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SAN JUAN 28-6 UNIT #128N
NATURAL GAS WELL AND PIPELINE PROJECT
Lease Number USA SF-079192

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
APD	Application for Permit to Drill
BLM	Bureau of Land Management
Burlington	Burlington Resources Oil and Gas Company, LP
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COA	Conditions of Approval
EA	Environmental Assessment
Ecosphere	Ecosphere Environmental Services
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEL	from the east line
FFO	Farmington Field Office
FNL	from the north line
GHG	greenhouse gas
GIS	Geographic Information Systems
HAP	hazardous air pollutant
MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act
NAAQS	National Ambient Air Quality Standard
NATA	National Scale Air Toxics Assessments
NEPA	National Environmental Policy Act
NMAAQS	New Mexico Ambient Air Quality Standards

NMPIF	New Mexico Partners in Flight
NO_2	nitrogen dioxide
NO_x	nitrous oxides
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter with a diameter between 2.5 and 10 micrometers
$PM_{2.5}$	particulate matter with a diameter 2.5 micrometers or less
ppb	parts per billion
ppm	parts per million
PRMP	Proposed Resource Management Plan
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
SO_2	sulfur dioxide
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compounds
WCRM	Western Cultural Resource Management, Inc.

1. PURPOSE AND NEED FOR ACTION

1.1 Background

Burlington Resources Oil and Gas Company, LP (Burlington) is proposing to develop the San Juan 28-6 Unit #128 natural gas well in Rio Arriba County, New Mexico. Burlington has filed an Application for Permit to Drill (APD) with the Bureau of Land Management (BLM) Farmington Field Office (FFO) to directionally drill a well from the proposed well pad. The proposed project would be co-located with the existing Burlington San Juan 28-6 Unit #223 well and would utilize an existing access road. Surface disturbance activities associated with the action would include construction of a well pad and subsurface well-tie pipeline. Williams Four Corners, LLC (Williams) would file for a right-of-way (ROW) grant with the BLM/FFO to construct and operate the proposed natural gas well-tie pipeline if the well is productive The proposed action is located approximately 2 miles south of U.S. Highway 64 and approximately 3 miles west of Fourmile Canyon.

1.2 Purpose and Need for Action

The purpose of the proposed action is to provide Burlington with reasonable access to BLM-managed federal mineral lease USA SF-079192 to construct the proposed well pad and pipeline and to drill the proposed well. The need for the action is BLM's responsibility under the Mineral Leasing Act (MLA) of 1920, as amended (30 United States Code [USC] 181 et seq.), to respond to the APD and ROW applications. The MLA authorizes the BLM to issue oil and gas leases for the exploration of mineral resources and permit the development of those leases. The need for the action is also established by the BLM's authority under the Title V of the Federal Land Policy and Management Act, as amended (43 USC 1761-1771), and Section 28 of the MLA (43 USC 185).

1.3 Decision to be Made

Based on the information in this Environmental Assessment (EA), the BLM/FFO will decide whether to approve the APD and ROW grant, and if so, under what terms and conditions. In compliance with the MLA, the decision to be made is how resource development should occur. Under the National Environmental Policy Act (NEPA), as amended (Pub. L. 91-90, 42 USC 4321 et seq.), the FFO must determine if there are any significant environmental impacts associated with the proposed action, warranting further analysis in an Environmental Impact Statement (EIS). The BLM/FFO Field Manager is the responsible officer who will decide one of the following:

- To approve the proposed APD and ROW grant with design features as submitted
- To approve the proposed APD and ROW grant with additional mitigations
- To analyze the effects of the proposal in an EIS
- To deny the APD and ROW grant

1.4 Conformance with Applicable Land Use Plan(s)

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this EA incorporates the information and analysis contained in the 2003 Farmington Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS) (USDI/BLM 2003a). The proposed action would

be in conformance with the oil and gas leasing and development management actions in the Resource Management Plan (RMP)/Record of Decision (ROD) signed December 2003 and updated in December 2003 (USDI/BLM 2003b). The proposed action would be in conformance with the 2003 RMP/ROD that states, to the extent possible, new ROWs will be located within or parallel to existing ROWs or corridors to minimize resource impacts (USDI/BLM 2003b, page 2-11).

The PRMP/FEIS and ROD are available for review at the FFO in Farmington, New Mexico or electronically at http://www.nm.blm.gov/ffo/ffo_home.html. This project EA addresses site-specific resources and/or impacts that are not covered within the PRMP/FEIS, as required by the NEPA.

Oil and gas development is recognized as an appropriate use of public lands in the FFO planning area (USDI/BLM 2003b). The RMP adheres to the federal mandates contained in the Energy Policy and Conservation Action (42 USC 6217) and Executive Order 13212, that direct federal land managing agencies to expedite the production of the federal mineral estate for the development of reliable domestic sources of energy (USDI/BLM 2003b, pages 1 and 11). The proposed project would not be in conflict with any local, county, or state plans.

1.5 Relationship to Statutes, Regulations, or Other Plans

Burlington would comply with all applicable state, federal, and local laws and regulations as well as obtain the necessary permits for the proposed action. These laws and regulations include, but are not limited to the following:

- Antiquities Act of 1906, as amended (Public Law [PL] 52-209; 16 USC 431-433)
- American Indian Religious Freedom Act of 1978 (PL 95-431; 92 Stat. 469; 42 USC 1996)
- Archaeological Resources Protection Act of 1979 (PL 96-95; 93 Stat. 721; 16 USC § 470aa et seq.), as amended (PL 100-555; PL 100-588)
- Bald and Golden Eagle Protection Act of 1940, as amended (PL 86-70, PL 87-884, PL 92-535, PL 95-616; USC 668-668d)
- Clean Air Act, as amended (PL 88-206; 42 USC § 7401 et seq.)
- Clean Water Act, as amended (PL 107-303; 33 USC § 1251, et seq.)
- Colorado River Salinity Control Act, as amended (PL 93-320; 7 CFR Part 702)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (PL 96-510; 42 USC § 9601; 40 CFR Part 307)
- Endangered Species Act of 1973 (PL 93-205; 16 USC § 1531 et seq.)
- Executive Order 11988 Floodplain management
- Executive Order 11990 Protection of Wetlands
- Executive Order 12898 Environmental Justice
- Executive Order 13007 Indian Sacred Sites
- Executive Order 13112 Invasive Species
- Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds
- Migratory Bird Treaty Act of 1918, as amended (16 USC §§ 703-712; 50 CFR Part 21)

- Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3048; 25 USC 3001; 43 CFR Part 10).
- Paleontological Resources Preservation Act as part of the Omnibus Public Land Management Act (PL 111-011, Title VI, Subtitle D)
- Safe Drinking Water Act, as amended (PL 93-523; 42 USC 300F-300-9), 40 CFR Parts 144 and 147).
- Section 106 of the National Historic Preservation Act of 1966 (PL 89-665; 80 Stat. 915; 16 USC 470 et seq.), as amended (implemented under regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800)

1.6 Scoping, Public Involvement, and Issues

The Council on Environmental Quality (CEQ) defines scoping as "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action alternative" (40 CFR 1501.7). Scoping is the process by which the BLM solicits internal and external input on the issues, impacts, and potential alternatives that will be addressed in an EIS or EA. As outlined in the BLM NEPA Handbook, it is optional for the BLM to conduct external scoping on actions analyzed by an EA (USDI/BLM 2008, Section 6.3.2).

The BLM/FFO Interdisciplinary Team was integrally involved in the internal scoping to identify potential issues, understand the proposal, develop the purpose and need, and develop a range of alternatives.

For the purpose of BLM NEPA analysis, an "issue" is a point of disagreement, debate, or dispute with a proposed action based on some anticipated environmental effect. Preliminary issues are frequently identified during the development of the proposed action through scoping.

The following issues were identified as potential issues of concern by the Interdisciplinary Team during internal scoping:

- How would the alternatives affect air quality in the area?
- How would the alternatives affect water resources?
- How would the alternatives affect upland vegetation and noxious weeds?
- How would the alternatives affect BLM special management species and migratory birds?
- How would the alternatives affect cultural resources?

As outlined in the BLM NEPA Handbook, it is optional for the BLM to conduct external scoping on actions analyzed by an EA (USDI/BLM 2008, Section 6.3.2). External scoping was conducted through posting this project on the FFO's online NEPA log. The log is located on the BLM New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html). The log contains a list of proposed and approved actions in the FFO. The public is encouraged to provide comments or request information on projects listed in the logs.

