



**U.S. Department of the Interior
Bureau of Land Management
Glenwood Springs Field Office
50629 Highway 6 & 24
Glenwood Springs, CO 81602**

ENVIRONMENTAL ASSESSMENT

NUMBER: CO-140-2004-081 EA

CASEFILE NUMBER: Leases COC- 50128, 54736, 54737, 54738, 55603, 55604, 56035.

PROJECT NAME: Grass Mesa Geographic Area Plan (GAP)

LEGAL DESCRIPTION: T6S, R93W Sec 22-35 & T7S, R93W Sec 2-4, 9-11, 16, 6th P.M.

APPLICANT: EnCana Oil & Gas (USA), Inc.

FONSI
CO-140-2004-081 EA

EnCana Oil & Gas (USA) Inc.
Grass Mesa Geographic Area Plan

The environmental assessment and analyzing the environmental effects of the proposed action have 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 (Grass Mesa Geographic Area Plan) as written (except for the following specific pad locations) in order to provide for the orderly, economical and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

This decision does not modify any lease terms and stipulations attached to the specific leases involved. Updates and amendments to the Geographic Area Plan may be made over the course of the two year drilling program. Depending on the magnitude of the changes in the future, additional NEPA compliance documentation may be necessary if determined to be outside the scope of this analysis.

After reviewing the GAP and its various recommendations regarding the operator's development plan, specific changes in the GAP are necessary on the B23NW pad and O27NW pads as follows:

B23NW pad: The construction of this well pad, gathering line and access road proposed on a prominent ridge in proximity to Rifle, the Colorado River and Interstate 70 is not approved as proposed. While the pad allows the operator to drill 1 federal well within the unit, this well bottomhole can readily be reached from the J23NW pad. Various resource concerns, including impacts to the City of Rifle/Interstate 70 viewshed (VRM Class II area), arose that are not mitigated and affected my decision on this pad. The operator's goal of reaching a second bottomhole location on nearby privately-held lease is apparent. However, the environmental impact to access and construct the B23NW pad is not necessary considering that other pad options on private lands appear more feasible and likely less environmentally impacting. Consequently, it is my decision to relocate the surface location for the lone federal well (23-7C) to the J23NW pad, eliminate 2000+ feet of new road construction across steep sideslopes in fragile soils and preserve the integrity of the Class II viewshed in the River/Interstate corridor.

O27NW pad: The construction of this pad, gathering line and access road is not approved as proposed. This site is in close proximity to a residence on Grass Mesa. Inventories identified important resource values that have restricted opportunities to relocate the pad within the 40 acre BLM parcel. After reviewing the various well bottomholes targets planned for the O27NW pad, it is apparent that these targets can be reached from other existing or proposed pad locations. Reconfiguring the H27NW pad in Section 27 (T6S R93W) by splitting its wellhead alignment "L" design into 2 separate pads and moving a pad southerly to the mesa's edge within SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 27 (T6S, R93W) will allow feasible distance to reach the bottomholes of the GMR 27-16B and GMR 27-16 wells. It is apparent that the remaining bottomholes can be reached from existing pads on fee surface. Furthermore, after splitting the H27NW pad into 2 separate pads, a pad could be moved further north into NE $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 27 (T6S, R93W) to avoid interference with bottomhole targets and access federal lease area east of the mesa's edge. Early in the GAP planning phase, 2 pads were proposed for the E $\frac{1}{2}$ NE $\frac{1}{4}$ of Section 27 (T6S, R93W). Returning to this concept of 2 pads will allow more flexibility for future federal bottomholes in the rugged country off the mesa's edge, while optimizing the bottomhole reach for some of the well targets associated with the O27NW pad.

In regards to traffic congestion issues raised by various landowners in their comments on this GAP, I encourage EnCana to operate and use their underground water pipeline system to move waters (fresh and produced) across Grass Mesa to the Hunter Mesa water treatment facility. Putting this system into use will alleviate a considerable amount of truck traffic across sizable portions of the Grass Mesa area, and make the most recognizable difference in truck traffic congestion and safety.

Prior to any approval of the APDs referenced in this GAP, the operator must provide the BLM signed certification statements from surface landowners, including the Grass Mesa Homeowners Association when appropriate, documenting that agreements have been obtained for road use and maintenance on private roads accessing well pads and facilities on adjacent BLM land.

RATIONALE:

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 outlined in the body of the Environmental Assessment or relate appendices listed below.
3. The proposed action is in conformance with the Glenwood Springs Resource Management Plan Amendment for Oil and Gas Leasing and Development and will not exceed the impacts beyond those already addressed in the Final Supplemental Environmental Impact Statement, dated January 1999.

MITIGATION MEASURES: Various mitigation measures are included in the body of the Environmental Assessment, described within the operator-submitted Surface Use Plan (Appendix A), not shown as proprietary cultural resource Conditions of Approval in Appendix B, and itemized as Standard (GAP-wide) Conditions of Approval and Site-Specific Conditions of Approval in Appendix C.

To assist in public review of this decision, the Environmental Assessment and related appendices are available on BLM Glenwood Springs web site: <http://www.co.blm.gov/gsra/GrassMesaOilandGasGlenwood.htm>. Copies of the Geographic Area Plan are also available for review at the BLM Glenwood Springs Field Office, 50629 Highway 6 & 24, Glenwood Springs, Colorado.

The decisions made in this plan are appealable when the Applications for Permit to Drill (APDs) are approved by this office. The required 30 day posting period for APDs was completed at the beginning of the GAP process. For further information on APD approval dates related to the GAP, periodic consultation with the BLM, Glenwood Springs office is recommended via following methods: phone (970) 947-2804, e-mail jim_byers@blm.gov, or website <http://www.co.blm.gov/gsra/GrassMesaOilandGasGlenwood.htm>.

In accordance with 43 CFR 3165.3, you may request a State Director Review upon approval of APDs outlined in this GAP. This request must be submitted in writing within 20 business days from date of APD approval. The request should be sent to: Colorado State Director, 2850 Youngfield Street, Lakewood, Colorado 80215-7076. The decision of the State Director may then be appealed to the Interior Board of Land Appeals in accordance with 43 CFR 3165.4.

NAME OF PREPARER: Jim Byers, Natural Resource Specialist

SIGNATURE OF AUTHORIZED OFFICIAL:


Authorized Officer

DATE SIGNED:

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DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

PROPOSED ACTION

Introduction

The Grass Mesa Geographic Area Plan (GAP) is a comprehensive and detailed plan for EnCana Oil & Gas (USA), Inc. (EnCana) to drill up to 100 natural gas wells in the Grass Mesa geographic area southwest of Rifle, Colorado. The proposed action is to drill 6 gas wells from 1 existing surface location and 94 gas wells from 16 new surface locations (Figure 1 – Appendix A).

The GAP encompasses approximately 15.3 sections of surface land (9,792 acres), with over 40% of the land (4,065.15 acres) under the jurisdiction of the Bureau of Land Management, Glenwood Springs Field Office (BLM) and nearly 60% of lands (5,725.20 acres) owned by private landowners. Under the GAP, 16 new pad surface locations and 1 existing pad are required to achieve 100 bottom-hole locations. Although the total number of bottom-hole locations to be drilled is 100, the number of locations to be drilled at each pad is subject to change.

Existing and Proposed Surface Disturbance

Within the Grass Mesa GAP there are 53 existing well pads, 164 bottom hole well locations, and 31.5 miles of roadway used for gas production. Existing surface disturbance from oil and gas activity is estimated as follows:

Existing Well Pads = 132.5 acres (based on an average of 2.5 acres/pad)

Existing Roads = 114.5 acres (based on an average 30-foot wide corridor)

Under the GAP, construction of 16 new well pads would result in the initial surface disturbance of approximately 96 acres (based on an average of approximately 6 acres/pad during construction, drilling and completion). Following drilling and completion activities, approximately 5 acres of each pad would be reclaimed, resulting in approximately 16 acres of well pad disturbance that would remain for the 20 to 30 year life of the project.

Approximately 6 miles of new access road / pipeline ROW would be required. Based on a construction width of 38-feet, construction of new roads/installation of pipeline would result in the initial disturbance of approximately 28 acres. Once road construction / pipeline installation is complete, the co-located road/pipeline ROW would be reduced to a 30-foot width, resulting in long-term disturbance of approximately 22.5 acres.

In addition, approximately 9 miles of pipeline ROW segments would be constructed along existing roads. Where these segments of pipeline are required, the existing road would have to be widened by approximately 15 feet, resulting in long-term disturbance of approximately 16.5 acres.

Table 1 summarizes new surface disturbance proposed under the Grass Mesa GAP.

Table 1. New Surface Disturbance Proposed under the Grass Mesa GAP.

GAP Action	Short-term Disturbance	Long-term Disturbance
Well Pads	96 ac	16 ac
Road/Pipeline ROW	28 ac	22.5 ac
Pipeline ROW	16.4 ac	16.4 ac
Total Acreage	140.4 ac	54.9 ac
Percent of Grass Mesa Geographic Area	1.4%	0.6%

Existing main traffic routes would require gravel for increased year-round traffic. New road construction in highly erosive soils and areas of steep cuts and fills on BLM lands would require design approved by the BLM.

GAP EA Process and Intent

The GAP Environmental Assessment (EA) Process is intended to provide a two to three year look at an overall development scenario instead of a case-by-case submittal of Applications for Permit to Drill (APDs). The intent of the GAP process is to address site-specific and cumulative environmental impacts associated with oil and gas development within a defined geographic area. In addition, the GAP process was created to propose mitigation for potential impacts to environmental resources, such as wildlife habitat and visual aesthetics that may occur within discrete ecosystems.

The result of the GAP is a reasonable foreseeable development (RFD) scenario proposed by the operator given the current market conditions and demand for natural gas, other constraints of the company, and by environmental constraints imposed by the BLM. The major elements of the GAP are presented below under Development (Construction/Drilling/Completion), Production (Operation and Maintenance), and Abandonment. The proposed elements contain a standard surface use plan (See Appendix A) for gas well development. With BLM's approval, all measures discussed in the SUP will be implemented as part of EnCana's proposed action. Any deviations from the standard practices below are called out in site-specific conditions of approval. The site-specific mitigation measures are intended to be mitigation measures that are not included in the Surface Use Plan and the Ten Point Plan of the Master APD (Appendix A). The mitigation measures would be incorporated into the Conditions of Approval (COA) that the BLM would attach to the APD.

Development

EnCana proposes to drill 100 natural gas wells within the Grass Mesa GAP during a two to three year program beginning in 2005. The plan proposes to drill the 94 new wells from up to 16 new

surface locations, plus 1 existing well pad for a total of 17 well pads. All 17 well pads would be appropriately deviated (directionally drilled) and would have multiple well bores.

All of the 100 proposed wells would be drilled on existing EnCana leases. Table 2 summarizes the distribution and type of proposed wells in the Grass Mesa GAP. It is possible that EnCana could drill fewer than those described in the planning and analysis process because of geologic uncertainty and market uncertainties.

Table 2. Distribution and Type of Proposed Wells

Wells	Vertical Wells	Deviated Wells	Existing Surface Pads	New Surface Pads
Number	0	100	1	16
Total	100		17	

Construction/Drilling/Completion

New wells would be drilled to an average depth of 7,200 to 10,100 feet. The typical natural gas well in this GAP would require about 14-18 days to drill and 45 days to complete. Multiple wells would be drilled from both the 1 existing pad and the 16 new well pads to minimize surface disturbance. As part of their standard policy, EnCana would operate no more than five drill rigs at one time on Grass Mesa. In general, only electric drill rigs would be used. Construction, drilling and completion activities would cease from December 1 through April 30 due to the big game limitation described in EnCana’s oil and gas lease agreements, including the lease that covers the BLM Grass Mesa Road. By imposing the winter timing limitation on BLM leases, Grass Mesa is effectively closed to such activities during the 5-month winter period. Language on the leases allows for exceptions to be granted under mild winter conditions for the last 60 days of the closure.

Surface soils would be stripped and typically placed along the pad’s edge. Pad construction, including the excavation of pits would be conducted by heavy equipment. All pits, cellars, rat holes, and other bore holes unnecessary for further lease operations, excluding the reserve pit, would be backfilled immediately after the drilling rig is released to conform with surrounding terrain.

On pads where reserve pits are needed, a minimum of two feet of free board would be maintained in the reserve pit, between the maximum fluid level and the top of the berm. All cuttings, drilling fluids, and chemicals would be contained in the reserve pit. These pits would be designed to exclude all surface runoff. Reserve pit fluids would be backfilled within 90 days of construction to allow for evaporation of fluids, unless an alternative method of disposal is approved. The backfilling of the reserve would be done in such a manner that the mud and associated solids would be confined to the pit and not squeezed out and incorporated into the surface materials. There would be a minimum of three feet of cover (overburden) in the pit. When work is complete, the pit area would support the heavy equipment without sinking. Utilizing the soli-bonding process to expedite pit closure (in order to help alleviate odor issues) could be done on a site-specific basis at the respective landowner’s request.

Approximately 6 miles of new access roads would be constructed with an average finished (i.e., after construction and reclamation) width of 30 feet. New pipelines and flowlines would be buried adjacent to existing or new access roads. At existing well pads where two or more new wells are proposed, additional 3- to 4-inch diameter flowlines would most likely be added. The lines would be buried to a minimum four feet from ground surface to top of pipe.

An average of 6 acres of surface terrain would be disturbed to create a new well pad. The exact acreage of surface disturbance per well pad would vary on an individual basis depending on topography and number of bottom-hole locations targeted. Subsequent reclamation would mitigate the disturbed area to approximately one acre after well development. Well site reclamation would be performed and monitored in accordance with the Standard Surface Use Plan/Master APD and BLM Land Use Plan.

As part of EnCana's stormwater management policy, as needed, additional engineering measures (see BMPs under Ground Water Mitigation) would be implemented to construct drainage systems and culverts in order to divert water flow away from the surface location, prevent erosion, and prevent sediment loading in waterways due to pad and/or road construction as needed.

Production

A typical EnCana well location would consist of wellheads, a production pack including a separation and dehydration unit, and aboveground storage tanks. Multi-well locations would share production equipment whenever feasible to minimize surface occupancy/disturbance. However, additional tanks and production packs would be installed as necessary. Production equipment would be painted to match the surrounding terrain and located to minimize visual impact. Telemetry equipment would be utilized to remotely monitor well conditions and to minimize traffic to and from well locations. Automated tank gauging would be employed to minimize the risk of spills. Centralized compression would be used from existing compressor stations (i.e., Pumba and/or East Mamm Creek Compressor Stations).

Produced water could be confined to the reserve pit for a period of 90 days after initial production. Steel tanks would be installed next to the production facilities to contain produced water and condensate during the operation period of the well. Produced water at well pads would be transported by either pipelines or tanker trucks to State-approved central evaporation facilities located on private lands. Condensate¹ would be transported by truck to market for refining.

¹ In the context of traditional natural gas production, condensate is defined as the liquid phase of natural gas. The volume of gas condensate produced at a well depends on the temperature and pressure within the associated gas reservoir, which affect condensation of vapor into liquid. Lower pressure and cooler temperature during production results in higher volumes of condensate. During production, condensate is often collected with produced water, separated from the water, and trucked or piped to a gas processing plant for sale.

Reclamation

After completion activities, EnCana would reduce the size of the well pad to the minimum surface area needed for production facilities, while providing for reshaping and stabilization of cut and fill slopes to match the original topography. All disturbed areas not necessary for drilling and production operations would undergo the following reclamation standards after completing dirt work and operations.

Some locations would require special reclamation practices such as hydromulching, straw mat application on steeper slopes, fertilizing, soil analysis to determine the need for fertilizer, seed-bed preparation, contour furrowing, watering, terracing, water barring, and the replacement of topsoil. If necessary due to livestock/wildlife grazing pressure, areas being reclaimed would be fenced for the first two growing seasons or until the seeded species have established. Noxious weeds that may be introduced due to soil disturbance and reclamation would be treated by methods to be approved by the BLM (See Appendix C – Standard Conditions of Approval and Site-Specific Conditions of Approval).

Access Road Maintenance

The access roads to Federal locations would be inspected by BLM and, if necessary, maintained on a quarterly basis at a minimum to include such items as:

- Road surface grading and graveling;
- Relief ditch, culvert and cattle guard cleaning;
- Erosion control measures for cut and fill slopes and all other disturbed areas;
- Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.
- Road and slope stabilization measures as required until final abandonment and rehabilitation;
- Weed control; and
- Dust abatement (as often as determined necessary by BLM and EnCana).

Road use and maintenance on well access roads crossing private lands would be conducted by the operator. Signed certification statements regarding surface owner permission for access over private lands would be required with the BLM Applications for Permit to Drill (APDs).

Workovers / Recompletion

Periodically, the workover or recompletion of a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the well bore equipment (casing, tubing, rods, or pump) the wellhead, or the production facilities. These repairs would usually be completed during daylight hours and run several days per well. The frequency for this type of work cannot be accurately projected because workovers vary well by well; however, an average may be one workover per well per year for a period of seven days. In the case of multi-well pads, space for equipment would usually be limited to the “in-use” (i.e., disturbed) area of the

surface location, although it is possible that interim reclamation could be delayed. In the case of a well recompletion, a reserve pit may have to be constructed.

Abandonment

Upon well abandonment each borehole would be plugged, capped, and all surface equipment would be removed. Subsurface pipelines would be plugged at specific intervals and site contouring would be accomplished using appropriate heavy equipment. All surface soil disturbances would be reseeded with native vegetation, the mix to be determined by the typical vegetation surrounding the specific well site. Well site reclamation would be performed and monitored in accordance with the 1998 GSRA Reclamation Policy, including control of noxious weeds. Further information on reclamation standards is available in Appendix I of the 1999 Oil and Gas Leasing and Development EIS. One of the basic goals of the policy is to “establish desirable (seeded and native) vegetation to set the stage for the natural process to restore the site”. Consequently, one of the goals of the proposed action is to accomplish as much reclamation on each well pad during the life of the well as possible, even on those pads with a large final reclamation or “in use” area. Unreclaimed areas or reclaimed areas that do not meet the objective of three years of sustained reclamation (known as “operator complete”) would undergo the reclamation re-treatment measures described in the Surface Use Plan (Appendix A). EnCana would also meet the BLM bonding requirements. Additional bonding would be provided for sites with extremely difficult reclamation conditions if repeated reclamation attempts have been unsuccessful, or final reclamation cannot be completed with standard reclamation measures.

A Sundry Notice would be submitted by the operator to the BLM that describes the engineering, technical, or environmental aspects of final plugging and abandonment. It would describe final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. The BLM’s and Colorado Oil and Gas Conservation Commission (COGCC) standards for plugging would be followed. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore (e.g., cementation) would be included in the Sundry notice.

Proposed Well Locations

Table I in Appendix D describes the legal description of the proposed well pad locations with a list of the proposed wells and stipulations attached to the respective oil and gas lease. Standard and site-specific Conditions of Approval in Appendix C were generated from various on-site exams conducted by the BLM, operator, and contractors to assess proposed pad layout, access road, cut and fill, topsoil stockpiling, erosion control, and reclamation potential of each existing surface pad. Appendix E is reserved for survey plats of the 18 pad locations. In the interest of paper reduction, copies of the Appendix E plats are not included in this EA, but are available through the Glenwood Springs Field Office.

NO ACTION ALTERNATIVE

The Proposed Action affects federal subsurface minerals that are encumbered with federal oil and gas leases granting the lessee a right to explore and develop the oil and gas leases in the project area. The No Action alternative constitutes denial of the proposed action. Absent a non-discretionary statutory prohibition against drilling, BLM cannot deny the right to drill and develop the leasehold. Only Congress can completely prohibit development activities (Western Colorado Congress, 130 IBLA 244, 248 (1994), citing *Union Oil Co. of California v. Morton*, 512 F.2d 743, 750-51 (9th Cir. 1975). Overall, the No Action alternative has been considered but eliminated from detailed analysis due to the existing lease rights involved.

ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

B16W and J16W Pads

The original locations for the B16W and J16W pads were sited in sagebrush habitat that contained two large populations of *Penstemon harringtonii*. Based on this issue, the original locations for the B16W and J16W were eliminated from detailed analysis. Both pads were moved approximately 200 meters west of their original locations into oakbrush habitat to avoid the major *Penstemon* concentrations.

F33NW and M33NW Pads

EnCana's original GAP map is provided in Appendix F. As seen on this map, well pads F33NW and M33NW were originally proposed to be located in the SENW1/4 of Section 33 and the SWSW1/4 of Section 33, T6S, R93W, respectively. However, the two locations were eliminated from detailed analysis for the following reasons:

- 1) Nearby landowners requested that the two well pads be located together to limit surface disturbance and reduce overall visual impacts from oil and gas development; and
- 2) Both proposed locations were sited in occupied *Penstemon harringtonii* habitat (a BLM Sensitive plant); and
- 3) An active raptor nest was located during survey.

Based on these issues, the F33NW (SE1/4 NW1/4 Section 33) and M33NW (NW1/4 SW1/4 Section 33) well pads were eliminated from detailed analysis, and a new replacement well pad called the K33NW (NE1/4 SW1/4 Section 33) is being carried forth for analysis in this GAP EA.

G25NW Pad

This pad is located on fee surface with underlying fee minerals. EnCana plans to occupy this location with Colorado Oil and Gas Conservation Commission (COGCC) approval and oversight. The new pad would be constructed under state permits and conditions of approval. As such, this private pad is dropped from further consideration in this EA.

I3 Pad

In the initial GAP proposal, 2 wells were planned from the existing I3 pad. During onsite review, it was determined that the 2 wells would, instead, be drilled from the adjacent I3B pad.

No additional wells are planned on the I3 pad at this time. Thus, this pad will be dropped from further consideration

NEED FOR THE ACTION:

The purpose and need is to authorize the Application for Permits to Drill (APD) to provide for federal lease development that will in turn provide natural gas for commercial marketing to the public.

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

- Glenwood Springs Resource Management Plan – approved January 1984;
Decision Number/Page: page 14 & Map 4
Decision Language: Continue to allow mineral exploration and development on lands not withdrawn for other uses or restricted to mineral activity.
- Oil and Gas Leasing and Development – amended in November 1991;
- Colorado Standards and Guidelines; amended in November 1996;
- Castle Peak Travel Management Plan; amended in August 1997;
- Oil and Gas Leasing and Development Final Environmental Impact Statement – amended in March 1999;
- Red Hill Plan Amendment - amended in November 1999; and
- Fire Management Plan for Wildland Fire Management and Prescriptive Vegetation Treatment Guidance – amended in September 2002.

Standards for Public Land Health: In January 1997, Colorado BLM approved the Standards for Public Land Health. The Glenwood Springs Field Office is in the process of completing Land Health Assessments. These assessments are done on a landscape basis. At this time, the landscape addressed in this EA has not had a formal Land Health Assessment completed. As such, no formal determination on conformance with the Standards would be made until a formal Land Health Assessment and Determination Document is completed. A Land Health Assessment for the small portion of the GAP area involving the E9W pad location is scheduled for 2005. The remaining area would be assessed in 2010. Based on the findings of these assessments, the authorized officer may take appropriate action to achieve conformance with the Standards or implement further mitigating measures on future actions to maintain or prevent a further decline in land health.

These 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. Because a Standard exists for these five categories, the impact analysis must address whether the proposed action or any alternatives being analyzed would result in impacts that would maintain, improve, or deteriorate land health conditions for that specific parameter. These analyses are located within the narrative found in specific elements described in the Affected Environment.

AFFECTED ENVIRONMENT / ENVIRONMENTAL CONSEQUENCES / MITIGATION MEASURES:

Approving individual APDs is contemplated by the FSEIS, which addressed the environmental impacts of oil and gas development. Implementing the Proposed Action is consistent with the Preferred Alternative described in the FSEIS. The environmental impacts of the Preferred Alternative are described in the FSEIS and will not be repeated in this EA. Rather, discussion of the environmental impacts in this EA will be limited to site-specific information not included in the FSEIS. In some cases, the conclusions of the FSEIS will be summarized if necessary to address issues raised in scoping or to provide information necessary to the decision maker. In addition, the discussion of environmental impacts will be limited to those remaining after reviewing the APDs, the application and conformance of mitigation from the FSEIS, and any changes or additions to the proposal resulting from the on-site investigations. The APDs and subsequent review and adjustments result in on-the-ground requirements and development of site-specific Standard Conditions of Approval (refer to Appendix C) to provide the best location of the proposal to minimize impacts and accomplish the objectives of the Glenwood Springs Reclamation Policy.

CRITICAL ELEMENTS

AIR QUALITY

The following discussions provide a brief summary of the affected environment and environmental consequences for air quality. A detailed analysis on air quality is provided in the air quality technical report for this project (Buys & Associates 2004), which is available for review at the Glenwood Springs Field Office.

Affected Environment: Existing air quality in the region is acceptable based on State of Colorado standards for the protection of human health. Garfield County is designated as an attainment area, meaning that the concentration of criteria pollutants in the ambient air is less than the NAAQS (CAQCC 2003). Additionally, representative monitoring of air quality in the general area indicates that the existing air quality is well within acceptable standards. Table 3 provides a summary of representative air quality data for the GAP area.

Table 3. Existing Air Quality Summary for the GAP Project Area

Pollutant	Averaging Period					Monitoring Station Location Description
	Annual	24-Hour	8-Hour	3-Hour	1-Hour	
Ambient Air Average Concentration ($\mu\text{g}/\text{m}^3$)						
PM ₁₀	24	54	NA	NA	NA	Rifle, Garfield County. (1998-2000 data collected by CDPHE) ^a
PM _{2.5}	7	19	NA	NA	NA	Grand Junction, Mesa County. (1999-2001 data collected by CDPHE) ^a
NO ₂	34	NA	NA	NA	NA	Provided by CDPHE ^a
CO	NA	NA	4,444	NA	8,000	Grand Junction, Mesa County. (Average of 1999-2001) ^a

Pollutant	Averaging Period					Monitoring Station Location Description
	Annual	24-Hour	8-Hour	3-Hour	1-Hour	
	Ambient Air Average Concentration ($\mu\text{g}/\text{m}^3$)					
SO ₂	11	39	NA	110	NA	Provided by CDPHE ^a
Ozone			145		145	Provided by CDPHE ^b

NA: not applicable

$\mu\text{g}/\text{m}^3$: micrograms of pollutant per cubic meter of ambient air

^a Background concentrations recommended by CDPHE

^b (personal communication with Nancy Chick) as composite averages of ozone monitoring locations in western Colorado and Eastern Utah

Environmental Consequences: Proposed Action emission sources would include those resulting from well development, well production, and gas processing. This includes increased vehicle traffic and drilling activity during the development phase of the Proposed Action, followed by continuous well site and central dehydrator emissions. Air pollutant emissions from these sources would include oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter less than 10 and 2.5 microns in effective diameter (PM₁₀, PM_{2.5}) and volatile organic compounds (VOCs). Results indicate that benzene, toluene, ethylbenzene and xylenes (BTEX) compounds and n-hexane would be the primary hazardous air pollutants (HAP) emitted from the Proposed Action sources.

Total estimated emissions for the Grass Mesa Geographic Area Plan (GAP) Proposed Action were calculated on EnCana's original proposal to develop up to 113 wells. These "worst-case scenario" emissions are summarized in Table 4. All development related emission calculations, which include well pad and access road construction, well drilling, and well completion, assume a maximum development rate of approximately 57 wells per year over a two-year period. Based on typical production rates in the area, it is estimated that a total of 113 gas wells would produce 34 MMscf/day of natural gas and 340 barrels of condensate per day at full production. Under the current proposed action, which includes drilling and production of 100 wells, total project emissions would be slightly less, but not significantly different than that illustrated in Table 4.

