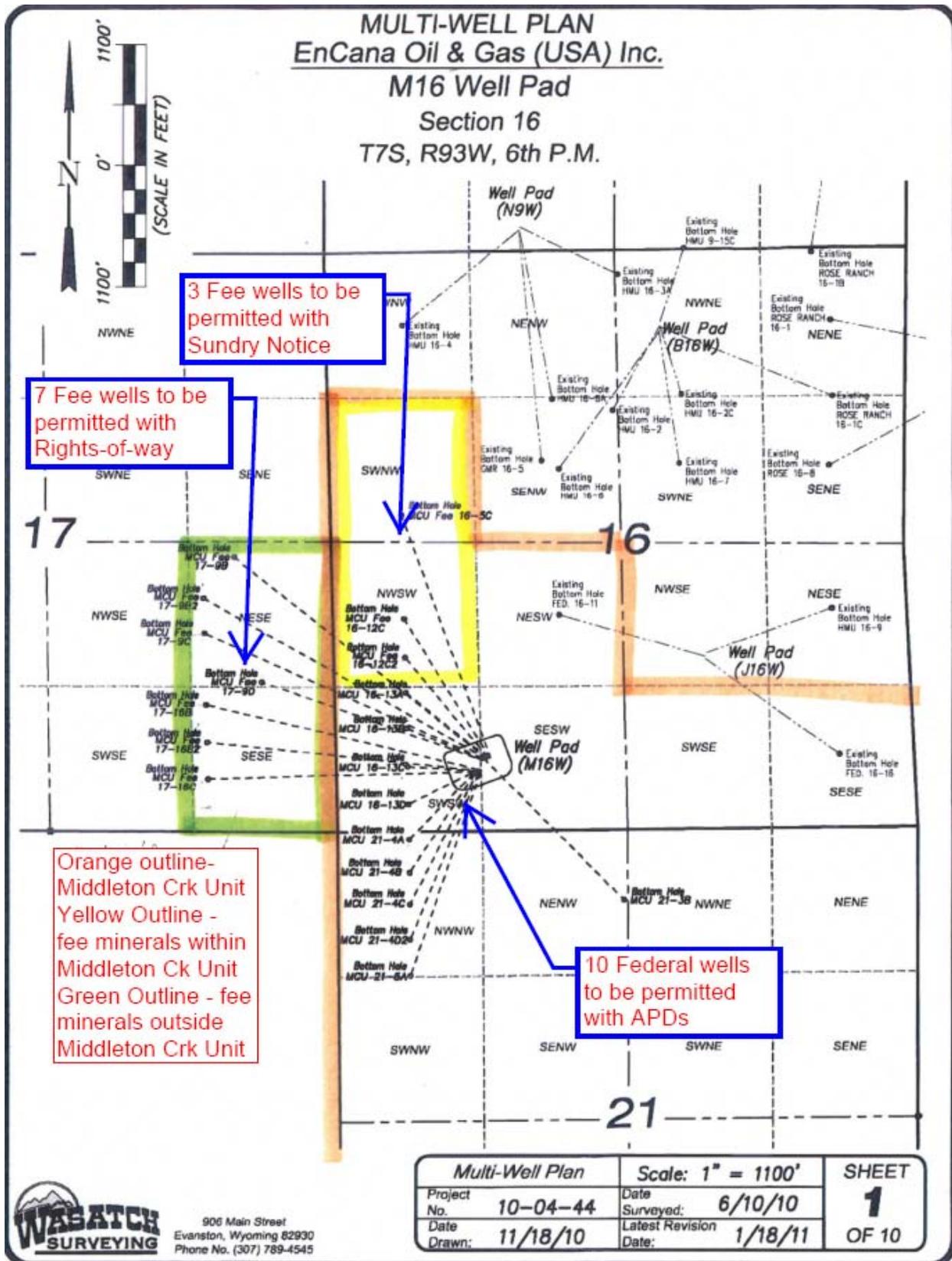


Figure 7. Permitting for the planned wells on the M16W pad.

The Proposed Action would create two new realty authorizations: (1) seven Fee wells in Section 17 would be authorized with individual ROWs issued by the BLM; and (2) the new L15W-N9W water line (segments on BLM) would be authorized with a linear ROW since the line would be buried between two Federal leases and off-lease waters would be moved through the line. Specific COAs are identified in Appendix A that would be included with the ROW permitting for these actions.

#### *Existing Grass Mesa Road Alternative*

Impacts to realty authorizations from this alternative are similar as described for the Proposed Action except that the new L15W-N9W water line would not be constructed nor authorized.

#### *No Action Alternative*

No new developments would occur which would adversely affect the terms of the existing Federal oil and gas leases (COC50128 and COC55604). No new realty authorizations would be necessary.

### **Socio-Economics**

#### Affected Environment

The project area is located within Garfield County, Colorado. The population of Garfield County grew by an average of approximately 3% per year from 2000 to 2005, resulting in an increase from 44,236 to 50,379 residents (DOLA 2010). Population growth in Garfield County is expected to more than double over the next 20 years from over 50,000 in 2005 to 106,549 in 2025 (DOLA 2010).

In the year 2009, industry groups in Garfield County with the highest percentage of total employment were construction 15%, tourism 12%, retail trade 13%, and education and health 20% (Colorado Department of Labor and Employment 2010). An estimated 13.3% of the population was retired in the year 2000 and did not earn wages (Garfield County 2000). Employment in agriculture, forestry, hunting, and mining accounted for 8% of total employment (DOLA 2010).

Personal income in Garfield County has also risen, growing from \$504 million in 1990 to \$2.2 billion in 2008 (U.S. Department of Commerce 2008). Annual per-capita income has grown in the same period; from about \$19,354 to \$40,166 (U.S. Department of Commerce 2008), and the average earnings per job in 2005 was approximately \$37,500 (Garfield County 2007). The communities of Parachute, Silt, and Rifle are considered the most affordable for housing, with costs to rent or own as much as 50% less than for similar housing in Battlement Mesa, New Castle, and Glenwood Springs (BLM 2006).

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. Big-game hunting, in particular, is viewed as critical to Garfield County, and especially the local community economies that depend on BLM and Forest Service public lands where most hunting occurs (BLM 2006). Expenditures by hunters in the Roan Plateau Planning Area have been estimated to be as much as \$1 million annually, with perhaps an additional \$1 million annually of indirect and local expenditures (CDOW 1995, cited in BLM 2006).

Growth of the oil and gas industry in the past 10 years has been increasingly important to local economies (BLM 2006). Gas production in Garfield County has increased greatly during the past 9 years from approximately 70,300 million cubic feet (MMCF) in 2000 to approximately 575,700 MMCF in 2009 (COGCC 2010). In addition, Garfield County is experiencing the fastest oil and gas development in

Colorado, with more than 2,000 drilling permits approved between July 2009 and September 2010 (COGCC 2010). Federal permits approved by the CRVFO during this period were approximately 285. While the number of workers employed in the mining and extraction industry in Garfield County has been shown to be only 1.7%, this number is considered misleading because some oil and gas employment has been incorporated as part of the construction sector statistics instead (BLM 2006). For example, in the year 2005, an estimated 4,000 persons were directly employed by gas development companies and their subcontractors in Garfield County (Garfield County 2009).

The Federal government makes “Payments in Lieu of Taxes” (PILT) to County governments to help offset property tax revenue lost of nontaxable Federal lands within County boundaries (BLM 2006). Payments are based on Federal acreage in the County for all land management agencies, including BLM, U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), and National Park Service (NPS). The amount may also be adjusted based on population and as appropriated by Congress. By formula, payments are decreased as other Federal funds, such as mineral royalty payments, increase. PILT received by Garfield County in the last five years has been as follows: \$808,348 in 2005; \$1,065,158 in 2006; \$1,078,087 in 2007; and \$1,078,521 in 2008; \$1,808,984 in 2009 (USDI2010).

In addition to PILT payments, BLM shares revenue generated by commercial activities on public lands with State and County governments (BLM 2006). 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. Half the royalty receipts are distributed to Colorado, and the amount distributed to Garfield County in 2002 attributable to oil and gas production was \$14.1 million. In 2001, the amount was \$5.5 million (BLM 2006). These funds are then allocated to fund County services, schools, and local communities.

Property tax revenue from oil and gas development has also become the largest source of public revenue in Garfield County (BLM 2006). In the year 2009, oil and gas assessed valuation in Garfield County amounted to approximately \$3.8 billion, or about 74% of total assessed value. Total tax revenues from property taxes and special district levies were \$130 million. Tax dollar distributions in 2009 were Schools 30.4%, County 32.3%, Special Districts 14.3%, Fire Districts 12.3%, Colleges 8.9%, and Towns 1.7% (Garfield County 2009).

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 Latino community is the only minority population of note in the vicinity of the project area. In 2000, 16.7% of the residents of Garfield County identified themselves as Hispanic or Latino, and this is consistent across the State (17.1%). African Americans, American Indians, and Pacific Islanders account for less than 1% of the Garfield County population, which is below the State levels (Garfield County 2000).

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would have minor positive impacts to the local economies of Garfield County through the retention or creation of job opportunities in the oil and gas industry and in supporting trades and services. In addition, local governments in Garfield County would experience an increase in tax and royalty revenues. Some minor economic loss to private landowners or guides may result from the potential displacement of big game and resulting reduction in big game hunting within the project area. The Proposed Action could result in minor negative social impacts, including (1) decrease in the

recreational character of the area, (2) reduced scenic quality, (3) increased dust levels, and (4) increased traffic. However, most of these impacts would be minor and temporary during drilling and completion.

*Existing Grass Mesa Road Alternative*

Since the same number of wells would be drilled in this alternative as the Proposed Action, the Socio-Economic impacts identified in the Proposed Action would generally be the same for this alternative.

*No Action Alternative*

The No Action Alternative would result in no additional impacts to socio-economics of the general area.

**Soils**

Affected Environment

The project is located on South Grass Mesa and surrounding slopes that are generally north and northwest facing, at elevations between 7,300 and 8,100 feet elevation, with gradients ranging from less than 5% to greater than 30%. The proposed project is covered by the *Soil Survey of Rifle Area, Colorado* (NRCS 2010, USDA1985). According to this survey, the project area contains the soil types in Table 11.

<b>Table 11. Soil Types in the South Grass Mesa Area</b>				
<i>Project Component</i>	<i>Soil Association</i>	<i>Soil Description</i>	<i>Slope (%)</i>	<i>Erosion Hazard</i>
J16W pad expansion & J16W – N9W pipeline	Morvall-Tridell Complex	Deep, well-drained soils on alluvial fans and mesa sides from 6,500 to 8,000 feet. Surface layer is loam or stony loam up to 10 inches thick; upper subsoil is clay loam to very stony loam about 12 inches thick. Permeability is moderate to moderately rapid, surface runoff is medium.	6-25%	Moderate
J16W pad expansion & J16W – N9W pipeline	Villa Grove-Zoltay Loams 5%	Deep, well-drained soils on mountainsides and alluvial fans from 7,500 to 7,600 feet. Surface layer is loam 4 to 20 inches thick; upper subsoil is clay loam to cobbly clay 11 to 35 inches thick. Permeability is slow to moderately slow, runoff is slow to medium.	15-30%	Slight to Moderate
MW16 pad road and pipeline	Bucklon-Inchau Loams 2%	Well-drained soils on ridges and mountainsides from 7,000 to 9,500 feet. Surface layer is loam 3 to 5 inches thick; upper subsoil, where present, is brown clay loam about 15 inches thick. Permeability is slow to moderate, surface runoff is medium.	25-50%	Severe
L15W – N9W pipeline & L15W –B16W road	Torriorthents-Camborthids-Rock Outcrop Complex	Exposed sandstone and shale bedrock, and shallow to deep soils formed on foothills and mountainsides. Clay to stony loam, covered by rock eroded from outcrops. Contains variable amounts of gravel and cobbles.	15-70%	Moderate to Severe

Environmental Consequences

*Proposed Action*

The Proposed Action would involve surface disturbance for access roads, pipelines, J16W pad expansion and M16W pad construction. The Proposed Action would result in approximately 30.1 acres of short-

term vegetation loss and soil compaction and displacement, with a long-term loss of approximately 8.9 acres. In general, the area that would be affected by the Proposed Action contains adequate vegetation buffers and low to moderate slopes that would reduce the potential for sediment transport to Ramsey and Dry Creeks and eventually the Colorado River. However, construction activities would cause mixing of soil horizons, slight to moderate increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Noxious weed infestation resulting from disturbance would impact soil productivity. 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 streams.

Throughout the affected area, the potential would also exist for accidental spills or leaks of petroleum products and hazardous materials during construction. These events would cause soil contamination and may decrease the soil fertility and revegetation potential. Long-term soil protection could be achieved by continued maintenance to reduce erosion, remediate soil contamination, and minimizing the size of the pad footprint through interim reclamation. Such impacts should be adequately mitigated by proper utilization of the standard and site-specific COAs. Following interim reclamation, it would be the responsibility of the operator to continue revegetation/reclamation efforts until vegetation communities on disturbed surfaces are composed of seeded or other desirable vegetation, as determined by the BLM. Appropriate revegetation is important to prevent or minimize soil erosion and infestation of weeds.

#### *Existing Grass Mesa Road Alternative*

The alternative action would result in 8.2 fewer acres of short-term surface disturbance and 3.0 less acres than the Proposed Action. The impacts to soils would be reduced accordingly.

#### *No Action Alternative*

The No Action Alternative would constitute denial of the Federal wells as proposed and none of the surface disturbance on BLM land. This alternative would result in the least amount of impacts to soils.

### **Special Status Species**

#### *Federally Listed, Proposed, or Candidate Plant Species*

##### Affected Environment

According to the latest species list from the USFWS, the following Federally listed, proposed, or candidate plant species may occur within or be impacted by actions occurring in Garfield County: Parachute beardtongue (*Penstemon debilis*), DeBeque phacelia (*Phacelia submutica*), Colorado hookless cactus (*Sclerocactus glaucus*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*).