1.6.1 Issues Considered but Not Analyzed

CEQ regulations (40 CFR § 1501.7) state that the lead agency shall identify and eliminate from detailed study the issues that are not important or have been covered by prior environmental review, narrowing the discussion of these issues in the document to a brief presentation of why they would not have a significant effect on the human or natural environment, or providing a reference to their coverage elsewhere.

The following resources were identified by the Interdisciplinary Team during internal scoping as potential issues of concern that would not be significantly impacted or have been evaluated in previous analyses.

For the proposed action, identification of Native American Religious Concerns was limited to reviewing existing, published, and unpublished literature (Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), the site-specific Class III survey report prepared for the proposed action, and a review by the BLM's cultural resources program regarding the presence of traditional cultural properties identified through ongoing BLM tribal consultation efforts. There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) or the Archaeological Resources Protection Act (16 USC 470) within the proposed action area. The proposed action would not impact any known traditional cultural properties, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with or hinder the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act of 1978 (42 USC 1996) or Executive Order 13007.

No federally listed species with the potential to occur in Rio Arriba County or potential habitats for federally listed species were observed within the proposed project area. Furthermore, no designated critical habitat for any federally listed species occurs within the proposed project area. The FFO reviewed and determined that the proposed action is in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. No. 2-22-01-I-389) (USDI/BLM 2002). No further consultation with the U.S. Fish and Wildlife Service (USFWS) is required.

2. PROPOSED ACTION AND ALTERNATIVES(S)

2.1 Proposed Action

Burlington is proposing the development of a natural gas well to access the Mesa Verde-Basin Dakota mineral estate administered by the BLM/FFO. The proposed natural gas well would be co-located with the existing Burlington San Juan 28-6 Unit #223 well pad. The proposed well head would be located at 770 feet from the north line (FNL) and 1,850 feet from the east line (FEL) in Section 17 of Township 28 North, Range 6 West, and directionally drilled to a bottom hole location of 320' FNL and 650' FEL of Section 17 of Township 28 North, Range 6 West, New Mexico Principal Meridian in Rio Arriba County, New Mexico. A project vicinity map is provided as Figure 1 (Appendix A). The proposed action is shown on the Delgadito Mesa and Fourmile Canyon New Mexico, U.S. Geological Survey 7.5-minute quadrangle map as Figure 2. Figure 3 displays the proposed action on a 2010 digital photo orthoquads (Appendix A).

For a detailed description of design features and construction practices associated with the proposed action, refer to the project plats provided in the APD (Appendix B). Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) and pipeline ROW grant stipulations are incorporated and analyzed in this alternative.

2.1.1 2.1.1. Construction

Surface disturbance for the San Juan 28-6 Unit #128N proposed natural gas well project would include a 230-foot by 300-foot well pad and a construction zone up to 50 feet wide around the perimeter of the well pad for a total surface disturbance of 3.03 acres. The maximum cut would be 12 feet on the northwest corner and the maximum fill would be approximately 9 feet on the southeast corner. The proposed project would be co-located with the existing Burlington San Juan 28-6 Unit #223 well and would utilize an existing access road. An approximate 836-foot subsurface well–tie pipeline would be constructed and operated by Williams to connect the proposed San Juan 28-6 Unit #128N natural gas well to the existing San Juan 28-6 Unit #14A. The proposed pipeline would be constructed within a 40-foot ROW, for a total surface disturbance of approximately 0.77 acre. Total surface disturbance associated with the proposed well pad and pipeline would be approximately 3.80 acres. Total new disturbance associated with proposed action would be approximately 2.46 acres.

Construction activities associated with the proposed action would include drilling the proposed natural gas well and the installation of any surface equipment necessary for natural gas production. Construction of the proposed well would commence following BLM/FFO approval of Burlington's APD. In general, construction of the well pad project would follow the sequence listed below:

1. Construction crews would remove vegetation from the proposed natural gas well project site. Excavated materials from the cuts would be used on the fill portion of the location to level the pad. Included in the pad construction would be excavation of the reserve and blow pits. Cut material from the reserve and burn pits would be stockpiled on the location or used to construct the back walls of the burn pit, which is where a gas flare is burned during drilling to relieve wellbore pressure.

2. The natural gas well drilling facility assembly would occur on the well pad after site clearing and leveling. Associated facilities and equipment utilized in this phase would include a drilling rig, generators, diesel engines, water tanks, mud tanks, safety stations, equipment and material storage units, blowout preventers, an accumulator station, and a gas buster. Water for the drilling would be obtained from a commercial source and trucked to the site.
3. The drill cuttings, drill water, and completion fluids would be placed in a lined reserve pit. The open reserve pit would be fenced on three sides, away from the pad during drilling; the fourth side would be fenced as soon as the rig is removed. The reserve pit would be allowed to dry or the free fluids would be removed or trucked to an approved disposal facility or reused in drilling operations at another well site. In addition, any other production equipment or facility for which fluids are present will be adequately fenced and properly maintained in order to safeguard livestock and wildlife.
4. Pipeline construction activities include excavation of trenches, laying of pipe, covering of pipe, and leveling.
5. After the well is completed, a portion of the pad not required for production equipment and vehicular access would be re–contoured and seeded; approximately 1 acre for production facilities on the well pad would remain in use for production equipment and vehicle access. These areas would not be reclaimed until final abandonment of the well. Production equipment that would remain on-site would include the wellhead, production unit separator, and a meter run. Ancillary equipment such as a Christmas tree, compressor, pump jack, storage tank(s), dehydrator, and separator could also be installed at the well pad site. Equipment such as compressors or pump jacks would be powered by gas compression engines. No electric power line construction is proposed.

2.1.2 Design features

All areas of proposed surface disturbance were inspected in the field to ensure that potential impacts to natural resources would be minimized through the implementation of design features. For a detailed description of the design and construction practices associated with the proposed action, refer to the APD in Appendix B. For the proposed action, standard and project-specific design features include but are not limited to the following:

- Roads will be maintained in the same or better condition as what existed prior to the commencement of operations; road maintenance will continue until final abandonment and reclamation of the well location.
- Dust emissions will be controlled on the roads and locations, as necessary, with the application of dust suppressants (e.g., magnesium chloride) and/or water.
- All FFO cultural resources stipulations will be followed, as indicated in the Cultural Resource Records of Review attached to the COAs in the APD/ROW as the case may be. These stipulations may include, but are not limited to, temporary or permanent fencing or other physical barriers, monitoring of earth-disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment. All employees, contractors,

and sub-contractors of the project will also be informed that it is illegal to collect, damage, or disturb cultural resources and that such activities are punishable by criminal and/or administrative penalties under the provisions of the Archaeological Resources Protection Act. In the event of a discovery during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery and then immediately notify the archaeological monitor, if present, or the BLM. The BLM will then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (based on the National Register, Native American Graves Protection and Repatriation Act, Archaeological Resources Protection Act), it will be protected in place until mitigating measures can be developed and implemented according to guidelines set by the BLM.

- Grazing permittees will be notified when construction is scheduled to begin. All hazards to livestock would be fenced or contained.
- All project activities would be confined to permitted areas only.
- Clearing, removal of topsoil, and grading will be limited to the minimum area required for safe and efficient construction.
- Trees larger than 6 inches in diameter will be cut at ground level and de-limbed. Trees will be stacked on roadside for wood gatherers to access. Stumps will be cut as close to the ground as possible. Stumps and root balls will be hauled to an approved disposal site or stockpiled at the edge of the well pad and buried in the cut slopes of the pad during interim reclamation.
- Trees smaller than 6 inches in diameter, slash, and brush will be chipped, shredded, or mulched.
- Remaining brush will be brush-hogged or scalped at ground level prior to ground disturbance.
- Topsoil will be segregated and stockpiled at the edge of the workspace. Topsoil is defined as the top 6 inches of soil. Vehicle/equipment traffic will be prevented from crossing topsoil stockpiles.
- If the location becomes prone to wind or water erosion, Burlington will take appropriate measures to prevent topsoil loss from wind. Such measures may include using tackifiers or water to wet the topsoil stockpile to create a crust across the exposed soil to prevent soil loss.
- Any spills of non-freshwater fluids will be immediately cleaned up and removed to an approved disposal site.
- Self-contained, chemical toilets will be provided for human waste disposal. The toilet holding tanks will be pumped, as needed, and the contents disposed in an approved sewage disposal facility. Toilets will be on-site during all operations.
- Garbage, trash, and other waste materials will be collected in a portable, self-contained, and fully enclosed trash container during drilling and completion operations. The accumulated trash will be removed, as needed, and disposed at an authorized sanitary landfill. No trash will be buried or burned on location.
- Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash container will be cleaned up and removed from the well location.
- No chemicals subject to reporting under Superfund Amendments and Reauthorization Act Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the drilling, testing, or completing of this well.

