United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-NM-F010-2013-0535

WPX Energy Production, LLC's
Chaco 2306-20M No. 208H

September 2013

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TABLE OF CONTENTS

1. Purpose and Need for Action 1
    1.1. Background 1
    1.2. Purpose and Need for Action 1
    1.3. Decision to be Made 2
    1.4. Conformance with Applicable Land Use Plan(s) 2
    1.5. Relationship to Statutes, Regulations or Other Plans 2
    1.6. Scoping, Public Involvement, and Issues 4
2. Proposed Action and Alternative(s) 5
    2.1. Proposed Action 5
    2.2. No Action 13
    2.3. Alternatives Considered but Eliminated from Detailed Study 13
3. Affected Environment and Environmental Consequences 13
    3.1. Air Resources 14
    3.2. Soil Resources 18
    3.3. Groundwater Resources 20
    3.4. Upland Vegetation 21
    3.5. Migratory Birds 23
    3.6. Special Status Species 25
    3.7. Cultural Resources 27
4. Supporting Information 28
    4.1. Tribes, Individuals, Organizations, or Agencies Consulted 28
    4.2. List of Preparers 28
    4.3. References 29

Appendix A. Maps A-1
Appendix B. Plats B-1
Appendix C. Photographs C-1
Appendix D. Surface Reclamation Plan D-2

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

WPX Energy Production, LLC (WPX) has submitted an Application for Permit to Drill (APD) and two Right-of-Way (ROW) Grant applications to the Bureau of Land Management – Farmington Field Office (BLM-FFO) for the Chaco 2306-20M No. 208H well project. The proposed action is the approval of the APD and ROW Grants by the BLM-FFO, located in Farmington, New Mexico.

The proposed project would include the horizontal drilling, possible production, and plugging of the Chaco 2306-20M No. 208H well, a Lybrook Gallup oil and natural gas well. The 208H well would access federal minerals managed by the BLM-FFO (lease NMSF 0078360). The well would be permitted via an APD.

The proposed project would also include the construction, use, and reclamation of an associated 5.48-acre well pad (including construction zone) and 235-foot-long access road. These features, which would be located partially off-lease (outside of the boundaries of lease NMSF 0078360), would each be permitted via a ROW Grant.

Oil and natural gas, vital components of the nation's energy supply, account for approximately 36 and 25 percent of total energy consumed in the United States (U.S.), respectively. These energy sources are used in residential and commercial buildings, in transportation, and by industry (U.S. Energy Information Administration 2012). Common uses for natural gas include space heating, water heating, cooling, cooking, waste treatment and incineration, metals preheating, drying and humidification, glass melting, food processing, fueling industrial boilers, vehicle fueling, and electricity generation. Gases such as butane, ethane, and propane can be extracted from natural gas to be used for products such as fertilizers and pharmaceuticals. Natural gas can also be used to create methanol, which is utilized in the production of formaldehyde, acetic acid, fuel cell sources, and additives for cleaner burning gasoline (Natural Gas Supply Association 2010). Most oil goes into fuels, including gasoline, jet fuel, and home-heating oil. Additionally, non-fuel compounds extracted from oil are used to develop lubricants; asphalt for roads; tar for roofing; waxes for food wrapping; solvents for paints; cosmetics and dry-cleaning products; plastics; and foams (U.S. Energy Information Administration 2012).

Approximately 84 percent of natural gas and 55 percent of oil consumed in the U.S. is produced in the U.S. Additionally, U.S.-produced natural gas and oil are also exported to other countries (U.S. Department of Energy 2011). Within the U.S., oil and natural gas reserves are concentrated within distinct fields. The BLM-FFO management area is within the San Juan Basin, one of the most prolific gas-producing basins in the country. Currently, the San Juan Basin produces small amounts of oil.

Taxes and royalties on oil, natural gas, and carbon dioxide production contribute approximately 25 percent of New Mexico's general fund, and the oil and gas industry is one of the largest private sector employers in the state (New Mexico Bureau of Geology and Mineral Resources 2012). Additionally, the federal government receives royalties, or a share of the production income, for extracted federal minerals. In 2011, federal natural gas royalties totaled over 2 billion dollars (Office of Natural Resources Revenue 2012).

The proposed project area is located within the BLM-FFO management area, 51 road miles south-southeast of the town of Bloomfield, 2 miles west of the community of Counselor, and more than 1 mile south of U.S. Highway 550 (see Figure A.1, Appendix A).

1.2. Purpose and Need for Action

The purpose of the proposed action is to allow WPX reasonable access to BLM-managed lands to develop their mineral lease.

The need for the proposed action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, as amended (MLA; 30 U.S. Code [USC] 181 et seq.), and the Federal Land Policy and

Management Act of 1976 (FLPMA, 43 USC 1701 et seq.). The MLA authorizes the BLM to lease public lands for the development of mineral deposits (including oil, gas, and other hydrocarbons) and permit the development of those leases. The FLPMA authorizes the BLM to grant, issue, or renew ROW grants over public lands for multiple uses. It is the policy of the BLM, as derived from several laws, including the MLA and FLPMA, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. Per 43 Code of Federal Regulations (CFR) 3160 (Onshore Oil and Gas Operations), the BLM is required to respond to a request for an APD. Per 43 CFR 2800 (ROWs Under the FLPMA), the BLM is required to respond to a request for a ROW Grant.