##### Environmental Consequences

#### *Proposed Action*

Results of a plant survey in 2010 indicate that no Federally listed, proposed, or candidate plant species or suitable habitat for these species occurs in the project area. Therefore, the Proposed Action would have “**No Effect**” on these species.

### *Existing Grass Mesa Road Alternative*

The alternative action would not cause impacts to any Federally listed, proposed, or candidate plants because these species do not occur in the area to be affected.

### *No Action Alternative*

The No Action Alternative would not cause impacts to any Federally listed, proposed, or candidate plants because these species do not occur in the area to be affected.

### ***Federally Listed, Proposed, or Candidate Animal Species***

#### Affected Environment

Eight species of Federally listed, proposed, or candidate threatened or endangered vertebrate species occur within Garfield County or may be affected by projects within the County. These species and their status, distribution, and habitat associations are summarized below:

Canada Lynx (*Lynx canadensis*). Federally listed as threatened. Canada lynx occupy high-latitude or high-elevation coniferous forests characterized by cold, snowy winters and an adequate prey base (Ruggiero et al. 1999). The preferred prey of Canada lynx throughout their range is the snowshoe hare (*Lepus americanus*). In the western United States, lynx are associated with mesic forests of lodgepole pine, subalpine fir, Engelmann spruce, and quaking aspen in the upper montane and subalpine zones, generally between 8,000 and 12,000 feet in elevation. Although snowshoe hares are the preferred prey in Colorado, lynx also feed on other species such as the rabbits, squirrels, and birds.

The U.S. Forest Service (USFS) has mapped suitable denning, winter, and other habitat for lynx within the White River National Forest (WRNF), portions of which are adjacent to BLM lands within the GSFO. The mapped suitable habitat in the WRNF comprises several areas known as Lynx Analysis Units (LAUs). Several LAUs border BLM lands along the I-70 corridor from east of Wolcott to west of DeBeque. While BLM lands within the GSFO area are generally not suitable habitat, they may support movement by animals dispersing to a new area or, potentially, moving to lower elevations during severe winter weather in search of prey. The project area does not border the Battlement Creek LAU and therefore is not considered further in this document.

Mexican Spotted Owl (*Strix occidentalis*). Federally listed as threatened. This large owl nests, roosts, and hunts in mature coniferous forests in canyons and foothills. The only extant populations in Colorado are in the Pikes Peak and Wet Mountain areas of south-central Colorado and the Mesa Verde area of southwestern Colorado. Because no known occurrences or suitable habitats are present in the project vicinity, this species is not considered further.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*). Candidate for Federal listing. This secretive species occurs in mature riparian forests of cottonwoods and other large deciduous trees with a well-developed understory of tall riparian shrubs. Riparian areas in the project area do not provide suitable habitat for this species. It also is not known to occur in the cottonwood corridor along the Colorado River a few miles north of the project area; occurrence there is unlikely due to the patchy nature of the stands and the general lack of a tall-shrub understory. Because no known occurrences or suitable habitats are present in the project vicinity, this species is not considered further.

Razorback Sucker (*Xyrauchen texanus*), Colorado Pikeminnow (*Ptychocheilus lucius*), Humpback Chub (*Gila cypha*), and Bonytail (*G. elegans*). Federally listed as endangered. 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 north 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.

Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*). Federally listed as threatened. The greenback cutthroat trout was not identified on the USFWS list for Garfield County; however, recent surveys have identified a population in Cache Creek, located several drainages east of the project area. The greenback is the subspecies of cutthroat trout native to the Platte River drainage on the Eastern Slope of Colorado, while the Colorado River cutthroat trout (*O. c. pleuriticus*) is the subspecies native to Garfield County and throughout the Western Slope of Colorado. Although the occurrence of greenbacks in Cache Creek and potentially elsewhere in the GSFO and WRNF areas is apparently the result of human intervention (e.g., sanctioned or *ad hoc* translocation of fish from the Eastern Slope), its status as threatened applies to Western Slope populations. However, because drainages within the project area do not support this species, it is not considered further.

### Environmental Consequences

#### *Proposed Action*

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

For the four Federally listed big-river fishes, BLM prepared a Programmatic Biological Assessment (PBA) in 2008 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, bonytail, humpback 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 to use for site-specific mitigation projects. These funds are used to contribute to the recovery of endangered fish through the restoration of habitat, propagation, and genetics management, instream flow identification and protection, program management, non-native fish management, research and monitoring, and public education.

#### *Existing Grass Mesa Road Alternative*

Regardless of the planned use of the existing Grass Mesa Road, instead of the new Rose Ranch route to access the planned oil and gas developments outlined in the Proposed Action, this alternative would also have “**No Effect**” on Federally listed, proposed, or candidate threatened or endangered vertebrate species.

The determination of “**May Affect, Likely to Adversely Affect**” for the Colorado pikeminnow, bonytail, humpback chub, or razorback sucker as a result of depletions associated with oil and gas projects would also apply to this alternative.

#### *No Action Alternative*

Under the No Action Alternative, any action requiring Federal approval would be denied and there would be no new surface disturbance. This would eliminate new impacts to Federally Listed, Proposed, or Candidate Animal Species though production activities and traffic related to the existing three J16W wells would continue for the producing life of the wells.

### ***BLM Sensitive Plant Species***

#### Affected Environment

BLM sensitive plant species with habitat and/or occurrence records in Garfield County include DeBeque milkvetch (*Astragalus debequaeus*), Naturita milkvetch (*Astragalus naturitensis*), Piceance bladderpod (*Lesquerella parviflora*), Roan Cliffs blazing star (*Mentzelia rhizomata*), Harrington's penstemon (*Penstemon harringtonii*), and Cathedral Bluffs meadow-rue (*Thalictrum heliophilum*).

Suitable habitat in the project area occurs for only one BLM sensitive plant species, Harrington's penstemon. Habitat for Harrington's penstemon is typically open sagebrush shrublands or sagebrush with encroaching pinyon-juniper. Soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials (basalt) ranging in elevation from 6,200 to 9,200 feet.

#### Environmental Consequences

##### *Proposed Action*

Surveys for Harrington's penstemon were conducted in the summer of 2010 in all areas of suitable habitat within the project boundary. Harrington's penstemon occurrences were found in mountain big sagebrush (*Artemisia tridentata* subsp. *pauciflora*) shrubland habitat within the project area.

Harrington's penstemon was found on the east side of the J16W pad. Approximately 50 individual plants fall within the disturbance boundary and would be directly impacted by the pad expansion. Encana originally wanted to expand the pad further to the east, which would have impacted more plants. BLM asked Encana to pull back the eastern pad edge to the extent possible, and Encana agreed to reduce the pad size to minimize plant losses.

Harrington's penstemon also occurs along the B16W-L15W road alignment on top of Grass Mesa. Approximately 200 individuals would be directly impacted by the new road. Because Harrington's penstemon does not occur in dense patches of oakbrush on Grass Mesa, Encana was asked to locate as much of the road alignment as possible in oakbrush to reduce impacts to occupied penstemon habitat.

The Proposed Action would result in both direct and indirect impacts to populations of Harrington's penstemon. Construction of pads, roads and pipelines as proposed is estimated to result in the total potential loss of 250 individual Harrington's penstemon plants. This would lead to the determination that the Proposed Action is "not likely to result in a loss of viability to the population or cause a trend toward Federal listing." This is because Harrington's penstemon has a wide range in western Colorado, and Eagle County is considered the core population. Losses of less than 1% of a population have not caused concern about the viability or the need for Federal listing.

A number of indirect effects to Harrington's penstemon could result from the Proposed Action, including an increase in dust, weed invasion, sedimentation and erosion, and loss of pollinators and their habitat. Potential impacts to plants from the accumulation of dust include clogged plant pores, reduced light reception, and alteration of glyphosate uptake mechanisms (Boerboom 2006, Ferguson et al. 2007). The clogging of pores can interfere with growth rates and water transpiration (Salisbury and Ross 1992).

The road effect zone can extend several times the actual width of a road and as much as 50 meters down slope and has been documented as accounting for approximately 40% of fugitive dust within an area (Forman and Alexander 1998, Ferguson et al. 2007). Impacts from dust would decrease as activity within the project area moves from construction and completion phases to production and operations and maintenance phases. Additionally, implementation of best management practices for dust reduction would further decrease dust impacts.

Another indirect effect could be an increase in invasive weeds from ground disturbing activities. Invasive weeds could compete with Harrington's penstemon for water, nutrients, and light or change ecosystem processes, such as increasing fire regimes. Mitigation measures designed to minimize the spread of invasive species are presented in Appendix A.

Finally, the Proposed Action could reduce the amount or quality of habitat needed by pollinator species. Mitigation to minimize this effect would include reclaiming the disturbed areas using a BLM-approved native seed mix. Mitigation measures designed to minimize the loss of pollinator habitat are presented in Appendix A.

#### *Existing Grass Mesa Road Alternative*

This alternative would result in fewer Harrington's penstemon losses than the Proposed Action. Because the B16W-L15W road alignment on top of Grass Mesa would not be built under this alternative, the 200 individuals that would be potentially lost under the Proposed Action from the construction of the road would not be impacted by this alternative. Approximately 50 Harrington's penstemon individuals would still be directly impacted by the expansion of the J16W pad.

#### *No Action Alternative*

There would be no losses of any BLM sensitive plants under the No Action Alternative because there would be no disturbance to BLM lands.

#### ***BLM Sensitive Animal Species***

##### Affected Environment

BLM sensitive animal species with habitat and/or occurrence records in the portion of the CRVFO that includes the project area and vicinity are listed in Table 12.

##### Environmental Consequences

#### *Proposed Action*

Fringed Myotis (*Myotis thysanodes* and Townsend's Big-eared Bat (*Corynorhinus townsendii*) – No caves or other suitable roosting sites occur in the project area. Loss of large trees, potentially also used for roosting, would be negligible. No new loss of habitat above which the bats could search for aerial prey would occur, and the area they might avoid during nighttime drilling and completion activities would represent a small portion of their total feeding range, if present.

Northern Goshawk (*Accipiter gentilis*) – This species is mostly limited to spruce/fir or aspen forests, such as atop the Roan Plateau, Battlement Mesa, and other areas that reach subalpine elevations. However, goshawks may migrate to lower elevation pinyon/juniper or Douglas-fir habitats during winter and

therefore could make occasional, transitory use of the project area for winter foraging. Goshawks feed primarily on small birds but also on diurnal small mammals (rabbits, chipmunks, etc.).

<b>Table 12. Special-Status Wildlife Species Present or Potentially Present in the Project Area</b>		
<i>Common Name</i>	<i>Habitat</i>	<i>Potential for Occurrence</i>
Fringed myotis, Townsend's big-eared bat	Breed and roost in caves, trees, mines, and buildings; hunt over pinyon-juniper, montane conifers, and semi-desert shrubs.	Possible
Northern goshawk	Predominantly uses spruce/fir forests but also use Douglas-fir, various pines, and aspens.	Possible
Bald eagle	Nests and roosts in mature cottonwood forests along rivers, large streams, and lakes.	Present along Colorado River
Brewer's sparrow	Sagebrush shrublands, mountain parks; may be found in alpine willow stands.	Possible – Habitat Marginal
Midget faded rattlesnake	High, cold desert dominated by sagebrush and with an abundance of rock outcrops and exposed canyon walls.	No suitable habitat
Great Basin spadefoot	Habitat includes pinyon-juniper woodlands, sagebrush, and semi-desert shrublands	No suitable habitat
Northern leopard frog	Wet meadows and the shallows of marshes, glacial kettles, beaver ponds, lakes, reservoirs, streams, and irrigation ditches.	No suitable habitat
Colorado River cutthroat trout	Restricted to small headwaters streams isolated from introductions or colonization by non-native trouts.	Not present
Flannelmouth sucker, bluehead sucker, and roundtail chub	Flannelmouth sucker and roundtail chub generally restricted to rivers and major tributaries. Bluehead sucker also in smaller streams. No habitat for these species within the project vicinity.	Present in Colorado River

Bald Eagle (*Haliaeetus leucocephalus*) – Formerly listed as endangered, downlisted to threatened, and more recently removed from the list of threatened or endangered species, the bald eagle remains protected by the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). Although the project area lies relatively near occupied habitat along the Colorado River, habitats present within the project area and vicinity are unlikely to attract use by the species, minimizing the potential for adverse impacts.

Brewer's Sparrow (*Spizella breweri*) – This project vicinity contains limited and marginal habitat for the Brewer's sparrow, which generally is restricted to extensive, uniform stands of sagebrush, primarily sagebrush steppe. If the species were to occur, oil and gas activities occurring within the home range of a nesting pair could cause individuals to shift their feeding patterns and to locate their nests to avoid the disturbance (noise, dust, human activity). However, this impact would be limited to the nesting season and would not be an issue for long-term production and maintenance operations.

Great Basin Spadefoot (*Spea intermontana*) – This species generally inhabits seasonal pools and ponds in pinyon-juniper woodland, sagebrush, and semi-desert shrubland habitats, mostly below 6,000 feet in elevation. The project vicinity is of marginal suitability for this species, and spadefoots have not been discovered in the area. Because the project would not involve new habitat disturbance, impacts to this species would not be expected, even if it were present in area streams or ponds.

Northern Leopard Frog (*Rana pipiens*) – Unlike the spadefoot, the northern leopard frog is limited to perennial waters, including ponds and slow-flowing perennial streams or persistent portions of

intermittent streams. This species requires streams with good water quality and abundant aquatic or shoreline vegetation. Suitable habitat occurs along some streams in the general vicinity of the project area. However, the project would not involve new habitat disturbance, and no are expected.