- No extremely hazardous substances (as defined in 40 CFR 355) in threshold planning quantities will be used, produced, stored, transported, or disposed of in association with the drilling, testing, or completing of this well.
- All existing improvements (such as fences, gates, and bar ditches) will be repaired to previous or better than pre-construction conditions. Cut fences will be tied to H-braces prior to cutting and openings will be protected as necessary during construction to prevent the escape of livestock. A temporary closure will be installed on the same day as the fence is cut. Following reclamation, the fence will be reconstructed to BLM specifications.
- Cover from top of pipe to ground level will be a minimum of 36 inches through typical soil. Inspection will be conducted to verify that minimum cover is provided, the trench bottom is free of rocks and debris, external pipe coating is not damaged, and the pipe is properly fitted and installed into the ditch.
- Rocks and limbs removed during clearing will be scattered across the workspace in a random arrangement using rubber-tired equipment.
- Open pits will be netted and vent caps placed on all open pipes to prevent bird entry and nesting.
- Permanent erosion control measures will be installed after the workspace has been re–contoured, as specified by the Authorized Officer.
- The disturbed areas will then be reseeded with a Piñon-Juniper Community seed mix in compliance with the BLM/FFO Bare Soil Reclamation Procedures. The proposed well pad will be reseeded with a piñon-juniper community seed mix. Seeding will be accomplished within 120 days of construction completion, weather permitting. Upon evaluation after the second growing season, seeding will be repeated if a satisfactory stand is not obtained. Cut and fill slopes will be hand seeded with hydro-mulch excelsior netting and/or mulch with netting.
- It will be the operator's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the proposed project. The operator will contact the BLM/FFO regarding acceptable weed-control methods. If the operator does not hold a current Pesticide Use Permit, then a Pesticide Use Permit will be submitted prior to pesticide application. Only pesticides authorized for use on BLM lands will be used. The use of pesticides will comply with federal and state laws. Pesticides will be used only in accordance with their registered use and limitations. The operator will contact the BLM/FFO prior to using these chemicals.
- Production equipment will be placed on location in such a manner as to minimize long-term disturbance and maximize interim reclamation. As practical, access will be provided by a teardrop-shaped road through the production area so that the center may be re-vegetated.
- A berm will be constructed completely around any production facilities that contain fluids (i.e., production tanks, produced water tanks, etc.). These berms will be constructed of compacted subsoil, corrugated metal, or equivalent and be impervious; the berms will hold 110 percent of the capacity of the largest tank.
- Production facilities would be painted Juniper Green to blend with the natural color of the landscape and would be located to minimize visual impact, to the extent practical. Equipment subject to safety considerations would not be painted.

- Engines would be equipped with mufflers and barriers, or other sound-proofing measures would be implemented (if needed) to meet the requirements of BLM Notice to Lessees and Operators on Onshore Oil and Gas Leases within the jurisdiction of the FFO NTL 03-1 FFO.

Design features specific to the construction of the San Juan 28-6 Unit #128N well pad include the following:

- The existing access road will be rerouted to enter the pad near corner 2, due to excess cut material and road grade.
- In order to accommodate cut for the well pad, part of the existing pipeline will be moved.
- A 50 foot by 50 foot silt trap will be constructed along the drainage between corners 3 and 5 to slow water velocities and reduce sediment transfer. Drainage around the existing pad will be re-established at the toe of the slope on the east side of the well pad, allowing drainage to the north.
- Corner 3 will be rounded to minimize impacts to the ephemeral drainage.
- Upgrading the existing access road to the proposed well with appropriate drainage diversions and cutouts that will help minimize impacts to water quality.

2.2 No Action

The BLM NEPA Handbook (H-1790-1) states that for EAs on externally initiated proposed actions, the no action alternative generally means that the proposed activity will not take place. This option is provided in 43 CFR 3162.3-2 (h) (2). This alternative would deny the approval of the APD and the current land and resource uses would continue to occur in the proposed project area. The no action alternative provides a useful baseline for comparison of environmental effects (including cumulative effects) and demonstrates the consequences of not meeting the need for the action.

2.3 Alternatives Considered but Eliminated from Detailed Study

No other alternatives were identified that would result in less disturbance or environmental impacts.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environment that would be affected by implementation of the alternative described in Chapter 2.0. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Only the aspects of the affected environment that are potentially impacted are described.

Under the no action alternative, the proposed action would not be implemented. The no action alternative would result in the continuation of the current land and resource uses in the project area. This alternative will not be evaluated further in this EA.

A field investigation of the proposed project area was conducted by biologists from Ecosphere Environmental Services (Ecosphere) on December 2, 2008; February 18, 2009; and December 4, 2013. Cultural resources surveys were conducted by Western Cultural Resource Management, Inc. (WCRM) between August 8, 2008 and February 2009. WCRM returned to the site to perform a field check of reported findings from previous surveys on November 12, 2013.

3.1 Air Resources

3.1.1 Affected Environment

The proposed action would be located in Rio Arriba County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington PRMP/FEIS. In addition, new information regarding greenhouse gases (GHGs) and their effects on national and global climate conditions has emerged since this document was prepared. Ongoing scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (NO_X), water vapor, and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably and may contribute to overall climatic changes—typically referred to as global warming.

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Quality Technical Report) (USDI/BLM 2013). This document summarizes the technical information related to air resources and climate change associated with oil and gas development, and the methodology and assumptions used for analysis.

The U.S. Environmental Protection Agency (USEPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, particulate matter (PM), PM with a diameter between 2.5 and 10 micrometers (PM_{10}) and PM with a diameter of 2.5 micrometers or less ($PM_{2.5}$), sulfur dioxide (SO_2), and lead. The USEPA has established National Ambient Air Quality

Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. The USEPA has approved the New Mexico's State Implementation Plan and New Mexico enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology, and terrain; included are applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. The USEPA has proposed or completed actions recently to implement Clean Air Act requirements for greenhouse gas emissions. Climate has the potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

The Air Quality Technical Report describes the types of data used for describing the existing conditions of criteria pollutants, how criteria pollutants are related to the activities involved in oil and gas development, and providing a table of current national and state standards (USDI/BLM 2013). The USEPA Green Book web page reports that all counties in the analysis area—San Juan, McKinley, Rio Arriba, and Sandoval Counties in New Mexico and La Plata County, Colorado—are in attainment of all NAAQS, as defined by the Clean Air Act. The area also does not violate any New Mexico Ambient Air Quality Standards (NMAAQS). The current criteria pollutant "design concentrations" in the analysis area are described below. Design concentrations are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. Table 3-1 shows monitored design values for ozone in recent years for each of the three San Juan County ozone-monitoring stations. Table 3-2 summarizes monitored design values for other criteria pollutants in San Juan County.

Table 3-1. Reported ozone values for San Juan County ozone monitoring stations

State Air Monitoring Station	8-hour Ozone Design Value (parts per million)				NAAQS
	2007-2009	2008-2010	2009-2011	2010-2012	2008
Substation	0.067	0.063	0.063	0.067	0.075
Bloomfield	0.061	0.060	0.061	0.067	0.075
Navajo Lake	0.069	0.066	0.068	0.071	0.075

Note: NAAQS = National Ambient Air Quality Standard Standards

Source: USEPA 2012

Table 3-2. Criteria pollutant design value concentrations monitored in San Juan County

Pollutant	Design Value	Averaging Time	NAAQS	NMAAQS
NO_2	13 ppb	Annual	53 ppb	50 ppb
NO_2	39 ppb	1-hour	100 ppb [(1)]	0.10 ppm (24-hour)
PM_{10}	Data incomplete	24-hour	150 µg/m^{3}, [(2)]	150 µg/m^{3}, [(3)]
$PM_{2.5}$	4.5 µg/m^3	Annual	12 µg/m^{3}, [(4)]	60 µg/m^{3}, [(3)]
$PM_{2.5}$	14 µg/m^3	24-hour	35 µg/m^{3}, [(1)]	
SO_2	0.001 ppm	Annual	None	0.02 ppm
SO_2	20 ppb	1-hour	75 ppb [(5)]	None
SO_2	0.008 ppm	24-hour	None	0.10 ppm

Note: NAAQS = National Ambient Air Quality Standard Standards; NMAAQS = New Mexico Ambient Air Quality Standards; NO_2 = nitrogen dioxide; ppb = parts per billion; µg/m^3 = micrograms per cubic meter; ppm = parts per million

Source: USEPA 2012.