Table 4. Proposed Action Emission Summary

Pollutant	Emissions (tons/year)				Total Estimated Emissions (tons/year)
	Well Development	Well Production	Well Subtotal	Central Dehydration	
NO _x	348.7	19.4	368.1	0.7	368.8
CO	114.6	4.5	119.1	0.1	119.2
VOC	19.4	626.8	646.2	2.4	648.6
SO ₂	5.9	0.0	5.9	0.0	5.9
PM ₁₀	203.8	1.5	205.3	0.0	205.4
PM _{2.5}	37.5	1.5	39.0	0.0	39.0
Benzene	0.0	3.3	3.3	0.3	3.7
Toluene	0.0	0.5	0.5	0.5	1.0
Ethylbenzene	0.0	0.0	0.0	0.0	0.1
Xylene	0.0	0.2	0.2	0.2	0.5

Pollutant	Emissions (tons/year)				Total Estimated Emissions (tons/year)
	Well Development	Well Production	Well Subtotal	Central Dehydration	
n-Hexane	0.0	9.2	9.2	0.1	9.3
Formaldehyde	0.1	0.0	0.2	0.0	0.2

The individual sources of Proposed Action related emissions are discussed below. Detailed emission calculations for each activity are available in the air quality technical report (Buys & Associates 2004) for the Grass Mesa project, which is available upon request through the Glenwood Springs Field Office.

Well Development Emissions

Emissions resulting from well development activities can be categorized into three distinct phases: well pad and access road construction, well drilling, and well completion. During well development, vehicle and fugitive dust emissions would increase within the GAP. Vehicle emissions would result from work crews commuting to and from the work site and from the transportation and operation of construction equipment. Vehicle tailpipes would emit small quantities of NO_x and CO. Fugitive dust concentrations would increase with additional vehicle traffic on unpaved roads and from wind erosion in areas of soil disturbance. Drill rig operations would result mainly in an increase of NO_x and CO emissions. Emission rates were calculated using applicable EPA emission factors and anticipated level of operational activities, such as estimated vehicle trips, load factors, and hours of operation.

Project Operation Emissions

After the construction phase is complete, the operation of the GAP wells would primarily produce NO_x, CO, PM₁₀, VOC, and HAP emissions from the following sources:

- separator heaters and condensate storage tanks located at well pads;
- glycol dehydrator reboilers and still vents located at two existing central compressor stations;
- vehicle tailpipe sources; and
- road dust from vehicles.

No substantial adverse impacts to air quality are anticipated as a result of the Proposed Action. Localized increases in NO_x, CO, and PM₁₀ concentrations would occur, but maximum concentrations would be below applicable Federal and State standards. Hazardous air pollutant health risks and incremental increases in cancer risk would be below applicable significance levels. Potential impacts to ambient air quality, visibility, acid neutralization capacity, and total nitrogen deposition would be below the levels of acceptable change.

Given the relative magnitude of the Proposed Action emissions, it is unlikely that the Proposed Action would strongly influence cumulative Air Quality Related Values impacts.

Mitigation:

- Mitigation of air quality impacts would be accomplished through the permitting of all regulated air pollution sources through the Colorado Department of Public Health and Environment, Air Pollution Control Division. The construction and operating permitting processes, where applicable (large glycol dehydration units) typically require the use of emissions controls to reduce air pollution emissions and impacts to air quality. For smaller, minor sources of air pollution (small dehydrators, condensate tanks), impacts are generally insignificant and mitigation is not warranted. The operator is responsible for applying dust abatement measures as needed or directed by the Authorized Officer to reduce the emissions of fugitive dust from access roads. The level and type of treatment (watering or application of various dust agents, surfactants and road surfacing material) may be changed in intensity and must be approved by the Authorized Officer. Dust control is needed to prevent heavy plumes of dust from road use that create safety problems and disperses heavy amounts of particulate matter on adjacent vegetation. Supporting mitigation is identified in Surface Use Plan (#2K).
- For all pad locations on Grass Mesa, straw (curlex) matting will be placed on excess material and topsoil piles to help limit heavy dust emissions into the air during windy weather conditions.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Affected Environment: There are no ACECs within the Grass Mesa geographic area.

Environmental Consequences/Mitigation: N/A.

CULTURAL RESOURCES

Affected Environment: The Grass Mesa GAP and surrounding 0.5-mile buffer, covering a total of 15,927 acres (9532 acres within the GAP boundary, and 6395 acres forming the buffer), has been the subject of 34 different cultural resource investigations, listed here by the Glenwood Springs Field Office project number:

61	1002-25	5402-2	9481
591	1002-28	5402-3	12704-1
743	1003-22	5402-12	14500-3
744	1098-6	5402-17	14503-1
779	1224	5402-23	
780	1309	5404-14	
871	5400-7	5404-15	
902	5400-12	5404-16	
1002-22	5401-4	5404-17	
1002-23	5401-8	5404-19	

Thirty-three are Class III inventories and one is a Class II sample survey. These inventories range in size from less than one acre to over 1900 acres. The majority of these inventories are related to oil and gas development. Most common are well pad inventories, followed by range improvement projects, and wildfire mitigation efforts. The remainder of the projects include: inventories for regional or trunk gas pipelines, county projects, transmission lines, water lines, and developments along I-70. The GAP fostered the largest investigation (GSFO #5404-16, 5404-17, and 5404-19), covering 1954 acres of federal surface within the GAP study area. Total inventoried acreage is 4600 acres, or 28.9% of the total GAP study area including the buffer. The majority of this acreage (86%) was inventoried on or after 1993 and is considered adequate by current standards. With the exception of the single Class II sampling survey, which served to provide planning information for the GSFO, all the inventories were for compliance with section 106 of the National Historic Preservation Act.

The GAP study area and buffer includes 143 known and recorded cultural resources. This information is compiled from GSFO GIS data and the results of GSFO projects #5404-16, 5404-17, and 5404-19. It was cross-checked against an on-line records search at the Colorado Office of Archaeology and Historic Preservation on September 29, 2004. Of the total 143 cultural resources, 37 (25.9%) are isolated finds and 51 (35.7%) are sites recommended to be not eligible for inclusion on the National Register. The remaining 55 (38.5%) are sites recommended to be eligible or are unevaluated, and are considered to be “historic properties” within the context of section 106 of the NHPA. The historic properties within the Grass Mesa GAP study area and buffer including the following types of sites (relative frequencies of each site type are shown in Figure 2):

Historic Euro-American sites

- Agricultural/residential complexes (farm or ranchsteads)
- Other structures
- House
- Highway
- Stone pile or Cairn
- Camps

Proto-historic or Historic Native American sites

- Structures (wickiups)
- Culturally sensitive sites

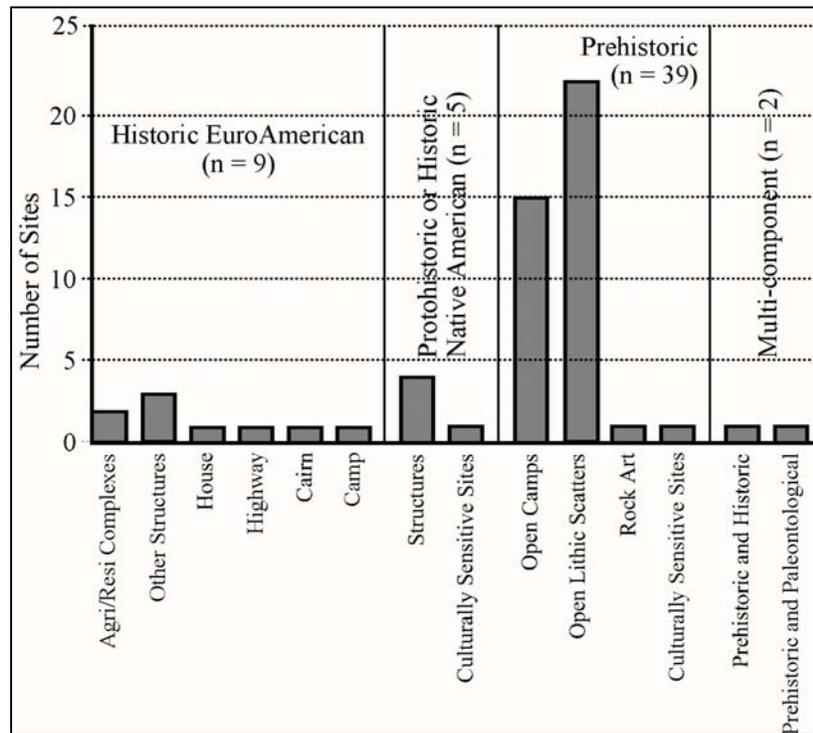
Prehistoric Sites

- Open camps (artifacts *and* activity areas and/or features)
- Open lithic scatters (chipped and/or ground stone artifacts *only*)
- Rock art

Multi-component Sites

- Prehistoric and historic (open lithic scatter and historic structures)
- Prehistoric and paleontological (open lithic scatter and fossils)

Figure 2. Graph of Historic Property Site Types in the Grass Mesa Gap and Buffer Area.



Cultural resource (all sites and isolated finds) density within the GAP study area and buffer area is as follows:

- All cultural resources 19.9/square mile or 1 resource/32 acres
- Sites 14.7/square mile or 1 site/44 acres
 - Historic properties 7.6/square mile or 1 historic property/84 acres

When these numbers are extrapolated to the entire study area, cultural resources within the Grass Mesa GAP and buffer are estimated at:

- All cultural resources 495
- Sites 367
 - Historic properties 190

It is important to acknowledge that the portions of the Grass Mesa GAP and buffer area that have been inventoried do not constitute a random sample of the entire study area primarily because the inventories have been largely confined to federal surface. Federal surface in the study area tends to concentrate on terrain and topography not suitable for ranching or dry land agriculture and thus includes a disproportionate amount of the forested areas and steeper, more rugged terrain. Private lands, which make up a relatively small percentage of the inventoried area, are typically the more open, flatter, non-forested terrain. Different types of sites can be expected to be differentially distributed in these areas. For this reason, estimates of total numbers of cultural resources in the entire study area should be considered with caution.

Section 106 of the NHPA requires federal agencies to take in to account the affects their actions will have on cultural resources. As a general policy, an agency will consider affects to cultural resources for any endeavor that involves federal monies, federal permitting/authorization, or federal lands. The implications of this policy for the Grass Mesa GAP are that projects that extend from private land onto federal land, or that involve federal minerals, or that otherwise would not be feasible if all federal involvement were eliminated, are required to consider affects to historic properties over the entire area of potential effect of the project, regardless of surface ownership. Because of this, consideration of the environmental consequences of the proposed action extends to all portions of the Grass Mesa GAP, whether the surface ownership is federal, state, or private.

On a landscape scale the Grass Mesa GAP, because it covers a reasonable large and contiguous block of land, and includes the prominent landform of Grass Mesa and its bounding ridges and valleys, warrants some consideration of impacts on a landscape scale. If considered at this scale, the cultural resources found in the Grass Mesa GAP study area can be evaluated and studied at the landscape level, rather than on a site-by-site basis. This provides opportunity for inter-site comparisons and analysis and synthesis of occupation within the study area and the surrounding region that is not feasible when individual sites are considered and studied separately. The prehistoric and protohistoric site assemblage within the Grass Mesa GAP study area is a reasonable candidate for definition as a Rural Historic Landscape or historic district made up of sites and isolated finds. Most of these sites and isolated finds could then be considered contributing elements of the district, which would be eligible under criterion “d” and possibly “c.” If considered as a rural historic landscape, individual parts of the proposed action (such as single well pads) have only a small and incremental impact on the resource, but the cumulative affect of the proposed action “at build-out” is considerable and certainly constitutes adverse effect.

Environmental Consequences: The proposed action has the potential to adversely affect historic properties. “Adverse affect” to an historic property occurs when a proposed action “may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.” (36 CFR §800.5[a][1]). Which part or parts of the proposed action may cause such an affect depends on the nature of the historic property, the criterion or criteria under which it is considered significant and eligible for the NRHP (36 CFR §60.4), which aspects of integrity are considered critical to that significance, and the location and nature of the specific proposed development with respect to the historic property.

Direct Impacts

Direct physical impacts will be the greatest single source of adverse effect caused by the proposed action to the majority of historic properties known and expected in the Grass Mesa GAP. For archaeological sites (sites manifested by artifacts and features found on or below the ground surface) these impacts come primarily from disturbance of surface and subsurface sediments through topsoil stripping, excavation, and pipeline trenching. These historic properties are considered eligible under National Register criterion “d” which recognizes the information potential inherent in the materials on the site. This potential is almost always

absolutely dependent on intact integrity of materials, location, and association, all which are damaged by disturbance to the matrix of the site. This loss of integrity negates the significance of the site. Such impacts will be concentrated in the development phase of the proposed action, though they can result any time undisturbed ground is subject to alteration.

Direct physical impacts will be considered adverse effect when they damage or destroy protohistoric structures that contribute to a site's eligibility under National Register criterion "c." These sites are considered eligible because they preserve rarely found examples of historic and protohistoric Native American structures. These sites also usually have an archaeological component associated with the structures and this component may also cause the site to be eligible under criterion "d."

Indirect Impacts

Generally, activities that do not directly physically damage or destroy an historic property are not considered "adverse effect". However, there are certain Native American sites that can be adversely affected by impacts that alter their surroundings. These culturally sensitive sites are usually ones that convey a significant association to the surrounding terrain or vegetation or specific topographic features. Assessing this effect is often one of consideration of the magnitude of the effect, the degree to which the significant qualities of the surrounding landscape are already affected, and how much weight these surroundings carry in the overall significance of the historic property. Evaluating this effect also relies on consultation with interested Native American tribes because sites may be significant within the context of their surroundings for reasons that are of religious or cultural importance to tribes.

Cumulative Impacts

The proposed action will alter the auditory, air quality, visual and landscape environment of the project area. It will also affect access to federal lands within the Grass Mesa GAP, primarily by providing new roads and thus new and/or easier avenues for entry onto the land. The affects of these changes may not be quantifiable at the level of individual sites, and may not constitute an affect at all depending on the site type, but the cumulative affect of these changes over time and over the entire Grass Mesa GAP will result in degradation of the condition and integrity to most sites due to the potential for increased surface collection, increased casual travel (which may physically impact certain sites), and impacts to the integrity of setting, location, association and feeling of certain sites for which the surrounding landscape is an integral part of the site's significance. Impacts to the auditory and visual environment at some sites may be of importance in considering values placed on some sites by Native American tribes; these values cause a site to be eligible, and thus impacting them could be considered an adverse effect.

Mitigation: *Well-specific mitigation is presented in Appendix B, Site-Specific Cultural Resource Mitigation. This information is considered proprietary by the Archaeological Resource and Protection Act (16 U.S.C. 470hh) and the National Historic Preservation Act (16 U.S.C. 470w-304) and is not subject to public review.*

- To provide adequate time to complete cultural monitoring and potential excavation work, pad construction will commence 30 days prior to anticipated initial spud date for wells on a pad. Cultural resource monitoring of excavation work, to be conducted by a qualified

archeologist, will occur throughout the pad construction period. Delays in construction may be expected if cultural materials or features are discovered. Discovery clause in standard COAs will be followed.

- In situations where federal action is required for wells directionally drilled into federal minerals from fee surface overlying fee minerals, BLM’s responsibilities under Section 106 of the National Historic Preservation Act [(NHPA) 16 U.S.C. 470] as amended, the National and Colorado State Historic Preservation Office/BLM Protocols, and Section 36 CFR 800 will be followed.
- Class III cultural resource inventories will be required on any and all new wells, access roads, pipelines and other ground disturbing activities not covered in this plan that require a federal permit or authorization to conduct the action. Additional action specific mitigation may be required – including but not limited to moving the location, archeological monitoring, testing, or data recovery.
- At the end of calendar year 2009 (12/31/09) the operator will contract out an archaeological synthesis compiling the past cultural work in the GAP on a landscape basis which will include but not be limited to: cultural/temporal affiliation, settlement patterns, subsistence, technology, social organization and origins and transitions.

ENVIRONMENTAL JUSTICE

Affected Environment: Review of 2001 data from US Census Bureau indicates the median annual income of Garfield County averages \$43,560, and is neither an impoverished nor a wealthy county. Median annual income of Eagle County averages \$51,578 and is considered a wealthy county. U.S. Census Bureau data from July 2002 shows the minority population of Garfield and Eagle County comprises less than 3 % of the total population².

Garfield County Median Household Income		Eagle County Median Household Income	
Estimate	90% Confidence Interval	Estimate	90% Confidence Interval
\$43,560	\$40,491 to \$46,613	\$51,578	\$47,958 to \$55,177

Environmental Consequences/Mitigation: The proposed action is not expected to create a disproportionately high and adverse human health impact or environmental effect on minority or low-income populations within the area.

² Table CO-EST2002-ASRO-02-08-County Population Estimates by Race Alone and Hispanic or Latino Origin: July 1, 2002 Source: Population Division, U.S. Census Bureau Release Date: September 18, 2003

FARMLANDS, PRIME AND UNIQUE

Affected Environment: The proposed action does not involve any prime or unique farmlands.

Environmental Consequences/Mitigation: N/A

FLOODPLAINS, WETLANDS & RIPARIAN ZONES

Affected Environment: Floodplain habitats occur along the intermittent drainages within Dry Creek and Ramsey Gulch but no floodplain habitat would be impacted by the proposed action. Within the Grass Mesa GAP, intermittent drainages occur along Dry Creek and Ramsey Gulch. However, no wetland habitats or riparian vegetation have been documented along these drainages.

Environmental Consequences: Indirect and cumulative impacts (e.g., sedimentation) to floodplains are discussed under the Water Quality (Surface and Ground Water) section of this EA. No well pads or new access roads would be located within the riparian corridors or wetlands. As such, there will be no impact to these resources.

Mitigation: N/A

Analysis on the Public Land Health Standard for Riparian Systems: Land health standards for riparian systems were evaluated for the vast majority of the proposed action area during 2004. Although a determination has not yet been made, it is not likely that the proposed action would prevent Standard 5 from being met, provided implementation of mitigation measures occurs.

GEOLOGY AND MINERALS

Affected Environment: There are three major topographic divisions in the State of Colorado, which loosely correspond to three major geologic zones. The topographic divisions are the Eastern Plains, the Rocky Mountains, and the Colorado Plateau. The Colorado Plateau is located within the western part of the state and consists of a succession of plateaus and mesas that slope gradually toward the west away from the mountains. The Colorado Plateau is largely underlain by sedimentary rock. Igneous and metamorphic areas also occur within the plateau, but outcrops of these rocks are limited in comparison to the extent of sedimentary rock. The Grass Mesa geographic area is located on Grass Mesa within the Piceance Basin. The Piceance Basin consists of a long, narrow depression filled with sedimentary rocks up to 20,000 feet thick and 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).

EnCana's proposed gas drilling would target horizons within the Williams Fork Formation, part of the Mesaverde Group, which consists of sandstones and interbedded seams of coal. The estimated well depths are between 7,200 and 10,100 feet below ground surface. There are also several hydrocarbon-producing marine sands located within the Iles Formation at or near the base of the Mesaverde Group, including the Cozette, Corcoran, and Rollins Sandstones. The

strata proposed for drilling is the “Coal Ridge” horizon, which is located above the Rollins Sandstone. The Cameo Sands are located above the marine sands within the Cameo coal zone. Above the Cameo Sands lies the “barren member”, named because of the lack of coal in this interval. The barren member is thought to be a continental or non-marine deposit consisting of numerous unconnected sandstone, shale, and mudstone layers with low permeability. The top of the Mesaverde Group is the Ohio Creek Member. The Wasatch Formation, consisting mostly of shale and mudstone, lies above the erosion surface at the top of the Mesaverde Group. The ground surface on Grass Mesa is underlain by glacial alluvium and landslide deposits.

Environmental Consequences: Implementation of the Proposed Action would result in natural gas and associated water being produced from the hydrocarbon-producing sands within the Mesaverde Formation. The amount of natural gas potentially produced from the 100 proposed wells cannot be estimated accurately. However, if the wells become productive, initial production rates would be expected to be highest during the first few years of production, then steadily decline during the remainder of the wells’ economic lives. Natural gas production from the proposed wells would contribute to the draining of hydrocarbon-bearing reservoirs within the Mesaverde Group in this area. The proposed well density is based on spacing that would most efficiently drain the hydrocarbon resources within the Williams Fork Formation, which is consistent with the BLM objective of maximizing recovery of the natural gas resource.

Mitigation Measures:

- In order to isolate the Mesa Verde -Wasatch contact, production casing on Federal wells will have a cement top a minimum of 200 feet above the Williams Fork formation (typically resulting in cement coverage of 800- 1000 feet above the targeted gas zones).

INVASIVE, NON-NATIVE SPECIES

Affected Environment: Existing roads, pipeline corridors, residential lots, and agricultural fields within the Grass Mesa geographic area support varying levels of weed infestation. Weed species commonly seen along proposed access roads and on other previously disturbed areas include cheatgrass (*Bromus tectorum*), musk thistle (*Cardus nuttans*), Russian thistle (*Salsola kali*), kochia (*Kochia scoparia*), and common peppergrass (*Lepidium densiflorum*).

Environmental Consequences: The spread of invasive, non-native weeds is a concern for any area proposed for surface development activities. Weeds are plants that are designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property. A noxious weed is commonly defined as a plant that grows out of place and is competitive, persistent and pernicious (James et al. 1991). Specific negative effects of noxious and invasive weeds can include 1) reduction in the overall visual character of an area; 2) competition with, or complete over-running of, native plants resulting in the loss of species diversity and ecosystem functions; 3) reduction or fragmentation of wildlife habitats; and 4) increased soil erosion. Construction activities, increased soil disturbance, and higher traffic volumes could potentially introduce and spread undesirable weed species within the Grass Mesa geographic area. However, implementation of mitigation would minimize the potential for their invasion or expansion in the GAP area.

Mitigation:

- EnCana would implement an intensive reclamation and weed control program beginning the first growing season after well completion. EnCana would seed all portions of the well pad not utilized for the operational phase of the project. Re-vegetation would be accomplished using certified weed-free seed mixes of native plant species as determined by the BLM.
- Post-construction seeding applications and re-treatment would continue until determined successful by the BLM. Weed control would be conducted through an Approved Pesticide Use and Weed Control Plan approved by the Authorized Officer. Weed monitoring and reclamation measures would be continued on an annual basis (or as frequently as the Authorized Officer determines) throughout the 20 to 30 year life of the wells.

MIGRATORY BIRDS

Affected Environment: The Migratory Bird Treaty Act (MBTA) as amended, was implemented for the protection of migratory birds. Unless permitted by regulations, the MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition to the MBTA, Executive Order 13186, sets forth the responsibilities of Federal agencies to further implement the provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of actions and agency plans on migratory birds.

Numerous migratory bird species occupy, or have the potential to occupy, the Grass Mesa geographic area. Those migratory bird species that are Federally listed under the Endangered Species Act of 1973, as amended, are addressed under Special Status Wildlife and Fish Species. This section addresses migratory birds that may inhabit the proposed project area, including those species classified as High-Priority birds by Partners in Flight. High-Priority species are denoted by an asterisk (*). Emphasizing the need to conserve declining species, the USFWS published a list of more than 100 Birds of Conservation Concern, which are species 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 Birds of Conservation Concern (USFWS 2002).

Avian species commonly associated with the mountain shrub community include dusky flycatcher, green-tailed towhee*, common poorwill*, band-tailed pigeon, Lewis's woodpecker, Stellar's jay, and western scrub jay (Partners in Flight 2000). Within the pinyon-juniper woodland habitats, the pinyon jay, black-throated gray warbler, black-chinned hummingbird, gray flycatcher, and juniper titmouse may be present. Within areas dominated by scrub oak, the Virginia's warbler* may be present. Bird species potentially found in riparian habitats of the project area include American kestrel, western screech owl, great-horned owl, mourning dove, northern flicker, Lewis' woodpecker*, western wood-pewee, western kingbird*, eastern

kingbird, house wren, black-billed magpie, American robin, yellow warbler, blue grosbeak, and Bullock's oriole (Partners in Flight 2000). Raptors use the Grass Mesa area for nesting and hunting activities. Nesting habitat is primarily found in the pinyon-juniper woodlands of the project area. Of the bird species potentially found in the Grass Mesa area, two are listed as Birds of Species Conservation Concern in USFWS Region 6 (USFWS 2002): Lewis' woodpecker and Virginia's warbler.

During a June 2004 raptor nest inventory of proposed well pad and access road/pipeline locations within pinyon-juniper woodlands, 6 raptor nests were documented: one active sharp-shinned hawk nest, one inactive great-horned owl nest, three probable red-tailed hawk nests (inactive), and one inactive kestrel nest.

Environmental Consequences: Direct impacts to migratory birds from the proposed action include the loss/fragmentation of approximately 140 acres of foraging/hunting and nesting habitat. Removal of mature pinyon pine and juniper trees, 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 or Birds of Conservation Concern. Reclamation activities resulting in the growth of herbaceous species would increase habitat for small rodents, and therefore, increase prey species for raptors. While habitat loss/fragmentation may affect individual birds, it is not expected to adversely impact a species as a whole.

If construction, drilling or completion activities occur during the spring/summer season, visual and noise disturbance near active nests could cause nest failure or nest abandonment and subsequently, a reduction in productivity. Construction activity during the nesting season could also result in the destruction of clutches and/or mortality of nestlings/fledglings.

Nests documented during the June 2004 raptor nest inventory, and potential impacts to those site-specific nests (if they are active in subsequent nesting seasons), include the following:

- An active sharp-shinned hawk nest was documented in the SENW ¼ of Section 33, T6S, R93W (near proposed K33NW). This nest is in good physical condition and has the potential to be used again by raptors during future nesting seasons. As such, if construction/drilling activities on the K33NW occur between January 15 and August 31, any birds actively using this nest could be adversely affected.
- An inactive great-horned owl nest was documented in the SWSE ¼ of Sec. 27, T6S, R93W (near the proposed O27NW). This nest is in good physical condition and has the potential to be used again by raptors during future nesting seasons. As such, if construction/drilling activities on the O27NW occur between January 1 and August 31, any owls actively using this nest could be adversely affected.
- An inactive stick nest (most likely built by a red-tailed hawk) was documented in the NESW of Sec. 22, T6S, R93W (near the K22NW). The nest was found in a dead juniper tree, approximately eight feet from the ground. The stick nest was full of dirt and debris, suggesting it had not been used in several nesting seasons. Another likely red-tailed

hawk nest was documented in a juniper tree in the SESE ¼ of Sec. 9, T7S, R93W (near the I9W). This nest was also old, falling apart and beginning to slide away from the tree. Both of these nests were in severe disrepair, have not been used by raptors in probably several seasons, and are not likely to be used again. As such, impacts to these to nests from the Proposed Action are not likely. A third, inactive red-tailed hawk was documented on a west-facing aspect of the in the NWNE ¼ of Sec. 23, T6S, R93W (near the B23NW). This nest is in good physical condition and has the potential to be used again by raptors during future nesting seasons. As such, if construction/drilling activities on the B23NW occur between March 15 and August 15, any red-tailed hawks using this nest could be adversely affected.