Midget Faded Rattlesnake (*Crotalus viridis concolor*) – The midget faded rattlesnake is a small, pale-colored subspecies of the common and widespread western rattlesnake. The midget faded rattlesnake is endemic to a small area of southwestern Wyoming, northeastern Utah, and northwestern Colorado, including western Garfield County. Suitable habitats include sandy and rocky areas in pinyon-juniper and semi-desert shrub. The relatively densely vegetated and generally north-facing aspects of the plan area are less suitable than the more barren south-facing areas north of I-70. In the unlikely event that this species were to occur in the project area, the lack of new habitat disturbance would greatly reduce the potential for adverse impacts.

Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) – Remaining populations of this subspecies of cutthroat trout occur mostly in headwater streams and lakes of the Colorado River drainage. There are no perennial streams within the vicinity of the project area, therefore the Colorado River cutthroat trout would not be affected by the Proposed Action.

Flannelmouth Sucker (*Catostomus latipinnis*) and Roundtail Chub (*Gila robusta*) – 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, in the unlikely event that this were to occur as a result of the project. Although not typically affected adversely by high sediment loads, inflow of chemical pollutants from the project area could result in direct impacts. The stormwater controls enforced by the CDPHE and protective COAs for water quality would minimize this potential (Appendix A).

These species are also, like the endangered Colorado River big-river fishes, vulnerable to alterations in flow regimes (including evaporative losses 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 small amount of water consumption associated with the Proposed Action would not cause discernible impacts to the Colorado River flow regime.

Bluehead Sucker (*Catostomus discobolus*) – This species is found throughout the middle and upper Colorado River Basin, in a variety of areas from headwater streams to large rivers (Woodling 1985). The bluehead sucker prefers areas with a rock substrate and mid to fast flowing waters. Because no perennial streams are present in the vicinity, the bluehead sucker would not be affected by the Proposed Action.

#### *Existing Grass Mesa Road Alternative*

Regardless of the planned use of the existing Grass Mesa Road, instead of the new Rose Ranch route to access the planned oil and gas developments outlined in the Proposed Action, the impacts related to this alternative would essentially be identical to those identified in the narrative for the Proposed Action.

#### *No Action Alternative*

Under the No Action Alternative, any action requiring Federal approval would be denied and there would be no new surface disturbance. This would eliminate new impacts to BLM Sensitive Animal Species though production activities and traffic related to the existing three J16W wells would continue for the producing life of the wells.

### Analysis on Public Land Health Standard 4 for Special Status Species

The area where Harrington's penstemon occurs in Garfield County has experienced increasing levels of natural gas development in the past few years. Although potential habitat within the Grass Mesa allotment is somewhat fragmented with natural gas wells and associated infrastructure, few Harrington's penstemon plants have been directly impacted from oil and gas development. The populations appear to be sustaining themselves at this time. Habitat conditions are currently good, with no noxious weeds observed in the vicinity. Standard 4 for Harrington's penstemon and other special status species is currently being met in this area; however, the habitat alteration associated with the Proposed Action would likely contribute to a declining trend and help to reduce the potential for meeting or maintaining Standard 4 for Harrington's penstemon over the long-term. With the implementation of the mitigation measures identified in this section and elsewhere in the EA, Standard 4 for special status plants and their habitats would be achieved, but populations are at risk due to increasing natural gas development.

#### *Existing Grass Mesa Road Alternative*

The alternative would result in less degradation to sensitive plant habitat than the Proposed Action, and would result in fewer plants lost than the Proposed Action.

#### *No Action*

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

### **Vegetation**

#### Affected Environment

The primary vegetation types in the project area include a mixed montane shrubland of Gambel's oak with pockets of mountain big sagebrush. Vegetation communities in the project area are generally in good condition with an abundant diversity of overstory and understory species and few invasive non-native species.

Mixed montane shrublands in the project area are dominated by Gambel's oak in associated with serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), mountain big sagebrush, mountain-mahogany (*Cercocarpus montanus*), and snowberry (*Symphoricarpos rotundifolius*). Common forbs include tailcup lupine (*Lupinus caudatus*), dusty penstemon (*Penstemon comarrhenus*), Osterhout's penstemon (*Penstemon osterhoutii*), aspen daisy (*Erigeron speciosus*), trailing fleabane (*Erigeron flagellaris*), Drummond's rockcress (*Boechera drummondii*), Nuttall's larkspur (*Delphinium nuttallianum*), lambs-tongue groundsel (*Senecio integerrimus*), longleaf phlox (*Phlox longifolia*), sticky false starwort (*Pseudostellaria jamesii*), and narrowleaf mountain trumpet (*Collomia linearis*). Elk sedge (*Carex geyeri*), a native perennial graminoid, is also common.

Mountain big sagebrush shrublands are composed primarily of mountain big sagebrush with less dominant shrubs like Wyoming big sagebrush (*A. t.* subsp. *wyomingensis*), bitterbrush (*Purshia tridentata*), snowberry, and green rabbitbrush (*Chrysothamnus viscidiflorus*). Mountain big sagebrush shrublands typically occur in openings of Gambel's oak shrublands. A dense herbaceous component is usually present. Common graminoid species include Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), slender wheatgrass (*Elymus trachycaulus*), western wheatgrass (*Pascopyrum smithii*), junegrass (*Koeleria macrantha*), and muttongrass (*Poa fendleriana*). Common forbs include tapertip onion (*Allium acuminatum*), Harrington's penstemon (*Penstemon harringtonii*),

trailing fleabane, mariposa lily (*Calochortus nuttallii*), lobe-leaf groundsel (*Packera multilobata*), tailcup lupine, death camas (*Toxicoscordion venenosum*), coppermallow (*Sphaeralcea coccinea*), balsamroot (*Balsamorhiza sagittata*), and Indian paintbrush (*Castilleja* sp.).

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would result in the most acres of disturbance to vegetation. There would be a short-term loss of approximately 30.1 acres of vegetation (24.4 acres of BLM land) of which approximately 8.9 acres would not be reclaimed during the life of the wells. With implementation of standard conditions of approval (Appendix A), desirable forbs and grasses on the unused portions of the pads, roads, and pipelines could be established within 2 to 3 years. However, because of periodic workovers and the potential for additional well bores in the future, it is likely that vegetation would remain in an early seral stage for the life of the wells.

Construction and expansion of the proposed and existing pads, pipelines, and access roads would result in both direct and indirect effects on vegetation. Direct effects would include short and long-term loss of vegetation and long-term modification of community structure and composition. Indirect effects could include increased potential for noxious weed invasion, increased soil erosion and sedimentation, reduced wildlife habitat quantity or quality, and changes in fire regime.

Although Gambel's oak and sagebrush shrublands would regenerate over time, this process could take several decades, depending on the growth and persistence of seeded species and the intensity of grazing by livestock or wildlife. This would result in an increase in the proportion of herbaceous (i.e., non-woody) species in the areas of disturbance. The success or failure of revegetation would affect other resources including soils, surface water quality, wildlife, visual resources, and livestock grazing.

#### *Existing Grass Mesa Road Alternative*

The alternative action would result in 8.2 fewer acres (3.1 fewer BLM acres) of disturbance to vegetation than the Proposed Action. There would be less short and long-term loss of vegetation, long-term modification of community structure and composition, and less risk of weed invasion.

#### *No Action Alternative*

Under the No Action Alternative, none of the proposed ground disturbance on BLM land would occur; therefore, no direct impacts to vegetation would occur.

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

This area was meeting the standard, although problems were noted: decadent stands of sagebrush with poor recruitment, encroaching juniper, and widespread invasion of cheatgrass with a corresponding loss of other functional groups such as native perennial grasses and forbs. In general, vegetation communities at higher elevations are in better condition than communities at lower elevations. Oakbrush/mixed mountain shrublands have an abundant understory with diverse composition of grasses and forbs. In the lower elevations, plant communities appear to be dominated by old or mature age classes with little evidence of recruitment. In many sagebrush and pinyon-juniper communities, functional groups such as cool-season perennial grasses and perennial forbs have declined in diversity and abundance.

Surface disturbance associated with the Proposed Action has the potential to encourage expansion and dominance of the site by cheatgrass and other invasive weeds. 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 would take place on public lands administered by the BLM and private lands on Grass Mesa south of Rifle, Colorado. The Proposed Action that occurs on public lands encompasses areas classified as Visual Resource Management (VRM) Class II, III, and IV as identified by the 1984 Glenwood Springs Resource Management Plan. The objectives for VRM Classes II, III, and IV, as defined in the BLM Manual H-8410-1 – Visual Resource Inventory (BLM 1986), are 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.
- The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- The objective of VRM Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of the viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

For the lower segment of the new L15W-B16W access road that occurs on private land, Federal lease terms regarding visual concerns are not applicable. Visual resource values for private lands are only protected by landowner discretion.

The project area consists of moderate to steep hillsides rising out of the Colorado River valley to mesas leading up to low mountains in the background. The area is characteristic of rural agricultural/ranching land, scattered rural residences and oil and gas development. The Proposed Action would occur on the southern end of Grass Mesa, which sits between Flat Iron Mesa to the west, White River National Forest to the south, Hunter Mesa to the East; and Grass Mesa Subdivision and the city of Rifle to the north. A pyramid-shaped point south of Flat Iron Mesa is the dominant topographic feature directly west of the Proposed Action and creates a scenic backdrop to the project area and to the Grass Mesa Subdivision. Vegetation on the northern end of Grass Mesa consists of dense, dark-green pinyon-juniper plant communities interspersed with patches of tan, exposed soil and sagebrush flats. Whereas, on the southern end of Grass Mesa, vegetation is predominantly sagebrush flats intermixed with dense patches of a mixed oak brush/mountain shrub plant communities.

A portion of the Proposed Action (M16W pad, J16W-M16W access road, J16W existing pad expansion, and J16W-N9W water pipeline) would occur on public land on top of South Grass Mesa while the remaining portion of the Proposed Action (L15W-B16W access road and L15W-N9W water pipeline) would occur on public land and private lands on the steeper eastern side slopes of South Grass Mesa. The L15W-B16 road would provide access to the J16W and M16W pads via the Rose Ranch access road.

The existing Grass Mesa Road route located on top of Grass Mesa presently provides access to the J16W and M16W pads from County Road 319 (Figure 8).

The visual resource analysis area includes County Road 319, County Road 322, and Grass Mesa Road viewshed corridors. These viewsheds are important, as they are viewed by people who live, work and recreate in the area. The Proposed Action would be located in the viewer's foreground/middle ground, within 5 miles from County Road 319, County Road 322, and Grass Mesa Road. BLM guidance states that lands with high visual sensitivity are those within five 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 can be easily noticed by the casual observer.

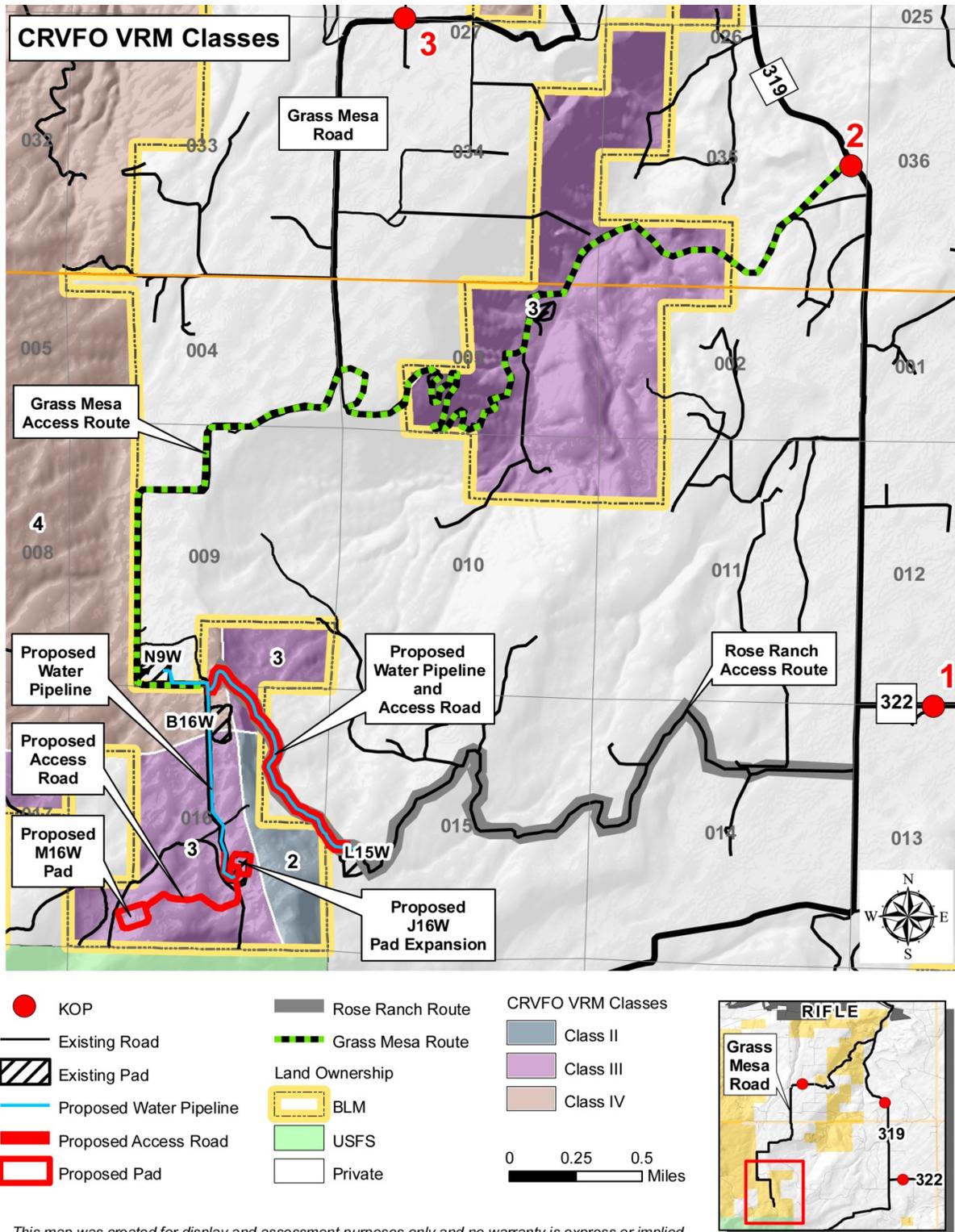
The visual impact analysis for this project is based on the views from 3 Key Observation Points (KOPs) representing 3 linear viewer locations representing the viewing angle and direction with the highest frequency of viewers: County Road 319, County Road 322, and Grass Mesa Road described below.