[(1)] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb.

[(2)] µg/m^3 refers to micrograms per cubic meter of air; not to be exceeded more than once per year, on average over 3 years.

[(3)] NMAAQS is a standard for total suspended particulate matter.

[(4)] Annual mean, averaged over 3 years.

[(5)] 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

In 2005, the USEPA estimated that there was less than 0.01 ton of lead per square mile emitted in the analysis area, which is less than 2 tons total (USDI/BLM 2013). There is no monitoring conducted for lead and CO in northwestern New Mexico. However, concentrations of these pollutants are expected to be low in rural areas; therefore, not monitored.

Hazardous Air Pollutants

The Air Quality Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (USDI/BLM 2013). The USEPA has identified 187 toxic air pollutants as HAPs. In March 2011, the USEPA published the fourth in a series of National Scale Air Toxics Assessments (NATAs) that quantifies HAP emissions for 2005 by U.S. counties. The purpose of the NATA is to identify areas where HAP emissions result in high health risk. Computer models are used to develop estimates of risk of cancer or other health impacts. NATA presents risk hazard indexes for cancer, neurological, and respiratory problems for each county and census tract. Because techniques have changed over the years, the NATA is not comparable to those previously issued. The USEPA also cautions that because data availability varies from state to state, the results are not necessarily comparable from one geographic area to another. The 2005 NATA estimated the total cancer risk for the analysis area as 25 to 50 per one million and the estimated tract level total respiratory hazard index was 0 to 1. The USEPA estimates the average national cancer risk for 2005 was 50 per one million, meaning one person out of every 20,000 had an increased likelihood of contracting cancer from breathing air toxics from outdoor sources if exposed to 2005 emission levels over his or her lifetime. A respiratory hazard index below 1 indicates that exposures in the area do not exceed reference levels that would have adverse effects for human health.

Climate

The analysis area is located in a semi-arid climate regime, typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F), and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100°F in June and July, and they have dipped below 0°F in December and January. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico.

Table 3-3 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico area.

Table 3-3. Climate information for the Farmington area, 1981-2010

Month	Average Temperature[1]	Average Maximum Temperature[1]	Average Minimum Temperature[1]	Average Precipitation (inches)
January	30.5	40.8	20.3	0.53
February	35.8	46.8	24.8	0.59
March	43.2	56.1	30.3	0.78
April	50.4	64.7	36.2	0.65
May	60.4	74.8	46.1	0.54
June	69.8	85.1	54.5	0.21
July	75.4	89.6	61.2	0.90
August	73.2	86.5	59.8	1.26
September	65.4	79.1	51.7	1.04
October	53.3	66.4	40.1	0.91
November	40.5	52.2	28.8	0.68
December	31.0	41.2	20.7	0.50

Source: USDI/BLM 2013
[1] Degrees Fahrenheit

3.1.2 Impacts from the Proposed Action

Methodology and assumptions for calculating air pollutant and GHG emissions are described in the Air Resources Technical Report (USDI/BLM 2013). This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one directional natural gas well. The calculators give an approximation of criteria pollutant, HAPs, and GHG emissions to be compared to regional and national emissions levels (USDI/BLM 2013). Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (USDI/BLM 2013).

Direct and Indirect Impacts

Criteria Pollutants

Table 3-4 shows estimated emissions from one proposed conventional gas well for criteria pollutants, volatile organic compounds (VOC) and GHGs (USDI/BLM 2013). For comparison, Table 3-5 shows total

human-caused emissions for each of the counties in the FFO and in La Plata County, Colorado, based on USEPA's 2008 emissions inventory (USEPA 2011). Table 3-6 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one conventional natural gas well.

Table 3-4. Criteria pollutant and volatile organic compound emissions estimated for construction of one conventional gas well (average 25 days to drill and complete)

Activity	NO_x	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH_4	CO_2
One time operations (tons)								
Construction	1.98	0.54	0.18	0.90	0.10	0.04	0.003	215.55
Completion	0.18	0.04	0.01	0.01	0.01	-	-	19.80
Interim Reclamation	0.006	0.006	0.006	0.001	-	0.003	-	1.24
Final Reclamation	0.008	0.008	0.008	0.001	-	0.004	-	1.66
Ancillary Operations (tons)								
Workover	0.129	0.04	0.01	0.01	0.01	-	-	10.59
Road Maintenance	-	-	-	-	-	-	-	0.26
Road Traffic	-	-	-	-	-	-	-	0.06
Annual operations (tons/year)								
Equipment Leaks	-	-	-	-	-	-	0.013	-
Field Compression	0.14	0.29	0.10	0.01	0.01	-	-	19.30
Total	**2.44**	**0.92**	**0.31**	**0.93**	**0.13**	**0.05**	**0.02**	**268.46**

Note: NO_X = nitrous oxides; CO = carbon monoxide; VOC = volatile organic compounds; PM_{10} = particulate matter with an diameter between 2.5 and 10 micrometers; $PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less; SO_2 = sulfur dioxide; CH_4 = methane; CO_2 = carbon dioxide
Source: USDI/BLM 2013

Table 3-5. Analysis area human caused emissions in tons per year, 2008

County	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2
McKinley	12,595.0	31,885.2	37,509.0	66,590.7	6,977.5	1,659.8
Rio Arriba	4,276.6	27,352.9	45,841.5	46,321.6	4,746.2	89.1
San Juan	35,651.7	54,549.5	46,994.9	69,655.7	8,108.3	11,471.0
Sandoval	4,780.1	33,290.5	31,733.6	36,232.3	4,056.3	123.4
Total	**57,303.4**	**147,078.1**	**160,079**	**218,800.3**	**23,897.3**	**13,343.3**

Note: NO_X = nitrous oxides; CO = carbon monoxide; VOC = volatile organic compounds; PM_{10} = particulate matter with an diameter between 2.5 and 10 micrometers; $PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less; SO_2 = sulfur dioxide

Source: USEPA 2008

Table 3-6. Percent Increase in Analysis Area Emissions per well

	NO_X	CO	VOC	PM_{10} (1)	$PM_{2.5}$ (1)	SO_2 (1)
Total Emissions tons/year	57,303.4	147,078.1	160,079.0	218,800.3	23,897.3	13,343.3
Conventional Gas Well Emissions tons/year	2.44	0.92	0.31	0.93	0.13	0.05
Percent Increase	**.004**	**.0006**	**.0002**	**.0004**	**.0005**	**.0004**

Note: NO_X = nitrous oxides; CO = carbon monoxide; VOC = volatile organic compounds; PM_{10} = particulate matter with an diameter between 2.5 and 10 micrometers; $PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less; SO_2 = sulfur dioxide

(1) Values derived from average emissions for any well drilling in the analysis area; calculated results available upon request.

(2) Current USEPA regulations require operators to reduce VOC emissions by 95 percent if their oil storage tanks emit over 6 tons of VOC emissions per year.

Hazardous Air Pollutants

The formulas used for calculating HAPs in the calculators are very imprecise. For many processes it is assumed that emission of HAPs will be equivalent to 10 percent of VOC emissions. Therefore, the estimated HAP emissions of 0.031 tons/year reported here should be considered a very gross estimate.

Total Greenhouse Gases

The available statewide GHG summary (NMED 2010) combines GHG emissions from CO_2 and CH_4. To compare the GHG emissions from the proposed action estimated by the calculator with statewide GHG emissions, CO_2 equivalent (CO_2e) emissions for both CH_4 and CO_2 were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO2e (76.2 million metric tons) (NMED 2010). The estimated CO2e metric tons emissions from one conventional gas well (243.5 metric tons) would represent a 0.0003 percent increase in New Mexico CO_2 emissions.