- A kestrel nest was documented in the NENW ¼ of Sec. 23, T6S, R93W (near the B23 NW). There was some white wash below the nest during the time of the June 2004 survey, suggesting it may have been used, or at least tended to, earlier in the 2004 breeding/nesting season. The kestrel nest in question is located approximately 0.2 miles from the proposed B23NW well pad. Given the distance from the proposed location, the abundance of kestrels in general, and their ability to adapt to human activity, construction and drilling activities associated with the B23NW are not likely to adversely affect this nest.

In addition, existing BLM data (i.e., nso_7 shapefiles) include eight raptor nests within one mile of the K22NW, G22NW, C26NW, J23NW, H23NW, K24NW, and H27NW. If any of these nests are used by raptors during future nesting seasons, construction and drilling activities within the nesting season and within 0.25-miles of the active nest could adversely affect nesting activity.

The findings of the 2004 raptor survey did not locate a nest, active or inactive, that was specifically listed and protected by lease stipulations within the GAP area. As such, if future surveys discover nests outside the specific legal descriptions listed under the protective raptor stipulation, a 60-day timing limitation on any new construction, drilling or completion activities would be invoked to provide some measure of protection.

Mitigation:

- In order to protect nesting raptors, prior to any new construction, drilling or completion activities planned between February 1 and August 15, all pinyon-juniper woodlands within 0.25 miles of the proposed disturbance will be surveyed for the presence of active raptor nests. The inventory would be completed no more than 10 days prior to initiation of the surface activity. If an active raptor nest(s) is documented within 0.25-miles of proposed construction, drilling or completion, the activity would be delayed by a 60-day timing limitation. If an active nest is located in an area that is specifically listed in lease stipulations, the lease language will be implemented full force and effect.

NATIVE AMERICAN RELIGIOUS CONCERNS

Affected Environment: The Grass Mesa GAP is within a larger area identified by the Ute Tribe of the Uintah and Ouray Bands as part of their ancestral homeland. Several areas of Native American concern were identified during the cultural resource inventories. The Ute tribes were notified of the proposed Grass Mesa GAP on August 11, 2004. They were given until September 17, 2004 to respond. Betsy Chapoose, Cultural Rights and Protection Director for the Ute Tribe of the Uintah and Ouray Bands, indicated via e-mail on September 9, 2004 that they were interested in visiting some of these areas that could be of traditional or religious concern to them. No other responses or requests to visit the sites have been received from the Southern Ute or Ute Mountain Ute tribes. An additional letter was sent October 15, 2004 identifying mitigation measures for sensitive areas. This mitigation is proprietary and not subject to public review. Additional mitigation suggested by the Native Americans will be considered during the implementation phase.

Environmental Consequences: Direct impacts of construction of well locations, access roads, and pipelines have the potential to irreparably damage or destroy these culturally sensitive sites. Additionally, these impacts will affect the physical setting possibly resulting in a loss of what makes the area significant thereby causing an adverse affect. There may also be other unidentified culturally sensitive or significant locations in the area that have not been identified on both federal and private lands. Indirect impacts resulting from increased access and personnel could range from illegal collection to vandalism, adversely impacting sensitive sites. Cumulative impacts of increased development, accesses, construction, operation, and maintenance may also adversely impact these sites, possibly degrading the cultural significance by either destroying the sensitive area or its landscape setting.

Mitigation:

- The Ute Tribe of the Uinta and Ouray Bands have visited other culturally sensitive sites in the Glenwood Springs Field Office area and have provided written and verbal indication to protect these sites. The following mitigation is based upon this information. If new data are disclosed after the Native Americans visit the Grass Mesa GAP, new terms and conditions may have to be negotiated to accommodate their concerns.
 - Site-specific Native American mitigation measures suggested during consultation will be considered during the implementation phase of the proposed action(s).
 - Strict adherence to the confidentiality of information concerning the nature and location of archaeological resources will be required of EnCana and their subcontractors (Archaeological Resource Protection Act 16 U.S.C. 470hh).
 - Periodic monitoring of these sensitive areas will be required.
 - Inadvertent Discovery: The National Historic Preservation Act (NHPA) as amended 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 BLM 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 (16 U.S.C. 470hh):
 - On private lands, Colorado State Statutes (CRS 24-80-401 and CRS 24-80-1301) for Historic, Prehistoric, and Archaeological Resources, and for Unmarked Human Graves will have to be adhered to by EnCana and their subcontractors. These State statutes require that the federal Authorizing Officer be notified immediately of any historic or prehistoric finds or human grave. The find must be protected until the Authorizing Officer indicates that the action may proceed.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Affected Environment: No known Federally threatened or endangered species, State listed threatened or endangered species, or Federally proposed or candidate species (TES) have been documented as occurring in the Grass Mesa geographic area. Only those TES species known to occur, or with habitat or potential to occur or be impacted by the proposed action are addressed in this EA. As such, only the Colorado River Endangered fishes and BLM Sensitive Harrington beardtongue (*Penstemon harringtonii*) are discussed.

Colorado River Endangered Fishes (Colorado Pikeminnow, Razorback Sucker, Bonytail Chub, Humpback Chub)

The Colorado pikeminnow and razorback sucker occur within the Colorado River downstream of the project area. The bonytail and humpback chubs are both found farther downstream near the Utah state line. These fishes require a diversity of habitats within the Colorado River, particularly during certain life stages. Low velocity side channels, backwaters, oxbows, sloughs, and flooded bottom lands are all important habitats for both young and adult fish. The Colorado River and its 100-year floodplain from the town of Rifle downstream is designated critical habitat for the razorback sucker and Colorado pikeminnow. Critical habitat for the bonytail and humpback chub is located in the Blackrocks area of the Colorado River near the Colorado-Utah state line.

The proposed action of constructing 16 new well pad locations and associated roads and pipelines would increase the potential for more erosion and increased sediment to Ramsey Gulch and Dry Creek (See Soils analysis for WEPP calculations). However, given the distance to occupied habitat and the size of the GAP, the amount of sediment reaching the Colorado River would be largely undetectable given the volume of water and sediment already carried by the river. Furthermore, these fish all evolved with the large amounts of sediment that the Colorado River has traditionally carried. Based on this information, the proposed action should have “**no effect**” on any of the Colorado River Endangered fishes, or their habitat. Given the amount of

surface disturbing activity occurring in the area and within the Colorado River Basin as a whole, cumulative effects regarding sediment should be negligible.

Harrington Beardtongue

Portions of the Grass Mesa geographic area support both occupied and potential habitat for the BLM Sensitive species, Harrington beardtongue. Habitat for Harrington beardtongue usually occurs between 6,800 and 9,200 feet in open sagebrush habitat or sagebrush habitat with encroaching pinyon-juniper woodland trees. Associated soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials.

In June and July of 2004 surveys for Harrington beardtongue were completed throughout the Grass Mesa GAP. Five distinct concentrations of the beardtongue ranging from a group of less than 25 to groups of nearly 1,000 were identified at proposed well pad locations, proposed access road/pipeline corridors, and along existing road/pipeline ROWs (as illustrated in EnCana's original GAP map [Appendix F]). The following changes for site locations were agreed to by EnCana in order to avoid the main plant concentrations and minimize negative impacts on this BLM sensitive species.

- M33NW (W $\frac{1}{2}$ Sec. 33, T6S R93W) - Proposed pad would not be completed, new pad K33NW (NWSW $\frac{1}{4}$ Sec. 33) that disturbs fewer plants would be the alternative carried forward (see also Alternatives Proposed but Not Carried Forward). The new K33NW location would disturb less than 10% of the main population.
- F33NW (SE $\frac{1}{4}$ Sec. 33, T6S R93W) - Proposed pad would not be completed, new pad K33NW (NWSW $\frac{1}{4}$ Sec. 33) that disturbs fewer plants would be the alternative carried forward (see also Alternatives Proposed but Not Carried Forward). The new K33NW location would disturb less than 10% of the main population.
- O27NW (SWSE $\frac{1}{4}$ Sec. 27, T6S R93W) - Access road would be re-routed to the east outside of occupied beardtongue habitat.
- E9W (NW $\frac{1}{4}$ Sec. 9, T7S R93W) - Well pad would be shifted 150 feet south outside of occupied beardtongue habitat pending re-survey results.
- B16W (NE $\frac{1}{4}$ Sec. 16, T7S R93W) - Well pad would be relocated 200 feet west from mapped location outside of occupied beardtongue habitat.
- J16W (SE $\frac{1}{4}$ Sec. 16, T7S R93W) - Road and well pad would be relocated 450 feet west by southwest from the mapped location outside of occupied beardtongue habitat.

Environmental Consequences: Relocating the proposed pads to areas with fewer or no Harrington beardtongue would reduce the negative impact on this species, but in some cases (i.e.

at the K33NW) a portion of occupied habitat would still be impacted. As a result, the proposed action would likely result in the loss of individual plants as well as suitable habitat for the species. Additionally, weed encroachment and the use of aggressive, non-native seed mixes for reclamation may further diminish the long-term viability of the beardtongue.

Mitigation:

- In addition to moving proposed pad locations out of areas with high concentrations of the beardtongue, EnCana will also implement aggressive and timely reclamation and weed control measures to minimize indirect impacts to populations. Native species will be used to encourage reestablishment of the beardtongue following reclamation. Herbicides used to control noxious weeds within occupied Harrington's penstemon habitat will involve spot spraying of target weeds only.

Analysis on the Public Land Health Standard for Threatened, Endangered and Sensitive Species: Land health standards for threatened, endangered and sensitive species were evaluated for the vast majority of the proposed action area during 2004. Although a determination has not yet been made, it is not likely that the proposed action would prevent Standard 4 from being met, provided implementation of mitigation measures occurs.

WASTES, HAZARDOUS OR SOLID

Affected Environment: N/A

Environmental Consequences: Fuel and lubricants would be temporarily stored in transportable containment trailers or tanks on the proposed well pad to minimize potential for accidental releases/spills. No other hazardous or potentially hazardous materials would be brought into the Grass Mesa geographic area.

Mitigation:

- If any spills of oil, gas, salt water, or other fluids were to occur during the construction, drilling or operational phase of the project, EnCana will immediately contact the BLM and any other regulatory agencies necessary. Strict cleanup efforts, based on a spill plan approved by the BLM will be initiated immediately. This mitigation will be applied at all stages of the project including drilling, completion, operation, and abandonment of the wells.

WATER QUALITY, SURFACE AND GROUND WATER

Affected Environment:

Surface Water

The Grass Mesa geographic area is located within the watersheds of Dry Creek and Ramsey Gulch. Both of these creeks are tributaries to the Colorado River.

Streamflow data are not available for the creeks in the Grass Mesa geographic area. Stream flows in the drainages within the Grass Mesa geographic area are generally ephemeral and dependent on seasonal storm and snowmelt runoff. The majority of the runoff is during the spring and early summer and is generated by melting of the winter snow pack. However, flood flows generally result from summer convective storms.

Water Quality and Beneficial Uses

The Colorado Department of Public Health and Environment (CDPHE) uses specific criteria to classify surface waters for the purpose of assigning water quality standards in compliance with the national water quality improvement objectives of the Clean Water Act. The classification system addresses beneficial use categories together with narrative standards, an anti-degradation rule, and numeric standards that define conditions necessary to maintain or attain the beneficial uses. All surface waters in the Grass Mesa geographic area are assigned the following beneficial uses:

Aquatic Life Cold Water Class 2: These waters are not capable of sustaining a wide variety of cold or warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.

Recreation Class 2: These waters are not suitable or intended to become suitable for primary contact recreation uses, but are suitable for or intended to become suitable for recreational uses on or about the water which are not included in the primary contact subcategory, including but not limited to wading, fishing, and other streamside or lakeside recreation.

Agriculture: Waters are suitable or intended to become suitable for irrigation of crops or livestock use.

Domestic Water Supply: These surface waters are suitable for or intended to become suitable for potable water supplies following standard treatment. From 1952 to 1982 specific conductance readings at the USGS operated gauging station #09092500 on Beaver Creek (the watershed just west of Grass Mesa) generally read below 500 microsiemens, indicating very good water quality.

Water quality data are not available for Dry Creek and Ramsey Gulch. However, based on water quality in similar areas nearby, the water quality is expected to be good.

Groundwater

The Grass Mesa geographic area lies within the south province of the Piceance Structural Basin. Groundwater resources in the Grass Mesa geographic area include shallow groundwater within alluvium and the Wasatch Formation, and deeper water-bearing intervals located within the Mesaverde Group and possibly the Morrison and Dakota Formations underlying the Grass Mesa geographic area. However, the depths to these latter units exceed 5,000 feet. Therefore, the Mesaverde Group, and Morrison and Dakota Formations are too deep to be considered as aquifers in this area.

There are 214 domestic water wells located within the Grass Mesa geographic area that are permitted with the Colorado Division of Water Resources. The wells range from a few feet deep to 580 feet deep. Over half of these wells (113) are completed at depths of less than 100 feet, and 79 wells are completed between 100 and 300 feet deep. Only two wells are more than 500 feet deep. Glover et al (1998) reports that the depth to the Mesaverde aquifer beneath the Grass Mesa geographic area is more than 2,000 feet below ground surface (bgs), however, the true depth to the top of the Williams Fork Formation in this area is more than 5,000 feet. Therefore, the wells within the area are representative of shallow groundwater that is present within the alluvium covering the surface and the underlying Wasatch Formation.

Water quality of the shallow groundwater underlying the Grass Mesa geographic area is generally good. Records of the geologic formation that these wells are completed in are not available. However, as discussed above, these wells are likely completed in the Wasatch Formation or overlying alluvium.

Total dissolved solids (TDS) range from 273 mg/L to 2,730 mg/L, with a mean of 662 mg/L. According to rules formulated by the Colorado Water Quality Control Commission, these TDS values classify the shallow groundwater underlying the Grass Mesa geographic area as being of Potentially Usable Quality. This classification is applied to groundwater resources that are currently not being used but have TDS values of less than 10,000 mg/L.

Chloride ranged from 3.3 to 1,140 mg/L, with a mean of 78.1 mg/L. Two of 37 samples exceeded the federal secondary drinking water standard for chloride of 250 mg/L. Iron ranged from <0.2 mg/L to 17 mg/L, with a mean of 0.72 mg/L. Twelve of 37 samples exceeded the secondary drinking water standard of 0.3 mg/L, and one sample exceeded the Colorado agricultural standard of 5 mg/L. Manganese ranged from <0.01 mg/L to 0.78 mg/L, with a mean of 0.04 mg/L and one sample exceeded the Colorado agricultural standard of 0.2 mg/L. Selenium ranged from <0.005 mg/L to 0.023 mg/L, below the primary drinking water standard of 0.05 mg/L and the Colorado agricultural standard of 0.2 mg/L. Nitrate was detected in all 21 samples at concentrations up to 21.9 mg/L, with a mean of 6.59 mg/L. Six of 21 samples exceeded the federal primary drinking water standard of 10 mg/L for nitrate. Sulfate ranged from 14 mg/L to 455 mg/L, with a mean of 106 mg/L. Four samples were above the federal secondary drinking water standard of 250 mg/L for sulfate.

Some of the samples exceeded standards for chloride, iron, manganese, and sulfate. The cause of some of these samples to exceed standards is likely the result of dissolution of these elements from the geologic materials through which they pass. The high nitrate values may be the result of agricultural activities in the area, as well as natural factors.

Environmental Consequences:

Surface Water

There are three types of potential direct or indirect effects to surface water resources that could occur as a result of the development of gas wells in the Grass Mesa geographic area:

- Direct impacts to Dry Creek and Ramsey Gulch and/or tributary channels;
- Increases in connected disturbed area (CDA) - i.e., sedimentation and turbidity of surface water as a result of ground disturbance and erosion into surface waters via runoff;
- Effects to water quality – i.e., potential contamination of surface water resources with drilling fluids or other wastes generated by natural gas drilling and production activities.

Each of these potential impacts is discussed below.

Direct and Indirect Effects to Streams

Construction activities near and across springs or wetlands can result in several types of adverse impacts, including increased sediment deposition, removal of sensitive riparian vegetation, water quality degradation, and destruction of wildlife habitat.

Increased sedimentation of Dry Creek, Ramsey Gulch and other tributary drainages is possible, especially during the construction of the project facilities. Increased sedimentation to these intermittent drainages could result particularly from disturbed areas. Increased sedimentation could include a short-term increase in turbidity and an increase in the deposition of fine sediment within the channels. Both of these effects could have negative impacts on aquatic habitat within affected streams.

For long-term access road disturbance within Dry Creek and Ramsey Gulch and their tributaries, Best Management Practices (BMPs) would be employed in the disturbed areas during construction to reduce the amount of sediment that reaches the drainages. Detailed construction plans for the proposed access roads would be prepared and submitted for review and approval prior to construction. The road design would include specific drainage components and BMPs that would be utilized to address control of sedimentation of surface waters in the Grass Mesa geographic area. Furthermore, as required, EnCana would submit 404 permit applications to the U.S. Corp of Engineers for any proposed construction within a designated Water of the U.S. In general, the access roads would be designed to maintain vegetative buffers between the roads and intermittent drainages, where possible, and feature relief ditches that would be installed at frequent intervals to channel water to undisturbed vegetated surfaces. These practices would help slow the velocity of runoff and filter out sediment prior to entering the intermittent drainages within the project area and downstream.

Direct and Indirect Effects on Connected Disturbed Areas

Direct impacts to surface water quality could also result from construction activities within connected disturbed areas, including road crossings of ephemeral tributaries. Potential impacts could include erosion of the banks of channels of ephemeral drainages and deposition of sediment from nearby disturbed surfaces into these channels. Since surface water quality impacts are likely to directly result from disturbance within and adjacent to stream channels, EnCana and its contractors would need to implement mitigation measures to minimize impacts to water quality in affected streams.

Direct and Indirect Effects on Water Quality and Beneficial Uses

Water quality effects from sedimentation were discussed previously under effects to connected disturbed areas.

During well drilling, a lined reserve pit would be used on each new well pad so that no drilling mud or production water would be discharged to shallow groundwater or on the surface. Standard industry practices and safety measures associated with the installation of roads, pipelines, and well pad facilities, and the containment of storage tanks in bermed areas (e.g., Spill Prevention and Counter Control Measures, Storm Water Management Plan) would be implemented to minimize the risk of accidental spills or introduction of contaminants to Grass Mesa geographic area drainages.

Groundwater

Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected and the presence of these zones reported to the BLM and COGCC.

In order to isolate the Mesa Verde -Wasatch contact, production casing on Federal wells will have a cement top a minimum of 200 feet above the Williams Fork formation (typically resulting in cement coverage of 800- 1000 feet above the targeted gas zones). This measure is required to isolate the Mesa Verde Formation from the Wasatch Formation. After the completion of drilling operations, the producing formation would be logged and production casing run and cemented in accordance with the drilling program approved in the APD. This would isolate all water-bearing formations in the borehole and would effectively eliminate communication between hydrocarbon-bearing zones and the shallow groundwater aquifers.

With respect to deeper groundwater resources, the thick impermeable layers of rock in the top section of the Williams Fork Formation make it highly unlikely for hydrocarbons or water produced from drilling operations to migrate into potable water zones. In addition, these deeper zones, while representing a possible groundwater resource, are located more than 5,000 feet below the ground surface and are therefore too deep to be usable as aquifers. The gas-producing zones that would be targeted are also several thousand feet below these deeper groundwater zones.

Mitigation:

- EnCana will implement aggressive reclamation and re-vegetation of disturbed areas not needed for operational activities. These measures will help prevent erosion and sedimentation to drainages. In addition EnCana will implement multiple BMPs including the following:
 - New access roads will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity.

- Relief ditches or corrugated metal pipes will be installed at regular intervals to direct drainage off of the road grade and into vegetated areas, where it would infiltrate into the ground and/or sediment would settle out on the surface.
 - Ditches will be allowed to vegetate and/or will include large rocks or stones to slow the velocity of drainage and allow sediment to settle out.
 - Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out.
 - EnCana's road construction plans will identify specific locations of drainage features and BMPs for approval by the BLM prior to construction.
 - Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected and the presence of these zones reported to the BLM and COGCC.
 - After the completion of drilling operations, the producing formation would be logged and production casing run and cemented in accordance with the drilling program approved in the APD.
 - BLM will conduct surface casing inspections on every federal well in the Grass Mesa project area.
 - In order to isolate the Mesa Verde -Wasatch contact, production casing on Federal wells will have a cement top a minimum of 200 feet above the Williams Fork formation (typically resulting in cement coverage of 800- 1000 feet above the targeted gas zones).
- In addition, the following site-specific mitigation measures will be implemented:
 - In accordance with EnCana's standard policy, all reserve pits will utilize impermeable liners to contain drilling fluids. Following completion activities, reserve pit liners would be removed at the respective landowners request. At the discretion of EnCana and in cooperation with the respective landowner, closed-loop drilling systems may be used on well pads within 100 feet of Dry Creek and Ramsey Gulch (i.e., the H23NW).
 - In accordance with EnCana's standard policy, erosion protection and silt retention techniques including construction of silt catchment dams, installation of culverts or drainage dips, placement of surface rock on approaches to stream crossings, placement of surface rock, straw bales, and/or matting will be used along proposed road reaches within 100-feet of stream channels (i.e., roads to the K4D and H23NW).

- Within areas less than 100 feet from Dry Creek and Ramsey Gulch, an adequate vegetative buffer, artificial buffers (e.g., straw bales, matting, etc.), or filter strip will be maintained between the road and Dry Creek or Ramsey Gulch to filter runoff from the road (i.e., roads to the K4D and H23NW) before it reaches the creek, wherever possible.

Analysis on the Public Land Health Standard for Water Quality: Land health standards for water quality were evaluated for the vast majority of the proposed action area during 2004. Although a determination has not yet been made, it is not likely that the proposed action would prevent Standard 5 from being met, provided implementation of mitigation measures occurs.

WILD AND SCENIC RIVERS

Affected Environment: There are no un-studied rivers, rivers found to eligible or designated Wild and Scenic Rivers within the proposed project area.

Environmental Consequences/Mitigation: N/A

WILDERNESS

Affected Environment: There are no designated Wilderness areas, Wilderness Study Areas or citizens proposed wilderness areas within the proposed project area.

Environmental Consequences/Mitigation: N/A

NON-CRITICAL ELEMENTS

HYDROLOGY AND WATER RIGHTS

Affected Environment: See Water Quality, Surface and Groundwater section.

Environmental Consequences: Since water would be obtained from an offsite source and hauled to the new well pad locations for drilling and completion, there would be no diversions or alterations of the flow regimes of Dry Creek or Ramsey Gulch. No effects to stream health from changes in stream flow regime should occur in the Grass Mesa geographic area as a result of the proposed actions.

Development of additional gas wells would result in the use of approximately 0.25 acre-feet of water to drill each well, for a total of approximately 25 acre-feet. Based on the average annual flow rate of 2,820,000 acre-feet per year for the Colorado River in this reach (based on flow data from the USGS gauging station at Cameo), this project-related water use would be insignificant from a hydrologic standpoint.

Mitigation: N/A

NOISE

The following discussions provide a brief summary of the affected environment and environmental consequences for noise. A detailed analysis on noise is provided in Appendix H.

Affected Environment: The BLM has not established noise standards for the Encana Grass Mesa Geographic Area Plan (GAP). The 55-dBA threshold for noise is not a regulatory requirement. Rather, the 55-dBA threshold for noise should be recognized as a level below which there is no reason to suspect that the public health and welfare of the general population would be at risk from any of the identified effects of noise.

The Colorado Oil and Gas Conservation Commission (COGCC 2004) has established regulatory noise limits for oil and gas facilities on state and private lands as follows:

“Oil and gas operations, including gas facility operations, shall comply with the following maximum permissible noise levels for the predominant land use existing in the zone in which the operation occurs. Any operation involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation is subject to the maximum permissible noise levels for industrial zones. In the hours between 7:00 a.m. and the next 7:00 p.m. the noise levels permitted below may be increased ten (10) db(A) for a period not to exceed fifteen (15) minutes in any one (1) hour period”.

The COGCC noise limits are summarized in Table 5.

Table 5. COGCC Maximum Permissible Noise Levels

Land Use	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential	55 db (A)	50 db (A)
Industrial	80 db (A)	75 db (A)

The primary noise sources in and near the Grass Mesa geographic area are the existing Pumba compressor station and the East Mamm Creek Compressor Station on the eastern border of the geographic area. Noise levels are also elevated during well pad, access road and pipeline construction, operation of drilling and completion rigs, near compressor stations, near private residences, and along roads.

Noise has been measured at typical compressor units (USGS 1981). A noise level of 90 dBA from one large compressor engine can be expected at 10 feet from the source. A compressor building enclosing compressor engines would afford further noise attenuation of about 15 dBA. Therefore, an existing compressor engine within the GAP, which is enclosed in a compressor building, would be expected to generate approximately 75 dBA at 10 feet from the source. Noise levels were studied at the Pumba Compressor Station. Noise levels at this facility met required noise mitigation standards of not exceeding 44dBA as measured from a residence 5,000 feet west of the compressor station.

Environmental Consequences: Noise above existing levels would occur during construction, drilling, completion, and operation of natural gas facilities as a result of the Proposed Action. Elevated noise from construction of well pads and roads, drilling, and completion activities would occur for to 10 to 45 days at any given location. After construction activities, noise increases from natural gas extraction activities would occur for the life of the project near production facilities such as gas processing stations, well pads, and along access roads.

Construction noise levels would be moderate but short-term at any given location. Based on an average construction site noise level of 85 dBA at 50 feet from the site, the construction noise could be above 55 dBA within 1,500 feet of the site. Additionally, elevated noise levels would occur along access roads as vehicles and heavy equipment travel to each site. Elevated noise levels would occur for a short duration at any given location and would occur only during daytime because construction would generally cease between sunset and sunrise.

Noise impacts from drilling and completion activities would be moderate and would last approximately 60 days at any one location. Based on a measured noise level of 50 dBA at ¼ mile (1,320 feet) from a drill rig, the noise would be above 55 dBA within 800 feet of a drill rig. Drilling noise would occur continuously for 24 hours per day during the approximate 16-day drilling period for each well. Completion flaring activities would also contribute to elevated noise levels for a short duration at any one site.

Additionally, traffic noise levels would be elevated along access roads during the drilling and completion sequences. However, the majority of traffic would occur during the morning and evening hours as workers arrive at and leave from the drilling sites.

Operational Noise Impacts

Noise impacts related to production work would be minor along access roads due to infrequent operations traffic and provided suggested mitigation is implemented. Additional noise sources would include periodic maintenance and workovers at well sites. Since no additional compression is planned for the Proposed Action, compression noise would remain unchanged from existing compression facility levels.

Since noise impacts during both the short-term and long-term timeframes would affect locations within close proximity to noise sources, no cumulative noise impacts (i.e., cumulative increases in noise throughout the Grass Mesa geographic area) are expected. Ongoing projects in the region are only expected to affect their own site-specific locations.

Mitigation:

- Any new compressor engines at the existing compressor stations will be equipped with critical silencers. Critical silencers reduce noise levels of compressor engines below the State standard of 55 dBA.
- During drilling and completion on Grass Mesa, EnCana will angle the outlet on the exhaust muffler stacks of the power units or generators away from private homes.