KOP 1 is located on County Road 322, representing the viewing angle and direction with the highest frequency of viewers (Figure 9). The viewers would be looking upward toward the Proposed Action. This KOP also represents a typical view that the viewer would see while traveling on the southern extent of County Road 319. The foreground consists of dense-dark green pinyon-juniper stands draped on the rolling hillsides interspersed with openings consisting of sagebrush flats, rural agricultural land, and oil and gas development. The pyramid-shaped form of the unnamed peak rises in the background.

KOP 2 is located on County Road 319, representing a location where the Proposed Action would be apparent to travelers (Figure 10). At this location, the viewer would be looking upward toward the Proposed Action. The foreground is similar to the foreground and background seen from KOP 1. This KOP represents a typical view a viewer would have while traveling along the northern extent of County Road 319.

KOP 3 is located on Grass Mesa Road, representing the viewing angle and direction with the highest frequency of viewers and where the Proposed Action and alternative alignment would be most visible to viewers (Figure 11). The viewer would be below the Proposed Action, but would be looking directly at the project area from most locations on Grass Mesa. KOP 3 also represents the typical view that residents of the Grass Mesa Subdivision would see when looking south. The foreground is a mixture of sagebrush flats with patches of pinyon/juniper stands, rural agricultural land, and oil and gas development.

In addition to analyzing the potential impacts of the Proposed Action immediately within the project area from KOPs, viewshed analyses were conducted to determine the effects of the project from observation or visibility corridors near the project area. Using these two methods, visual impacts and appropriate mitigation measures were identified.



**Figure 8. Proposed Action and Existing Grass Mesa Homeowner Association (GMHOA) Road Alternative Relationship to CRVFO Visual Resource Management (VRM) Class Designations.**



Figure 9. KOP 1 (Note: Access road and pipeline locations are not to scale).

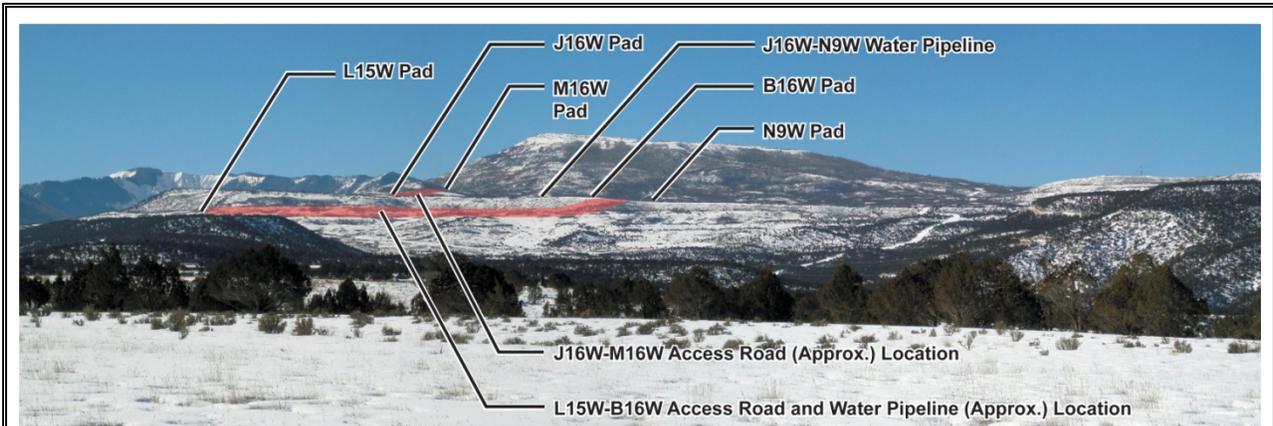


Figure 10. KOP 2 (Note: Access roads and pipeline locations are not to scale).

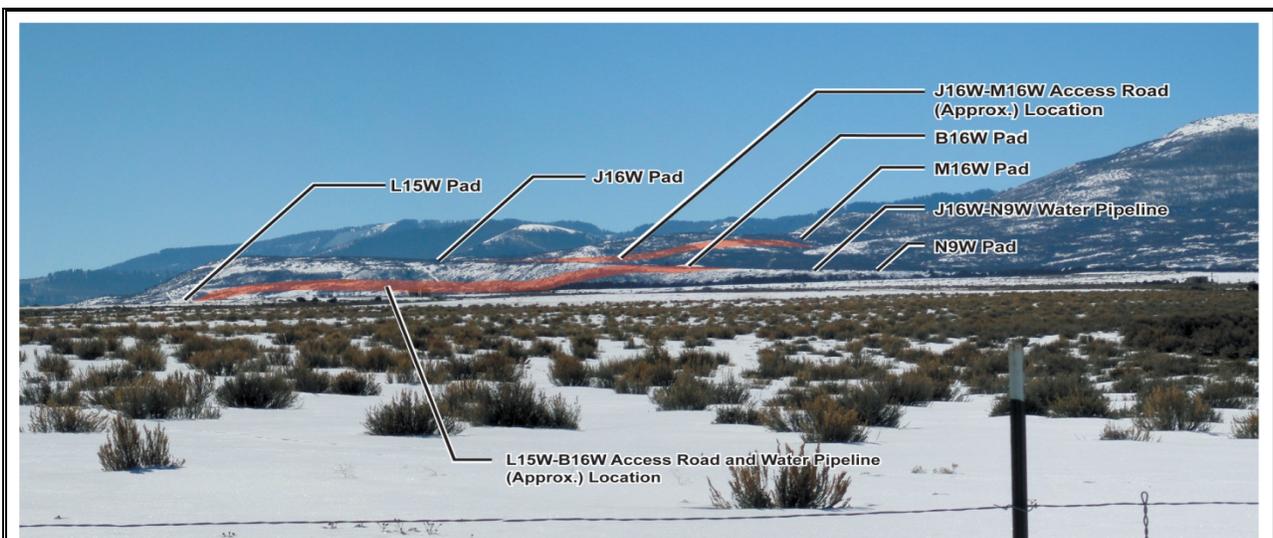


Figure 11. KOP 3 (Note: Access roads and pipeline locations are not to scale).

## Environmental Consequences

### *Proposed Action*

The planning process involved several site visits where layout locations for the pad, pad expansion, water pipelines, and access roads were reviewed. The project was designed to utilize existing terrain to screen viewer locations as much as possible.

Short-term visual impacts due to pad and access road construction; water pipeline installation, drilling and completion activities would occur within the project area. The existing landscape would be changed by the introduction of contrasting elements within the landscape in the form of new lines, colors, forms, and textures. New pads, surface facilities, roads, and water pipelines would increase the presence of drilling rigs, heavy equipment (e.g., dozers, graders, etc.), and vehicular traffic with an associated increase in dust, light pollution, and well flaring.

Long-term visual impacts would be moderate to weak and are explained in detail below.

### *J16W Pad Expansion*

The J16W pad expansion would occur in VRM Class III. The pad would be expanded by 2.5 acres from its reclaimed footprint of 5.1 acres to the east and north of its existing boundary fence. The expanded pad would have a maximum cut of 23.9 feet near the southeast corner and a maximum fill of 18.6 feet at the northwest corner. The existing access road and buried gas pipeline would continue to serve this pad and the additional 14 wells. To accommodate the pad expansion, a hydroaxe would be used to mow the vegetation from the planned pad expansion footprint. By hydroaxing the vegetation, the root structure would be preserved which would facilitate vegetation growth during interim reclamation and reduce erosion. New tanks would be added to the existing tank containment that exists on the southwest side of the pad near the road entrance.

The pad expansion would be most visible along the western, northern and eastern limits of the pad from on top of Grass Mesa as seen from KOP 3 (Figure 11). To meet Class III objectives, mitigation requirements are summarized in Table 13 and applied as COAs (See Appendix A). Total short-term surface disturbance attributed to the J16W pad expansion would be 7.6 acres occurring on public land. Long-term, after the pad is reclaimed, the disturbance would amount to 2.3 acres of reclaimed pad footprint on BLM (Table 2).

### *Proposed M16W Pad*

The M16W pad would occur in VRM Class III. Private land lies to the north and west of the pad with a private cabin located approximately 600 feet from the northern edge of the pad. The pad location was rotated from its original configuration to fit to the topography and to reduce the amount of cut and fill required to meet grade. The pad would sit below a ridgeline so the facilities would not create a silhouette against the skyline. A hydroaxe would be used to mow the vegetation from the location prior to construction, preserving the root structure, which would facilitate vegetation growth during interim reclamation and reduce erosion. The pad would have a maximum cut of 29.4 feet near the southeast corner and a maximum fill of 30.4 feet at the center north edge.

The pad would be most visible from on top of Grass Mesa as seen from KOP 3 and the private cabin but would be screened to some extent by topography from County Road 319 and County Road 322 (Figures 9 and 10). To meet Class III objectives, mitigation requirements are summarized in Table 13 and applied as COAs (See Appendix A).

**Table 13. Summary of Mitigation Requirements to Meet VRM Class Objectives**

<i>Project Component</i>	<i>Description</i>	<i>Mitigation</i>
<b>Pad</b>	<p><b>J16W Pad Expansion</b> (VRM Class III)</p> <p><b>M16W Pad</b> (VRM Class III)</p>	<p><u>Construction</u></p> <ul style="list-style-type: none"> <li>All woody vegetation (live and dead) should remain standing at the toe of the fill slope and at the top of the cut slope to provide visual screening.</li> <li>Rocks and woody debris should be saved during the construction process; care should be taken to preserve the canopy of the woody material while storing and transporting.</li> <li>Facilities should be located to maximize area for interim reclamation (<b>M16W Pad specific</b>).</li> <li>All facilities should be painted Shadow Gray, a color found in the natural vertical elements.</li> </ul> <p><u>Interim Reclamation</u></p> <ul style="list-style-type: none"> <li>All woody vegetation left standing at the toe and at the top of the cut slope should be protected and remain standing and undamaged when fill material is pulled back to recontour the pad.</li> <li>All cut and fill slopes should have undulating contours which emulate the slopes seen in the adjacent landscape. Constructed slopes should meet existing grades with a similar slope to eliminate the line created at the edge where two different grades meet.</li> <li>Rocks and woody debris saved during the construction process should be re-placed onto the cut and fill slopes to emulate the color and texture closer to that of the native landscape and to encourage vegetation growth.</li> <li>A berm along the northern edge of the pad should be utilized to interrupt the sightline from viewers located below the pad (residents of the Grass Mesa Subdivision and the private cabin). The berm would help break up the form and texture of the facilities; and the scale of the cut slope; and should appear to be a natural extension of the landscape (<b>M16W Pad specific</b>).</li> </ul>
<b>Access Road and Pipeline Corridor</b>	<p><b>L15W-B16W Access Road and L15W-N9W Water Pipeline Construction</b> (VRM Class II, III, and IV)</p> <p><b>M16W Access Road and Pipeline</b> (VRM Class III)</p>	<p><u>Pre-work</u></p> <ul style="list-style-type: none"> <li>In areas where clearing within dense vegetation is required, thinning of the adjacent vegetation should be incorporated. Thinning dissipates the clearing and softens the strong linear form created between the new construction and the existing vegetation (<b>L15W-B16W Access Road and L15W-N9W Water Pipeline specific</b>).</li> </ul> <p><u>Construction</u></p> <ul style="list-style-type: none"> <li>The road/pipeline corridor should follow the natural contours so that they conform to the landscape and reduce the amount of cut and fill required to meet grade and to eliminate distant, straight-line impacts.</li> <li>The cut and fill slopes should meet the existing grades at natural angles to create a more natural appearance without creating a visually apparent transition line.</li> <li>The upper edge of the cut slopes should undulate and take advantage of opportunities where the existing topography and openings in vegetation provide locations where more gradual contours can be created during interim reclamation. This would add visual variety to the width of the line (or band) of the bare soil created by the cut slope as seen from the KOPs. The cut slopes on the road/pipeline corridor could be step-terraced with some terrace widths designed to allow the placement of cleared trees for visual mitigation. The less steep cut slopes could be laid back to 2:1 slope to allow for more favorable slope for reclamation establishment.</li> <li>Woody vegetation in and below the fill slopes should be preserved to provide visual screening. Care should be taken to preserve the integrity of the stands.</li> <li>Spoils from the road should not be side cast and should be used in areas short of fill. (<b>L15W-B16W Access Road and L15W-N9W Water Pipeline specific</b>).</li> </ul> <p><u>Post-Construction</u></p> <ul style="list-style-type: none"> <li>After construction, the road alignment should be reviewed to see if the surface color contrasts with the surrounding landscape and if it detracts from viewshed (as seen from the KOPs). Dust abatement measures with MgCl should be required to help darken the color of the road so that it blends with surrounding landscape (<b>L15W-B16W Access Road and L15W-N9W Water Pipeline specific</b>).</li> </ul>

<b>Pipeline</b>	<b>J16W-N9W Water Pipeline Replacement</b> (VRM Class III and IV)	<p><u>Construction</u></p> <ul style="list-style-type: none"> <li>Rocks and woody debris should be saved during the construction process; care should be taken to preserve the canopy of the woody material while storing and transporting.</li> </ul> <p><u>Interim Reclamation</u></p> <ul style="list-style-type: none"> <li>Rocks (white side down) and woody debris saved during construction should be replaced on the pipeline corridor to emulate the texture closer to that of the native landscape and to encourage vegetation growth. Placement of rocks and woody debris on the pipeline corridor would also deter off-road travel, which would prevent additional surface disturbance, expansion of the corridor and visual impacts.</li> </ul>
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Total short-term surface disturbance for the proposed M16W pad construction would be 7.9 acres occurring on public land. Long-term, after the pad is reclaimed, the total disturbance would amount to 2.2 acres attributed to the reclaimed pad footprint (Table 2).