Cumulative Impacts

The FFO manages Federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley counties. There are approximately 23,522 wells in the San Juan Basin. About 16,435 of the wells in these counties are Federal wells. Analysis of cumulative impacts for reasonable development scenarios and the reasonable foreseeable development scenario of oil and gas wells on public lands in the FFO was presented in the 2003 RMP. This included modeling of impacts on air quality. A more detailed discussion of cumulative effects can be found in the Air Resources Technical Report (USDI/BLM 2013).

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (USDI/BLM 2013). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

The emissions calculator estimated that there could be very small direct and indirect increases in several criteria pollutants, HAPs, and GHGs as a result of implementing the proposed alternative. The very small increase in emissions that could result would not be expected to exceed the NAAQS for any criteria pollutants in the analysis area.

The very small increase in GHG emissions that could result from implementing the proposed alternative would not produce climate change impacts that differ from the no action alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the action alternatives cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the action alternatives on global or regional climate.

The Air Resources Technical Report (USDI/BLM 2013) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.2 Water Resources/Quality – Surface and Groundwater

3.2.1 Affected Environment

The project area is located in the Upper Colorado River Hydrologic Region and is part of the San Juan River sub-region. The project area is located within the Carrizo sub-watershed. The nearest perennial water sources are Cutter Dam located approximately 11 miles to the west, and Navajo Reservoir located approximately 10 miles northwest of the project area.

There are no designated National Hydrography Dataset bluelines located within the project boundary. A small ephemeral drainage is located outside of the proposed well pad, northwest of corners 3 and 5. The drainage is a small tributary to a defined jurisdictional drainage, north of the proposed project area, which eventually leads to Encierro Canyon. There are no perennial surface water resources (i.e., rivers, lakes, ponds, or streams) and no wetlands, springs, or riparian habitats within the proposed project area.

The primary aquifers in the BLM/FFO area are the Uinta-Animas and the Mesaverde, which are sandstone based. Groundwater is readily available in most of the BLM/FFO area and is of fair to poor quality. A search of the New Mexico State Engineers Office - Water Administration and Technical Engineering Resource System (WATERS) database for the proposed project area and vicinity (1-mile radius) was performed. The database has no records of water wells located within the proposed project area or within a 1-mile radius.

3.2.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Potential impacts to surface water and shallow groundwater resources could occur from stormwater runoff and the accidental spill of chemicals, produced water, or flowback fluids. The potential for these impacts would be long term for the life of the proposed action.

The proposed action would temporarily expose an estimated 3.80 acres of soil as a sediment source entering area drainage ways. Vegetation cover is low throughout the project area. Exposure of soils, particularly on slopes, would lead to an increase in an undetermined but likely small amount of sediment transport, particularly during and following storm events. Slight alterations in project area drainage patterns may also lead to an increase in sediment transport. These increases in sediment transport would persist for several years until the disturbed areas are stabilized. The potential for sediment transport into the drainages would be minimized through the implementation of best management practices and other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions.

A 50-foot by 50-foot silt trap will be constructed along the drainage between corners 3 and 5 to slow water velocities and reduce sediment transfer. Drainage around the existing pad will be re-established at the toe of the slope on the east side of the well pad, allowing drainage to the north. Corner 3 will be rounded to minimize impacts to the ephemeral drainage.

Water for drilling and completions would be sourced from a private water well that has been permitted by the State of New Mexico. The San Juan 29-6 Water Well #1 has been assigned the POD Number SJ 134764 by the New Mexico Office of the State Engineer.

Minimal amounts of hazardous materials (i.e., gas, diesel, etc.) would be used and stored on location. There would be the potential for accidental spills or releases of these materials that could impact local water quality. All chemicals stored on-site would be properly contained. On-site containment structures such as containment dikes, containment walls, and drip pans would be sufficiently impervious and would be maintained to prevent a discharge to waters of the U.S. Any spills of non-freshwater fluids would be immediately cleaned up and removed to an approved disposal site in accordance with federal and state regulations.

Potential impacts to groundwater resources could occur from the proposed well bores. The potential for impacts to groundwater from the well bore would be long term for the life of the well. Adherence to Conditions of Approval and design features such as adequate casing, cementing, and other drilling and completion methods are intended to minimize effects to water quality.

Cumulative Impacts

Reasonably foreseeable development within the Carrizo sub-water shed may include an estimated, additional 1,834 wells and related facilities. Surface-disturbing activities that would be associated with these actions may affect an estimated 8,361 acres (USDI/BLM 2003a, page 4-7). The PRMP/FEIS determined that the primary cumulative impacts on water quality would result from surface disturbance, which would generate increased sediment yields (USDI/BLM 2003a, pages 4-123 and 4-124). Cumulative effects to water resources from the proposed action would be maximized shortly after construction begins and would decrease over time as reclamation efforts progress.

The proposed action would cumulatively contribute approximately 2.46 acres of new disturbance within the watershed. Cumulative impacts to surface waters would be related to short-term sedimentation or flow changes. Surface-disturbing activities other than the proposed action that may cause accelerated erosion include (but are not limited to) construction of roads, other facilities, and installation of trenches for utilities; road maintenance such as grading or ditch cleaning; public recreational activities; vegetation manipulation and management activities; prescribed and natural fires; and livestock grazing.

3.3 Upland Vegetation and Noxious Weeds

3.3.1 Affected Environment

Approximately half of the proposed well pad would be located within piñon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*) woodland. The remaining half would be located partially on re-claimed big sagebrush (*Artemisia tridentata*) grassland and on continually disturbed bare soils. The proposed pipeline would be partially located within re-claimed big sagebrush and grassland. The remainder of the pipeline would be located on bare soils associated with existing access roads and well pads. The dominate understory throughout the proposed project includes alkali sacaton (*Sporobolus airoides*), cheatgrass (*Bromus tectorum*), and galleta grass (*Pleuraphis jamesii*).

The wooded areas of the proposed project are located within a historically chained area, with coarse woody remnants scattered throughout the associated project and action areas. About 50 to 75 trees, standing approximately 5 to 7 feet high, are located in the western portion of the proposed well pad. A complete list of plants found during the field survey is included in the project Biological Survey Report (BSR) (see Appendix C).

The BLM/FFO maintains a list of invasive and non-native plant species of concern (USDI/BLM 2003a, page 3-24). No BLM listed invasive and native plant species of concern were found in the project area. Cheatgrass (*Bromus tectorum*), a Class C State of New Mexico listed noxious and invasive plant species was identified as one of the dominant species within the project area.

3.3.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Construction of the proposed action would result in the modification of 2.46 acres of undisturbed vegetation and 1.34 acres of previously disturbed vegetation, and would include the removal of approximately 50 to 75 piñon and juniper trees. Direct impacts would include the removal of vegetation during site clearing activities. Potential impacts pertain to changes in species composition and density, and an increased potential for invasive species to establish. The impact of the proposed action on area vegetation would be low and short to long term. Impacts to vegetation are minimized by construction of the proposed project on existing disturbance.

Invasive species are generally tolerant of disturbed conditions and the disturbed soils at project sites may provide an opportunity for the introduction and establishment of non-native invasive species. During construction and operation, noxious weed sources could be introduced to disturbed areas from vehicles, equipment, people, wind, water, or other mechanisms. There would be a long-term potential for non-native invasive weeds to establish in the area. Burlington would be responsible for monitoring and controlling any non-native invasive weed species within the well pads and associated ROW for the life of the project.

Cumulative Impacts

Within the FFO planning area, there are approximately 633,400 acres of piñon-juniper habitat type (USDI/BLM 2003a, page 3-31). Based on the acres of plant community types within the planning area

and the estimated total disturbance of future activities, less than 1 percent of the piñon-juniper woodland community would be disturbed within the planning area over 20 years from reasonably foreseeable future actions (USDI/BLM 2003a, page 3-31 and 4-7). The proposed action would cumulatively contribute approximately 2.46 acres of long-term vegetative disturbance in the planning area.

3.4 Special Management Species

3.4.1 Affected Environment

In accordance with BLM Manual 6840, the BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. Special status species and their potential to occur in the proposed project area are listed in Table 3-7. The project BSR, included in Appendix C, provides the basis for the findings listed in the table.