- The operator is urged to use noise-reducing drill rigs for all pad locations on Grass Mesa proper. At a minimum, the operator will use noise-reducing “rig power packs” and/or electric-powered drill rigs on the following pad locations (E9W, B16W, G22NW, H27NW, H34NW, K4D, K22NW, K33NW and O27NW) to help mitigate expected noise levels from drilling activities near residences.
- As a matter of policy, EnCana will not stage and use more than 5 operating drill rigs on Grass Mesa at any one time.
- Excess spoil material will be piled along the edge of the well pad to act as a sound barrier between the well pad and nearby private residence. Sound barrier walls will be installed when excess spoil material piles are not available to augment noise whenever drilling or completion work is undertaken within 0.5 miles of private residences.
- EnCana will use telemetry equipment at all gas well meters to reduce the number of pumper traffic within the Grass Mesa area. Reduction of vehicle traffic will reduce overall noise impacts to nearby homeowners.
- To help reduce the truck traffic noise associated with removing produced water from the various sites on the mesa, EnCana is encouraged to upgrade and use the buried pipeline on the mesa for transport of produced water volumes to its water treatment facility at Hunter Mesa. Reports indicate that this pipeline exists at least to portions of the pads on the mesa.

PALEONTOLOGY

Affected Environment/Environmental Consequences: The affected environment and environmental consequences discussions for paleontological resources are discussed in the following sections on a site-specific basis for those proposed locations with fossil potential.

B23NW

Exposed rock (i.e., potential locations for fossil resources) was identified during on-site investigations of the proposed access road to the B23NW well location. A paleontological field survey of the proposed B23NW pad was completed on August 29, 2004. Due to the scarcity of fossils found along the proposed corridor, BLM has determined that this location has a low probability of containing fossil resources, and therefore, it is not necessary to monitor construction of this well site and access road.

C26NW

Exposed rock was identified during on-site investigations of the proposed access road to the C26NW well location. Due to the scarcity of fossils found along the proposed corridor, BLM paleontologist Harley Armstrong determined from field review that a detailed paleontological inventory is not necessary, and that the proposed action is not likely to adversely affect fossils.

I9W

Exposed rock was also identified during on-site investigations of the proposed I9W well location. However, due to the scarcity of fossils found at the location, the BLM has determined that a detailed paleontological inventory is not necessary, and that the proposed action is not likely to adversely affect fossils.

Mitigation:

- If vertebrate fossils are documented during construction, construction at that spot should be delayed until the project paleontologist, BLM paleontologist or representative, and the company inspector can be notified to evaluate the discovery. Construction work should be allowed to proceed beyond the discovery so there are no construction delays. If scientifically important fossils are encountered during operations and cannot be avoided, additional mitigation measures (e.g., re-location of the pad/access road) may be necessary.

RANGE MANAGEMENT

Affected Environment: The BLM permits livestock grazing on public land on three allotments within the Grass Mesa planning area: Beaver Mamm # 08104, Grass Mesa # 08112, and Oates # 08103 Allotments. The Grass Mesa Allotment and the Oates Allotment are entirely within the project area. Only the eastern half of the Beaver Mamm Allotment is within the GAP area. Permitted grazing use on the allotments is summarized below:

<u>Allotment Name & No.</u>	<u>Permittee</u>	<u>Livestock (Type & No.)</u>	<u>Period of use</u>	<u>%PL</u>	<u>AUMs</u>
Beaver Mamm #08104	Jack Farris	Cattle 79	05/15 – 10/15	100	400
	George Ferguson	Cattle 45	05/15-10/15	100	228
Grass Mesa #08112	James L. Rose	Cattle 32	05/15 – 06/30	100	49
	James L. Rose	Cattle 40	07/01 – 08/15	15	9
Oates #08103	Alvin W. Woody	Sheep 125	05/01 – 06/15	100	38

Livestock use on the Grass Mesa allotment has not occurred in last several years with the onset of oil and gas lease development. Furthermore, grazing has not been known to occur to much degree on the public land portion of the Oates allotment.

Environmental Consequences: The proposed action would have negative and positive impacts on livestock grazing. The Beaver Mamm Allotment would have one new well pad on BLM surface. The Grass Mesa Allotment would have 3 new well pads on BLM land. The Oates Allotment would have 8 new well pad locations on BLM surface.

Surface disturbing activities such as construction and use of roads, pipelines, well pads, etc. would initially remove forage. On areas that are disturbed and rehabilitated, herbaceous vegetation and herbaceous forage production typically recovers to the level before disturbance in 3 years. Rehabilitated sites often produce more livestock forage than native rangeland. There would be some loss of vegetation on well pads and roads that remain in use for the life of the project. This long-term projected loss of vegetation and forage on each allotment is expected to be relatively minor with a projected loss of about 16 acres (estimate 1 acre loss for “in-use” area per well pad). This would amount to an estimated loss of no more than 1 to 2 AUMs of forage on each allotment. Development and maintenance of oil and gas facilities would increase human activity, which would disturb grazing livestock. Construction of roads and pipelines may improve access into remote areas of allotments that livestock have difficulty reaching.

Mitigation:

- It is not anticipated that the level of impacts expected from implementation of the proposed action will require adjustment of stocking rates. The level of forage utilization will be monitored on affected allotments and if necessary, adjustments in livestock use will be made to protect land health based on this monitoring.
- The operator will fence reclaimed well pads to inhibit livestock grazing pressure on seeded sites.
- To allow access to K33NW pad and still control nearby livestock on BLM land, the operator will install livestock fence of same style, materials and standard as existing allotment boundary fence. This new fence will be installed around the perimeter of planned surface disturbance of the K33NW access road (around the outside edge of planned road switchback) and pad (around the outside perimeter of excess material pile). To avoid problems with uncontrolled livestock grazing, the fence installation will be completed prior to beginning any road or pad construction related to the K33NW location, unless otherwise approved by the Authorized Officer. Steel fence posts to be installed will be standard green color.

RECREATION

Affected Environment:

General: The 1984 Glenwood Springs Resource Management Plan (RMP) does not identify specific, measurable or targeted recreation management objectives for the Grass Mesa area. The scattered parcels of BLM administered public lands are part of the Glenwood Springs extensive recreation management area (ERMA) where recreation management is unstructured and management actions are generally custodial to allow for dispersed/undirected recreation activities.

Recreation Opportunity Spectrum (ROS): The existing physical setting characteristics were very generally mapped for the 1984 RMP. The physical setting was mapped as Roded Natural. Neither the social or managerial settings were mapped.

Specific prescriptions for the management of the physical, social or managerial settings are not done in ERMAs, therefore none were identified in the 1984 RMP. However, the RMP provided a general overview of appropriate experience and activity opportunities that occur by adopted Recreation Opportunity Spectrum (ROS) classes. For the Grass Mesa area, the RMP recreation direction was to maintain a roaded-natural setting (physically, socially and administratively) for a variety of experience and activity opportunities.

Developed Recreation: No developed sites are present.

Commercial Recreation Permits: No commercial permittees operate in the Grass Mesa area.

Environmental Consequences: The proposed action will not necessarily change the variety of experience and activity opportunities that occur or that are appropriate on public lands. However, the proposed actions will shift the physical ROS setting from a roaded natural towards a rural ROS setting because landscape modifications and use will be obvious (also see Transportation, Travel and Access section). Social settings will also move towards a rural ROS setting because the sights and sounds and evidence of development will be evident. There will be an administrative ROS shift due to the presence of access restrictions/signs and possibly more field presence. The ROS setting changes are also a concern of the Grass Mesa HOA.

Mitigation: N/A

SOILS

Affected Environment: Baseline soil information was obtained from the Soil Survey of Rifle Area, Parts of Garfield and Mesa Counties (SCS 1985). Table 6 provides a listing of the soil map units within the Grass Mesa geographic area and their topographic position, slopes, general soil texture, and depth class. Soil map units within the area include the Arvada loam (map units 3 and 4), the Bucklon-Inchau loam (12), the Cimmaron loam (16), the Morval loam (44) and the Morval-Tridell complex (45), the Olney loam (50 and 51), the Potts loam (55 and 56), the Potts-Ildefonso complex (58), the Torriorthents-Camborthids-Rock Outcrop complex (66 and 67), the Vale Silt loam (68), and the Villa Grove-Zoltay loams (71). With the exception of the Torriorthents-Camborthids-Rock Outcrop complex, the Bucklon-Inchau loam, and Villa Grove-Zoltay loams, all of these units are generally flat-lying and occur on alluvial fans, terraces, mesa tops, and drainages. Soil types are generally loam, clay loam, and silty clay loam, and most are deep and well-drained. Only the Arvada loam, Bucklon-Inchau loam, Potts loam, and Torriorthents-Camborthids-Rock Outcrop complex are considered to be fragile soils because of high water erosion potential.

Table 6. Soil Map Units in the Grass Mesa Geographic Area

Soil Map Number	Soil Mapping Unit Mapping Name	Topographic Position	Slope	Soil Texture	Depth Class	Highly Erodible Soil?
3	Arvada loam	Alluvial fans and high terraces	1 to 6%	Loam, silty clay loam, clay loam	Deep	No
4	Arvada loam	Alluvial fans and high terraces	6 to 20%	Silty clay loam, loam	Deep	Yes
12	Bucklon-Inchau loam	Ridges and mountainsides	25 to 50%	Loam, clay loam	Shallow	Yes
16	Cimmaron Loam	Along drainageways and narrow mountain valleys	2 to 12%	Loam, silty clay loam, silty clay	Deep	No
44	Morval Loam	Mesas and sides of valleys	3 to 12%	Loam, clay loam, stony clay loam	Deep	No
45	Morval-Tridell complex	Alluvial fans and sides of mesas	6 to 25%	Loam, clay loam, stony clay loam	Deep	No
50	Olney Loam	Alluvial fans and sides of valleys	3 to 6%	Loam, sandy clay loam, gravelly sandy clay loam	Deep	No
51	Olney Loam	Alluvial fans and sides of valleys	6 to 12%	Loam, sandy clay loam, gravelly sandy clay loam, very gravelly sandy loam	Deep	No
55	Potts Loam	Mesas, benches, and sides of valleys	3 to 6%	Loam, clay loam	Deep	No
56	Potts Loam	Mesas, benches, and sides of valleys	6 to 12%	Loam, clay loam	Deep	Yes
58	Potts-Ildefonso complex	Mesas, alluvial fans, and sides of valleys	12 to 25%	Loam, clay loam, stony loam, very stony loam	Deep	No
66	Torriorthents-Camborthids-Rock outcrop complex	Foothills and mountainsides	15 to 70%	Clay loam with variable amounts of rock, rock outcrop, stony loam	Shallow to deep	Yes
67	Torriorthents-Rock outcrop complex	Foothills and mountainsides	15 to 70%	Clay loam with variable amounts of rock, rock outcrop, stony loam	Shallow to moderately deep	Yes
68	Vale Silt Loam	Mesas, terraces, and alluvial fans	3 to 6%	Loam, silty clay loam, silt loam	Deep	No
71	Villa Grove-Zoltay loams	Mountainsides and alluvial fans	15 to 30%	Loam, clay loam	Moderately deep	No

Thirteen of the seventeen proposed well pads in the Project Area have Controlled Surface Use stipulations (CSUs) (See Appendix D, Table I) associated with their corresponding lease agreements that protect fragile soils. Fragile soil performance standards are outlined in the lease stipulations. The standards dictate a variety of erosion control measures, construction guidelines, and reclamation activities that EnCana would abide by as a part of their standard operating procedure.

Environmental Consequences: The primary effect of long-term surface disturbances on soil resources is increased erosion and the resulting increase in sediment yield to nearby drainages and streams. In order to estimate potential erosion and sediment yield increases from long-term surface disturbance, the Water Erosion Prediction Project model (WEPP) developed by the U.S. Forest Service was used.

Baseline WEPP modeling of the grassland areas in the proposed Grass Mesa geographic area shows that the existing erosion rate from these surfaces is about 0.01 tons per acre. For the proposed well pads, an average long-term erosion rate of 0.03 tons per acre per year was calculated, assuming a nearly flat surface and zero surface cover. Pipelines would be installed in two locations: along existing roads and within the roadway of the proposed new access roads. For the new pipeline corridors that would be constructed along existing roads, the modeled erosion rate is about 0.04 tons per acre. In addition to these pipeline corridors, approximately 6.12 miles of new access road with co-located pipelines would be constructed for the Proposed Action. WEPP modeling of the road surfaces shows that approximately 10.58 tons per year can be expected to be eroded from these surfaces each year, assuming a width of 30 feet, an average road gradient of 4%, a native outsloped running surface with 20% rock content, and the modeled annual precipitation of about 18.9 inches.

Applying these modeled erosion rates to the 54.9 acres that would be disturbed over the long-term life of the project; a total erosion rate of 11.78 tons per year is estimated for the Proposed Action, compared with the current erosion rate of about 0.57 tons per year. Therefore, for the long-term, an increase of about 11.21 tons per acre per year of erosion would result from the Proposed Action. However, because these areas would generally be well buffered (at least 100 feet) from Dry Creek and Ramsey Gulch, little or no eroded material is expected to reach the creeks in the short- or long-term from the disturbed surfaces. The modeling also shows that following re-vegetation and two growing seasons, the erosion rate and potential sediment yield would drop to near baseline conditions. Sensitive areas near Dry Creek or Ramsey Gulch would be site-specifically engineered (e.g., silt fences and/or other BMPs) to protect against sedimentation. Additionally, all depositional areas created by eroded material would be re-vegetated to reduce the potential for noxious weed encroachment along the drainages. Estimated long-term erosion rates under the Proposed Action are summarized in Table 7.

Table 7. Long-term Erosion Rates Under the Proposed Action

GAP Action	Long-Term Erosion Rates (Tons/Acre/Year)	Long-term Disturbance	Total Long-Term Erosion Rates (Tons/Year)
Well Pads	0.03	16 ac	0.54
Roads/Pipelines	0.47	22.5 ac	10.58
Pipeline ROW	0.04	16.4 a	0.66
Totals		54.9 ac	11.78

Thirteen of the seventeen proposed well pads in the Project Area have Controlled Surface Use stipulations (CSUs) (See Appendix D, Table I) associated with their corresponding lease agreements that protect fragile soils. The CSU stipulations state, “*Prior to surface disturbances*

of fragile soils, it must be demonstrated to the Authorized Officer through a plan of development that the following performance objectives will be met:

Performance Objectives:

- 1. Maintain the soil productivity of the site.*
- 2. Protect off-site areas by preventing accelerated soil erosion (such as fano-sliding, gullyng, rilling, piping, etc.) from occurring.*
- 3. Protect water quality and quantity of adjacent surface and groundwater sources.*
- 4. Select the best possible site for development in order to prevent impact to the soil and water resources.*

Fragile soil areas in which the performance objective will be enforced, are defined as follows:

- A. Areas rated as highly or severely erodible by wind or water, as described by the conservation service in the Area Soil Survey Report or as described by on-site inspection.*
- B. Areas with slopes greater than or equal to 35 percent, if they also have one of the following soil characteristics: (1) a surface texture that is sand, foamy sand, very fine sandy foam, fine sandy foam, silty clay or clay; (2) a depth to bedrock that is less than 20 inches; (3) an erosion condition that is rated as poor; (4) a K factor of greater than 0.32.*

Performance Standards:

- 1. All sediments generated from the surface-disturbing activity will be retained on site.*
- 2. Vehicle use would be limited to existing roads and trails.*
- 3. All new permanent roads would be built to meet primary road standards (BLM standards) and their location approved by the Authorized Officer. For oil and gas purposes, permanent roads are those used for production.*
- 4. All geophysical and geochemical exploration would be conducted by helicopter, horseback, on foot or from existing roads.*
- 5. Any sediment control structures, reserve pits, or disposal pits would be designed to contain a 100-year, 6-hour storm event. Storage volumes within these structures would have a design life of 25 years.*
- 6. Before reserve pits and production pits would be reclaimed, all residues would be removed and tucked off-site to an approved disposal site.*
- 7. Reclamation of distributed surfaces would be initiated before November 1 each year.*
- 8. All reclamation plans would be approved by the Authorized Officer in advance and might require an increase in the bond.*

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)”

Mitigation: The following measures would be implemented to help prevent erosion and subsequent sedimentation:

- In accordance with EnCana's standard policy, erosion protection and silt retention techniques including construction of silt catchment dams, installation of culverts or drainage dips, placement of surface rock on approaches to stream crossings, placement of surface rock, straw bales, and/or matting will be used along proposed road reaches within 100-feet of stream channels (i.e., roads to the K4D and H23NW).
- New access roads will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity.
- Relief ditches or corrugated metal pipes will be installed at regular intervals to direct drainage off of the road grade and into vegetated areas, where it would infiltrate into the ground and/or sediment would settle out on the surface.
- Ditches will be allowed to vegetate and/or will include large rocks or stones to slow the velocity of drainage and allow sediment to settle out.
- Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out.
- Straw (curlex) matting will be placed on excess material piles to help limit heavy dust emissions into the air during weather-created wind events.
- EnCana's road construction plans will identify specific locations of drainage features and BMPs for approval by the BLM prior to construction.
- After the completion of drilling operations, the producing formation would be logged and production casing run and cemented in accordance with the drilling program approved in the APD.

Analysis on the Public Land Health Standard for Upland Soils: Land health standards for upland soils were evaluated for the vast majority of the proposed action area during 2004. Although a determination has not yet been made, it is not likely that the proposed action would prevent Standard 1 from being met, provided implementation of mitigation measures occurs.

TRANSPORTATION

Affected Environment: Traffic in the Grass Mesa area would primarily originate from Rifle or Silt, Colorado. There are approximately 31.54 miles of existing roads within the project area, 11.54 of which are attributed to oil and gas development. All of the county roads from Silt and Rifle to the private property boundary are open to the public year-round. Existing traffic on these county roads includes local residents, ranchers, school buses, oil and gas operators, and recreational visitors accessing public lands.

In 2002, after repeated COGCC-issued citations for traffic safety concerns on the existing Grass Mesa subdivision road, BLM approved the construction and use of a new access road to Grass Mesa crossing public land in Sections 2 and 3, T7S R93W (shown as Restricted Access on GAP map). This access road intersects County Road 319 on private land, and is gated to limit access to EnCana and its subcontractors. The BLM Grass Mesa Road is the only access road approved for use by EnCana and its subcontractors to conduct lease operations on the mesa. Since the road crossed federal oil and gas leases in Sections 2 and 3, the use of the road is subject to the lease terms, which include big game winter timing limitation running from December 1 through April 30 annually.

Environmental Consequences: Under the proposed action, approximately 6 miles of new road would be constructed in order to access the proposed wells. Short-term increases in the volume of both heavy and light traffic would occur during the construction, well drilling, and completion phases of the project, proposed for 2005 and 2006. To construct, drill and complete each well, an average of approximately 16 light truck trips and 8 heavy truck trips per day would be expected on local area roads. Project-related traffic during the 20 to 30 year operational phase of the project would be as follows: An EnCana employee would visit the Grass Mesa wells approximately twice per week to inspect well site facilities, read meters, and perform other routine facility maintenance activities. Tanker trucks would remove produced water and condensate from the storage tanks on the well pad at varying rates from 1-2 trips per day to about once per week. On average, there would be one workover or recompletion per well per year. Increased traffic associated with a workover or recompletion would consist of three to five truck trips per day for a period of seven days. Potential impacts to travel and access of other land users during the construction/drilling phase and recompletion/workover activities would include temporary conflicts with existing traffic (including a potential for delays and increased vehicle collision rates), degradation of County, BLM and private roads due to heavy equipment use, fugitive dust, and traffic-related noise.

Mitigation:

- Commuting construction and drilling crews would be encouraged to car pool to reduce the number of vehicle trips on local area roads and associated wear and tear.
- EnCana will use telemetry equipment at all gas well meters to reduce the number of pumper traffic within the Grass Mesa area. Any reduction of vehicle traffic will reduce overall noise impacts to nearby homeowners.

- Road maintenance standards listed on page 8 and further described in Appendix C, Standard Conditions of Approval will be used and implemented on BLM and related private road easements.
- To help reduce the truck traffic noise associated with removing produced water from the various sites on the mesa, EnCana is encouraged to upgrade and use the buried pipeline on the mesa for transport of produced water volumes to its water treatment facility at Hunter Mesa. Reports indicate that this pipeline exists at least to portions of the pads on the mesa.

TRAVEL/ACCESS

Affected Environment: The travel designation for BLM administered public lands is open year-round for travel on and off routes. Public access, however, is limited due to private property.

Environmental Consequences: When small parcels of public land are intermingled with private lands and the parcels are open to cross-country travel, problems with resources and private landowners are more likely. These issues, along with the pioneering of unauthorized routes particularly during hunting seasons, have been raised by the Grass Mesa HOA. The expanded road system on public lands will provide opportunities for the public to more easily traverse public lands by foot or horse, by bike and by motorized vehicles.

If land use changes proposed in this EA require restricting travel and access for safety or resource concerns, administratively permitted travel can be controlled through operating stipulations. Even though authorized uses can be controlled by stipulations identified in this EA, travel and access for the general public remains unchanged. The general public and adjacent private landowners can still access public lands and travel on and off routes year-round. Lease terms, which apply to administratively permitted uses and include a big game winter timing limitation from December 1 through April 30, do not restrict public travel and access.

The indirect action of locking gates and constructing fences will reduce access to public lands and disrupt historic access and use patterns. The consequences will be unfavorable to those who currently access public lands at proposed gated/fenced locations.

Mitigation:

- If casual foot, horse, wheeled or motorized access by the public or adjacent landowners is determined to create safety concerns or resource conflicts with the proposed actions, then area travel designations will need to be amended from "open" to "limited" or "closed".

VEGETATION

Affected Environment: Vegetation within the Grass Mesa geographic area primarily consists of hillsides dominated by pinyon-juniper woodlands (*Juniperus osteosperma* and *Pinus edulis*)

and the mesa top dominated by mixed mountain shrubs, mostly big sagebrush (*Artemisia tridentata*), Gambel oak (*Quercus gambelii*), and serviceberry (*Amelanchier alnifolia*). Several of the proposed locations fall within areas dominated by sagebrush-steppe. Herbaceous and succulent species commonly found in the project area include arrow-leaf balsamroot (*Balsamorhiza sagittata*), prickly pear cactus (*Opuntia polyacantha*), prairie lupine (*Lupinus wyethii*), orange globemallow (*Sphaeralcea munroana*), and several species of penstemon (*Penstemon* spp.) and paintbrush (*Castilleja* spp.). In addition to these “showy” species, several undesirable weed species are also commonly found in the area. Some of these include field bindweed (*Convolvulus arvensis*), kochia (*Kochia scoparia*), common peppergrass (*Lepidium densiflorum*), cheatgrass (*Bromus tectorum*), and Russian thistle (*Salsola kali*). Some areas, primarily disturbed locations on private lands (e.g., along existing roads, agricultural fields), tend to be dominated by these weed species, whereas other areas support these species as a component of the understory (See Invasive, Non-Native Weeds).

Like many areas in Colorado, numerous pinyon pines in the Grass Mesa geographic area have suffered from engraver beetle (*Ips confuses*) infestation. *Ips* beetles are bark beetles that specifically damage pinyon pine trees by boring under the bark and producing egg galleries that have a girdling effect on the tree’s cambium layer. This girdling creates loss of nutrient flow in the tree resulting in mortality. (Colorado State 2004).

Environmental Consequences: Vegetation removal and soil disturbance associated with the construction and installation of the well pads, pipelines, and access roads would affect vegetation resources both directly and indirectly. Direct effects would include the short-term loss of vegetation and the long-term modification of structure, species composition, and extent of cover types. Indirect effects may include the short-term and long-term increased potential for noxious weed invasion; exposure of soils to accelerated erosion; shifts in species composition and/or changes in plant density; reduction of wildlife habitat; and changes in visual aesthetics. These potential effects are discussed in more detail within the following paragraphs and under Invasive, Non-Native Weeds.

As summarized in Table 1, implementation of the Proposed Action would initially disturb up to 140 acres. Initial surface disturbance would consist of blading and grading of vegetation during the construction of the well pads, roads and pipelines. Of the total 140 acres of initial disturbance, 74 acres would be reclaimed and re-vegetated upon the completion of construction. The resulting 55 acres would remain disturbed for the long-term 20 to 30 year life of the project. This disturbance would occur until the abandoned well pads and road corridors are reclaimed. Herbaceous ground cover would likely re-establish within 1 to 2 years following seeding using native plant species. Given, the arid precipitation zone of the Grass Mesa geographic area, it would take at least 7 to 8 years for shrub species to successfully re-vegetate the Project Area and 20+ years for pinyon pine and Utah juniper to become established.

Freshly cut or injured trees are susceptible to *Ips* beetle infestation. As such, where pinyon pines must be removed under the Proposed Action, those trees would be at risk for *Ips* infestation.

Mitigation:

- Where road, pipeline or pad construction requires the removal of pinyon pine trees, the trees will be disposed of in the following manner to avoid attracting pinyon Ips beetles into live standing trees and mitigate effects of ongoing Ips beetle infestation in the local area: (1) broken down with earthmoving equipment and buried in excess material pile or at toe of fillslopes; (2) cut down, sectioned and chipped with Hydroaxe-type equipment capable of chipping large pinyon trees; or (3) cut and removed trees from BLM land and hauled to Colorado State Forest Service-approved disposal site.

VISUAL RESOURCES

Affected Environment: The Grass Mesa proposed action takes place within areas classified as Visual Resource Management (VRM) Classes II, III, and IV, as identified in the 1984 Glenwood Springs Resource Management Plan (See Figure 3). A small portion of the northern section of the project area falls within VRM Class II. The majority of the project area is within VRM Classes III and IV. Class IV occurs in the western half of the project area and Class III occurs in the eastern half of the project area. Objectives for each of these VRM classes, as defined in the BLM's Manual H-8410-1 - Visual Resource Inventory (BLM 1986), are described below:

- The objective of VRM Class II is to retain the existing characteristic landscape. The level of change in any of the basic landscape elements (line, form, color, texture) due to management activities in Class II areas should be low and not evident.
- 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 modifications of existing character of the landscape. The level of change within VRM Class IV areas can be high. Management actions within VRM Class IV may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of activities in areas through careful location, minimal surface disturbance, and repeating the basic landscape elements.

Landscape is currently characteristic of rural agricultural-ranching land and scattered rural residences. Recent changes include increased transportation corridors, more utilities, and the development of gas fields in the area.

Viewshed Analysis

In addition to analyzing the potential visual impacts of the proposed project immediately within the project area, a viewshed analysis was conducted to determine the effects of the project from observation or visibility corridors within and near the project area. The viewshed analysis was conducted using a GIS by integrating visibilities from a regular spacing of points along a chosen

visibility or observation corridor, in this case, roads. Three observation corridors (a.k.a. visibility corridors) were chosen for viewshed analysis: the I-70 corridor, County Road 319 corridor, and the main Grass Mesa access road. The roads were digitized as lines, and each vertice represented a viewpoint that was integrated with other viewpoints to construct the viewshed. Each point was spaced approximately 400 feet apart, depending on curvature; high curvature contains more vertices per linear distance, therefore there were more points per linear distance for analysis. The I-70 corridor contains 191 points, County Road 319 contains 167 points and the main Grass Mesa access road contains 353 points. The main Grass Mesa access road contains significantly more points because the roads shows a correspondingly higher degree of curvature over its' length of analysis. Transient obstructions such as structures and tall vegetation are not modeled in the DEM, so they were not factored into the viewshed analyses. While some areas may be "highly visible" at any given point, the viewshed analysis results looks at viewshed corridor as a whole.