*Proposed M16W Access Road and Pipeline*

The M16W access road and pipeline would occur in VRM Class III. The road would provide access from the expanded J16W pad to the M16W pad. The road would be located below the ridgeline to minimize the visual effect. The graveled surfaced road would be 24 feet in width (including ditch) and 2,470 feet in length. The gas-gathering pipeline and water delivery line would be buried along the upper side of the proposed road, which would minimize additional disturbance and visual impacts. The average width of the road/pipeline corridor would be 60 feet. A hydroaxe would be used to mow the vegetation from the location prior to construction, preserving the root structure, which would facilitate vegetation growth during interim reclamation and reduce erosion.

The road would be most visible from on top of Grass Mesa as seen from KOP 3 (Figure 11) but would be screened to some extent by topography from County Road 319 and County Road 322 until the access road begins to approach the pad (Figures 9 and 10). To meet Class III objectives, mitigation requirements are summarized in Table 13 and applied as COAs (See Appendix A).

The total short-term surface disturbance attributed to the M16W access road and pipeline would be 3.4 acres occurring on public land. Long-term, after the pad is reclaimed, the disturbance would amount to 1.4 acres of reclaimed pad footprint on lands administered by the BLM (Table 2).

*L15W-B16W Access Road and L15W-N9W Water Pipeline*

The L15W-B16 W access road and water pipeline would occur in VRM Class II, III, and IV (Table 14).

<b>Table 14. VRM Class Designations Applicable to the L15W-B16W Access Road and L15W-N9W Water Pipeline</b>			
<i>Project Component</i>	<i>VRM Class Designation</i>		
	<i>Class II</i>	<i>Class III</i>	<i>Class IV</i>
<b>L15W-B16W Access Road</b>	290 feet	1,381 feet	634 feet
<b>L15W-N9W Water Pipeline</b>	314 feet	1,380 feet	808 feet
<i>Calculations are derived using GIS data provided by the operator. Each project component was clipped to its associated VRM Class Designation and the length in feet was calculated for each segment.</i>			

The new “Rose Ranch” access road would provide a new route for drilling and well completion traffic to serve the South Grass Mesa well pads. A 60-foot disturbance corridor would be used to accommodate the new access road and buried water pipeline.

The road/waterline corridor would be visible from County Road 319, County Road 322, and from on top of Grass Mesa as seen from KOPs 1, 2, and 3 (Figures 9, 10, and 11). The duration and frequency of visibility would vary from each location. The segment of the road/waterline that is within VRM Class III is the longest segment that is located on BLM land and would be the most visible from all locations and would require the most mitigation. To meet Class II, III, and IV objectives, mitigation requirements are summarized in Table 13 and applied as COAs (See Appendix A).

The segment of the road/waterline corridor that is within Class IV is on top of the Grass Mesa and would not be in direct view like the segments that cross the steeper slopes of Grass Mesa and is located in gentler topography which would require less cut/fill. VRM Class IV provides for management activities that require major modifications of the existing landscape, but are still mitigated.

The surface disturbance associated with the new road construction would amount to 7.4 acres. Except for the 1,310-foot section along the existing road to the N9W pad, the disturbance for the water pipeline has been factored into the L15W-B16W access road construction. The disturbance (on private land owned by Encana) for the 1,310-foot segment would be 1.4 acres (short-term) with no long-term disturbance allocation assuming the pipeline corridor would be acceptably reclaimed over time. After burial of the water line and reclamation of the road cuts and fills, the long-term disturbance for the new construction would total 3.0 acres. The amount of actual disturbance on BLM land would be 3.1 acres (short-term) and 1.2 acres (long-term) for the running surface of the road and the road ditch (Table 2).

*J16W-N9W Water Pipeline Replacement*

The J16W-N9W water pipeline would occur in VRM Class III and IV (Table 15).

<b>Table 15. VRM Class Designations Applicable to the J16W-N9W Water Pipeline Replacement</b>		
<i>Project Component</i>	<i>VRM Class Designation</i>	
	<i>Class III</i>	<i>Class IV</i>
<b>J16W-N9W Water Pipeline</b>	3,173 feet	1,117 feet
<i>Calculations are derived using GIS data provided by the operator. Each project component was clipped to its associated VRM Class Designation and the length in feet was calculated for each segment.</i>		

The pipeline would be constructed within the reclaimed (existing) pipeline corridor. The pipeline would be installed within a 25-foot wide disturbance between the road and the existing range allotment fence. This pipeline would also be co-located within the L15W-N9W water pipeline corridor for 1310 feet along the existing N9W road. The pipeline corridor would be most visible within the project vicinity. To meet Class III and IV objectives, mitigation requirements are summarized in Table 13 and applied as COAs (See Appendix A).

The J16W-N9W water line would amount to 2.4 acres (short-term) with no attributable long-term measure (Table 2). The 2.4-acre disturbance would occur entirely on BLM for 4185 feet alongside the J16W access road.

### *Existing Grass Mesa Road Alternative*

The existing Grass Mesa Road alternative is located on BLM and private land. This alternative would include all of the project components identified in the Proposed Action *except* for the construction of the new L15W-B16W access road and L15W-N9W water pipeline that crosses BLM and the Rose Ranch. Instead of accessing the J16W and M16W pads using the new Rose Ranch access route from the L15 W pad, these pads would be accessed using the existing Grass Mesa Homeowner Association road (GMHOA) system and BLM Grass Mesa Road from County Road 319.

Although less surface disturbance would result from not constructing the L15W-B16W access road and L15W-N9W water pipeline, there would be an increase in vehicular traffic with an associated increase in visual impacts to the residents of the Grass Mesa Subdivision including dust and light pollution.

### *No Action Alternative*

Under the No Action Alternative, none of the components of the Proposed Action would be approved and there would be no new surface disturbance. This would eliminate new impacts to the visual environment. However, the visual impacts associated with production activities and traffic related to the existing three J16W wells would continue for the producing life of the wells.

## **Wastes, Hazardous or Solid**

### Affected Environment

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 (BLM 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. Pertinent of the Federal laws dealing with hazardous materials contamination are as follows:

- The Oil Pollution Act (Public Law 101-380) 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) provides for emergency response, cleanup, and compensation associated with releases of hazardous substances into the environment. It also provides national, regional, and local contingency plans. Applicable emergency operations plans in place include the National Contingency Plan (NCP)(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.

- Hazardous spill cleanup activities that fall outside the criteria set forth in CERCLA still require the submission of a Preconstruction Notice to the U.S. Army Corps of Engineers (USACE) and may be subject to Nationwide Permit Number 38.
- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580) 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 road, pad, and pipeline and for refueling and maintaining equipment and vehicles. Potentially harmful substances used in the construction and operation 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.

Surface water or groundwater could be impacted 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 which 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.

#### *Existing Grass Mesa Road Alternative*

The deletion of the construction of the Rose Ranch Road segment and associated buried water line would not occur in this alternative. The impacts described in the Proposed Action would generally apply in this alternative with the exception that there would be slight reduction of the waste impact potential since the 1-mile length of road and waterline construction would not occur.

#### *No Action Alternative*

This alternative would result in no new disturbances, no construction and no well drilling or completion work. No impacts attributed to solid or hazardous wastes under this alternative would occur other than those associated with activities for the Fee wells.

## Water Quality, Surface and Ground

### Surface Water

#### Affected Environment

The existing locations lie within two separate USGS 6<sup>th</sup>-code hydrologic unit watershed. The project area where Proposed Activities for the M16W and J16W pads, proposed road, and proposed pipeline would occur is within the Ramsey Gulch unit, which empties directly into the Colorado River approximately 13 miles south of the project. The proposed Rose Ranch access road and pipeline connecting L15W to N9W would occur is within Dry Creek unit, which empties directly into the Colorado River approximately 13 miles south 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 the project sections in the Ramsey Gulch 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 segments 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, however, suitable or intended to become suitable for potable water supplies and agricultural purposes that include irrigation and livestock use.

Dry Creek, flowing within 1 mile from the Rose Ranch Road and pipeline area, is within WQCC segment 4e, which includes the main stems of Dry Creek including all tributaries and wetlands from the source to the confluence with the Colorado River. Following is a brief description of segment 4e.

- Segment 4e – This segment has been classified as aquatic life cold 2, recreation N, 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 for 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; no streams within segment 4e are on this list. *Colorado's Monitoring and Evaluation List* identifies water bodies where there is reason to suspect water quality problems, but uncertainty also exists regarding one or more factors. No stream segments within the project area are on the State of Colorado's *Monitoring and Evaluation List* (CDPHE 2010).

The USGS has collected limited surface water flow and quality data at sites along Dry Creek near the project area (USGS 2007b). Data were also collected from the Colorado River below the project area near Rulison in 1977 and 1978 (Table 16).

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).

<b>Table 16. Selected Water Quality Data for Two Sampling Locations near the Project Area</b>		
<b>Parameter</b>	<b>Dry Creek near Parachute, CO, USGS Site #392530108042301 8/8/1979</b>	<b>Colorado River below Rulison CO, USGS Site #09092570 4/8/1977</b>
Instantaneous discharge (cfs)	0.1	1,560
Temperature, water (°C)	22	11
Field pH (standard units)	8.3	8.1
Specific conductance (µS/cm/cm at 25°C)	1,300	1,200
Total Dissolved Solids (mg/L)	1,020	733
Hardness as CaCO <sub>3</sub> (mg/L)	540	250
Chloride (mg/L)	21	230
Selenium (µg/L)	NA	1
Dissolved oxygen (mg/L)	NA	10
Note: NA = data not available Source: USGS 2007.		

Environmental Consequences

*Proposed Action*

The Proposed Action would result in the most acres of surface disturbance and compaction. In the short term there would be approximately 30.1 acres of disturbance of which approximately 8.9 acres would not be reclaimed during the life of the wells. 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. Initially impacts can be minimized by stormwater management, stockpiling topsoil, controlling erosion, rehabilitation of 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 footprint 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. Additionally, tanks used to store produced water and condensate would be placed in secondary containment to prevent offsite release. 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. Cuttings management areas must be decontaminated to COGCC standards prior to pit closure.

The location of the M16W pad was moved south and east to avoid potential impacts to a water spring-seep area. The seep presently lies approximately 600 feet north of the proposed edge of disturbance. 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.

#### *Existing Grass Mesa Road Alternative*

The alternative action would result in 8.2 fewer acres of surface disturbance than the Proposed Action, which would reduce the impacts to surface waters.

#### *No Action Alternative*

The No Action Alternative would constitute denial of the Federal wells as proposed and none of the disturbance on BLM land would occur. There would be the least amount of potential for impacts to surface waters as described above for the Proposed Action and the Grass Mesa Road Alternative.

### ***Waters of the U.S.***

#### Affected Environment

Waters of the U.S. located in the project vicinity include the ephemeral tributaries of the Ramsey and Dry Creeks. The project is not located near the mainstem of either creek. 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. A permit is required for both permanent and temporary discharges into waters of the United States; larger discharges require an individual permit, while smaller discharges may be granted a nationwide permit (NWP).

#### Environmental Consequences

##### *Proposed Action*

No new crossings of waters of the U.S. are included in the Proposed Action, nor is any pad construction, road alignment, or pipeline installation proposed that could discharge fill into waters of the U.S.

Improperly designed crossings of small ephemeral drainages, in particular any undersized or poorly aligned culverts, could result in soil degradation, including erosion at culvert outlets. This could potentially supply sediment to the Colorado River approximately 13 miles to the north. However, standard and site-specific surface-use COAs listed in Appendix A would be implemented to protect Ramsey and Dry Creeks, the Colorado River, and any other waters of the U.S. potentially impacted by long-distance stormflow transport.

##### *Existing Grass Mesa Road Alternative*

No new crossings of waters of the U.S. are included in the Grass Mesa Road Alternative that could discharge fill into waters of the U.S.

##### *No Action Alternative*

The No Action Alternative would constitute denial of the Federal wells and well pad, roads and pipelines as proposed. Therefore, no potential exists for impacts to waters of the U.S.

## ***Groundwater***

### Affected Environment

The Lower Piceance Basin contains both alluvial and bedrock aquifers (CGS 2003). Unconsolidated alluvial aquifers are the most productive aquifers in the region (EPA 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 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 upper most 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 the 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 which consists of the lower two members of the Green River Formation, and the Wasatch Formation. Although considered a confining unit, some fresh water wells are completed in the discontinuous water bearing sands of the Wasatch Formation, but these water-bearing intervals are considered localized.

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 project 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 (EPA 2006). The quality of the water in the Mesaverde aquifer is highly variable, with concentrations of dissolved solids ranging from less than 1,000 milligrams per liter in many of the basin-margin areas to more than 10,000 milligrams per liter in the central part of the Piceance Basin (EPA 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 found throughout the basin. Only very shallow waters such as those from the surficial Wasatch Formation are used for drinking water (Graham 2001 as cited in EPA 2004).

No permitted domestic water wells are located within the proposed disturbance for the J16W pad expansion, the M16W pad construction or the proposed access road segment. Two permitted water well locations are found within a 1-mile radius of the proposed project area. Both wells are 1 mile north in Section 9, T7S, R93W. The closest well is 130 feet deep with a static water level of 88 feet bgs and is listed as monitoring well. The second well is 180 feet deep, has a static water level of 105 feet bgs, a pump rate of 8 gallons per minute, and is listed as domestic. Well depths and static water levels are indicative of wells completed in alluvial deposits.