Table 3-7. Bureau of Land Management sensitive species and their potential to occur in the project and action areas based upon habitat associations

Species	Habitat Associations	Potential to occur in the Project or Action Area
Mammals		
Spotted bat (*Euderma maculatum*)	Meadows in subalpine coniferous forests are the preferred habitats for this species; rocky cliffs are important for roosting. Also recorded in a wide variety of habitats, from riparian and piñon-juniper woodlands to ponderosa pine and spruce-fir forests.	Potential foraging and roosting habitat occurs in the analysis area; not observed during biological surveys.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Roosts mostly in caves or mines; at night can roost in abandoned buildings. In summer, this species occurs widely across state and can be found over desert-scrub, desert-mountains, oak-woodland, piñon-juniper, and coniferous forests.	Suitable foraging habitat occurs within the project area; not observed during biological surveys.
Birds		
Golden eagle (*Aquila chrysaetos*)	In the West, mostly open habitats in mountainous, canyon terrain; nests primarily on cliffs and in trees. Forages in shrublands, open woodlands and grasslands.	The project and action areas provide potential foraging habitat; not observed during biological surveys.
Piñon jay *(Gymnorhinus cyanocephalus)*	Primarily associated with piñon-juniper habitat.	Suitable habitat occurs in the action area; not observed during biological surveys.

Species	Habitat Associations	Potential to occur in the Project or Action Area
Prairie falcon (*Falco mexicanus*)	Arid, open regions of grassland or scrub vegetation with cliff formations that are at least 30 feet high. Breeding cliffs are sometimes in semi-open regions with scattered conifer trees and occasionally dense woodlands.	Potential foraging habitat occurs in the project and action areas; not observed during biological surveys.

3.4.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Two parameters are considered when evaluating habitat loss—direct habitat loss and effective habitat loss. Direct habitat loss occurs through the removal of vegetation, which reduces the extent or quality of habitat in terms of food and cover. Vegetation removal strips the affected area of its value to wildlife; therefore, direct habitat loss can be quantified by comparing the area of habitat lost to the amount retained. The amount of habitat available to wildlife is called effective habitat. The effectiveness of habitat is lost when a species abandons or avoids an area. Loss of effective habitat area can exceed direct habitat loss. Effective habitat loss can occur from habitat fragmentation, disturbance, and interference with movement. The impacts of habitat fragmentation are related to the loss of large contiguous areas of habitat and the relative increase in habitat "edge" in smaller areas. Construction of roads and other development, as well as human and vehicular traffic on existing roads, can cause habitat fragmentation. Such disturbance can cause animals to shift their activity or alter their behavior.

The project area and its surroundings offer suitable foraging habitat for spotted bat and Townsend's big-eared bat. No suitable roosting habitat would be removed by the proposed project. Impacts to these bat species would be limited to avoidance of the area during nighttime drilling activities, when they may incidentally forage in the area. These impacts would be short term.

The project and action areas contain potential foraging habitat for golden eagle (*Aquila chrysaetos*) and prairie falcon (*Falco mexicanus*). No potential nesting habitat for these species would be removed or modified by the proposed action. It is possible that these raptor species could fly through the proposed action area. Direct impacts to raptor species would include the removal and modification of 2.46 acres of potential foraging habitat and the loss of approximately 50 to 75 piñon and juniper trees of various ages and sizes. Impacts from loss or modification of habitat and avoidance would be long term. Additional impacts may include the avoidance of the project area by raptors during construction, drilling, and operation due to disturbance and activity from human and vehicle presence and associated noise. These impacts would be short term for the duration of construction and drilling.

Impacts to the piñon jay would include the removal of approximately 2.46 acres of undisturbed piñon-juniper woodland, resulting in a loss of potential piñon-jay breeding and foraging habitat. Approximately 50 to 75 trees would be removed from the proposed well pad. No nests were identified in the proposed project area during the biological surveys.

Cumulative Impacts

The FFO would continue to manage non-federally listed species according to BLM policies and guidelines, with the goal of contributing to the conservation of these species to reduce the potential for being listed under the Endangered Species Act (ESA) of 1973, as amended (USDI/BLM 2003a, 4-111). For reasonably foreseeable actions on federal lands, direct impacts to nesting special status raptor species would be avoided through the BLM's siting criteria. Development on federal and private lands would result in the removal or modification of potential foraging habitat. These effects would be related to availability of undisturbed habitat and the amount of disturbance that would occur within the project area.

The PRMP/FEIS determined that up to 5.5 percent (128,000 acres) of vegetation in the planning area could be impacted cumulatively by oil and gas development (USDI/BLM 2003a, page 4-125). Other reasonably foreseeable actions within the planning area that could impact special status species would include livestock grazing, agriculture, commercial and residential development, mining, and vegetation management. The proposed action would not contribute appreciably to a cumulative habitat loss for BLM special management species within the planning area. There would be a cumulative loss of approximately 2.46 acres of golden eagle and prairie falcon foraging habitat and piñon jay nesting and foraging habitat. Because approximately 25 percent of the project area has been previously disturbed, the proposed action would result in minimal habitat fragmentation and a small increase in edge habitat.

3.5 Migratory Birds

3.5.1 Affected Environment

Under the Migratory Bird Treaty Act (MBTA) (16 USC §703-712) and EO 13186, federal agencies are required to consider management impacts to migratory birds. The BLM migratory bird conservation policy for the planning area is detailed in Instruction Memorandum No. NM-F00-2010-001 (USDI/BLM 2010). This management policy establishes a consistent approach for addressing migratory bird populations and habitats when by making project level implementation decisions. The management policy also outlines best management practices and design features to avoid or minimize impacts.

While all migratory songbirds are protected by law, certain species have been determined to be at greater risk than others. There are slightly over 350 avian species that occur in San Juan County and the surrounding area administered by the BLM/FFO. Data collected through breeding bird surveys coordinated by the USFWS (as well as other private sector efforts) have provided the basis for the Partners in Flight organization to develop bird "Watch Lists" and the USFWS "Birds of Conservation Concern List." The proposed project area occurs in the Colorado Plateau physiographic region and contains two of the habitat types addressed in these documents—great basin desert shrub (Sage/Grass) and piñon/juniper woodland.

The Bird Conservation Plan, developed for the State of New Mexico by the NMPIF, lists the sage thrasher (*Oreoscoptes montanus*) and sage sparrow (*Amphispiza belli*) as a "highest priority" species for conservation in the Great Basin desert shrub habitat. Priority species in piñon-juniper woodland habitat include the gray vireo, piñon jay, and juniper titmouse *(Baeolophus ridgwayi)*. Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management list of "Birds of Conservation Concern 2008" within the Bird Conservation Region 16–Southern

Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).

A variety of MBTA protected species may be found in the proposed project area such as horned lark (*Eremophila alpestris*), vesper sparrow (*Pooecetes gramineus*), and lark sparrow (*Chondestes grammacus*). The project area may be utilized as foraging habitat by birds during the non-breeding season such as mourning dove (*Zenaida macroura*), mountain bluebird (*Sialia currucoides*), and dark-eyed junco (*Juncus hyemalis*). Certain birds, including the juniper titmouse (*Baeolophus ridgwayi*) and bushtit (*Psaltriparus minimus*), nest almost exclusively in piñon-juniper habitats. Mountain chickadees (*Parus gambeli*), black-throated gray warblers (*Dendroica nigrescens*), and blue-gray gnatcatchers (*Polioptila caerulea*) are also common in this habitat type.

3.5.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Executive Order 13186 calls for increased efforts to fully implement the Migratory Bird Treaty Act. In keeping with this mandate, the BLM consulted the NMPIF Bird Conservation Plan for the State of New Mexico and the USFWS list of Birds of Conservation Concern. A review of these documents—specifically as they pertain to the Colorado Plateau physiographic area—indicates there are three "priority" avian species with a known range of distribution in the FFO planning areas that utilize the piñon-juniper woodland habitat and eight priority species that utilize the sage-grass habitat within the Great Basin desert shrub habitat.

Various types of perturbations and/or anthropogenic activity may affect these species. These species and a brief assessment of the effects of the proposed action on their habitat are provided in Table 3-8.

Table 3-8. Migratory bird species of concern potentially occurring within the project area and effects from the proposed action

Species	Habitat Type	Effects
Ferruginous hawk (*Buteo regalis*)	Sage-grass/piñon-juniper interface	No impacts. No suitable habitat in the area.
Ash-throated flycatcher (*Myiarchus cinerascens*)	Piñon-juniper	Cavity nester; some loss of nesting habitat.
Gray flycatcher (*Empidonax wrightii*)	Piñon-juniper	Nests in sage and piñon-juniper; reduction may be detrimental.
Juniper titmouse (*Baeolophus ridgwayi*)	Piñon-juniper	Secondary cavity nester; some loss of nesting habitat.
Piñon jay (*Gymnorhinus cyanocephalus*)	Piñon-juniper	Colony nester in piñon; loss of piñon may impact.
Gray vireo (*Vireo vicinior*)	Piñon-juniper	Nests in juniper; reduction of juniper may be detrimental.