The I-70 observation corridor is defined as an eight-mile stretch of I-70 extending approximately two miles past the eastern and western limits of the project area. The County Road 319 observation corridor is defined as a 12-mile stretch of County Road 319 extending from the intersection of County Road 333 to a point a couple miles south of the project area. The main Grass Mesa access road observation corridor is defined as the stretch of the Grass Mesa access road that runs southwest from the junction with CR319 up onto the Grass Mesa, through the project area paralleling section lines to the B16W well pad in the southwest corner of the project area. Viewshed analysis for all three roads was conducted at a height of two meters above the ground surface, as calculated from a 30-meter DEM (Digital Elevation Model, 30-meter grid sample spacing).

Four visibility categories were calculated for each visibility corridor: "not visible", "low visibility", "moderate visibility" and "high visibility". "Not visible" was defined as not being visible from any points, or from less than 1% of the points. "Low visibility" was defined as being visible from less than 25% of the points. "Moderate visibility" was visible from 25% to 50% of the points. "Highly visible" was defined as being visible from over 50% of the points within an observation corridor. The visibility of each proposed pad and associated roads and pipelines were analyzed from each visibility corridor, and were analyzed in comparison to the VRM class within which they fall. While some pads may be "highly visible" from some specific locations along the corridor, the visibility category results were based on calculations derived from the entire length of the corridor. The results of the viewshed analysis for each visibility corridor are discussed in the following sections. Results are also illustrated within Figures a, b, and c in Appendix I.

I-70 Observation Corridor Results (See Figure a, Appendix I)

Less than 2% of the project area is classified as being "highly visible" from the I-70 observation corridor. Highly visible areas are confined to ridges on the steep northern slopes of Grass Mesa. The G22NW and B23NW well pads would occur within "moderately visible" terrain based on the analysis. The G22NW falls within VRM Class IV, thus moderate visibility from I-70 would be in conformance with this VRM Class. The B23NW, however, falls within VRM Class II, and would not be in conformance with VRM Class II objectives. A portion of central Grass Mesa is visible from less than 25% of the I-70 corridor. High east facing slopes of Flatiron Mesa are

classified as being “moderately visible” from the I-70 corridor. Most of the project area is obscured from the I-70 observation corridor by the steep erosional slopes on the north side of Grass Mesa.

County Road 319 Observation Corridor Results (See Figure b, Appendix I)

County Road 319 passes through the far northeast corner of the project area, south to West Mamm Creek, and westward along the creek for a couple miles. Much of the eastern slopes of Grass Mesa are visible from the observation corridor; however, of the visible terrain, less than 20% is classified as “moderately visible” and less than 3% is classified as being “highly visible” from the CR319 observation corridor. Areas classified as “highly visible” are primarily confined to a small area in the extreme southern portion of the project area, and no existing or proposed infrastructure occurs within these areas. Over 90% of the top of Grass Mesa is classified as being not visible from CR319, because the area is mostly obscured by the east-facing slopes of Grass Mesa. The great majority of the existing and proposed infrastructure is classified as being either not visible or “low visibility”, with two proposed pads occurring in “moderately visible” terrain, H34NW and the B23NW. The H34NW pad falls within VRM Class III area and would not conform to VRM objectives during construction and drilling activities. However, during operations, the proposed pad facilities at the H34NW, even though moderately visible from I-70, would still be in conformance with VRM Class III objectives. The B23NW pad falls within VRM Class II and would not be in conformance with those objectives during construction or operation periods.

Grass Mesa Subdivision Road Observation Corridor Results (See Figure C, Appendix I)

The Grass Mesa homeowner access road, which runs through the middle of the project area from the northeast to southwest, shows the greatest amount of highly visible terrain, mostly in the north-central portion of the project area, on the top of Grass Mesa, and in the southwestern portion of the project area, on the east-facing slopes of Flatiron Mesa. Approximately half of Grass Mesa is visible from the access road, with the central portion being the least visible (less than 25% visibility from the corridor). The proposed K4D pad occurs within terrain that is “moderately visible” from the Grass Mesa visibility corridor, and is also in close proximity to highly visible terrain, as determined by the viewshed analysis. The O27NW pad would occur within terrain that is “moderately visible”, however this pad would be directly adjacent to a portion of the Grass Mesa access road and would highly visible and dominate the landscape form that section of road. Both the K4D and O27NW locations and associated roads and pipeline fall within VRM Class IV and would meet those objectives. The H27NW and J16W pads would occur in VRM Class III areas in terrain that was determined to be in “moderately visible and highly visible” areas. These pads would not meet VRM objectives during construction and drilling activities but would meet those objectives during the operations period.

Environmental Consequences: Short-term visual impacts due to construction, drilling and completion activities would occur on all new pads, and on existing pads where new bottomholes are proposed. The existing landscape will be changed by introduction of new elements within the landscape in the form of new lines, colors, forms, and textures. New well pads, facilities, roads and pipelines would increase visual contrasts created by oil and gas activities (e.g., dozers, drilling rigs, truck traffic, heavy equipment, dust, flaring, lights, etc.) within the Grass Mesa landscape. Construction will take place over a two-year period and would generally occur in

clusters. Drilling activity typically occurs 24-hours per day, therefore, visual impacts during drilling activities would not cease during nighttime hours.

Long-term impacts of the project consist of reduced visual harmony within the overall landscape due to the introduction of new visual elements that create contrasts. The contrasts would result from well pad facilities, pipelines and roads, turning the project area into a more industrialized setting. The site-specific and cumulative effects of drilling and operational facilities were identified as a major concern by private landowners in the Grass Mesa area.

While the 1999 FSEIS provided some protection for visual resources, the proposed locations and associated infrastructures are authorized on older leases, which have “no” visual resources stipulations attached. The protection of VRM classes, landscape character and scenic quality on private and public lands and split estate is discussed on pages 3-41 through 3-45 of the 1999 FSEIS. The impacts of development are discussed on pages 4-49 through 4-54 of the 1999 FSEIS.

Alternative sites, alternative access routes and directional drilling off adjacent pads were considered to mitigate visual impacts. However, due to other resource issues or concerns that included sensitive plants, archaeological resources, topographic limitations, erosive soils, geologic targets, etc. they were not feasible.

Conformance with VRM Classes

Within VRM Class II, 0.11 miles of pipeline would be installed along an existing road to service existing wells at the existing H21 pad. In addition, the proposed B23NW well pad and approximately 0.2 miles of access road would be constructed within VRM Class II. During construction of this proposed well pad, access road, and pipeline, the drill rig and construction vehicles and equipment would be highly visible to Grass Mesa residents and visitors (as well as from some of the visibility corridors as discussed above), and therefore, would not meet VRM Class II criteria. Long term impacts resulting from the pipeline would meet VRM Class II Objectives, as the disturbance is adjacent to an existing road. While the pipeline will introduce a new linear feature into the landscape the impacts after reclamation efforts would be minimal and not evident. However, the B23NW well will not meet VRM Class II objectives short term or long term due to the location on a ridgeline. The removal of vegetation and the fill slopes along the northern boundary of the pad would make this location highly visible to travelers on the I-70 corridor and to residents in the town of Rifle. The production facilities for the B23NW wells will be located down on the nearby J23NW pad, thereby reducing traffic and associated visual impacts. No other mitigation was identified that would bring the well into compliance with the objectives without compromising other resource values.

Within VRM Class III, eight new well pads (C26NW, J23NW, H23NW, K24NW, H27NW, H34NW, I9W, J16W), 2.86 miles of road/pipeline, and 4.46 miles of pipeline would be constructed or installed. Total long-term surface disturbance in VRM Class III from the proposed action would be 27.5 acres. During construction, drilling and completion, the operator’s vehicles, rigs and equipment on the proposed C26NW, J23NW, H23NW, K24NW, H27NW, H34NW, I9W and J16W pads would be visible to Grass Mesa residents and visitors (as well as from some of the visibility corridors as discussed above) and would dominate the landscape. As such, the Proposed Action would not meet VRM Class III objectives during the

short-term (i.e., construction, drilling and completion phases) at these locations. After reclamation and during operations the well site facilities would be a moderate change in the landscape that may attract attention of the viewer but would not dominate the landscape. Objectives of VRM Class III would continue to be met during the long-term.

Within VRM Class IV, eight new well pads (K22NW, G22NW, O27NW, K4D, K33NW, E9W, and B16W), 3.26 miles of road/pipeline, and 4.28 miles of pipeline would be constructed or installed. Total long-term surface disturbance in VRM Class IV from the proposed action would be 27.65 acres. During construction, drilling and completion activities, equipment on these pads would dominate the landscape. However, as level of change within VRM Class IV can be high, objectives of VRM Class IV would continue to be met.

Summary of Long-term Visual Impacts

Potential long-term impacts were reduced through the directionally drilling of multiple wells from existing and new pads, rather than vertically drilling all 100 new wells. However, the introduction of new production facilities on both new and existing pads would still contribute to long-term visual impacts within the landscape on a site-specific basis. The impacts will be most noticeable in the foreground-middleground views. Cumulatively, the addition of new well pads, new production facilities, pipelines, and access roads would change the setting of the Grass Mesa area as a whole to more of an industrialized landscape character.

Mitigation:

- To help mitigate the contrast of bare, re-contoured slopes, reclamation will include measures to feather cleared lines of vegetation, and to save and re-distribute cleared trees, debris, and rock over re-shaped cut and fill slopes.
- To reduce the view of production facilities from Visibility corridors and private residences, facilities should not be placed in visually exposed locations (i.e., they should be located against backdrops or cut side of pad) and will be placed to allow the maximum re-shaping of cut and fill slopes. Furthermore, all aboveground facilities will be painted to blend with the existing landscape. Refer to site-specific Conditions of Approval in Appendix C for recommended paint colors for the various well pads.
- To help consolidate truck traffic and reduce the visual impact of production facilities, facilities supporting the wells on the B23NW, I3B, J16W, K4D and O27NW pads will be located on nearby pads as listed in site-specific Conditions of Approval in Appendix C.
- Trees will be left along the edge of the mesa on the O27NW, E9W, B16W, H27NW, H34NW, G22NW, and K4D well pads in order to obscure view of pad facilities from below the mesa.

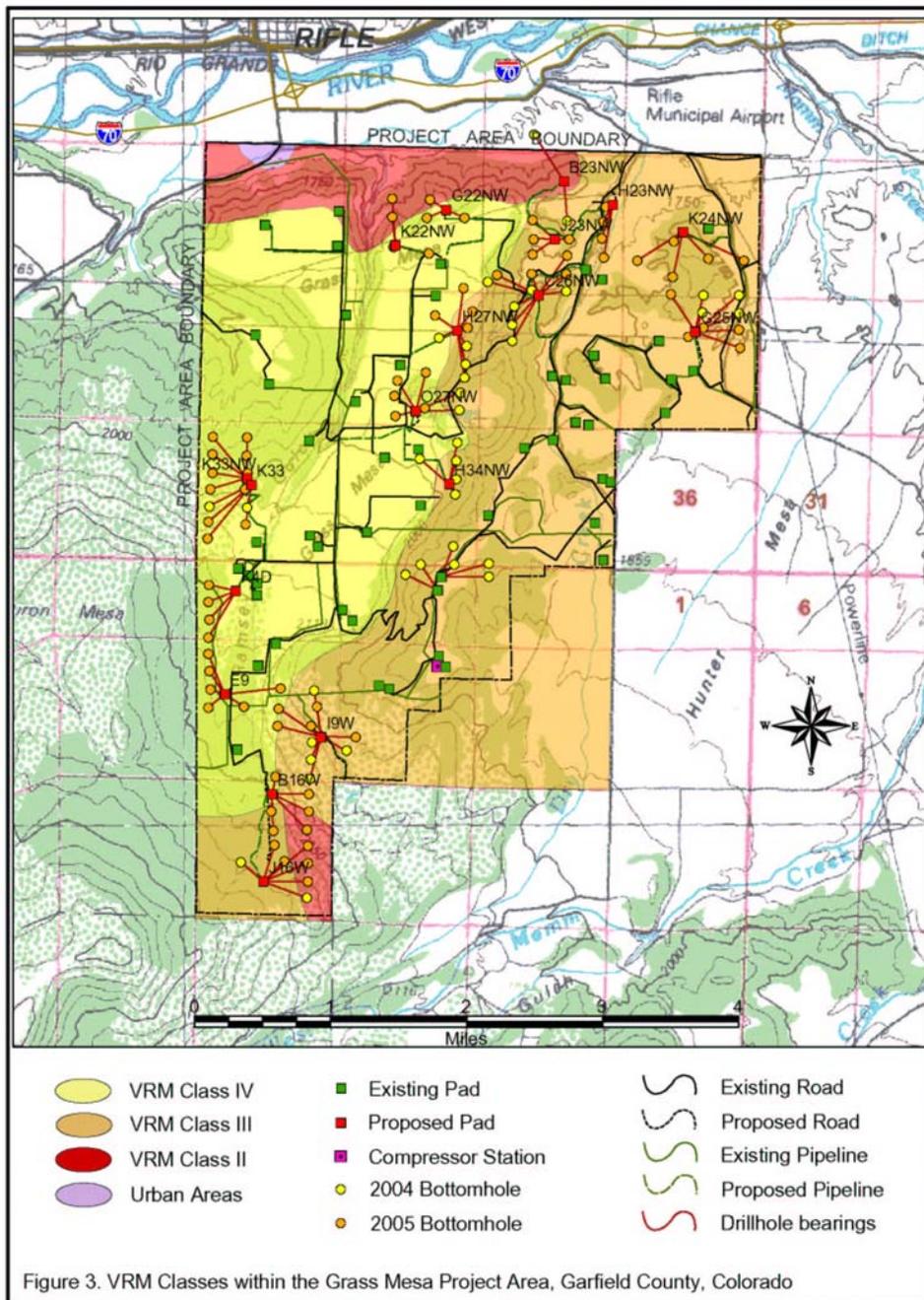


Figure 3. VRM Classes within the Grass Mesa Project Area, Garfield County, Colorado

WILDLIFE, AQUATIC

Affected Environment: Aquatic habitat is severely limited in the Grass Mesa geographic 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: As 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 threatened and endangered fish in the Colorado River are discussed under Threatened, Endangered and Sensitive species.

Mitigation: N/A

WILDLIFE, TERRESTRIAL

Affected Environment: Habitat for variety of terrestrial wildlife species occurs in the Grass Mesa geographic area. Common mammals likely to occur in the Grass Mesa geographic area include elk, mule deer, black bear, mountain lion, bobcat, coyote, raccoon, badger, porcupine, Nuttall's cottontail, white-tailed jackrabbit, red fox, ringtail, striped skunk, and various species of shrews, rodents and bats. Bird species include numerous migratory and upland game birds, raptors, and waterfowl species. Herptiles potentially found in the Grass Mesa geographic area include the plateau lizard, sagebrush lizard, smooth green snake, Great Plains rat snake, western terrestrial garter snake, and western rattlesnake (Hammerson 1999).

Information on elk and mule deer seasonal activity areas were researched and downloaded from the CDOW's Wildlife Resource Inventory System (WRIS) for several types of habitats: summer range, winter range, summer concentration areas, winter concentration areas, severe winter range, production areas, and migration corridors (CDOW 2003). Definitions of these types of habitat, as defined by the CDOW, are included in Table 8.

Elk seasonal use areas in the Grass Mesa geographic area (and the proposed locations that occur in each type of seasonal use area) include the following:

- summer range in the extreme southwestern corner of the GAP boundary, which includes only the J16W well pad;
- winter concentration area throughout the southern and central portion of the geographic area, including the well pads and roads/pipelines for the K22NW, G22NW, H27NW, H34NW, E9W, I9W, B16W, J16W, O27W, K4D and the existing I3B pads.
- severe winter range throughout almost the entire project area (with the exception of the E9W, B16W, and J16W locations).

Table 8. CDOW Seasonal Big Game Range Definitions

Seasonal Range	Definition
Summer Range	That part of the range of a species where 90 percent of the individuals are located between spring green-up and the first heavy snowfall, or during a site specific period of summer as defined for each data analysis unit (DAU). Summer range is not necessarily exclusive of winter range; in some areas winter range and summer range may overlap.
Winter Range	That part of the overall range where 90 percent 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 DAU.
Summer Concentration Area	Those areas where elk concentrate from mid-June through mid-August. High quality forage, security, and lack of disturbance are characteristics of these areas to meet the high-energy demands of lactation, calf rearing, antler growth, and general preparation for the rigors of fall and winter.
Winter Concentration Area	That part of the winter range where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten.
Severe Winter Range	That part of the overall range where 90% 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
Production Area	That part of the overall range of elk occupied by the females from May 15 to June 15 for calving. Only known production areas have been mapped by the CDOW, additional production areas in each DAU may exist.
Migration Corridors	A specific identifiable corridor through which large numbers of animals migrate and loss of which would change migration routes.

Mule deer seasonal use areas in the Grass Mesa geographic area (and the proposed locations that occur in each type of seasonal use area) include the following:

- summer range in the extreme southwestern corner of the GAP boundary, which includes only the J16W well pad;
- winter concentration area throughout almost the entire project area (with the exception of the B16W and J16W locations).
- severe winter range along the northern border and in the northeastern corner of the geographic area, which affects the B23NW, J23NW, H23NW, K24NW, C26NW, and H34NW.

Migration routes for elk or mule deer have not been formally mapped within the Grass Mesa geographic area. However, the CDOW has identified Ramsey Gulch and adjacent habitats as a high-use big game migration corridor during both peak spring and fall migration (Brett Ackerman, CDOW, personal communication with Dawn Martin, Buys & Associates).

Most of the proposed well pads in the Project Area have Timing Limitation stipulations (TLs) (See Appendix D, Table I) associated with their corresponding lease agreements that limit surface use in crucial big game winter habitat during the winter months. The winter timing limitation associated with the use of the BLM Grass Mesa road restricts any operations across that road other than those associated with operation and maintenance of production facilities.

Therefore, no construction drilling, or completion work is allowed December 1 through April 30 on Grass Mesa. Exception criteria allow for consideration of waiver for the last 60 days of the period if mild winter conditions exist.

Timing limitations help protect big game by limiting surface use during peak big game activity in winter habitats. EnCana would abide by these lease stipulations as a part of their standard operating procedure.

Environmental Consequences: The proposed action would result in the initial loss and fragmentation of 140.4 acres of wildlife habitat. While vegetation in the area provides important habitat for many wildlife species, the vegetation communities found on Grass Mesa are widespread throughout Glenwood Springs Field Office area. As such, the loss of 140 acres of forage would not adversely impact viability of most wildlife species in the Grass Mesa area. Following partial reclamation of new well pads and roads, long-term forage disturbance would be reduced to approximately 57 acres. 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.

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.

Construction and drilling operations would likely result in the temporary displacement of wildlife species from the Grass Mesa geographic area into surrounding habitats. Depending on the suitability of adjacent habitats, unmitigated displacement from habitats can result in high animal mortality rates and reduced breeding success. Vehicle traffic and soil excavation could result in the direct mortality of nesting birds, small mammals, amphibians and reptiles occurring in the Grass Mesa geographic area. If construction were to occur during the spring, the proposed action could also result in the direct mortality of eggs and/or nestlings within the project area.

The primary concern for terrestrial wildlife is the potential effect of the project on big game, particularly impacts to big game migration and wintering activities. As discussed under the Affected Environment, the Grass Mesa geographic area contains critical winter range for mule deer and elk. Ramsey Gulch also provides an important migration route to and from winter and summer grounds. Peak spring use of this corridor occurs in the month of April (B. Ackermann, CDOW, personal communication with D. Martin, Buys & Associates Inc.), when big game move from wintering grounds up to summering habitats. Peak fall use of this migration corridor occurs from approximately the third week in October through November (B. Ackermann, CDOW, personal communication with D. Martin, Buys & Associates Inc.), during which, big game are moving from summer habitats down to wintering grounds. Surface disturbing activities within

these habitats during the winter and during migratory seasons has the potential to displace mule deer and elk from these important habitats. The effects of visual and noise impacts from construction, drilling and completion on big game migration along Ramsey Gulch would likely be most severe in the spring, when individual animals are weakened and malnourished from the winter. Potential impacts to big game are discussed in more detail in the Threshold Analysis provided after the Mitigation section. Mitigation is provided to reduce impacts to mule deer and elk.

Mitigation:

- As required by lease stipulation and discussed above, EnCana will avoid construction or drilling activities within critical deer and elk winter range between December 1 and April 30. Compliance with this timing limitation is required for all drilling and construction activities on all federal lease parcels within the Grass Mesa geographic area because this winter timing limitation occurs on the leases that the BLM Grass Mesa Road crosses. After consultation with the CDOW, exceptions to these lease stipulations may be granted for federal surface locations during the last 60-days of the respective timing limitation under mild winter conditions. Severity of winter conditions will be determined on the basis of snow depth, snow crusting, daily mean temperatures, and whether big game were concentrated on winter range within the area during the winter months.
- To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW. Protecting the migration routes during this time period would be most beneficial, as EnCana would be reducing potential displacement of big game that are already weakened from the winter months. Hunting season pressures occurring during the fall migration tend to limit the opportunities for protection.

Threshold Analysis for Wildlife and Wildlife Habitat Mitigation: In addition to the mitigation measures proposed above, the FSEIS Record of Decision (March 1999) on page 14 it states that: *“Within high value or crucial big game winter range, the operator is required to implement specific measures to reduce impacts of oil and gas operations on wildlife and wildlife habitat...Measures to reduce impacts would generally be considered when well density exceeds four wells per 640 acres, or when road density exceeds three miles of road per 640 acres.”* Furthermore, Lease Notice GS-LN-05 states: *“Within high value or crucial big game winter range, the operator is required to implement specific measures to reduce impacts of oil and gas operations on wildlife and wildlife habitat.”*

The road and well density threshold analysis (Appendix G) was completed for the 16 new surface locations, associated access roads, and all the existing natural gas development located within the project area boundary. Results show that upon implementation of the GAP, 71 surface locations will be present. The threshold is 61.2 surface locations. The road density will be 11.54 miles of road attributed to oil and gas development. The threshold is 45.9 miles of road. Thus, the threshold for surface locations has been exceeded.

Because of the level of activity in the Grass Mesa area, and the importance of the area as high value big game winter range, offsite or replacement mitigation to reduce/offset impacts to wildlife (most notably mule deer) would be considered. This mitigation will be necessary to help offset direct loss of winter range habitat and effective loss of habitat due to fragmentation and increased human use.

As discussed, total direct disturbance to big game winter ranges will be approximately 140.4 acres from natural gas activity within the GAP (96-acres for surface locations, 28-acres for roads, and 16.4 acres for pipelines). Direct impacts result from the physical loss of food and cover (hiding, thermal, escape, loafing) required by big game. Losses of forage and cover can reduce carrying capacity of big game herds over time, as more animals are concentrated onto smaller blocks of habitat not capable of sustaining populations over time.

The extent to which big game are disturbed by human uses adjacent to their habitats varies by species and other factors such as timing of disturbance, topography, vegetative screening, habituation to disturbance, and frequency and intensity of disturbance. The amount of habitat lost due to displacement is termed “effective habitat loss.” In some areas research has shown that mule deer reduce their habitat use within a 1/8-mile on either side of a road. This “effective habitat loss” displacement factor was analyzed in the 1999 FSEIS, and is also used to evaluate impacts to big game in the Grass Mesa geographic area. Based on 6 miles of proposed 38-foot wide road and a 1/8-mile displacement factor, the proposed action will result in the effective loss of approximately 987 acres of high value winter range due to road construction³. As such, this amount is being considered with regard to offsite/replacement mitigation. Although many wildlife species may be impacted by road development, mule deer and elk are the species being emphasized, given their local importance, and the limited abundance of their most critically important habitat type (winter range). It is assumed that mitigation aimed at improving mule deer and elk winter range habitat will also benefit a variety of other upland species over time.

Habitat Replacement/Improvement

To compensate for the 987 acres of direct and effective winter range habitat loss, a Wildlife Mitigation Plan (Plan) will be developed by EnCana in consultation with the Colorado Division of Wildlife. BLM will assist the operator in developing the goals and objectives of the Plan. The plan will discuss in greater detail the habitat values being impacted and mitigation for it. It will also disclose other mitigation measures intended to reduce impacts, and enhance vegetation on reclaimed portions of wells pads. This Plan will provide mitigation commitments regarding acreage and values for the Grass Mesa GAP.

The BLM, EnCana, and the CDOW will identify, begin planning, and move toward implementation of a specific project/action with respect to the wildlife habitat attributes to be mitigated as identified and discussed in the Grass Mesa GAP Wildlife Mitigation Plan. The

³ Effective Winter Range Habitat Loss Calculations due to Proposed Roads

6 miles = 31,680 feet

1/8 mile = 660 feet

38-feet + 2 (660 feet) = 1,358 foot-wide corridor for effective habitat loss calculation

1,358-foot-wide corridor X 31,680-foot-long road = 43,021,440 square feet / 43,560 square feet per acre = 987 acres of effective habitat loss due to road construction.

primary goal of the Plan will be to identify site-specific habitat improvement projects that benefit mule deer and/or elk. For example, habitat improvement techniques could include mechanical falling of mature aspens outside the Grass Mesa area in order to create meadow habitat and improve foraging habitat for big game and raptors. Trees would be left onsite unless fuel loading is determined to be excessive, in which case some trees would be removed by hand and scattered outside the stands.

Any specific project/action will require its own planning, and if conducted on public lands will require NEPA analysis and approval prior to implementation.

OTHER NON-CRITICAL ELEMENTS: For the following elements, those brought forward for analysis would be formatted as shown above.

Non-Critical Element	NA or Not Present	Applicable or Present, No Impact	Applicable & Present and Brought Forward for Analysis
Travel/Access			X
Cadastral Survey	X		
Fire/Fuels Management	X		
Forest Management	X		
Geology and Minerals			X
Hydrology/Water Rights			X
Law Enforcement	X		
Paleontology			X
Noise			X
Range Management			X
Realty Authorizations		X	
Recreation			X
Socio-Economics			X
Transportation			X
Visual Resources			X

ADDITIONAL ISSUES

HYDROCARBON ODORS

Environmental Consequences: Several Grass Mesa homeowners have identified hydrocarbon odor as a negative impact from drilling operations within the project area. While no quantitative assessment has been completed to document the actual impacts of odors, frac pits and volatile organic compounds (VOC) combustors are thought to be the primary cause of these odors. Frac pits are generally used to cut down on tank truck traffic and are a greater source of odors over reserve pits. Based on homeowner feedback, hydrocarbon odor within the Grass Mesa area is strongest at night, when night-cooling downwind breezes cause hydrocarbon fumes from nearby pad locations to drift into private residences.

With regard to odors from VOC combustors, EnCana is committed to researching new technology to possibly replace the use of VOC combustors for future projects. However, such

technology is either currently not available, or is not economically or technically feasible. Therefore, for this project, EnCana will continue using VOC combustors in order to fulfill their purpose and need for the Grass Mesa project area.

Mitigation:

- EnCana has been, and will continue to work with the Grass Mesa Homeowners Association on developing methods to reduce the effects of hydrocarbon odors on private landowners. For example, EnCana is researching and testing the use of closed-loop drilling⁴ in many of their oil and gas operations. In order to reduce or eliminate the problem of reserve pit and frac pit odors, closed-loop drilling is an option that may be considered for proposed well pads within 0.5 miles of a private residence.
- Frac pit use within 0.5 miles of any residence will be prohibited by BLM. Only standard reserve pits of a size to support the number of planned wells will be allowed within 0.5 mile of residences (i.e., B16W, E9W, K4D, K33NW, H34NW, O27NW, H27NW, G22NW, and K22NW).