### 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 (fracing) would be incorporated to create additional pathways to facilitate gas production. Propping agents, or proppants, are mixed with both fresh and produced water to help “prop open” the fractures created by fracing. Proppants typically 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. Hydrofracturing would be conducted at 5,000 feet or more below ground surface (bgs). Drilling scenarios are developed to prevent fluids and produced hydrocarbons from migrating upward into fresh water zones. Geologic and engineering reviews are conducted to ensure that the cementing and casing programs are adequate to protect all downhole resources. With the use of proper construction practices, drilling practices, and BMPs, no significant adverse impact to groundwater aquifers is anticipated to result from the project (see Appendix A regarding cementing and casing programs).

#### *Existing Grass Mesa Road Alternative*

No increase or decrease of impacts on groundwater resources would result from the implementation of the Grass Mesa Road Alternative.

#### *No Action Alternative*

No new adverse impacts would result from the No Action Alternative. Ongoing natural gas development in the project area would be the primary source of impacts to groundwater sources.

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

#### Affected Environment

Aquatic habitat is severely limited in the South Grass Mesa area given the intermittent nature of project area streams. No fish occur in Ramsey Gulch or Dry Creek given their small size and limited water flow.

### Environmental Consequences

#### *Proposed Action*

Since aquatic habitats do not occur within the project area, the Proposed Action would not have any direct impact on aquatic wildlife. Potential indirect effects to endangered fishes in the Colorado River are discussed under the section on Special Status Species.

### *Existing Grass Mesa Road Alternative*

Since aquatic habitats do not occur within the project area, the Proposed Action would not have any direct impact on aquatic wildlife. Potential indirect effects to endangered fishes in the Colorado River are discussed under the section on Special Status Species.

### *No Action Alternative*

Under the No Action Alternative, any action requiring Federal approval would be denied and there would be no new surface disturbance. This would eliminate new impacts to aquatic wildlife species though production activities and traffic related to the existing three J16W wells would continue for the producing life of the wells.

## **Wildlife, Terrestrial**

### Affected Environment

#### *Mammals*

The site is located within winter range and severe winter range for both mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elaphus nelsoni*) as mapped by CDOW (2008). Winter range is the portion of the overall range of a species in which 90% of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up, or during a site-specific period of winter as defined for each data analysis unit (DAU) (CDOW 2008). Severe winter range is that part of the range of a species where 90 percent of the individuals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten (CDOW 2006). Field surveys indicate that the project area is occupied winter range for elk and that mule deer occupy on a year-round basis.

Large carnivores present in the project vicinity include the mountain lion (*Puma concolor*) and black bear (*Ursus americanus*). CDOW (2008) has mapped all of the analysis area as black bear (*Ursus americanus*) overall range. In addition, the southeastern portions of the analysis area are at the periphery of a black bear fall concentration area (CDOW 2008), reflecting the abundance of calorie-rich acorns and berries provided by the oaks and rosaceous shrubs (serviceberry, chokecherry). Mountain lions move seasonally to generally follow migrations of their preferred prey, mule deer. Two medium-sized 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. Smaller carnivores in habitats similar to those near the project site include the ringtail (*Bassariscus astutus*) and spotted skunk (*Spilogale gracilis*).

Small mammals present within the planning area include rodents such as the rock squirrel (*Spermophilus variegatus*), golden-mantled ground squirrels (*S. lateralis*), least chipmunk (*Tamias minimus*), and packrat (bushy-tailed woodrat) (*Neotoma cinerea*), as well as the mountain cottontail (*Sylvilagus nuttallii*). Rodents and, to a lesser extent rabbits, are the primary prey base for a variety of avian and mammalian predators.

#### *Birds*

Raptors potentially nesting in the large Gambel's oaks throughout the project vicinity include two small resident hawks (Cooper's hawk, sharp-shinned hawk) and, where taller conifers are present for nesting or

perching, two larger resident raptors (red-tailed hawk and great horned owl). Other birds of prey potentially present include three small owls: the migratory flammulated owl and the resident northern pygmy owl and northern saw-whet owl, the latter two primarily where tall conifers or tall deciduous trees are present among the shrubs.

Other residents or short-distance migrants in the project vicinity include the northern flicker (*Colaptes auratus*), common raven (*Corvus corax*), black-billed magpie (*Pica hudsonia*), western scrub-jay (*Aphelocoma californica*), mountain and black-capped chickadees (*Poecile gambeli*, *P. atricapillus*), American robin (*Turdus migratorius*), Townsend's solitaire (*Myadestes townsendi*), blue-gray gnatcatcher (*Poliophtila caerulea*), and house finch (*Carpodacus mexicanus*). See the sections on Migratory Birds and Special Status Species for discussions of other birds in the area.

One upland gamebird species occurs in the project vicinity, the wild turkey (*Meleagris gallopavo*). Although the area is not mapped by CDOW as a turkey concentration area, the abundant acorns and berries that attract black bears are likely to also attract turkeys, particularly in fall, but also in other seasons when they can forage for other plant and invertebrate food items in the dense leaf litter.

#### *Reptiles and Amphibians*

The project area is above the elevational range of most reptile species known to occur in Garfield County. Species most likely to occur include the western fence lizard (*Sceloporus undulatus*) and gopher snake (bullsnake) (*Pituophis catenifer*) in xeric shrublands or grassy clearings and the western terrestrial garter snake (*Thamnophis elegans*) in mesic sites. Other snakes in the project vicinity are mostly associated with riparian habitats, and especially at lower elevations. For the same reason, amphibians are not expected to occur within or near the project area. However, the amphibian with the greatest potential for occurrence is the western chorus frog (*Pseudacris triseriata*), which can breed and reside in small, temporary wetland areas.

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would result in the initial loss and fragmentation of 30.1 acres of wildlife habitat. Following partial reclamation of new well pads and roads, long-term forage disturbance would be reduced to approximately 8.9 acres for the Proposed Action. Reclamation activities would benefit some wildlife species by increasing herbaceous forage. In areas where shrubs and trees would be disturbed, impacts to wildlife from loss of thermal and/or hiding cover would be long-term, lasting the 20 to 30+ years following reclamation that it would take for these woody species to re-establish. Surface disturbing activities within these habitats during the winter and during migratory seasons have the potential to displace mule deer and elk from these important habitats.

Construction activities, soil disturbance, and traffic could potentially spur the introduction and spread of weed species within the Grass Mesa geographic area. Weed invasion and establishment has become an increasingly important concern associated with surface disturbing activities in the West. Weeds often out-compete native plant species, rendering an area less productive as a source of forage for wildlife. However, implementation of the suggested mitigation measures in the Invasive, Non-Native Weeds section of this EA would minimize the potential for invasion and establishment of the Grass Mesa geographic area by undesirable plants.

Indirect impacts on wildlife, especially big game and raptors, would be the disturbance caused by increased human activity, equipment operation, vehicle traffic, harassment by any dogs brought to the site

by contractors, and noise related to drilling and completion activities. Most species of wildlife are relatively secretive and distance themselves from these types of disturbance or move to different areas screened by vegetation screening or topographic features. This avoidance, referred to as displacement, results in underuse of habitat near the disturbance. Avoidance of forage and cover resources adjacent to disturbance reduces habitat utility and the capacity of the affected acreage to support wildlife populations (BLM 1999a).

Nearly all of the Proposed Action would occur on Federal Lease COC55604. As shown in Table 4, Summary of Lease Stipulations, a timing limitation would be enforced from December 1 through April 30 to protect big game winter habitats.

#### *Existing Grass Mesa Road Alternative*

The existing Grass Mesa Road alternative would result in the initial loss and fragmentation of 21.9 acres of wildlife habitat. Following partial reclamation of new well pads and roads, long-term forage disturbance would be reduced to approximately 5.9 acres for this alternative. Reclamation activities would benefit some wildlife species by increasing herbaceous forage. In areas where shrubs and trees would be disturbed, impacts to wildlife from loss of thermal and/or hiding cover would be long-term, lasting the 20 to 30+ years following reclamation that it would take for these woody species to re-establish. Surface disturbing activities within these habitats during the winter and during migratory seasons have the potential to displace mule deer and elk from these important habitats.

#### *No Action Alternative*

Under the No Action Alternative, any action requiring Federal approval would be denied and there would be no new surface disturbance. This would eliminate new impacts to Terrestrial Wildlife Species though production activities and traffic related to the existing three J16W wells would continue for the producing life of the wells.

### **SUMMARY OF CUMULATIVE IMPACTS**

Until relatively recently, modifications of the region have been characteristic of agricultural and ranching lands, with localized industrial impacts associated with the railroad and I-70 corridors. More recently, these changes are cumulative to the growth of residential and commercial uses, utility corridors, oil and gas developments, and other rural industrial uses. These increasing activity levels have accelerated the accumulation of impacts in the area. Cumulative impacts have included (1) direct habitat losses; (2) habitat fragmentation and losses in habitat effectiveness; (3) elevated potential for runoff, erosion, and sedimentation; (4) expansion of noxious weeds and other invasive species; and (5) increased noise and traffic and reductions in the scenic quality of the area (BLM 1999a: 4-1 to 4-68).

Although none of the cumulative impacts described in the 1999 FSEIS was characterized as significant, and while new technologies and regulatory requirements have reduced the impacts of some land uses, it is nonetheless clear that past, present, and reasonably foreseeable future actions has had and would continue to have adverse affects on various elements of the human environment. The anticipated impact levels for existing and future actions range from negligible to locally major, and primarily negative, for specific resources. The primary reasons for this assessment are twofold: (1) the rate of development, particularly oil and gas development, has until recently been increasing in the area, resulting in an accelerated accumulation of individually nominal effects; and (2) residential and commercial expansion, as well as most of the oil and gas development, has occurred private holdings lands where mitigation measures designed to protect and conserve resources are not in effect.

It is clear that the Proposed Action would contribute to the collective adverse impact for some resources. Although the contribution would be very minor, the Proposed Action would contribute incrementally to the collective impact to air quality, vegetation, migratory birds, terrestrial wildlife, and other resources.

**PERSONS AND AGENCIES CONSULTED**

Encana Oil & Gas (USA) Inc – Miracle Pfister, Deanne Spector, David Grisso, Scott Parker, Bryan Whiteley, Bob Anderson, Renata Busch, Paul Row

Private Landowner – Jim Rose

Colorado Oil and Gas Conservation Commission – Dave Kubeczko

Garfield County Oil and Gas Liaison Office – Nikki Reckles

Tri-State Land Surveying, Inc. (J16W pad)

Wasatch Surveying Associates (M16W pad, L15W-B16W Road & L15W-N9W Water Pipeline)

**INTERDISCIPLINARY TEAM REVIEW**

BLM staff from the CRVFO who participated in the preparation of this EA—including review of survey results submitted by Encana’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 17.

<b>Table 17. BLM Interdisciplinary Team Authors and Reviewers</b>		
<i>Name</i>	<i>Title</i>	<i>Areas of Participation</i>
Beth Brenneman	Ecologist	Invasive Non-native Species, Special-status Species (Plants), Vegetation
John Brogan	Archaeologist	Cultural Resources, Native American Religious Concerns
Jim Byers	Natural Resource Specialist	EA Project Lead, Access and Transportation, Range Management, Socio-Economics
Allen Crockett, Ph.D.	Supervisory NRS	NEPA Review
William Howell	Petroleum Engineer	Downhole COAs
Shauna Kocman, Ph.D.	Hydrologist	Air Quality, Noise, Soils, Surface Water, Waters of the U.S.
Julie McGrew	Natural Resource Specialist	Visual Resources
Sylvia Ringer	Wildlife Biologist	Migratory Birds, Special-status Species (Animals), Wildlife, Aquatic and Terrestrial
Todd Sieber	Geologist	Geology and Minerals, Groundwater, Paleontology

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**DOI-BLM-CO-N040-2011-0072-EA**

The environmental assessment analyzing the environmental effects of the Proposed Action has been reviewed. The approved mitigation measures result in a Finding of No Significant Impact on the human environment. Therefore, an environmental impact statement 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 presented in the attached Environmental Assessment (EA). The Proposed Action includes (1) expansion of the existing J16W pad; (2) construction of the new M16W pad, road and associated pipelines; (3) construction of the L15W-B16W (Rose Ranch) Access Road; (4) the burial of the L15W-N9W water pipeline; (5) the installation of the J16W-N9W water pipeline; and (6) the drilling, completion, and production of Federal oil and gas wells on the J16W and M16W pads.

It is my decision to proceed with the processing and approval of the BLM rights-of-way for (1) the Fee wells in Section 17, to allow the Fee wells to occupy the M16W pad on BLM throughout their productive cycle; (2) the BLM segments of the L15W-N9W water line; and (3) the J16W-N9W water pipeline. Furthermore, it is my decision to allow the Fee wells in Section 16 to occupy the BLM surface on the M16W pad, because these wells lie within the boundary of the Middleton Creek Unit.

Initiation of surface-disturbing activities and of drilling and completion activities associated with Federal oil and gas wells on the J16W and M16W pads shall not commence until approval by BLM of the APDs, rights-of-way, and Sundry Notices submitted by Encana Oil & Gas (USA) Inc.

This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

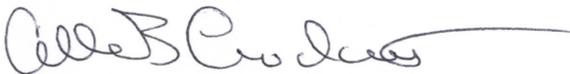
RATIONALE: The bases for this decision are as follows:

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 have been mitigated with measures incorporated into the Proposed Action or as specified in the Conditions of Approval (COAs) appended to the EA.

MITIGATION MEASURES: Mitigation measures presented in Appendix A will be applied as COAs for both surface and drilling operations.