Impacts to migratory birds would generally be low, given the amount of potential habitat that would be removed or modified. Impacts to those species associated with piñon-juniper woodlands would be low

because of the removal of approximately 50 to 75 piñon and juniper trees. Silt traps constructed for the proposed project would retain water for short periods following storm events and would provide an additional water source for migratory birds. Impacts to migratory birds would be greater should construction occur during the breeding season of May 15 through July 15. Construction activities may cause some nest abandonment in adjacent areas

Cumulative Impacts

Other reasonably foreseeable actions within the planning area that could impact migratory birds would include livestock grazing, agriculture, commercial and residential development, mining, wildfire, and vegetation management. Cumulative impacts to migratory birds from the proposed action would result from the long-term changes in density and composition of approximately 2.46 acres, including the removal of approximately 50 to 75 piñon and juniper trees. The proposed action would contribute negligible impacts to migratory birds when combined with past, present, and future actions.

3.6 Cultural Resources

3.6.1 Affected Environment

The project is located within the archeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: PaleoIndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 BC to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (A.D. 1-1540), and the historic (A.D. 1540 to present) that includes Native American as well as later Hispanic and Euro-American settlers. A detailed description of these various periods and select phases within each period is provided in the Farmington PRMP/FEIS (USDI/BLM 2003a).

Cultural sites vary considerably and can include but are not limited to simple artifact scatters, domiciles of various types with a myriad of associated features, rock art and inscriptions, ceremonial/religious features, and roads and trails.

The entire area of potential effect for the proposed action was archaeologically surveyed by WRCM at a BLM Class III level (100 percent) and reports were prepared and submitted to the BLM in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (USDI/BLM 2005). In conjunction with field surveys of the project area, the investigation included a literature review of known resources within the project area. WRCM conducted the literature review using available Geographic Information Systems (GIS) data from the Laboratory of Anthropology Archaeological Record Management Section and from the BLM/FFO. WRCM initially surveyed a total of 9.97 acres on August 8, 11, 12, and 13, 2008 and February 23, 2009. The project area was resurveyed on December 12, 2013. WRCM personnel were able to relocate previously recorded features and re–establish the site datum. No new cultural material was discovered during the December 2013 visit.

Two previously documented sites (LA 79816 and LA 79817) were encountered during the cultural resources surveys and are located outside of the proposed project. Both sites are recommended as potentially eligible or eligible for inclusion in the National Register of Historic Places. Additionally, two

isolated occurrences were discovered within the project area. The cultural resources report has been submitted to the BLM under separate cover [WCRM (F) 738].

3.6.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Direct impacts normally include alterations to the physical integrity of a cultural site. If a cultural site is significant for other than its scientific information, direct impacts may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. A potential indirect impact from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural sites in the area.

Significant cultural sites (e.g., National Register eligible/listed) are being avoided with the implementation of design features such as (but not limited to) reduction of construction areas, temporary barriers, and site monitoring. These design features are detailed in the BLM Cultural Resource Record of Review, attached to the COAs in the APD and ROW grant. The proposed action is not known to physically threaten any traditional cultural property, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The proposed action would have no direct or indirect impact on significant cultural sites.

Cumulative Impacts

The proposed action would have no negative cumulative impact on cultural resources, as significant cultural sites would be avoided. A positive cumulative effect is the additional scientific information yielded by the archaeological surveys.

4. SUPPORTING INFORMATION

4.1 Tribes, Individuals, Organizations, or Agencies Consulted

- Dollie Busse, Staff Regulatory Technician, ConocoPhillips Company
- Brent Hottell, Lead Projects, ConocoPhillips Company
- Sam Jaquez, Construction Supervisor, ConocoPhillips Company

4.2 List of Preparers

This EA was prepared by Ecosphere in conformance with the standards of, and under the direction of, the BLM/FFO. List of preparers include:

- Mike Flaniken, Environmental Protection Specialist, BLM/FFO
- Jim Copeland, Archaeologist, BLM/FFO
- Sheila Williams, District Botanist, BLM/FFO
- John Kendall, Threatened and Endangered Species Biologist, BLM/FFO
- Kylan Frye, Biologist, Ecosphere
- Joey Herring, Project Manager/Sr. Biologist, Ecosphere
- John Dodge, Biologist, Ecosphere
- Lucas Phipps, GIS Specialist, Ecosphere
- Tom Lennon, Archaeologist, WCRM
- Chuck Wheeler, Archaeologist, WCRM

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Appendix A: Maps and Photographs