CUMULATIVE IMPACTS SUMMARY

The analysis of the 1999 FSEIS was based on a reasonable Foreseeable Development Scenario (RFD) of 1,200 additional wells in Region 4. Of this estimated number of wells, 230 wells were expected to occur on Federal lands, outside the Naval Oil Shale Reserve (NOSR) Production Area. Since the completion of the 1999 FSEIS, the number of wells analyzed in subsequent environmental assessments and associated APDs approved have not exceeded 230. An average surface disturbance of 3.4 acres per well or 1,020 acres from Federal wells was used in the FSEIS for identification of future impacts. The FSEIS analysis was based on a RFD scenario, including the number of wells, well spacing, necessary equipment, and assumed emission rates. Since completion of the FSEIS, the majority of new wells have been drilled directionally from existing locations, so the average disturbance per well is much less than expected. For example, in the Grass Mesa GAP, total surface disturbance would be 1.13 acres per well. Federal well densities have not gone lower than one well per 40 acres, although 10-acre downhole spacing densities have been approved in many areas. In addition, the most active operators have voluntarily installed condensers at new facilities where new wells have been drilled. This action condenses out and captures the VOCs that might otherwise escape to the atmosphere. This is resulting in lower potential air quality impacts than assumed in the FSEIS analysis. Thus, the projected impacts for the Grass Mesa GAP proposed action in this EA are still within the scope of the analysis made in the FSEIS for numbers of wells and acres impacted for cumulative effects.

⁴ Closed-loop drilling is a closed containment system that reduces the volume of drilling waste and eliminates the need for reserve or frac pits. The closed-loop drilling system involves the use of steel tanks with secondary containment and leak detectors. Closed-loop drilling is also beneficial because it reduces overall pad size, which reduces overall surface disturbance.

PERSONS / AGENCIES CONSULTED

The Council on Environmental Quality (CEQ) regulations require an “early and open process for determining the scope of issues to be addressed and for identifying significant issues related to a Proposed Action” (40 CFR 1501.7). In order to satisfy this CEQ requirement, the BLM requested input from the public to determine their concerns and issues with EnCana’s proposal, to develop alternatives to the proposal that respond to those issues, to analyze the environmental effects of the proposed action and to prepare the environmental document for the Grass Mesa GAP.

The legal notice addressing the Grass Mesa GAP proposed action was published in local newspapers on June 25, 2004 for the general public and a copy was mailed directly to adjacent landowners, the Grass Mesa Homeowners Association board of directors, the Garfield County oil and gas auditor, the City of Rifle, and the Colorado Department of Wildlife. The original comment period was scheduled to end on July 26, 2004; however, the comment period was extended to August 2, 2004. Additionally, the BLM extended verbal invitations to affected landowners for on-site reviews.

Sixteen comment letters, e-mails, and/or verbal comments (via telephone and at on-site reviews) were received in response to the scoping notice. Using the comments from the public and other agencies, the BLM developed a list of issues to address the public’s concerns. The BLM separated the issues into two groups: key and non-key issues. These issues, and an indication of where they are addressed in this EA, are discussed below.

Key Issues

Key issues were defined as issues that 1) drive the analysis of environmental effects; 2) prescribe or necessitate the development of mitigation measures; 3) drive the development of additional project alternatives. These key issues are summarized as follows:

- hydrocarbon odors (see Additional Issues)
- effects of noise from construction, drilling and operations on homeowners (see Mitigation under Noise analysis)
- effects on big game habitats, including migration corridors (See Terrestrial and Aquatic Wildlife analysis)
- effects of drilling on domestic water supply and springs (see Water Quality, Surface and Ground analysis)
- effects of GAP on air quality (see Air Quality analysis)
- traffic impacts from gas development activities (see Transportation analysis)

Non-Key Issues

Non-key issues were identified as those: 1) outside the scope of the Proposed Action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific or factual evidence; or 5) are general opinions or position statements of a general nature; 5) public issues/requests/concerns

that cannot be enforced by BLM. The CEQ NEPA regulations require this delineation in Sec. 1501.7; "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)". These non-key issues (and a brief rationale as to why they are categorized as non-key issues) are summarized as follows:

- trespass onto private roads by EnCana personnel (BLM has requested that EnCana comply with private landowner requests to stay off of private roads unless permission is granted to EnCana in writing. However, BLM has no ability to enforce this requirement.)
- use of bright lights during nighttime drilling (COGCC regulations require the use of night-lighting during night-time drilling operations.)
- objection to any drilling in Grass Mesa GAP
- objection to drilling on fee surface

In addition to the public "scoping" period, BLM has initiated formal consultation with the Southern Ute, Ute Mountain Ute, and Northern Ute Tribes. BLM has also coordinated with the CDOW.

LIST OF PREPARERS

Resource Parameter / Area(s) of Responsibility	Buys & Associates, Inc. Personnel	Education
Project Manager / Threatened, Endangered & Sensitive Species, Wildlife, Migratory Birds	Dawn Martin, Sr. Ecologist	M.S., Wildlife Biology B.S., Natural Resources
Assistant Project Manager / Environmental Justice, Socioeconomics, Wastes, Travel, Access & Transportation	Stephanie Stewart, Environmental Scientist	M.S., Environmental Science (in progress) B.S., Human Biology
Air Quality, Noise	Jon Torrizo, Sr. Air Quality Scientist	M.S., Environmental Science Certificate in Meteorology M.B.A B.S., Mathematics
Vegetation, Invasive Non-native Species	Andy Dworak, Senior Ecologist	B.S., Natural Resource Management
Socioeconomics	Chris Freeman, Sr. Environmental Scientist	B.S., Environmental Sciences
Visual Resources / GIS	Roger Melick, Geologist/GIS Specialist	M.S., Geochemistry (In Progress) B.A., Geology-Chemistry
GIS Mapping	Scott Sprague, GIS Specialist	B.S., Computer Science and Information Technology
Geology and Minerals, Water Quality, Floodplains, Wetlands & Riparian Zones, Soils	Dave Nicholson, Hydrologist/Geologist	M.S., Environmental Engineering M.S., Geology B.A., Geology

INTERDISCIPLINARY REVIEW

Resource Parameter/Area of Responsibility	Responsible IDT Member
Air Quality	Mark Wimmer
Areas of Critical Environmental Concern	Kay Hopkins
Cultural Resources	Cheryl Harrison
Environmental Justice	Jim Byers
Farmlands, Prime and Unique	Jim Byers
Floodplains	Mark Wimmer
Invasive, Non-Native Species	Carla Scheck
Migratory Birds	Tom Fresques
Native American Religious Concerns	Cheryl Harrison
Threatened, Endangered and Sensitive Species	Tom Fresques (wildlife) Carla Scheck (plants)
Wastes, Hazardous or Solid	Jim Byers
Water Quality, Surface and Ground (including 404 permit issues)	Mark Wimmer Jim Scheidt Jim Wilkinson
Wetlands and Riparian Zones	Mike Kinser
Wild and Scenic Rivers	Kay Hopkins
Wilderness	Kay Hopkins
Soils	Mark Wimmer
Vegetation	Carla Scheck
Wildlife, Aquatic	Tom Fresques
Wildlife, Terrestrial	Tom Fresques
Travel/Access	Brian Hopkins
Transportation	Brian Hopkins
Geology and Minerals (Adverse Energy Impact Statement)	Jim Wilkinson Bruce Fowler
Hydrology/Water Rights	Mark Wimmer Jim Scheidt
Paleontology	Jim Wilkinson Harley Armstrong
Range Management	Mike McGuire
Realty Authorizations	Vaughn Hackett
Recreation	Brian Hopkins
Socio-economics	Brian Hopkins
Visual Resources	Kay Hopkins

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APPENDIX A

**GAP MAP AND
STANDARD 13 POINT SURFACE USE PLAN
for the GRASS MESA GAP**

**T6S-R93W:SECTIONS 21-28, 33-35
T7S-R93W:SECTIONS 2(W/2W/2, LOT2), 3,4, 9, 10 NE,N2/NE,SWNE,N/2SW), 11 (NWNW), 16
GARFIELD COUNTY, COLORADO**

13 Point Surface Use Plan

1. EXISTING ROADS

- A. The proposed wellsite is staked and reference stakes are present as shown on attached Topo maps.
- B. Access Roads – refer to Topo maps “A” and “B”.
- C. Access Roads within a one-mile radius – refer to Topo map “B”.
- D. The existing roads will be maintained in the same or better condition as existed prior to the commencement of operations and said maintenance will continue until final abandonment and reclamation of the well location. Excessive rutting or other surface disturbance will be avoided. Operations will be suspended temporarily during adverse weather conditions if excessive rutting is occurring when access routes are wet, soft, or partially frozen.

2. PLANNED ACCESS ROAD

All proposed access roads are shown on Topo map “B”.

- A. Width maximum – 30 foot overall right-of-way with an 18-foot road running surface, crowned and ditched and/or sloped and dipped.
- B. Construction standard – the access road will be constructed to the same standards as previously accepted in this area.

The road will be constructed to meet the standards of the anticipated traffic flow and all weather requirements. Construction will include ditching, draining, crowning and capping or sloping and dipping the roadbed as necessary to provide a well-constructed and safe road.

Prior to construction/upgrading the roadway shall be cleared of any snow cover and allowed to dry completely.

Traveling off of the thirty (30) foot right-of-way will not be allowed.

Road drainage crossings shall be of the typical dry creek drainage crossing type. Crossings shall be designed so they will not cause siltation or the accumulation of debris in the drainage crossing nor shall the drainages be blocked by the roadbed. Diverting water off at frequent intervals by means of cutouts shall prevent erosion of the drainage ditches by runoff water.

Upgrading shall not be allowed during muddy conditions. Should mud holes develop, they will be filled in and detours around them avoided.

- C. Maximum grade – the average grade will be 10% or less, wherever possible. The 10% grade will only be exceeded in areas where physical terrain or unusual circumstances require it.
- D. Drainage design – the access road will be crowned and ditched or sloped and dipped, and water turnouts installed as necessary to provide proper drainage along the access road route.
- E. Turnouts will be constructed along the access route as necessary or required to allow for the safe passage of traffic.
- F. Culverts – none will be required unless otherwise specified during the onsite inspection.
- G. Surface materials – surfacing materials will consist of native soil. If any additional surfacing materials are required they will be purchased from a local contractor having a permitted source of materials in the area. None are anticipated at this time.

-
- H. Gates, cattleguards or fence cuts – none required unless specified during the onsite inspection.
 - I. Road maintenance – during both the drilling and production phase of operations, the road surface and shoulders will be kept in a safe and legal condition and will be maintained in accordance with the original construction standards. The access road right-of-way will be kept free of trash during operations.
 - J. The proposed access road has been centerline flagged.
 - K. Dust will be controlled on the roads and locations during construction and drilling by periodic watering of the roads and locations.

3. **LOCATION OF EXISTING WELLS WITHIN A ONE MILE RADIUS**

Please refer to Topo Map “C”.

4. **LOCATION OF EXISTING AND/OR PROPOSED FACILITIES**

- A. At each drill location, surface disturbance will be kept to a minimum. Each drill pad will be leveled using cut and fill construction techniques as noted in the attached survey.
- B. Should drilling result in established commercial production the following will be shown:
 - 1. Proposed location and attendant lines, by flagging, if off well pad.
 - 2. Dimensions of facilities.
 - 3. Construction methods and materials.
 - 4. Protective measures and devices to protect livestock and wildlife.
 - 5. All buried pipelines will be buried to a depth of 3 feet, except at road crossing where they will be buried to a depth of 4 feet.
 - 6. Construction width of the right-of-way/pipeline route shall be restricted to 50 feet of disturbance.
 - 7. Pipeline location warning signs shall be installed within 90 days after construction is completed.
 - 8. EnCana shall condition pipeline right-of-ways in a manner to preclude vehicular travel upon said rights-of-way, except for access to pipeline drips and valves.
 - 9. Pipeline right-of-way will be requested on the APD. ROW request is for 60’ for construction of working surface during construction. After construction is complete 30’ is to be rehabilitated leaving a 30’ working surface. In the event production is established this well will be tied-in to an existing pipeline as shown in topo map “D”.
 - 10. The area used to contain the proposed production facilities will be built using native materials. If these materials are not acceptable, arrangements will be made to acquire appropriate materials from private sources.
 - 11. A dike will be constructed completely around any production facilities that contain fluids (i.e. production tanks, produced water tanks, etc.) These dikes will be constructed of compacted subsoil, be impervious, hold 110% of the capacity of the largest tank, and be independent of the back cut.
 - 12. All permanent (onsite for six months or longer) above-the-ground constructed or installed, including pumping units, will be painted a flat non-reflective, earthtone color to match one of the standard environmental colors as determined by the five State Rocky Mountain Interagency committee. All production facilities will be painted within six months of installation. Facilities required to comply with Occupation Health and Safety Act Rules and Regulations will be excluded from this painting requirement.
 - 13. The production (emergency) pit will be 8 feet in diameter and 8 feet deep. It will be lined with corrugated steel with a steel mesh cover.
 - 14. If different production facilities are required, a sundry notice will be submitted.

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- C. EnCana Oil & Gas (USA) Inc. shall protect all survey monuments, witness corners, reference monuments and bearing trees in the affected areas against disturbance during construction, operation, maintenance and termination of the facilities authorized herein.

EnCana Oil & Gas (USA) Inc. shall immediately notify the authorized officer in the event that any corners, monuments or markers are disturbed or are anticipated to be disturbed. If any monuments, corner or accessories are destroyed, obliterated or damaged during construction, operation or maintenance, EnCana shall secure the services of a Registered Land Surveyor to restore the disturbed monuments, corner or accessories, at the same location, using surveying procedures found in the Manual of surveying Instructions for the Survey of the public Lands of the United States, latest edition. EnCana shall ensure that the Registered Land Surveyor properly records the survey in compliance with the Colorado Revised Statutes 38-53-101 through 38-53-112 (1973) and shall send a copy to the authorized officer.

- D. During drilling and subsequent operations, all equipment and vehicles will be confined to the access road right-of-way and any additional areas as specified in the approved Application for Permit to Drill.
- E. Reclamation of disturbed areas no longer needed for operation will be accomplished by grading, leveling and seeding as recommended by the Bureau of Land Management.

EnCana Oil & Gas (USA) Inc. will be responsible for road maintenance from the beginning to completion of operations.

5. LOCATION AND TYPE OF WATER SUPPLY

- A. Water to be used for the drilling of these wells will be hauled by truck over the roads described in item #1 and item #2, from the nearest water supply. Water volume used in drilling operation is dependent upon the depth of the well and any losses that might occur during drilling.

6. SOURCE OF CONSTRUCTION MATERIALS

- A. All access roads crossing Federal land are described under Item #2, and shown on Map "A". All construction material for these location sites and access roads shall be borrowed material accumulated during the construction of the location sites and access roads. No additional construction material from other sources is anticipated at this time. If in the future it is required, the appropriate actions will be taken to acquire it from private sources.
- B. All trees on the locations, access road, and proposed pipeline routes shall be disposed of by one of the following methods:
1. Trees shall be cut with a maximum stump height of six inches (6") and cut to 4-foot lengths and stacked off location. Trees will not be dozed off the location or access road, except on private surface where trees may be dozed. Trees may also be dozed on pipeline routes and then pulled back onto right-of-way as part of final reclamation.
 2. Limbs may be scattered off location, access road or along the pipeline, but not dozed off.

Rootballs shall be buried or placed off location, access road, or pipeline route to be scattered back over the disturbed area as part of the final reclamation.

7. METHODS OF HANDLING WASTE MATERIALS

- A. Cutting will be deposited in the reserve/blooiie pit.
- B. Drilling fluids including salts and chemicals will be contained in the reserve/blooiie pit. Upon termination of drilling and completion operations, the liquid contents of the reserve pit will be

removed and disposed of at an approved waste disposal facility within ninety (90) days after termination of drilling and completion activities.

In the event that adverse weather conditions prevent removal of the fluids from the reserve pit within this time period, an extension may be granted by the Authorized Officer upon receipt of a written request from EnCana Oil & Gas (USA) Inc. The reserve pit will be constructed so as not to leak, break or allow discharge.

- C. Produced fluids – liquid hydrocarbons produced during completion operations will be placed in test tanks on the location. Produced waste water will be confined to a lined pit (reserve pit) or storage tank for a period not to exceed ninety (90) days after initial production. During the permanent disposal method and location, along with the required water analysis shall be submitted for the Authorized Officer’s approval. Failure to file an application within the time frame allowed will be considered an incidence of noncompliance.
- D. Sewage- self-contained, chemical toilets will be provided for human waste disposal. Upon completion of operations, or as needed, the toilet holding tanks will be pumped and the contents thereof disposed of in the nearest, approved, sewage disposal facility.
- E. Garbage and other waste material – garbage, trash and other waste materials will be collected in a portable, self-contained and fully – enclosed trash cage during drilling and completion operations. Upon completion of operations (or as needed) the accumulated trash will be disposed of at an authorized sanitary landfill. No trash will be burned on location or placed in the reserve pit.
- F. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash cage will be cleaned up and removed from the well location. No adverse materials will be left on the location. Any open pits will be maintained until such time as the pits are backfilled.
- G. The reserve and/or production pit will be constructed on the existing location and will not be located in natural drainages where a flood hazard exists or surface runoff will destroy or damage the pit walls. All pits will be constructed so as not to leak, break, or allow the discharge of liquids there from.
- H. Any spills of oil, gas, salt water or other potentially hazardous substances will be reported immediately to the BLM, and other responsible parties, and will be mitigated immediately, as appropriate, through clean up or removal to an approved disposal site.

8. ANCILLARY FACILITIES

Self-contained travel-type trailers may be used on site during drilling operations. Standard drilling operation equipment to be on location will include: drilling rig with associated equipment; living facilities for company representative, tool pusher, mud logger, directional driller; toilet facilities and trash containers.

Facilities other than those described in this surface use plan to support drilling operations will be submitted to the Authorized Officer via a sundry notice (form 3160-5) for approval prior to commencing operations.

WELLSITE LAYOUT

- A. The attached location plat specifies the drill site layout as staked. Cross sections have been drafted to visualize the planned cuts and fills across the location. An average minimum of six (6) inches of topsoil will be stripped from the location (including the areas of cut, fill and/or subsoil storage) and stockpiled for future reclamation of the well site. The stockpiled soil will be seeded within 48 of completion of the pad.
- B. A production schematic showing the proposed production facility layout is attached.

-
- C. The reserve pit and blooie pit will be constructed as a combination pit capable of holding approximately four times the TD hole volume. The pits were combined, as these are gas wells and there will be no danger of the accumulation of hydrocarbons that could result in a potential safety hazard. The blooie pit might be used for testing, but only after the drilling is completed and the drilling equipment and personnel are off the well site location. In the event that drilling fluid (mud) will have to be used then this pit will also serve as the reserve pit. The reserve pit will be lined to prevent seepage.

This requirement may be waived by the Bureau of Land Management upon receipt of additional information from EnCana Oil & Gas (USA) Inc. concerning the location of fresh water aquifers and potential flow rates, chemical analyses of waters from the aquifers, and information concerning both the mechanics and nature of the air mist drilling system including any additives used therein.

- D. Prior to the commencement of drilling operations, the reserve pit will be fenced on three (3) sides using three strands of barbed wire according to the following minimum standards:
1. Corner posts shall be cemented and/or braced in such a manner to keep the fence tight at all times.
 2. Standard steel, wood, or pipe posts shall be used between the corner braces. The maximum distance between any two (2) posts shall be no greater than sixteen (16) feet.
 3. All wire shall be stretched by using a stretching device before it is attached to the corner posts.

The fourth side of the reserve pit will be fenced immediately upon removal of the drilling rig and the fencing will be maintained until the pit is backfilled.

- E. Any hydrocarbons on the pit will be removed from the pit as soon as possible after drilling operations are completed.
- F. Operator will notify the Authorized Officer at least three (3) working days prior to construction of the well pad and/or related facilities and within two (2) working days after completion of the well pad.

9. PLANS FOR RECLAMATION OF THE SURFACE:

The BLM will be contacted prior to commencement of any reclamation operations.

A. PRODUCTION

1. Immediately upon well completion, the well location and surrounding areas(s) will be cleared of all debris, materials, trash and junk not required for production.
2. Immediately upon well completion, any hydrocarbons in the pit shall be removed in accordance with 43CFR 3162.7-1.
3. Before any dirt work to restore the location takes place, the reserve pit will be completely dry and all cans, barrels, pipe, etc. will be removed.

Other waste and spoil materials will be disposed of immediately upon completion of drilling and workover activities.

4. The reserve pit and that portion of the location and access road not needed for production facility/operations will be reclaimed within ninety (90) days from the date of well completion, weather permitting.
5. If the well is a producer, EnCana will upgrade and maintain access roads as necessary to prevent soil erosion, and accommodate year round traffic. Areas unnecessary to operations will have areas reshaped. Topsoil will be redistributed and disked. All areas

outside the work area will be re-seeded according to the Bureau of Land Management recommendations for seed mixture.

6. If the well is abandoned or a dry hole, EnCana will restore the access road and location to approximately the original contours. During reclamation of the site, fill material will be pushed into cuts and up over the backslope. No depressions will be left that will trap water or form ponds. Topsoil will be distributed evenly over the location and seeded according to the recommended seed mixture. The access road and location shall be ripped or disked prior to seeding. Perennial vegetation must be established. Additional work shall be required in case of seeding failures, etc.

Seedbed will be prepared by disking, then roller packing following the natural contours. Seed will be drilled on contours at a depth no greater than one-half inch (1/2). In areas that cannot be drilled, seed will be broadcast at double the seeding rate and harrowed into soil. Certified seed will be used whenever available.

Fall seeding will be completed after September 1, and prior to prolonged ground frost. To be effective, spring seeding will be completed after the frost has left the ground and prior to May 15th.

7. Upon completion of backfilling, leveling and recontouring, the stockpiled topsoil will be evenly spread over the reclaimed areas(s). Prior to reseeded, all disturbed surfaces will be scarified and left with a rough surface. No depressions will be left that would trap water and form ponds. All disturbed surfaces will be re-seeded with a seed mixture to be recommended by the BLM.

Seed will be drilled on the contour to approximately a depth of one-half (1/2) inch. All seeding will be conducted after September 1 and prior to ground frost. Spring seeding will be done after the frost leaves the ground and no later than May 15th. If the seeding is unsuccessful, EnCana may be required to make subsequent seedings.

B. DRY HOLE/ABANDONED LOCATIONS

- A. On lands administered by the BLM, abandoned well sites, roads or other disturbed areas will be restored to near their original condition.

This procedure will include:

1. Re-establishing irrigation systems where applicable,
2. Re-establishing soil conditions in irrigated field in such a way as to ensure cultivation and harvesting of crops and,
3. Ensuring revegetation of the disturbed areas to the specification of the BLM at the time of abandonment.

- B. All disturbed surfaces will be recontoured to the approximate natural contours and re-seeded according to BLM specifications. Reclamation of the well pad and access road will be performed as soon as practical after final abandonment and reseeded operations will be performed in the fall or spring following completion of reclamation operations.

10. SURFACE OWNERSHIP

Surface ownership may be either Fee or Federal and is noted on the APD.

11. OTHER INFORMATION

- a. A Class III Cultural Resource Inventory of the proposed drill sites, access roads and other facilities on federal lands will be conducted and a report filed with the appropriate BLM office.

-
- b. If archaeological, historical or vertebrate fossil materials are discovered during the course of any construction activities, EnCana will suspend all operations that further disturb such materials and immediately contact the appropriate BLM office. Operations in the area of discovery will not resume until written authorization to proceed has been issued by the BLM Authorized Officer (AO).
 - c. EnCana will be fully responsible for the actions of their subcontractors. A copy of the approved APD and Conditions of Approval will be on location during drilling and completion operations.
 - d. Any construction activity in the areas shall be done with awareness that many natural gas pipelines are buried. Some are apparent as to location; some have grown over with weeds and brush. It is suggested that the contractor contact the operators in the area to locate all lines before digging.

12. REPRESENTATIVES AND CERTIFICATION

- A. Representative:
RuthAnn Morss
EnCana Oil & Gas (USA) Inc.
950 17th Street, Suite 2600
Denver, CO 80202
(303)-389-5060

All lease and/or unit operations will be conducted in such a manner that full compliance is made with all applicable laws, regulations, Onshore Oil and Gas Orders, the approved Plan of Operations, and any applicable Notice to Lessees.

The Operator will be fully responsible for the actions of its subcontractors. A complete copy of the approved Application for Permit to Drill will be furnished to the field representatives to ensure compliance and shall be on location during all construction and drilling operations.

- B. Representative Certification:
I hereby certify that I, or persons under my supervision, have inspected the proposed drill site and access route, and I am familiar with the conditions that currently exist; that the statements made in this plan are, to the best of my knowledge, true and correct and the work associated with the operations proposed herein will be performed by the Operator, its contractors, and subcontractors conformity with this plan and the terms and conditions under which is approved.



10-26-04

RuthAnn Morss
EnCana Oil & Gas (USA) Inc.
(303) 389-5060

Date

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APPENDIX B

SITE-SPECIFIC CULTURAL RESOURCE MITIGATION For the Grass Mesa GAP

This information is considered proprietary by the Archaeological Resource and Protection Act (16 U.S.C. 470hh) and the National Historic Preservation Act (16 U.S.C. 470w-304) and is not subject to public review.

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APPENDIX C

STANDARD (GAP-wide) AND SITE-SPECIFIC CONDITIONS OF APPROVAL (COAs) for the GRASS MESA GAP

Standard (COAs)

Air Quality:

The operator is responsible for applying dust abatement measures as needed or directed by the Authorized Officer to reduce the emissions of fugitive dust from access roads. The level and type of treatment (watering or application of various dust agents, surfactants and road surfacing material) may be changed in intensity and must be approved by the Authorized Officer. Dust control is needed to prevent heavy plumes of dust from road use that create safety problems and disperses heavy amounts of particulate matter on adjacent vegetation. Supporting mitigation identified in Surface Use Plan (#2K)

For all pad locations on Grass Mesa, straw (curlex) matting will be placed on excess material and topsoil piles to help limit heavy dust emissions into the air during windy weather conditions.

Cultural Resource Monitor for Pad Construction

To provide adequate time to complete cultural monitoring and potential excavation work, pad construction will commence 30 days prior to anticipated initial spud date for wells on a pad. Cultural resource monitoring of excavation work, to be conducted by a qualified archeologist, will occur throughout the pad construction period. Delays in construction may be expected if cultural materials or features are discovered. Discovery clause in standard COAs will be followed.

Cultural Resource Synthesis Requirement

Class III cultural resource inventories will be required on any and all new wells, access roads, pipelines and other ground disturbing activities not covered in this plan that require a federal permit or authorization to conduct the action. Additional action specific mitigation may be required – including but not limited to moving the location, archeological monitoring, testing, or data recovery. At the end of calendar year 2009 (12/31/09) the operator will contract out an archaeological synthesis compiling the past cultural work in the GAP on a landscape basis which will include but not be limited to: cultural/temporal affiliation, settlement patterns, subsistence, technology, social organization and origins and transitions. Information from this synthesis will provide needed data for determining whether current management practices should continue or if new practices are needed to protect and/or conserve archaeological resources.

Cultural Resource Education/Discovery

All persons in the area who are associated with this project must 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 43CFR10.4(g), the BLM authorized officer must 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 43CFR10.4 (c) and (d), activities must stop in the vicinity of the discovery and the discovery must be protected for 30 days or until notified to proceed by the authorized officer.