NAME OF PREPARER: Jim Byers, Natural Resource Specialist

SIGNATURE OF AUTHORIZED OFFICIAL:



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

April 29, 2011  
Date Signed

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**APPENDIX A**

**Standard Surface-Use Conditions of Approval**

**Site-Specific Surface-Use Conditions of Approval  
for  
J16W Pad  
M16W Pad, Road and Pipeline  
L15W-B16W Access Road  
J16W-N9W Buried Water Line**

**Downhole Conditions of Approval  
for  
J16W Pad  
M16W Pad**

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**STANDARD SURFACE-USE CONDITIONS OF APPROVAL  
DOI-BLM-CO-N040-2011-0072-EA**

The following standard surface use COAs are in addition to all stipulations attached to the respective Federal leases and to any site-specific COAs for individual well pads.

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.
2. Brush Clearing for Pad and Road Work. The road, pad and pipeline brush/tree clearing work shall be accomplished with the use of a brush cutter machine (hydroaxe). Such clearing work shall be completed prior to start of any earthwork unless otherwise authorized by the BLM.
3. 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. (*Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, The Gold Book, Fourth Edition—Revised 2007, BLM/WO/ST-06/021+3071/REV 07.*)
  - a. Road Construction Staking. The road centerline would be flagged and staked prior to the start of tree/brush clearing and/or earthwork within the planned disturbance corridor. The edges of disturbance for the road and pipeline would be established with flagging before the tree clearing work is completed. Consideration shall be given to the extra pipeline construction space needed during the road corridor staking.
  - b. Construction Best Management Practices. The following BMPs proposed by the operator would be incorporated into the construction techniques to address any saturated or fragile soil conditions, seeps, springs or slumps encountered during the actual road pioneering:
    - During the initial road pioneering, a surface disturbance corridor shall be established with sufficient area to allow trenching, spoil storage and pipeline burial within the roadway disturbance corridor.
    - Road structures and cut/fill instability issues, if present, shall be mitigated with soil and slope reinforcement including, but not limited to; soil importation, mechanical compaction, design and installation of synthetic geogrids, aggregated subgrade and road base, mechanically stabilized earth walls, and gabion buttress walls and mattresses.
    - Surface runoff shall be mitigated with, but not limited to, the installation of CMP culverts, borrow ditches, diversion berms, riprap and other diversionary structures as required by site conditions.
    - Subsurface ground water shall be mitigated with the installation of several alternatives including, but not limited to; gravel pack drains, French drains, and collection sumps as required by site conditions.

- All road construction activities shall be supported with a fully implemented stormwater management plan, best management practices and a reclamation/vegetation plan.

c. Earthwork Sidecasting Restriction. On the L15W-B16W Road, where sideslopes exceed 50%, no sidecasting from road construction shall be allowed; excavated material shall be end-hauled or machine-drifted to a location with gentler slopes – preferably where additional fill material will be needed. Where feasible in areas with sideslopes less than 50%, cuts shall be laid back to 2:1 slope in order to break up the visual scar and facilitate reclamation.

Additional road construction COAs are found under Site-Specific COAs for L15W-B16W Access Road

4. Drill Cuttings Management. The drill cuttings shall be placed in an excavated trench on the pad or stacked against the cutslope on the pad surface. The cuttings shall be remediated per COGCC regulations (Table 910-1 standards) prior to trench closure and/or earthwork reshaping related to well pad interim reclamation.
5. Remote Frac Site Use. The N9W pad site is recommended for any remote water storage and water delivery (with surface frac lines) be implemented for the well completion work on either the J16W pad or M16W pad.
6. 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.
7. 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 (Travis Morse).

8. 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 (Travis Morse). Copies of any printed or emailed approved USACE permits or verification letters shall be forwarded to the BLM.

9. Wetlands and Riparian Zones. The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Colorado River Valley Field Office to determine appropriate mitigation, including verification of native plant species to be used in restoration.
10. 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 will be required prior to APD approval. The plan shall contain the following components: detailed reclamation plans, 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 for the pad. Reclamation, including seeding, of temporarily disturbed areas along roads, pipelines, and topsoil piles and berms, shall be completed within 30 days following construction.

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 will 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 number 19) 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.

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

Requests for use of soil amendments, including basic product information, shall be submitted to the BLM 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 Attachments 1 and 2 of the letter provided to operators dated May 1, 2008). Note that temporary seeding no longer allows the use of sterile hybrid non-native 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 noxious, prohibited, or restricted 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 reseeding 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 will be considered firmly established when at least 50% of the new plants are producing seed. The BLM will 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 BLM.
11. 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 shall be submitted to BLM by **December 1**.
  12. 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**.
  13. 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, should be coordinated with the BLM project lead and BLM wildlife biologist and the USFWS representative in the BLM Field Office (970-876-9051).
  14. Raptor Nesting. Raptor nest surveys in the project vicinity resulted in the location of one or more raptor nest structures within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility. To protect nesting raptors, a 60-day Timing Limitation (TL) shall be applied to the M16W road, pipeline or pad construction, drilling, or completion activities within the buffer widths specified above, if the activities would be initiated during the nesting period of **April 1 to May 31**. An exception to this TL may be granted for any year in which a subsequent survey determines one of the following: (a) the nest is in a severely dilapidated condition or has been destroyed due to natural causes, (b) the nest is not occupied during the normal nesting period for that species, (c) the nest was occupied but subsequently failed due to natural causes, or (d) the nest was occupied, but the nestlings have fledged and dispersed from the nest.
  15. Migratory Birds. 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. Under the MBTA, “take” means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such

conduct. The operator shall prevent use by migratory birds of any pit containing fluids associated with oil or gas operations, including but not limited to reserve pits, produced water pits, frac-water pits, cuttings trenches (if covered by water/fluid), and evaporation pits. Fluids in these pits may pose a risk to migratory birds (e.g., waterfowl, shorebirds, wading birds, songbirds, and raptors) as a result of ingestion, absorption through the skin, or interference with buoyancy and temperature regulation. Regardless of the method used, it shall be in place within 24 hours following the placement of fluids into a pit. Because of high toxicity to birds, oil slicks and oil sheens should immediately be skimmed off the surface of any pit that is not netted. The most effective way to eliminate risk to migratory birds is prompt drainage, closure, and reclamation of pits, which is strongly encouraged. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the USFWS representative in the BLM Field Office at 970-876-9051 (Creed Clayton) and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.

16. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from **May 1 to July 1** to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will 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 aural 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.
17. Range Management. Range improvements (fences, gates, reservoirs, pipelines, etc) shall be avoided during development of natural gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator will be responsible for repairing or replacing the damaged range improvements.

A new steel frame gate would be installed in two locations:

- (1) The existing range fence near the junction of the new Rose Ranch road with the existing B16W road. This gate shall remain closed and locked except during heavy truck traffic periods related to rig mobilizations or well completions. All production truck traffic serving the J16W pad, M16W pad or any pads on Grass Mesa proper shall use the BLM Grass Mesa Road in Section 3.
- (2) The existing range fence between the J16W and M16W pads located along the proposed M16W access road. This gate shall remain closed between May 15 and October 15 (livestock season of use) except when vehicles are passing through the gate.

Additionally, a perimeter fence capable of holding grazing livestock would be installed around newly constructed well pads prior to pad construction to help provide a barrier to grazing livestock during the drilling/completion phase and mitigate potential surface impacts to surrounding special status plant species and habitat

18. Paleontological 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 will, 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.

19. 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 will 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 U.S.C 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 will 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 will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places
- what mitigation measures the holder will 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 will 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 will 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 U.S.C 433, 16 U.S.C 470, 18 U.S.C 641, 18 U.S.C 1170, and 18 U.S.C 1361).

20. Visual Resources. Existing vegetation shall be preserved when clearing and grading for pads, roads, and pipelines. The BLM may direct that cleared trees and rocks be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features.

Above-ground facilities shall be painted **Shadow Gray** to minimize contrast with adjacent vegetation or rock outcrops. The color shall be specified by the BLM and attached as a COA to individual APDs.

During construction, BLM and Encana representatives shall jointly review construction measures to determine effectiveness in meeting visual resource mitigation measures, and if subtle changes in construction techniques are warranted.

During interim reclamation on pads, all cut and fill slopes shall have undulating contours that emulate the slopes seen in the adjacent landscape. Constructed slopes shall meet existing grades with a similar slope to eliminate the line created at the edge where two different grades meet.

21. 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. Specifically for roads, topsoil windrows shall be created above the top of the planned cutslope and below the toe of the planned fillslope, where feasible based on topography. Topsoil berms shall be promptly seeded to maintain soil microbial activity, reduce erosion, and minimize weed establishment.
22. Soils. Cuts and fills shall be minimized when working on erosive soils and slopes in excess of 30 percent. Cut-and-fill slopes shall be stabilized through revegetation practices with an approved seed mix shortly following construction activities to minimize the potential for slope failures and excessive erosion. Fill slopes adjacent to drainages shall be protected with well-anchored silt fences, straw wattles, or other acceptable BMPs designed to minimize the potential for sediment transport. On slopes greater than 50 percent, BLM personnel may request a professional geotechnical analysis prior to construction.
23. 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 COAS APPLICABLE TO J16W PAD EXPANSION  
SOUTH GRASS MESA PROJECT**

The following site-specific surface use COAs are in addition to the standard COAs applicable to all pipelines within the South Grass Mesa project and all stipulations attached to the respective Federal leases.

1. The remote telemetry tower shown on Tri-State Sheet 7 of 11 shall be removed prior to any pad expansion work.
2. The existing pad enclosure fence shall be removed as necessary to accommodate the earthwork slated for the pad expansion and the fence perimeter shall be re-established around the new edge of disturbance for the expanded pad. Such fence work shall be completed prior to any earthwork startup on the J16W pad. No surface disturbance shall be allowed for any reason outside the new fenced J16W pad boundary. A steel frame gate shall be installed at the J16W pad entrance to control grazing livestock from entering the pad area.
3. When planning and staging the storage tanks on the J16W pad, sufficient space must be allowed to set the tanks serving the M16W wells within the planned tank battery and containment.

Prior to installation of the storage tank batter and separator units on the J16W pad, a site visit by EnCana and BLM representatives shall determine the final location of the production facilities.

**SITE-SPECIFIC COAS APPLICABLE TO M16W PAD  
SOUTH GRASS MESA PROJECT**

1. Prior to beginning any earthwork on the M16W pad, a perimeter fence capable of keeping livestock off the pad shall be installed around the outer edge of the proposed pad disturbance. No surface disturbance shall be allowed for any reason outside the fenced M16W pad perimeter. A steel frame gate shall be installed at the J16W pad entrance to control grazing livestock from entering the pad area.
2. The storage tanks supporting the M16W wells shall be staged on the J16W pad within the planned J16W tank battery designed with appropriate secondary containment. During the installation of the M16W buried gas pipeline, the dump lines from the separators on the M16W pad that will serve the M16W tanks shall be buried concurrently. Prior to installation of the separator units, a site visit by EnCana and BLM representatives shall determine the final location of the separators on the pad.

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.

3. During interim reclamation, a berm along the northern edge of the pad shall be constructed to interrupt the sightline from viewers located below the pad (residents of the Grass Mesa Subdivision and the private cabin). The slopes of the berm shall mimic those found in the adjacent landscape, gradually transitioning to meet grade. Where the berm begins to meet the adjacent contours, the edge shall be transitioned; it shall not form a visually disruptive line where it meets the existing grade.

4. To protect nesting raptors, a 60-day Timing Limitation (TL) shall be applied to the M16W road, pipeline or pad construction, drilling, or completion activities within the buffer widths specified above, if the activities would be initiated during the nesting period of **April 1 to May 31**.

**SITE-SPECIFIC COAS APPLICABLE TO L15W-B16W ACCESS ROAD  
SOUTH GRASS MESA PROJECT**

1. Prior to beginning any earthwork on the L15W-B16W Access Road, the proposed road alignment shall be reviewed with the landowner to determine the location of any water seeps in the vicinity. Should a source of water be located that needs to be routed and fed under the proposed road, Encana shall coordinate with the landowner on the location of any ditching and method to transfer collected water under the roadway.
2. The existing Rose ditch that traverses across BLM land north of the B16W pad and flows east to Rose Ranch property shall remain functional during the planned road and water line installations. A properly-sized corrugated metal pipe shall be installed in the ditch alignment under the new L15W-B16W road within 48 hours of the road being pioneered into that location – unless otherwise approved by the Authorized Officer.
3. Prior to construction, areas where clearing within dense vegetation shall be identified and staked so that the adjacent vegetation can be thinned during pioneering of the road and pipeline corridor to soften the strong linear form created between the new construction and existing vegetation. The woody debris from the thinned areas shall be stockpiled for dispersing over seeded areas during interim reclamation.
4. The upper edge of the cut slopes shall undulate and take advantage of opportunities where the existing topography and openings in vegetation provide locations where more gradual contours can be created during interim reclamation. This would add visual variety to the width of the line (or band) of the bare soil created by the cut slope as seen from the KOPs. The cut slopes on the road/pipeline corridor could be step-terraced with some terrace widths designed to allow the placement of cleared trees for visual mitigation. The less steep cut slopes could be laid back to 2:1 slope to allow for more favorable slope for reclamation establishment.
5. After construction, the road alignment shall be reviewed to determine if the road surface color detracts from the viewshed (as viewed from the KOPs). If it is determined that the road surface color contrasts with the surrounding landscape, dust abatement measures with Magnesium Chloride or other dust abatement measure, as approved by the BLM authorized officer, shall be required. The operator shall implement a regularly scheduled dust abatement application so that the road surface takes on and maintains a dark appearance when the road is viewed from the KOPs. The level and type of treatment may be changed in intensity and must be approved by the BLM authorized officer. Magnesium chloride or other chemical suppressant shall not be applied within 100 feet of any drainage.
6. The L15W-B16W Access Road shall be used only for construction, drilling and completion activities related to the J16W and M16W pads or the proposed water line installations serving the N9W pad area. All production traffic on Grass Mesa, including trucks supporting the future producing wells on the J16W and M16W pads, shall use the existing BLM's Grass Mesa road.