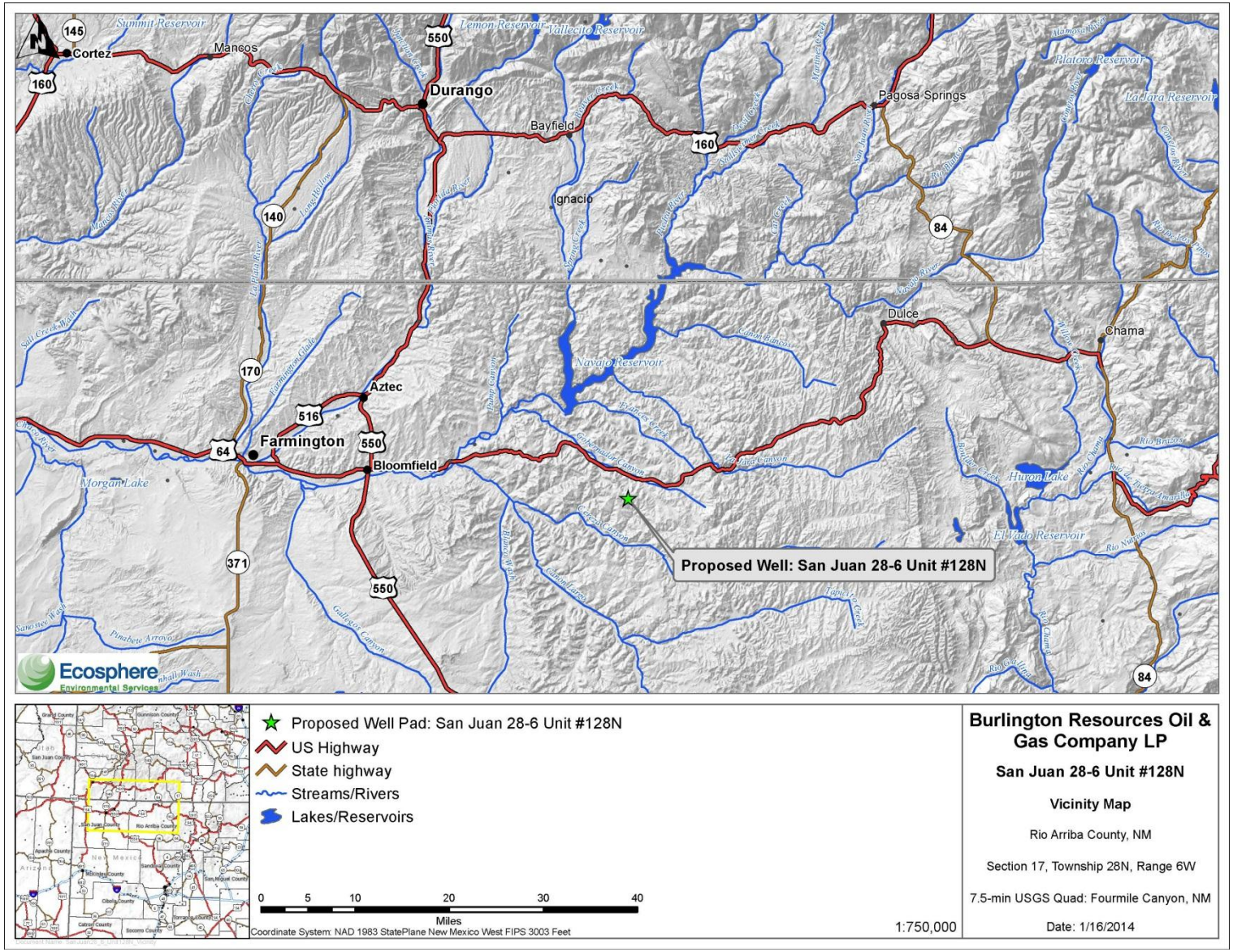

Figure 1: Proposed San Juan 28-6 Unit #128N and vicinity

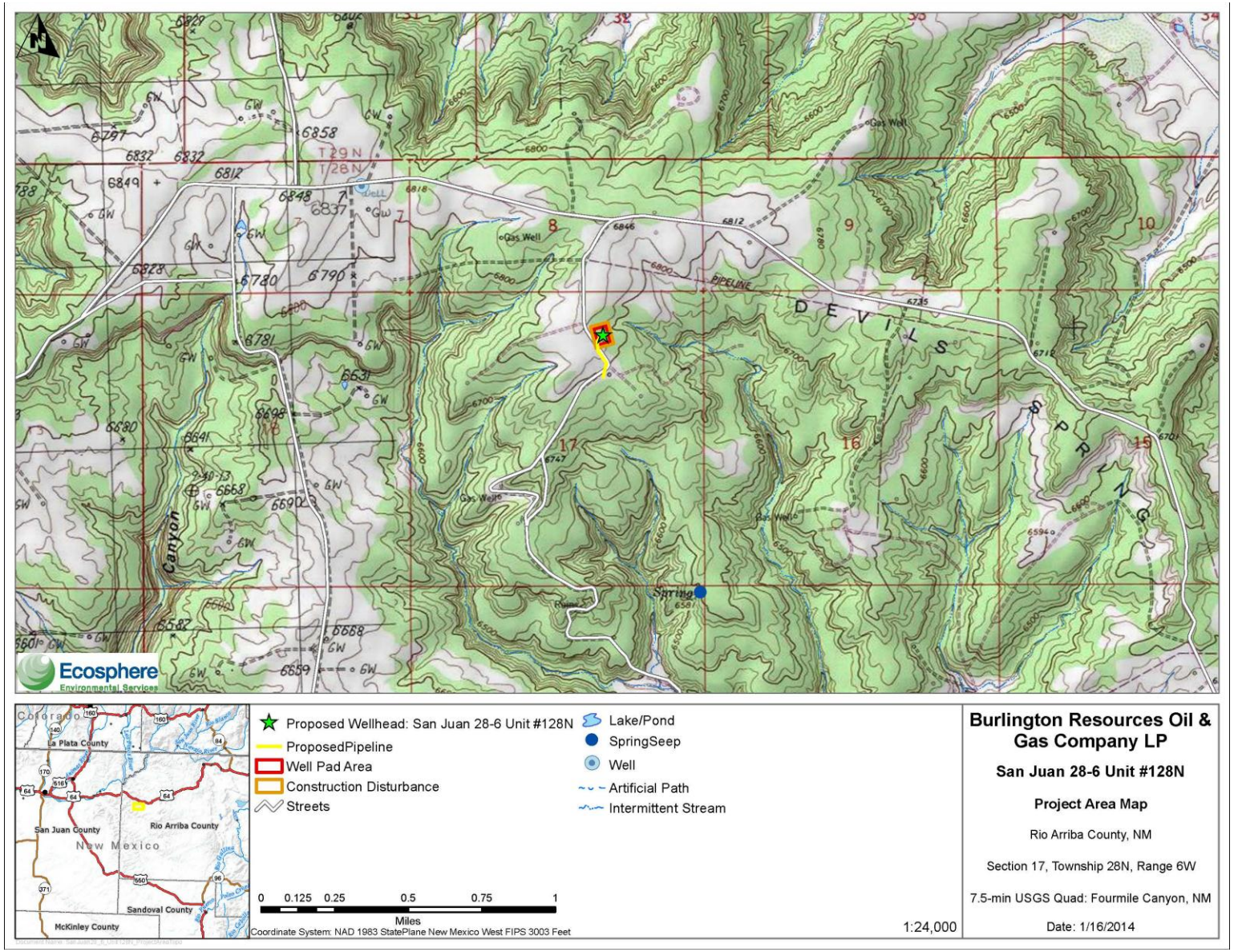

Figure 2: Proposed San Juan 28-6 Unit #128N project area

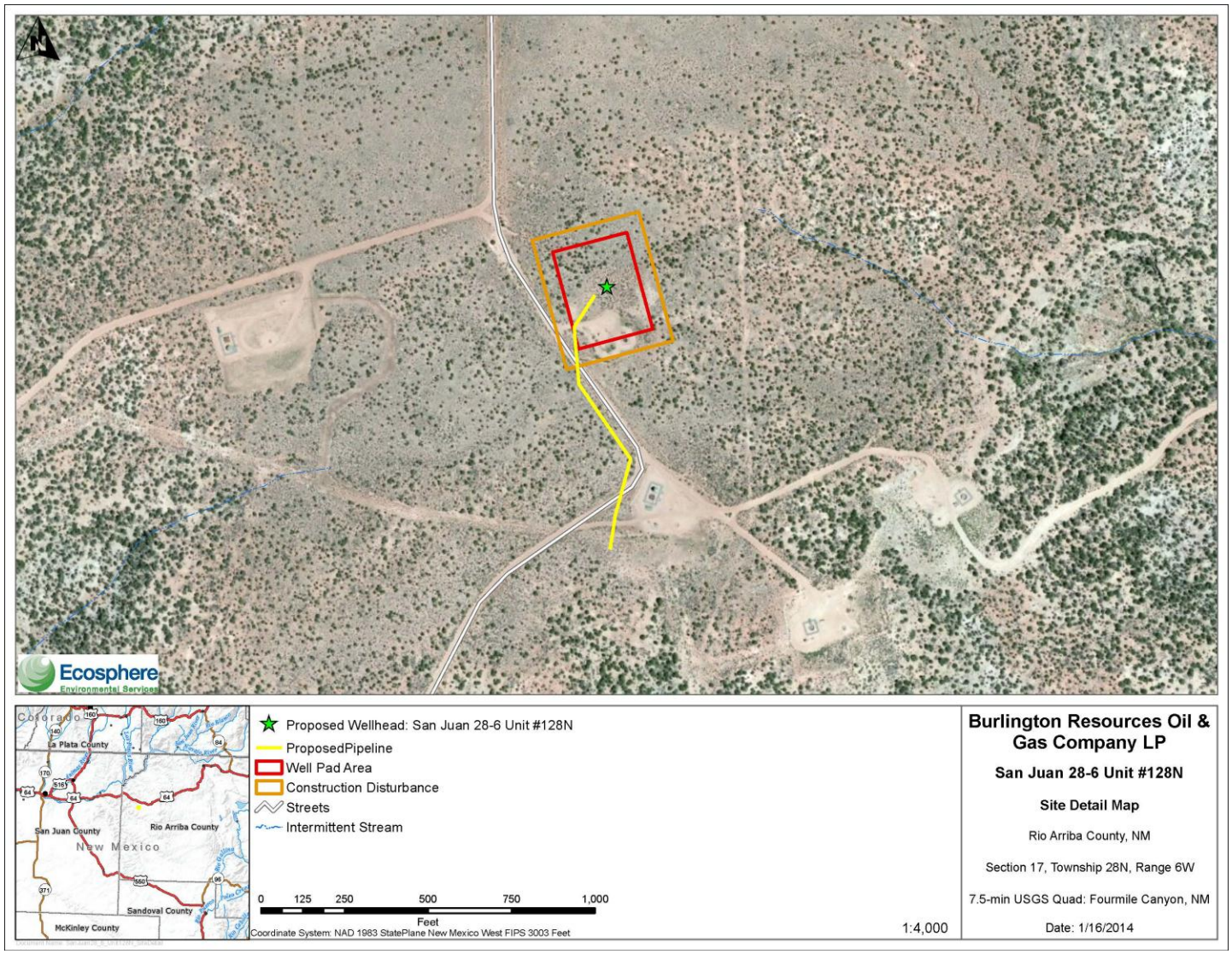

Figure 3: Site detail of proposed San Juan 28-6 Unit #128N

Photograph 1. Looking north from the proposed San Juan 28-6 Unit #128N well head

Photograph 2. Looking south from the proposed San Juan 28-6 Unit #128N well head

Appendix B: Application for Permit to Drill

Appendix C: Biological Survey Report