If in connection with operations under this contract the project proponent, his contractors, subcontractors, or the employees of any of them, discovers, encounters or becomes aware of any objects or sites of cultural or paleontological value or scientific interest such as historic or prehistoric ruins, graves or grave

markers, fossils, or artifacts, the proponent shall immediately suspend all operations in the vicinity of the cultural or paleontological resource and shall notify the BLM authorized officer of the findings (16 U.S.C. 470h-3, 36CFR800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the authorized officer. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the authorized officer from a federal agency insofar as practicable. When not practicable, the holder shall bear the cost of the services of a non-federal professional.

Within five working days the authorized officer will inform the holder as to:

- whether the materials appear eligible for the National Register of Historic Places;
- the mitigation measures the holder will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- a time frame for the authorized officer to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the State Historic Preservation Officer that the findings of the authorized officer are correct and the mitigation is appropriate.

The proponent may relocate activities to avoid the expense of mitigation and/or the 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 proponent will be responsible for mitigation costs. The authorized officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the authorized officer that the required mitigation has been completed, the proponent will then be allowed to resume construction.

Antiquities, historic, prehistoric ruins, or objects of scientific interest that are outside of the authorization boundaries but directly associated with the impacted resource will also be included in this evaluation and/or mitigation.

Antiquities, historic, prehistoric ruins, or objects of scientific interest, identified or unidentified, that are outside of the authorization and not associated with the resource within the authorization will also be protected. Impacts that occur to such resources, which are related to the authorizations activities, will be mitigated at the proponent's cost including Native American consultation cost.

In situations where federal action is required for wells directionally drilled into federal minerals from fee surface overlying fee minerals, BLM's responsibilities under Section 106 of the National Historic Preservation Act [(NHPA) 16 U.S.C. 470] as amended and Section 36 CFR 800.4 will be followed.

Ground Water / Soils: EnCana will implement aggressive reclamation and re-vegetation of disturbed areas not needed for operational activities. These measures will help prevent erosion and sedimentation to drainages. In addition EnCana will implement multiple BMPs including the following:

New access roads will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity.

Relief ditches or corrugated metal pipes will be installed at regular intervals to direct drainage off of the road grade and into vegetated areas, where it would infiltrate into the ground and/or sediment would settle out on the surface.

Ditches will be allowed to vegetate and/or will include large rocks or stones to slow the velocity of drainage and allow sediment to settle out.

Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out.

EnCana's road construction plans will identify specific locations of drainage features and BMPs for approval by the BLM prior to construction.

Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected and the presence of these zones reported to the BLM and COGCC.

After the completion of drilling operations, the producing formation would be logged and production casing run and cemented in accordance with the drilling program approved in the APD.

BLM will conduct surface casing inspections on every federal well in the Grass Mesa project area.

In order to isolate the Mesa Verde -Wasatch contact, production casing on Federal wells will have a cement top a minimum of 200 feet above the Williams Fork formation (typically resulting in cement coverage of 800- 1000 feet above the targeted gas zones).

In addition, the following site-specific mitigation measures will be implemented:

In accordance with EnCana's standard policy, all reserve pits will utilize impermeable liners to contain drilling fluids. Following completion activities, reserve pit liners would be removed at the respective landowners request. At the discretion of EnCana and in cooperation with the respective landowner, closed-loop drilling systems may be used on well pads within 100 feet of Dry Creek and Ramsey Gulch (i.e., the H23NW).

In accordance with EnCana's standard policy, erosion protection and silt retention techniques including construction of silt catchment dams, installation of culverts or drainage dips, placement of surface rock on approaches to stream crossings, placement of surface rock, straw bales, and/or matting will be used along proposed road reaches within 100-feet of stream channels (i.e., roads to the K4D and H23NW).

Within areas less than 100 feet from Dry Creek and Ramsey Gulch, an adequate vegetative buffer, artificial buffers (e.g., straw bales, matting, etc.), or filter strip will be maintained between the road and Dry Creek or Ramsey Gulch to filter runoff from the road (i.e., roads to the K4D and H23NW) before it reaches the creek, wherever possible.

Hydrocarbon Odors from Drilling & Completion Operations: EnCana has been, and will continue to work with the Grass Mesa Homeowners Association on developing methods to reduce the effects of hydrocarbon odors on private landowners. For example, EnCana is researching and testing the use of closed-loop drilling in many of their oil and gas operations. In order to reduce or eliminate the problem of reserve pit and frac pit odors, closed-loop drilling is an option that may be considered for proposed well pads within 0.5 miles of a private residence.

Frac pit use within 0.5 miles of any residence will be prohibited by BLM. Only standard reserve pits of a size to support the number of planned wells will be allowed within 0.5 mile of residences (i.e., B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

Invasive Non-Native Species: EnCana would implement an intensive reclamation and weed control program beginning the first growing season after well completion. EnCana would seed all portions of the well pad not utilized for the operational phase of the project. Re-vegetation would be accomplished using certified weed-free seed mixes of native plant species as determined by the BLM. Post-construction seeding applications and re-treatment would continue until determined successful by the BLM. Weed control would be conducted through an Approved Pesticide Use and Weed Control Plan approved by the Authorized Officer. Weed monitoring and reclamation measures would be continued on an annual basis (or as frequently as the Authorized Officer determines) throughout the 20 to 30 year life of the wells.

Migratory Birds: In order to protect nesting raptors, prior to any new construction, drilling or completion activities planned between February 1 and August 15, all pinyon-juniper woodlands within

0.25 miles of the proposed disturbance will be surveyed for the presence of active raptor nests. The inventory would be completed no more than 10 days prior to initiation of the surface activity. If an active raptor nest(s) is documented within 0.25-miles of proposed construction, drilling or completion, the activity would be delayed by a 60-day timing limitation. If an active nest is located in an area that is specifically listed in lease stipulations, the lease language will be implemented full force and effect.

Native American Consultation: The Ute Tribe of the Uinta and Ouray Bands have visited other culturally sensitive sites in the Glenwood Springs Field Office area and have provided written and verbal indication to protect these sites. The following mitigation is based upon this information. If new data are disclosed after the Native Americans visit the Grass Mesa GAP, new terms and conditions may have to be negotiated to accommodate their concerns.

- Site-specific Native American mitigation measures suggested during consultation will be considered during the implementation phase of the proposed action(s).
- Strict adherence to the confidentiality of information concerning the nature and location of archaeological resources will be required of EnCana and their subcontractors (Archaeological Resource Protection Act 16 U.S.C. 470hh).
- Periodic monitoring of these sensitive areas will be required.
- Inadvertent Discovery: The National Historic Preservation Act (NHPA) as amended 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 BLM 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 (16 U.S.C. 470hh).

- On private lands, Colorado State Statutes (CRS 24-80-401 and CRS 24-80-1301) for Historic, Prehistoric, and Archaeological Resources, and for Unmarked Human Graves will have to be adhered to by EnCana and their subcontractors. These State statutes require that the federal Authorizing Officer be notified immediately of any historic or prehistoric finds or human grave. The find must be protected until the Authorizing Officer indicates that the action may proceed.

Noise: Any new compressor engines at the existing compressor stations will be equipped with critical silencers. Critical silencers reduce noise levels of compressor engines below the State standard of 55 dBA.

During drilling and completion on Grass Mesa, EnCana will angle the outlet on the exhaust muffler stacks of the power units or generators away from private homes.

The operator is urged to use of noise-reducing drill rigs for all pad locations on Grass Mesa proper. At a minimum, the operator will use noise-reducing “rig power packs” and/or electric-powered drill rigs on the following pad locations (E9W, B16W, G22NW, H27NW, H34NW, K4D, K22NW, K33NW and O27NW) to help mitigate expected noise levels from drilling activities near residences.

As a matter of policy, EnCana will not stage and use more than 5 operating drill rigs on Grass Mesa at any one time.

Excess spoil material will be piled along the edge of the well pad to act as a sound barrier between the well pad and nearby private residence. Sound barrier walls will be installed when excess spoil material piles are not available to augment noise whenever drilling or completion work is undertaken within 0.5 miles of private residences.

EnCana will use telemetry equipment at all gas well meters to reduce the number of pumper traffic within the Grass Mesa area. Reduction of vehicle traffic will reduce overall noise impacts to nearby homeowners.

To help reduce the truck traffic noise associated with removing produced water from the various sites on the mesa, EnCana is encouraged to upgrade and use the buried pipeline on the mesa for transport of produced water volumes to its water treatment facility at Hunter Mesa. Reports indicate that this pipeline exists at least to portions of the pads on the mesa.

Paleontological Resource Education/Discovery

All persons associated with operations under this authorization must 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 proponent shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM authorized officer of the findings. The discovery must be protected until notified to proceed by the authorized officer.

As feasible, the proponent shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM authorized officer of any finds. The BLM authorized officer 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 proponent shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.

Transportation/ Road Maintenance

Commuting construction and drilling crews would be encouraged to car pool to reduce the number of vehicle trips on local area roads and associated wear and tear.

Road maintenance standards listed in GAP EA on page 8 will be used and implemented on BLM and related private road easements.

Terrestrial Wildlife: As required by lease stipulation, EnCana will avoid construction or drilling activities within their federal leases from December 1 to April 30 in order to minimize impacts to wintering big game animals. Compliance with this timing limitation is required for all drilling and construction activities on all federal lease parcels accessed with the BLM Grass Mesa Road. Exceptions to this lease stipulation could be granted for federal surface locations during the last 60-days (i.e., March 1 – April 30) of the timing limitation under mild winter conditions. Severity of winter conditions will be determined on the basis of snow depth, snow crusting, daily mean temperatures, and whether big game were concentrated on winter range within the area during the winter months.

Threatened, Endangered and Sensitive Species: In addition to moving proposed pad locations out of areas with high concentrations of the beardtongue, EnCana will also implement aggressive and timely reclamation and weed control measures to minimize indirect impacts to populations. Native species will be used to encourage reestablishment of the beardtongue following reclamation. Herbicides used to control noxious weeds within occupied Harrington's penstemon habitat will involve spot spraying of target weeds only.

Vegetation: Where road, pipeline or pad construction requires the removal of pinyon pine trees, the trees will be disposed of in the following manner to avoid attracting pinyon *Ips* beetles into live standing trees and mitigate effects of ongoing *Ips* beetle infestation in the local area: (1) broken down with earthmoving equipment and buried in excess material pile or at toe of fillslopes; (2) cut down, sectioned and chipped with Hydroaxe-type equipment capable of chipping large pinyon trees; or (3) cut and removed trees from BLM land and hauled to Colorado State Forest Service-approved disposal site..

Visual Resources: To help mitigate the contrast of bare, re-contoured slopes, reclamation will include measures to feather cleared lines of vegetation, and to save and re-distribute cleared trees, debris, and rock over re-shaped cut and fill slopes.

To reduce the view of production facilities from visibility corridors and private residences, facilities will not be placed in visually exposed locations (i.e., they will be located against backdrops or cut side of pad) and will be placed to allow the maximum re-shaping of cut and fill slopes. Furthermore, all above ground facilities will be painted to blend with the existing landscape.

To help consolidate truck traffic and reduce the visual impact of production facilities on some pads, facilities supporting the wells on the B23NW, I3B, J16W, K4D and O27NW pads will be located on nearby pads as listed in site-specific Conditions of Approval in Appendix C.

Wastes, Hazardous or Solid: If any spills of oil, gas, salt water, or other fluids occur during the construction, drilling or operational phase of the project, EnCana will immediately contact the BLM and any other regulatory agencies necessary. Strict cleanup efforts, based on a spill plan approved by the BLM will be initiated immediately. This mitigation will be applied at all stages of the project including drilling, completion, operation, and abandonment of the wells.

Water Quality Surface and Ground: EnCana will implement aggressive reclamation and re-vegetation of disturbed areas not needed for operational activities. In addition EnCana will implement multiple BMPs including the following: New access roads will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity. Relief ditches will be installed at regular intervals to direct drainage off of the road grade and into vegetated areas, where it would infiltrate into the ground and/or sediment would settle out on the surface.

Ditches will be allowed to vegetate and/or will include large rocks or stones to slow the velocity of drainage and allow sediment to settle out. Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out. EnCana's road construction plans will identify specific locations of drainage features and BMPs for approval by the BLM prior to construction.

Wetlands and Riparian Zone Protection: Closed-loop drilling systems will be used on well pads within 500 feet of Dry Creek and Ramsey Gulch. If closed-loop drilling is not feasible, reserve pits must utilize impermeable liners to contain drilling fluids. Erosion protection and silt retention techniques including construction of silt catchment dams, installation of culverts or drainage dips, placement of surface rock on approaches to stream crossings, and placement of surface rock will be used along proposed road reaches within 100-feet of stream channels. Within areas less than 100 feet from the creeks, an adequate vegetative buffer or filter strip will be maintained between the road and Dry Creek or Ramsey Gulch to filter runoff from the road before it reaches the creek, wherever possible. Sediment traps or basins will be installed in problem locations where insufficient vegetative buffering is available to filter runoff prior to entering Dry Creek, Ramsey Gulch or other tributaries.

Reclamation Plan. Refer to Appendix I. Surface Reclamation of the 6/98 GSFO's Draft Supplemental EIS for Oil & Gas Leasing Development (pages I-1 through I-8) for specific reclamation goals, objectives, timelines, measures and monitoring methods. These guidelines will be followed in completing the reclamation of disturbed surfaces on well pads, access roads and pipelines.

Some effective practices that will be implemented during reclamation include, but are not limited to: proper siting of the well pad to minimize impacts, the immediate seeding of disturbed areas after construction, proper storage and redistribution of topsoil, reshaping cut and fill slopes, seeding with specified seed mix within the first available growing season after disturbance, deep ripping (>18 inches on 2 foot centers), fencing reclaimed areas to protect from livestock use, and the use of riprap, slash or other erosion control structures to help control sediment loss.

The 4 Reclamation Categories defined on Page I-8 of Appendix I (6/98 GSFO's Draft Supplemental EIS for Oil & Gas Leasing Development) will be used in gauging the progress of reclamation monitoring.

Seed Mix Application Practices

A specified seed mix (listed by well pad in Site-Specific Conditions of Approval) designed to meet interim reclamation standards while providing forage and browse for wintering elk and deer using a mixture of shrub, grass and forb species shall be applied. The following seed mix and rates will be used on all disturbed surfaces, including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
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...Refer to seed mix components identified in Site-Specific Conditions of Approval

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

Upon completion of backfilling, leveling, ripping to minimum 18-inch depth on 2-foot centers, and recontouring, the stockpiled topsoil will be evenly spread over the reclaimed areas(s). Prior to reseeding, all disturbed surfaces will be scarified and left with a rough surface. No depressions will be left that would trap water and form ponds.

The prepared seedbed will be seeded within 24 hours after completing dirt work unless a change is requested by the operator and approved by the Authorized Officer. Prepare the seedbed by contour cultivating 4-6 inches deep. Drill seed ½ to 1 inch deep following the contour. In areas that cannot be drilled, broadcast seed at 1½ times the application rate and cover ½ to 1 inch deep with a harrow or drag bar. All seeding will be conducted after September 1 and prior to ground frost. Spring seeding will be done after the frost leaves the ground and no later than May 15th. If the seeding is unsuccessful, operator will be required to make subsequent seedings until the reclamation objectives identified in Appendix I. Surface Reclamation of the 6/98 GSFO's Draft Supplemental EIS for Oil & Gas Leasing Development are met.

Erosion Control Practices

The cut and fill slopes will be protected against rilling and erosion with measures such as water bars, lateral furrows, or other measures approved by the Authorized Officer. Weed free straw bales, straw "wattles", straw matting or a well-anchored fabric silt fence will be used on cuts and fill slopes to protect against soil erosion.

Topsoil Practices

During well pad, road and/or pipeline construction, topsoil will be stripped to a minimum depth of 6 inches and segregated from other subsurface material piles, i.e. excess material from reserve pit construction. If topsoil is less than 6 inches, the top 6 inches of surface material will be stripped and piled. The topsoil piles will be seeded within 48 hours of stockpiling.

Site Protection Practices

Reclaimed areas will be fenced to exclude livestock until seeded species have established. The Authorized Officer will approve the type of fencing. Fencing shall be to BLM standards

The operator will submit an annual reclamation report by December 31 to the Authorized Officer. The report will document compliance with all aspects of the reclamation objectives. The report will specify if the reclamation objectives are likely to be achieved and actions needed to meet these objectives.

SITE-SPECIFIC COAs

Existing Location:

I3B Pad	New wells:	3-7 C	34-16
		35-13D	3-8C
		2-12B	3-10B

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

The storage tanks supporting the I3B wells will be jointly located on the I3 pad to consolidate service truck use onto a single (I3) pad and allow the operator to return additional area on I3B pad to the reclamation stage once the pad is reshaped and seeded. Production Packs supporting the I3B wells can remain on the I3B pad as originally staged.

To accommodate the drilling planned for the I3B wells, a 20-foot by 20-foot cuttings pit will be installed in vicinity of soli-bonded reserve pit. The existing I3 pad and pit will remain available to support completion activities planned on the I3B pad. The I3 and I3B pad will be reclaimed and seeded no later than fall, 2004.

Fencing to control grazing livestock within the BLM range allotment will be installed around the area of pad disturbance including the perimeter of excess material. This fencing will be of standard and type to keep livestock from penetrating the fenced perimeter. Fencing will be installed after dirtwork and seed application is completed for interim reclamation and prior to livestock turnout on the allotment.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

New Surface Locations:

B16W Pad

Wells:	16-2	16-4C	16-2C
	9-15C	16-8	
	16-1	16-7	

Cattleguard with steel frame gate spanning the guard will be installed at BLM boundary to allow gate to be locked during hunting season to control public entry onto private lands. Furthermore, steel frame bypass gate will be installed near cattleguard to allow passage of stock and tracked equipment around the cattleguard. Both gates (cattleguard and bypass) will be locked at all times during big game hunting seasons except when authorized vehicles are passing through. Livestock permittees will be provided key or combinations to locked gates to conduct operations.

Steel frame gate will be installed pad in BLM allotment fence along road spur to B16W to provide barrier to grazing livestock but allow vehicles to pass through fence. Gate will remain closed at all times during grazing season (May 15th –October 15th).

Fencing to control grazing livestock within the BLM range allotment will be installed around the area of pad disturbance including the perimeter of excess material. This fencing will be of standard and type to keep livestock from penetrating the fenced perimeter. Fencing will be installed after dirtwork and seed application is completed for interim reclamation and prior to livestock turnout on the allotment.

Standing live Douglas-fir tree located near PT3 & PT4 at north end of pad will be protected from disturbance. Excess material on north end of pad between PT 2 & PT 7 will be reconfigured to protect Douglas-fir tree from any damage.

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material along North-side of pad between PT2 & PT7 will be aligned to provide visual and noise screening for nearby residence.

Gathering line alignment for this pad will run directly along and within the surface disturbance planned for the access road. Surface disturbance for the pipeline will not exceed the road construction disturbance unless otherwise approved by the Authorized Officer.

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
Mountain brome		2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

B23NW Pad

Wells: 23-7C
14-14

All production facilities for the B23W pad including storage tanks and production pack (separators) will be jointly located on the J23W pad to reduce truck traffic and allow the operator to conduct maximum reclamation stage on the B23W pad.

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

Install culverts (sizes determined by engineering in consultation with Army Corps of Engineer recommendation) in existing drainages along the B23NW access road alignment. Equipment access to existing power line route will be made available during and after access road construction.

Topsoil piles will be placed on south end of pad along both sides of access road between PT10 & PT12 as needed. Excess material pile will be placed at southeast edge of pad between PT8 and PT 10. No material (topsoil or excess) will be piled on north edge of pad to avoid visual concerns with I-70 viewshed.

Silt fencing will be installed along toe of fillslope between PT3 and PT 11 and around outside perimeter of topsoil and excess material piles to control any sheet or rill erosion.

Gathering line alignment for this pad will run directly along and within the surface disturbance planned for the access road. Surface disturbance for the pipeline will not exceed the road construction disturbance unless otherwise approved by the Authorized Officer.

All Juniper trees along west and north edge of pad will be left standing for a visual buffer.

Movement of the B23NW approximately 200 feet south of its currently proposed location would move the pad into VRM Class III, and would therefore eliminate conflict with VRM Class II objectives.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

C26NW Pad	Wells:	23-13	23-14C
		23-14	23-15C
		23-10C	26-4A
		23-15	26-4D
		23-13C	26-5A

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

Gathering line alignment for this pad will run directly along and within the surface disturbance planned for the access road. Surface disturbance for the pipeline will not exceed the road construction disturbance unless otherwise approved by the Authorized Officer.

Install culverts (sizes determined by engineering in consultation with Army Corps of Engineer recommendation) in existing drainages along the access road.

Steel frame traffic control gate will be placed between County Road 319 and C26NW pad at defensible position to prohibit vehicle travel by general public to the C26NW pad.

To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

E9W Pad

Wells: 9-4 9-5C
 9-4C 9-6D
 9-5

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

Silt fencing will be installed along outside perimeter of topsoil and excess material piles between PT7 and PT10 to control any sheet or rill erosion.

Fencing to control grazing livestock within the BLM range allotment will be installed around the area of pad disturbance including the perimeter of excess material. This fencing will be of standard and type to keep livestock from penetrating the fenced perimeter. Fencing will be installed after dirtwork and seed application is completed for interim reclamation and prior to livestock turnout on the allotment.

Prior to start of road/pad construction, Penstemon plant population north of pad will be delineated in manner approved by Authorized Officer to establish protected areas from surface disturbing activities.

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material along North-side of pad between PT10 & PT12 will be aligned to provide visual and noise screening for nearby residence. Sound barriers will be installed along west side of pad on excess material pile to provide additional noise relief to residence.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
Mountain brome		2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

G22NW Pad

Wells: 22-7
22-9B
22-10B

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

No surface disturbance, including location of excess material piles, is allowed within 30 feet of edge of mesa unless approved by Authorized Officer. Height of excess material pile will not exceed 15 feet in height.

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material along will be aligned to provide visual and noise screening for nearby residence. Sound barriers will be installed along southwest side of pad on excess material pile to provide additional noise relief to residence.

To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

H23NW Pad

Wells: 23-8 23-9
 24-9B 23-9C

Approval to construct the road junctions for the H23NW pad and J23NW pad will be subject to County access permit. The existing draw south of road junction with CR319 will be straightened to remove dogleg and potential erosion problems. Install culvert (size determined by engineering in consultation with Army Corps of Engineer recommendation) in existing drainage directly north of pad along pad access road.

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Carlsbad Canyon (2.5Y 6/2).

Silt fencing will be installed along toe of fillslope between PT7 and PT 12 to control any sheet or rill erosion from excess material piles. Silt fencing will also be placed around outside edges of 2nd excess material pile located north of drainage.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

H27NW Pad

Wells: 27-8A 27-7A
 27-8 22-16D
 27-9A 27-2D
 27-9 27-1

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Carlsbad Canyon (2.5Y 6/2).

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material along west side of pad between PT4 & PT11 will be aligned to provide visual and noise screening for nearby residence. Sound barriers will be installed along west side of pad on excess material pile to provide additional noise relief to residence.

All pinon-juniper trees along east side of pad between PT2 & PT15 will be protected from damage and left standing to provide visual screen to mesa's edge.

If combustor is installed on site, it will be located far enough away from mesa's edge so it is not visible from valley floor.

To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

H34NW Pad	Wells:	34-1	34-8D
		34-1D	34-7B
		34-8	

The paint color on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

All pinon-juniper trees along east side of pad between PT2 & PT12 will be protected from damage and left standing to provide visual screen to mesa’s edge. About 10 pinon trees will require removal during pad or road construction. Refer to Standard COAs, Vegetation for details regarding disposal of pinon trees.

Culvert (minimum 18” diameter) will be installed in access road as it crosses dry gulch at north end of pad.

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Sound barriers will be installed to provide additional noise relief to residence.

Silt fencing will be installed along toe of fillslope between PT1 and PT 10 to control ay sheet or rill erosion from pad fill and excess piles.

If combustor is installed on site, it will be located far enough away from mesa’s edge so it is not visible from valley floor.

To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

I9W Pad

Wells:	9-8	9-10
	9-9D	9-8C
	9-16	9-9
	9-16C	10-12D
	10-13A	9-7D

Construct and improve well pad access road outside of existing pipeline corridor to avoid disturbance to well-established vegetation along pipeline.

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

Operator will submit Pesticide Use Proposal to BLM for approval to treat weeds on site (specifically Musk Thistle) in spring 2005.

To reduce the overall pad size and height of cutslope around the reserve pit, the pad edge will run straight between PT3 & PT6 eliminating PT 4 & PT5. Furthermore, the edge of reserve pit (PT B to PT C) will shift 15 feet toward pit so that pit's edge will run in straight line between PT6 & PT9. The 15-foot bench shown on west side of pit will be reduced to 10 feet. The north edge of pit between PT C & PT D will be extended north as needed to compensate for pit area because of these changes to edge of pad surface.

Fencing to control grazing livestock within the BLM range allotment will be installed around the area of pad disturbance including the perimeter of excess material. This fencing will be of standard and type to keep livestock from penetrating the fenced perimeter. Fencing will be installed after dirtwork and seed application is completed for interim reclamation and prior to livestock turnout on the allotment.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

J16W Pad

Wells: 16-11
16-16
16-9

To provide continued, unimpeded access along existing 2-track route at southern end of pad, excess material will be piled at north end of pad between PT2 & PT7 instead of south end of pad as shown on Sheet 4 of 11. The recharge flow into the existing stock pond at southwest pad corner (PT13) will remain unimpeded to allow the stock pond to remain a usable water source.

The new access road will be constructed from existing 2-track north of stock dam around the east side of stock dam to tie back with the existing 2-track route to the pad. The road drainage will be designed to direct runoff on the road into the stock dam with proper use of ditches.

Steel frame gate will be installed in BLM allotment fence to provide barrier to grazing livestock but allow vehicles to pass through fence. Gate will remain closed at all times during grazing season (May 15th –October 15th).

Fencing to control grazing livestock within the BLM range allotment will be installed around the area of pad disturbance including the perimeter of excess material. This fencing will be of standard and type to keep livestock from penetrating the fenced perimeter. Fencing will be installed after dirtwork and seed application is completed for interim reclamation and prior to livestock turnout on the allotment.

All production facilities for the J16W pad including storage tanks and production pack (separators) will be jointly located on the B16W pad to reduce truck traffic and allow the operator to conduct maximum reclamation stage on the J16W pad.

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

To assist with completion work and reduce truck traffic to site, frac pit will be installed at NE pad corner (approximately 14,000 barrels in size) with fresh water line laid along existing road.

Gathering line alignment for this pad will run directly along and within the surface disturbance planned for the access road. Surface disturbance for the pipeline will not exceed the road construction disturbance unless otherwise approved by the Authorized Officer.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
Mountain brome		2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

J23NW Pad

Wells: 23-11 23-14A
 23-10 23-6C

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

Excess material pile will be placed between PT 2 & PT8 to avoid stacking material on slope above access road.

Steel frame traffic control gate will be placed between County Road 319 and J23NW pad at defensible position to prohibit vehicle travel by general public to the J23NW pad.

Where feasible, the access road alignment will follow existing limits of disturbance for recently installed water pipeline.

Gathering line alignment for this pad will run directly along and within the surface disturbance planned for the access road. Surface disturbance for the pipeline will not exceed the road construction disturbance unless otherwise approved by the Authorized Officer.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

K4D PadWells: 4-12 4-13
4-4B

All production facilities for the K4D pad including storage tanks and production pack (separators) will be located on the nearby K4C or K4BCW pad to reduce truck traffic to the pad and allow the operator to conduct maximum reclamation on the pad.