7. To protect special status plants in proximity of the L15W-B16W Access Road, large boulders shall be placed along the outside edge of the road and/or drainage ditch to ensure that vehicles including ATVs do not leave the roadway and potentially disturb the plants or habitat. This work shall occur between the existing B16W road and the eastern edge of Grass Mesa. The rocks shall also be placed in a manner that further inhibits travel around the traffic control gate to be installed near the edge of the mesa.

### **SITE-SPECIFIC COAS APPLICABLE TO GAS AND WATER PIPELINES SOUTH GRASS MESA PROJECT**

These COAs shall also be attached to the Pipeline Right-of-Way Grants issued for this project.

1. Brush Clearing for Pipeline Work. The pipeline brush/tree clearing work shall be accomplished with the use of a brush cutter machine (hydroaxe) across the entire planned disturbance corridor for the pipeline unless otherwise authorized by the BLM. Such clearing work shall be completed prior to start of any earthwork.
2. Pipeline Excavation Restrictions. Excavation work disturbing the topsoil and underlying root mass shall occur only above the planned pipeline trench area. Areas within the disturbance corridor that will serve as topsoil or trench spoil areas shall have topsoil and root mass remain in place with the excess materials windrowed on top of the mowed vegetation.

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.

3. Pipeline Installations. The steel gas pipeline (maximum 12-inch diameter) serving the M16W well pad shall be buried within the M16W road disturbance corridor (maximum corridor width shall be 60 feet). The buried water delivery “dump” line(s) flowing fluids from the M16W separators to the storage tanks staged on the J16W pad shall be buried concurrently in the same M16W gas line trench so the trench is only opened and disturbed one time. The gas and water pipelines shall be installed during the road pioneering phase so that road and pipeline reclamation would be accomplished together.

The L15W-N9W steel water line (maximum 12-inch diameter) shall be buried within the L15W-B16W road disturbance corridor (maximum corridor width shall be 60 feet).. The pipeline shall be installed during the road pioneering phase so that road and pipeline reclamation would be accomplished together.

The J16W-N9W water delivery line (maximum 12-inch diameter) shall be buried within the existing reclaimed gas pipeline corridor along the east side of the J16W access road. The existing range fence that parallels the east edge of the pipeline corridor shall remain undisturbed and functional during the water line work. If damaged during the construction work, this fence shall be repaired within a 2-hour period of the occurring damage.

Should a temporary water line serve the water delivery needs for the J16W and M16W pad, that line shall be laid within the existing road-pipeline disturbance area and shall be decommissioned and removed prior to winter weather conditions (December 1) unless otherwise approved by the Authorized Officer.

4. Hydrostatic Pipeline Testing. After testing of newly installed pipelines including surface water delivery lines, water used in pressure testing of the lines shall be disposed at a State-approved facility or reused for drilling and/or completion operations.
5. Welding of Pipeline. A minimum of 10% of all welds shall be X-rayed. Visual inspections shall be performed on 100% of all pipeline welds. Any pipeline occurring within the Rifle Municipal Watershed Area and/or within 100 feet of any perennial or intermittent stream crossing shall have all welds X-rayed. Area All bored areas shall have 100% X-rays of all pipeline welds. (49 CFR 192.225 Welding procedures) All welders shall be appropriately certified. (49 CFR 192.227 Qualification of welders). NOTE: 49 CFR Subpart F—Joining of Materials other than by Welding (192.281 includes plastic pipe).
6. Pipeline Warning Signs. Pipeline warning signs shall be installed within five days of construction completion and prior to use of the pipeline for transportation of product. Pipeline warning signs are required at all road crossings. Signs shall be visible from sign to sign along the right-of-way. For safety purposes, each sign shall be permanently marked with the holder's name and shall clearly identify the owner (emergency contact) and purpose (product) of the pipeline. (49 CFR 192.707(a) Buried Pipelines).
7. Surface Pipelines. All surface pipelines shall be marked with surface signs denoting the type of pipeline, WARNING notations, CONTACT information.
8. Pipeline Testing and Notifications. The entire pipeline shall be tested in compliance with DOT regulations (49 CFR Part 192). Incremental segments of the pipeline shall be tested to the desired maximum pressure and held for the duration of the test (8 hours minimum). (49 CFR 192.503.c).

Notification to all nearby residents as well as the Garfield County Dispatch Center shall be made no less than 24 hours prior to the pressure test and blow down. All necessary and reasonable precautions shall be taken to ensure the safety of the employees and the general public, the lands, domestic animals and wildlife, etc. This may include, but not be limited to, restriction of access to the pipe being tested, temporary warning signs installed in appropriate locations, effective communication.

Encana and its contractors shall ensure that pressure testing operations are carried out in accordance with the following:

- United States Department of Transportation Code of Federal Regulations (CFR), Title 49, Part 192, Subpart J, entitled "Test Requirements"
  - Environmental Protection Agency
  - Portable compressors for pressure testing shall not be stationed within 100 feet of any residence. All nearby residents, including the Garfield County Dispatch Center, shall be notified at least 24 hours in advance of beginning the pipeline loading process.
9. Fire Suppression. Welding or other use of acetylene or other torch with open flame shall be operated in an area barren or cleared of all flammable materials at least 10 feet on all sides of equipment. Internal combustion engines shall be equipped with approved spark arrestors which meet either (a) the USDA Forest Service Standard 5100-1a or (b) Society of Automotive Engineers (SAE) recommended practices J335(b) and J350(a).

10. Visual Resources. Rocks saved during construction shall be replaced “white side down” on the pipeline corridor during interim reclamation to reduce the amount of color contrast with the surrounding landscape and to deter off-road travel. Rocks and woody debris shall be replaced on the pipeline corridor to emulate the texture closer to that of the native landscape and to encourage vegetation growth. Placement of rocks and woody debris on the pipeline corridor will also deter off-road travel, which will prevent additional surface disturbance, expansion of the corridor and visual impacts.



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**DOWNHOLE CONDITIONS OF APPROVAL**  
**Applications for Permit to Drill**

**Company/Operator:** Encana Oil & Gas (USA) Inc.

**Surface Location:** NWSE, Section 16, Township 7 South, Range 93 West, 6<sup>th</sup> P.M.

<u>Well Name</u>	<u>Well No. / Pad</u>	<u>Bottomhole Location</u>	<u>Lease/Unit</u>
Federal HMU	16-9C / J16W	NESE, Sec 16, T7S, R93W	COC55604/055972X
Federal HMU	16-10A / J16W	NWSE, Sec 16, T7S, R93W	COC55604/055972X
Federal HMU	16-11B / J16W	NESW, Sec 16, T7S, R93W	COC55604/068997X
Federal HMU	16-11D / J16W	NESW, Sec 16, T7S, R93W	COC55604/055972X
Federal HMU	16-14A / J16W	SESW, Sec 16, T7S, R93W	COC55604/055972X
Federal HMU	16-14D / J16W	SESW, Sec 16, T7S, R93W	COC55604/055972X
Federal HMU	16-14D2 / J16W	SESW, Sec 16, T7S, R93W	COC55604/068997X
Federal HMU	16-14D3 / J16W	SESW, Sec 16, T7S, R93W	COC55604/068997X
Federal HMU	16-16B / J16W	SESE, Sec 16, T7S, R93W	COC55604/068997X
Federal HMU	16-16C / J16W	SESE, Sec 16, T7S, R93W	COC55604/068997X
Federal HMU	16-16C2 / J16W	SESE, Sec 16, T7S, R93W	COC55604/068997X
Federal HMU	21-1B / J16W	NENE, Sec 21, T7S, R93W	COC61121/068997X
Federal HMU	21-3A / J16W	NENW, Sec 21, T7S, R93W	COC61121/068997X

1. Twenty-four hours *prior* to (a) spudding, (b) conducting BOPE tests, (c) cementing/running casing strings, and (d) within twenty-four 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; and Alan White, 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, Will Howell at 970-876-9049 (office) or 970-319-5837 (cell) for verbal approvals.
3. If a well control issue (e.g. kick, blowout, water flow, casing failure, or a bradenhead pressure increase) occurs during drilling or completions operations, Will Howell 970-876-9049 (office), 970-319-5837 (cell) shall be notified within 24 hours from the time of the event. IADC/Driller's Logs and Pason Logs (mud logs) will be forwarded to CRVFO, Will Howell, 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 #2 for a **5M** system and recorded in the IADC/Driller's log. A casing head rated to 5,000 psi or greater shall be utilized.
5. 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 trip tank, pit volume totalizer, stroke counter, and flow sensor.
6. 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.

7. 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' 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.
8. A minimum length of 1,500 feet of surface casing will be required on these wells to protect potential water source/aquifers and control loss circulation zones.
9. After the surface casing is cemented, in order to make sure the surface casing is set in a competent formation, a Pressure Integrity Test/Mud Equivalency Test/FIT will be performed on the first well drilled in accordance with OOGO No. 2; Sec. III, B.1. i. This is not a Leak-off Test, but a formation competency test, insuring the formation at the shoe is tested to the minimum mud weight equivalent anticipated to control the formation pressure to the next casing shoe depth or TD. Submit the results from the test via email (whowell@blm.gov) on the first well drilled on the pad and record results in the IADC log.
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, Will Howell, 2300 River Frontage Road, Silt, CO 81652 within 48 hours. If the TOC is lower than required or the cement sheath of poor quality, then within 48 hours from running the CBL and prior to commencing fracturing operations, a CRVFO petroleum engineer shall be notified for remedial operations.  
  
A greater volume of cement may be required to meet the 200-foot cement coverage requirement for the Williams Fork Fm./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, Will Howell/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 CFR 3160-9 (a). Contact Will Howell for clarification.
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, Will Howell 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 within 48 hours after frac operations.
14. Submit a monthly report of operations or production per 43 CFR 3162.4-3 including any production from these wells in MCFPD, BOPD, BWPD with FTP/SITP until the completion report (Form 3160-4) is filed.

15. Per 43 CFR 3162.4-1(c), not later than the fifth 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.

## DOWNHOLE CONDITIONS OF APPROVAL

### Applications for Permit to Drill

**Company/Operator:** EnCana Oil & Gas (USA)

**Surface Location:** SWSW, Section 16, Township 7 South, Range 93 West, 6<sup>th</sup> P.M.

<u>Well Name</u>	<u>Well No. (Pad)</u>	<u>Bottomhole Location</u>	<u>Lease</u>
MCU	16-13B (M16W)	SWSW, Sec 16, T7S, R93W	COC 55604
MCU	16-13C (M16W)	SWSW, Sec 16, T7S, R93W	COC 55604
MCU	16-13D (M16W)	SWSW, Sec 16, T7S, R93W	COC 55604
MCU	21-3B (M16W)	NENW, Sec 21, T7S, R93W	COC 61121
MCU	21-4A (M16W)	NWNW, Sec 21, T7S, R93W	COC 61121
MCU	21-4B (M16W)	NWNW, Sec 21, T7S, R93W	COC 61121
MCU	21-4C (M16W)	NWNW, Sec 21, T7S, R93W	COC 61121
MCU	21-4D2 (M16W)	NWNW, Sec 21, T7S, R93W	COC 61121
MCU	21-5A (M16W)	NWNW, Sec 21, T7S, R93W	COC 61121

1. Twenty-four hours *prior* to (a) spudding, (b) conducting BOPE tests, (c) cementing/running casing strings, and (d) within twenty-four hours *after* spudding, the CRVFO shall be notified. One of the following CRVFOs 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; and Alan White, 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, Will Howell at 970-876-9049 (office) or 970-319-5837 (cell) for verbal approvals.
3. If a well control issue (e.g. kick, blowout, water flow, casing failure, or bradenhead pressure increase) arises during drilling or completions operations, Will Howell 970-876-9049 (office), 970-319-5837(cell) shall be notified within 24 hours from the time of the event. IADC/Driller's Logs and Pason Logs (mud logs) will be forwarded to CRVFO, Will Howell; 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 #2 for a **5M** system and recorded in the IADC/Driller's log. A casing head rated to 5,000 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, deformation, and as straight/short as possible.
6. Prior to drilling out the surface casing shoe, an electrical/mechanical mud monitoring equipment shall be function tested. As a minimum, this equipment shall include a trip tank, 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 gain/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' from the well head 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. A length of 1,102 to 1,548 feet of Surface Casing will be required on these wells to protect potential water source/aquifers and control loss circulation zones.
10. After the surface casing is cemented, a Pressure Integrity Test/Mud Equivalency Test/FIT will be performed on the first well drilled in accordance with OOGO No. 2; Sec. III, B.1. i. in order to make sure the surface 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 minimum mud weight equivalent anticipated to control the formation pressure to the next casing shoe depth or TD. Submit the results from the test via email ([whowell@blm.gov](mailto:whowell@blm.gov)) on the first well drilled on the pad and record results in the IADC log.
11. 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 will be submitted to CRVFO, Will Howell, 2300 River Frontage Road, Silt, CO 81652 within 48 hours. If the TOC is lower than required or the cement sheath of poor quality, then within 48 hours from running the CBL and prior to commencing fracturing operations, a CRVFO petroleum engineer shall be notified for remedial 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 cement coverage.
12. 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, Will Howell/Todd Sieber, 2300 River Frontage Road, Silt, CO 81652. Contact Todd Sieber at 970-876-9063 or [asieber@blm.gov](mailto:asieber@blm.gov) for clarification.
13. 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 CFR 3160-9. Contact Will Howell for clarification.
14. 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, Will Howell 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 within 48 hours after Frac operations.

15. Submit a monthly report of operations or production per CFR 3162.4-3 including any production from these wells in MCFPD, BOPD, and BWPD with FTP/SITP until the completion report (Form 3160-4) is filed.
16. Per CFR 3162.4-1(c), not later than the fifth 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.