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Carlsbad Canyon (2.5Y 6/2).

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

Silt fencing will be installed along outside perimeter of topsoil and excess material piles between PT5 and PT12 to control any sheet or rill erosion.

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material will be aligned to provide visual and noise screening for nearby residence.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

K22NW Pad

Wells: 22-6 22-11
 22-6C 22-10C

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Carlsbad Canyon (2.5Y 6/2).

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Sound barriers will be installed to provide additional noise relief to residence.

To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

K24NW Pad

Wells: 24-11C 24-10D
 24-12C 24-9C
 24-14 24-10

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

Gathering line alignment for this pad will run directly along and within the surface disturbance planned for the access road. Surface disturbance for the pipeline will not exceed the road construction disturbance unless otherwise approved by the Authorized Officer.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

K33NW Pad

Wells:	33-3	33-11	33-11D
	33-6	33-12	33-5D
	33-3D	33-11A	33-4
	33-4D	33-12D	
	33-5	33-13	

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2). Tanks will be placed near center of pad along western pad edge to use access road grade to help hide tanks from long-term I-70 view.

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

To allow access to K33NW pad while controlling nearby grazing livestock on BLM, operator will install livestock fence of same style, materials and standard as existing allotment boundary fence. This new fence will be installed around the perimeter of planned surface disturbance of K33NW access road (around the outside edge of planned road switchback) and pad (around the outside perimeter of excess material pile). To avoid problems with uncontrolled livestock grazing, the fence installation will be completed prior to beginning any road or pad construction related to the K33NW location, unless otherwise approved by the Authorized Officer. Steel fence posts to be installed will be standard green color.

Piling of excess material will be concentrated northeast of K33NW pad between PT2 and PT5. No excess material will be stockpiled northwest of pad (between PT 2 and PT12) unless otherwise approved by the authorized officer.

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material along north-side of pad will be aligned to provide visual and noise screening for nearby residences.

Gathering line alignment for this pad will run upslope to shorten the overall surface disturbance. Reclamation standards will be followed in reclaiming this pipeline location,

Prior to start of road/pad construction, Penstemon plant population in proximity of pad will be delineated in manner approved by Authorized Officer to establish protected areas from surface disturbing activities.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

O27NW Pad	Wells: 27-16B	27-14
	27-16	27-11D
	27-15	27-10
	27-14D	

The paint color to be used on all surface facilities including the metal containment rings surrounding the tank battery, pipeline risers and gate installations is Shale Green (5Y 4/2).

All production facilities on the O27NW pad including storage tanks and production pack (separators) will be jointly located on the nearby fee pad to reduce truck traffic and allow the operator to conduct maximum reclamation stage on the O27NW pad.

To help reduce hydrocarbon odors affecting nearby residence(s), no frac pit construction or use will be allowed. Only standard reserve pits of a size to support the number of planned wells will be allowed within ½ mile of residence (B16W, E9W, G22NW H27NW H34NW, K4D, K22NW, K33NW and O27NW).

To help mitigate noise impacts from drilling to nearby residence, electric drill rig will be used on location to drill wells. Excess material along west-side of pad will be aligned to provide visual and noise screening for nearby residence. Sound barriers will be installed along west side of pad on excess material pile to provide additional noise relief to residence.

Prior to start of road/pad construction, Penstemon plant population south of pad will be delineated in manner approved by Authorized Officer to establish protected areas from surface disturbing activities.

Excess material shown at PT2 will be moved to west side of pad to allow road access into pad at PT3.

Silt fencing will be installed along toe of fillslope between PT1 and PT 10 to control any sheet or rill erosion from pad fill.

The large-diameter live juniper tree standing near PT5 will be protected from damage. Additionally, access road will be constructed around large juniper trees located south and east of pad

To minimize impacts to big game migrating to summering grounds, no construction, drilling or completion activities will be allowed from April 1 – April 30 along the migration corridor affecting the following pad locations: C26NW, G22NW, H27NW, H34NW, K22NW, and O27NW.

A seed mix designed to meet GSRA reclamation objectives and provide forage and browse for wintering elk and deer using a mix of shrub, grass and forb species shall be used. The following recommended seed mix and rate shall be used on all disturbed surfaces including pipelines unless otherwise noted in the specific APD:

<u>Species of Seed</u>	<u>Variety</u>	<u>Application Rate (lbs/acre)</u>
4-wing Saltbush	Rincon	2.0
Thickspike wheatgrass	Critana	3.0
Western wheatgrass	Arriba	3.0
Bluebunch wheatgrass	Secar	3.0
Sainfoin		1.0
Small Burnet		1.0
Total:		13.0

The above rate of application is listed in pounds of pure live seed (PLS)/acre. The seed will be certified and there will be no primary or secondary noxious weeds in the seed mixture. The operator shall notify the Authorized Officer 24 hours prior to seeding and shall provide evidence of certification of the seed mix to the Authorized Officer within 30 days of completion of the seed application.

APPENDIX D

TABLE I - SUMMARY OF NEW AND EXISTING SURFACE LOCATIONS AND PROPOSED WELLS for the GRASS MESA GAP

Table I. Grass Mesa GAP - New/Existing Surface Locations and Proposed Additional New Wells							
Surface Location Qtr/Qtr Section	Existing Surface Locations & Access Description	Proposed Surface Locations & Access Description	Lease Number & Date	Proposed Additional Wells to Grass Mesa	Current # of wells on pad	Additional Total Acres of Disturbance	Lease Stipulations Attached to Each Lease
Existing Pad							
T7S, R93W Sec 3 SENE	I3B Pad Existing Access (BLM/Benzel) BLM/BLM		COC 55603 1/1/94	34-16 3-8C 35-13D 2-12B 3-7C 3-10B (6)	4	3.55 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days.
New Pads							
T7S, R93W Sec 16 NWNE		B16W Pad New access (EnCana) BLM/BLM	COC 55604 12/1/93	16-2 9-15C 16-1 16-4C 16-8 16-7 16-2C (7)		6.31 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days.

T6S, R93W Sec 23 NWNE	B23NW New Access (BLM) BLM/BLM	COC 54736 7/1/93	23-7C 14-14 (fee) (1 + 1 fee well)	3.68 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days TL: Raptor Habitat (2/1 - 8/15) with exception criteria
T6S, R93W Sec 26 NENW	C26NW New access (BLM & Benzel) BLM/BLM	COC 54737 7/1/93	23-13 23-14 23-10C 23-15 23-13C 23-14C 23-15C 26-4A 26-4D 26-5A (10)	4.67 Acres	CSU: Fragile Soils w/ performance req'ts TL: Big Game Winter Habitat (12/1-4/30) with exception last 60 days
T7S, R93W Sec 9 SWNW	E9W Pad New access (BLM) BLM/BLM	COC 50128 8/1/89	9-4 9-4C 9-5 9-5C 9-6D (5)	7.05 Acres #	No specific stipulations are listed on lease for this BLM pad location. However, 5 month big game winter TL listed on federal lease, which BLM Grass Mesa Road crosses, would apply.
T6S, R93W Sec 22 SWNE	G22NW New access (Jewell) BLM/BLM	COC 54736 7/1/93	22-7 22-10B 22-9B (3)	5.59 Acres #	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days TL: Raptor Habitat (2/1 - 8/15) with exception criteria

T6S, R93W Sec 23 SENE	H23NW New Access (BLM) BLM/BLM	COC 54736 7/1/93	23-8 23-9B 23-9 23-9C (4)	4.46 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days TL: Raptor Habitat (2/1 - 8/15) with exception criteria
T6S, R93W Sec 27 SENE	H27NW New access (Hunter/Franchuk) BLM/BLM	COC 54737 7/1/93	27-8A 27-8 27-9A 27-9 27-7A 22-16D 27-2D 27-1 (8)	8.96 Acres #	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days.
T6S, R93W Sec 34 SENE	H34NW New access (Hogue/Kehr) BLM/BLM	COC 54737 7/1/93	34-1 34-1D 34-8 34-8D 34-7B (5)	4.19 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days.
T7S, R93W Sec 9 NESE	I9W Pad New access (Rose) (Split Estate) Fee/BLM	COC 50128 8/1/89	9-8 9-9D 9-16 9-16C 10-13A 9-10 9-8C 9-9 10-12D 9-7D (10)	6.41 Acres	TL: Critical Deer & Elk Winter Ranges (1/16-4/29) with exception criteria.

T7S, R93W Sec 16 NWSE	J16W New access (EnCana) BLM/BLM	COC 55604 12/1/93	16-11 16-16 16-9 (3)	4.73 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days.
T6S, R93W Sec 23 NWSE	J23NW New Access (BLM) BLM/BLM	COC 54736 7/1/93	23-11 23-10 23-14A 23-6C (4)	5.02 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days TL: Raptor Habitat (2/1 - 8/15) with exception criteria
T7S, R93W Sec 4 NESW	K4D New access (EnCana) Fee/Fee Surface	COC 54738 7/1/93	4-12 4-4B 4-13 (3)	5.52 Acres #	No specific lease stipulation would apply as this pad is located on fee surface / fee minerals. However, 5 month big game winter TL listed on federal lease, which BLM Grass Mesa Road crosses, would apply.
T6S, R93W Sec 22 NESW	K22NW New Access (Daniels/Jewell?) BLM/BLM	COC 54736 7/1/93	22-6 22-6C 22-11 22-10C (4)	3.60 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days TL: Raptor Habitat (2/1 - 8/15) with exception criteria
T6S, R93W Sec 24 NESW	K24NW New access(Airport LLC) Split Estate Fee/BLM	COC 56035 3/1/94	24-11C 24-12C 24-14 24-10D 24-9C 24-10 (6)	8.28 Acres	TL: Big Game Winter Habitat (12/1-4/30) with exception last 60 days

T6S, R93W Sec 33 NESW		K33NW New access (Brennan) Fee/BLM	COC 54737 7/1/93	33-3 33-6 33-3D 33-4D 33-5 33-5D 33-4 33-11 33-12 33-11A 33-12D 33-11D 33-13 (13)	8.75 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days
T6S, R93W Sec 27 SWSE		O27NW New access (BLM) BLM/BLM	COC 54737 7/1/93	27-16B 27-16 27-15 27-14D 27-14 27-11D 27-10 (7)	4.96 Acres	CSU: Fragile soils with performance requirements TL: Big game winter habitat (12/1-4/30) with exception last 60 days.

- Acreage to change with deletion of frac pit.

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APPENDIX E

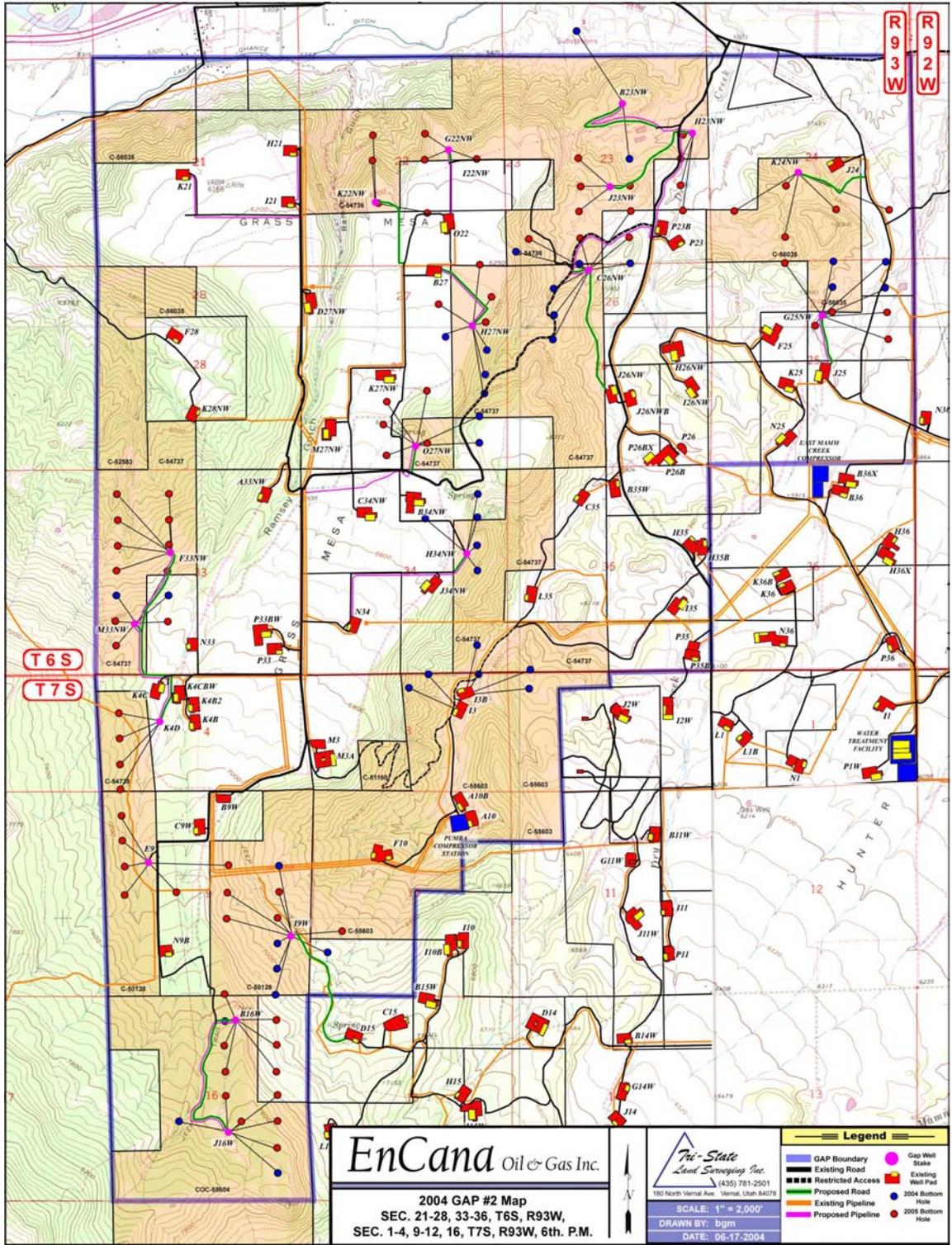
SURVEY PLAT INFORMATION & CUT/FILL DIAGRAMS for the GRASS MESA GAP

Detailed survey plat information for the 17 well pads and associated wells requiring federal authorization is available for review from the BLM, Glenwood Springs Field Office upon request.

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APPENDIX F

**ORIGINAL GAP MAP (JUNE 2004) for the
GRASS MESA GAP**



EnCana Oil & Gas Inc.

2004 GAP #2 Map
 SEC. 21-28, 33-36, T6S, R93W,
 SEC. 1-4, 9-12, 16, T7S, R93W, 6th. P.M.

Tri-State
 Land Surveying Inc.
 (435) 781-2501
 180 North Vernal Ave., Vernal, Utah 84078

SCALE: 1" = 2,000'
 DRAWN BY: bgm
 DATE: 06-17-2004

Legend	
	GAP Boundary
	Existing Road
	Restricted Access
	Proposed Road
	Existing Pipeline
	Proposed Pipeline
	Gap Well Stake
	Existing Well Pad
	2004 Bottom Hole
	2005 Bottom Hole

APPENDIX G

WILDLIFE THRESHOLD CALCULATIONS for the GRASS MESA GAP

ACREAGE:

Total BLM surface acres = 4,065 acres

Total split estate involving federal minerals = 520 acres

Total FEDERAL acres in GAP area : **4,585 acres**

Total federal and fee (private) acres within GAP boundary: **9,792 acres**

PROPOSED PADS:

14 BLM surface locations

2 Split Estate Locations = **16** proposed new pads with BLM involvement

PAD THRESHOLD -

FEDERAL LANDS:

4585 Ac/640 Ac per section = 7.16 'sections' x 4 pads/section = **28.65 pads allowed under threshold**

16 proposed federal pads + **5 existing** federal pads (includes 1 split estate) = **21 BLM pads in GAP**

ALL LANDS: (Cumulative effects)

9792 Ac/640 Ac = 15.3 sections x 4 pads/section = **61.2 pads allowed under threshold figure.**

Proposed 16 fed pads + 5 existing fed pads + 50 existing (48) / proposed (2) fee pads = **71 pads in GAP**

ROAD THRESHOLD -

FEDERAL LANDS:

6.21 'sections' x 3.0 miles/section = **21.48 road miles allowed under the threshold.**

Proposed roads (2.28 mi) and existing roads (11.54 mi) = **13.82 miles of road attributed to oil & gas development** on federal surface or split estate lands.

ALL LANDS: (Cumulative Effects)

15.3 sections x 3.0 miles/section = **45.9 road miles allowed under the threshold.**

Proposed roads (6.12 mi) and existing roads (11.54 mi) = **17.66 miles of roads attributed to oil & gas development** regardless of land ownership.

From BLM, Oil and Gas Leasing and Development Final Supplemental Environmental Impact Statement, (1/99) Record of Decision, Appendix B, Management of Lease Development - #5. Impacts on Wildlife Habitat:

“It is not BLM’s intent that oil and gas operators be held accountable for mitigation of habitat impacts due to residential, agriculture or other commercial users, including those impacts associated with the Federal and State Highways and County Roads.”

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APPENDIX H

NOISE IMPACT ANALYSIS for the GRASS MESA GAP

Noise is generally described as unwanted sound. Discussions of environmental noise do not focus on pure tones because commonly heard sounds have complex frequency and pressure characteristics. Accordingly, sound measurement equipment has been designed to account for the sensitivity of human hearing to different frequencies. Correction factors for adjusting actual sound pressure levels to correspond with human hearing have been determined experimentally. For measuring noise in ordinary environments, A-Weighted correction factors are employed. The filter de-emphasizes the very low and very high frequencies of sound in a manner similar to the response of the human ear. Therefore, the A-weighted decibel (dBA) is a good correlation to a human's subjective reaction to noise.

The dBA measurement is on a logarithmic scale. To the average human ear, the apparent increase in "loudness" doubles for every 10-dBA increase in noise (Bell 1982). Taking a baseline noise level of 50 dBA in a daytime residential area, noise of 60 dBA would be twice as loud, 70 dBA would be four times as loud, and 80 dBA would be eight times as loud.

The propagation of noise is a function of several environmental factors that might enhance or attenuate sound propagation, the most important being the distance from the noise source, the presence or absence of terrain that may inhibit sound propagation, and wind. The distance between a noise source and a receiver influences the perceived noise intensity. As the distance between a source and a receiver doubles, the noise intensity decreases by a factor of four. Sound is best propagated in the same direction the wind is blowing. Stable air conditions and calm winds between 2 and 11 miles per hour (1 and 5 meters per second) are most conducive for sound propagation.

Regulatory Noise Standards

The BLM has not established noise standards for the Grass Mesa Geographic Area Plan (GAP). However, the Environmental Protection Agency (EPA) established a noise level of 55 dBA as a guideline for acceptable environmental noise (EPA 1974). This established noise level is used as a basis for evaluating noise effects when no other local, county, or state standard has been established. It is important to understand that this noise level was defined by scientific consensus, was developed without concern for economic and technological feasibility, and contained a margin of safety to ensure its protective value of the public health and welfare. Furthermore, this noise level is directed at sensitive receptors (residences, schools, medical facilities, recreational areas) where people would be exposed to an average noise level over a specific period of time.

In this context, public health and welfare includes personal comfort and well-being, and the absence of mental anguish, disturbances, and annoyance as well as the absence of clinical symptoms such as hearing loss or demonstrable physiological injury. Therefore, a 55-dBA noise level is not a regulatory requirement. Rather, the 55-dBA noise level should be recognized as a level below which there is no reason to suspect that the public health and welfare of the general population would be at risk from any of the identified effects of noise. A noise level of 55 dBA can be compared to a common human experience. A noise level of 60 dBA is generated during the normal conversation of two people five feet apart. Therefore, a noise level of 55 dBA from a nearby source would barely be audible during normal conversation.

Common Noise Levels

The following presents a discussion of noise levels common to most people. These levels are meant to represent the average noise levels over a given period (for example, a 24-hour interval or a yearly average) in various land use areas. Depending on the location, quantity, and type of noise sources, these levels can have a large variation but generally are in the range of 3 to 5 dBA (EPA 1974). Table 1 shows examples of noise levels generated by commonly experienced sources and the relative strength of the “loudness” of noise levels compared to normal conversation.

Table 1 Common Noise Levels

Noise Source	Average Noise (dBA)	“Loudness” (based on normal conversation baseline)	Range of Noise (dBA)
Ambulance siren at 100 feet	100	16	95-105
Motorcycle at 25 feet	90	8	85-95
On a typical construction site	85	6	80-90
Single truck passing at 25 feet	80	4	75-85
Urban shopping center	70	2	65-75
Single car passing at 25 feet	65	1.5	60-70
Average highway noise at 100 feet	60	1	55-65
Normal conversation 5 feet apart	60	1	57-63
Residential area during day	50	0.5	47-53
Recreational area	45	0.37	40-50
Residential area at night	40	0.25	37-43
Rural area during day	40	0.25	37-43
Rural area at night	35	0.18	32-37
Quiet whisper	30	0.12	27-33
Threshold of hearing	20	0.06	17-23

Source: EPA (1974), Harris (1991)

Existing Project Area Noise Levels

Currently, natural gas drilling and production activities are widespread but limited in scale near the GAP. The primary noise sources in and near the GAP are existing compressor stations. Noise levels are also elevated near well pad and access road construction, drilling rigs, private residences, and along roads used by private landowners and the oil and gas industry.

During oil and gas development activities, it is likely that several noise sources will be operating simultaneously. The simultaneous operation of two equal noise sources results in a combined noise level that is approximately 3 dBA greater than the individual value. If the difference in noise levels between two sources is greater than 10 dBA, the cumulative impact is essentially that of the louder source (Thumann and Miller 1986).

Noise has been measured at typical compressor units (USGS 1981). A noise level of 90 dBA from one large compressor engine can be expected at 10 feet from the source. A compressor building enclosing compressor engines would afford further noise attenuation of about 15 dBA. Therefore, an existing compressor engine within the GAP, which is enclosed in a compressor building, would be expected to generate approximately 75 dBA at 10 feet from the source.

The effect of multiple noise sources is not arithmetically additive, but rather is a logarithmic summation. The total effect of multiple collocated noise sources is characterized by the following relationship (Harris 1991):

$$L = 10 * \text{LOG} (10L_1/10 + 10L_2/10 + \dots + 10L_n/10)$$

where: L_1, L_2, \dots, L_n are the source sound levels of individual collocated sources.

L is the overall noise level.

LOG is the common logarithm base 10.

Using the preceding equation, and assuming four operational compressors at an existing compressor site, the noise level is predicted to decrease to 55 dBA at 200 feet and to below 50 dBA at 340 feet from the source.

Refer to Environmental Consequences and Mitigation outlined in Noise for further details.

References Cited:

Bell. 1982. Lewis H. Bell, Industrial Noise Control, Fundamentals and Applications, Marcel Dekker, New York, NY, 1982.

Colorado Oil & Gas Conservation Commission (COGCC). 2004. Colorado Oil and Gas Conservation Commission Rules and Regulations. Aesthetic and Noise Control Regulations (800 series). Available online at <http://www.oil-gas.state.co.us/>.

Environmental Protection Agency (EPA). 1974. Information on Noise Levels Identified As Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. EPA-550/9-74-004, Arlington, VA, 1974.

Harris. 1991. Cyril M. Harris, Handbook of Acoustical Measurements and Noise Control, McGraw-Hill, Inc., New York, NY, 1991.

Thumann, A., and R.K. Miller. 1986. Fundamentals of noise control engineering. Prentice-Hall, Englewood Cliffs, New Jersey.

U.S. Department of Interior, Geologic Survey (USGS). 1981. Report on Climate, Air Quality, and Noise for the Cache Creek-Bear Thrust Environmental Impact Statement, Open-File Report by Paul Kruger, Billings, MT. June 1981.

U.S. Environmental Protection Agency (EPA). 1974. Information on Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. EPA-550/9-74-004, Arlington, VA.

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APPENDIX I

**VIEWSHED ANALYSIS for the
GRASS MESA GAP**

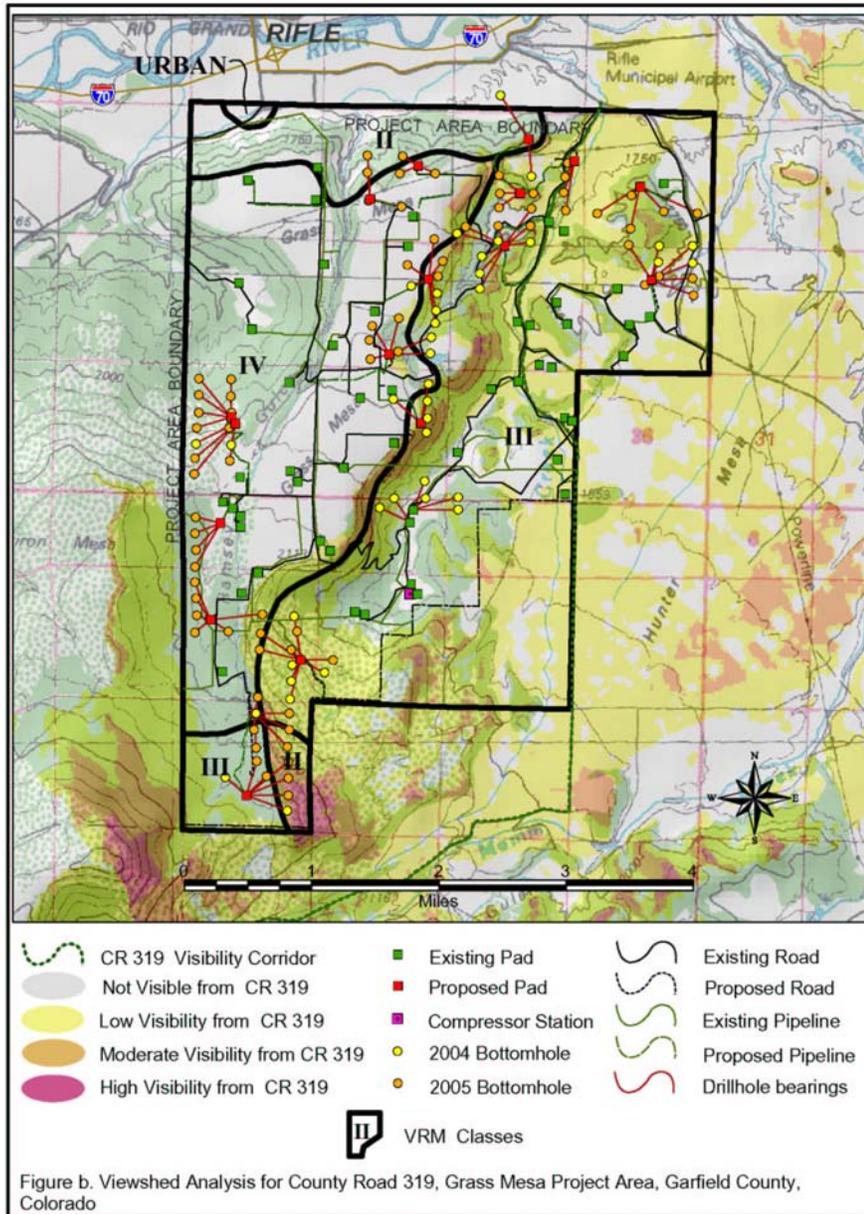


Figure b. Viewshed Analysis for County Road 319, Grass Mesa Project Area, Garfield County, Colorado