1.3. Decision to be Made

The BLM-FFO will decide whether or not to issue the Chaco 2306-20M No. 208H APD and ROW Grants, and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA; Public Law 91-90, 42 USC 4321 et seq.), the BLM-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 APD and ROW Grants with design features as submitted
- To approve the APD and ROW Grants with additional mitigation
- To analyze the effects of the proposed action in an EIS
- To deny the APD and ROW Grants

1.4. Conformance with Applicable Land Use Plan(s)

The proposed action is in conformance with the 2003 BLM-FFO Resource Management Plan (RMP). Pursuant to 40 CFR 1508.28 and 1502.21, this site-specific EA tiers into and incorporates by reference the information and analysis contained in the BLM-FFO Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS; BLM 2003a). The RMP was approved by the September 29, 2003 Record of Decision (ROD; BLM 2003b), and updated in December 2003.

Specifically, the proposed action supports the following BLM policy:

> It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands. (BLM 2003b, 2-2 – 2-3)

Development of energy-related ROWs, such as access roads and off-lease well pads, is one of the primary activities of the BLM-FFO lands program. Such ROWs receive environmental review on a case-by-case basis (BLM 2003b). As required by NEPA, this EA addresses site-specific resources and effects of the proposed action that were not specifically covered within the PRMP/FEIS.

1.5. Relationship to Statutes, Regulations or Other Plans

WPX would comply with applicable federal, state, and local laws and regulations. Necessary permits and approvals for the project would be obtained prior to project implementation.

Many requirements regulating specific environmental elements are found in the appropriate elements sections of this EA (Chapter 3). Several permits, licenses, consultations, or other requirements are discussed below.

1.5.1. Clean Water Act

The proposed action is in conformance with the Clean Water Act, as amended (CWA; 33 USC 1251 et seq.).

Under Section 404 of the CWA, the U.S. Environmental Protection Agency (EPA) regulates the discharge of dredged or fill material into Waters of the U.S., including wetlands. The Section 404 program is administered by the EPA and U.S. Army Corps of Engineers (USACE). Under the CWA, the USACE has jurisdiction over Waters of the U.S. Waters of the U.S. are considered jurisdictional because they have a "significant nexus" to traditional navigable waters. The BLM-FFO and USACE - Durango Regulatory Division Office have determined that jurisdictional waters (i.e., Waters of the U.S.) may include U.S. Geological Survey (USGS) watercourses (i.e., "blue lines" on USGS 1:24,000 topographic maps) and potentially tributaries to these USGS watercourses. A Section 404 permit is required for projects that would result in discharged material into a Water of the U.S. Topographic maps indicate that one USGS watercourse crosses the proposed access road and crosses through the northeastern portion of the proposed well pad (see Figure A.3, Appendix A). However, a field survey conducted by scientists with Nelson Consulting, Inc. (NCI) found that this watercourse does not exhibit an ordinary high water mark; this wash appears to be a vegetated swale. Therefore, it was determined by the BLM-FFO that this segment (i.e., the headwaters) of the watercourse is not a Water of the U.S. No Waters of the U.S. would be impacted by the proposed project.

Under Section 402 of the CWA, the EPA regulates storm water discharges from industrial and construction activities under the National Pollution Discharge Elimination System program. Permits are required if discharge results in a reportable quantity for which notification is required (pursuant to 40 CFR 117.21, 40 CFR 302.6, or 40 CFR 110.6) or if the discharge contributes to a violation of a water quality standard.

Under Section 401 of the CWA, an applicant for a federal license or permit to conduct an activity that may result in a discharge into a Water of the U.S. must provide the federal agency with a Section 401 certification declaring that the discharge would comply with the CWA. The certification would be granted by the New Mexico Environment Department (NMED).

1.5.2. National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA; 16 USC 470) requires federal agencies to take into account the effects of their actions on historic properties, and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment. Compliance with the requirements of the NHPA is met by following the Protocol Agreement between the New Mexico BLM and New Mexico State Historic Preservation Officer, which is authorized by the Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (1997).

1.5.3. Clean Air Act

The Clean Air Act of 1972, as amended (CAA; 42 USC 7401 et seq.), establishes national ambient air quality standards (NAAQS) to control air pollution. In New Mexico, the NMED has adopted most of the CAA into the New Mexico Administrative Code (NMAC). The NMED issues construction and operating permits for air quality and enforces air quality regulations and permit conditions.

1.5.4. New Mexico State Regulations

The New Mexico Oil Conservation Division (NMOCD), which is in the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), regulates oil and gas operations in New Mexico. The NMOCD has the responsibility of gathering production data, permitting new wells, establishing pool rules and allowables, issuing discharge permits, enforcing rules and regulations, monitoring underground injection wells, ensuring that abandoned wells are properly plugged, and ensuring that the land is responsibly

restored. Oil and gas regulations administered by NMOCD are contained in NMAC 19.15. These regulations include the following, with which WPX would comply:

- The EMNRD requires operators to follow “pit rule” guidelines (NMAC 19.15.17) to reduce groundwater contamination from industry-related activities.
- NMAC 19.15.15 establishes requirements for well acreage spacing, obtaining approval of unorthodox well locations, and pooling or communitizing small acreage oil lots.
- NMAC 19.15.16.19 requires the disclosure of hydraulic fracture constituents.

1.6. Scoping, Public Involvement, and Issues

1.6.1. Scoping and Public Involvement

The BLM-FFO publishes a NEPA log for public inspection. This log contains a list of proposed and approved actions within the BLM-FFO. The log is located on the BLM’s New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html).

An onsite meeting, attended by WPX, a BLM-FFO representative, and an environmental consultant (NCI), was held for the proposed project on August 14, 2013. The local chapter of the Navajo Nation was invited to the onsite meeting by the BLM-FFO; no members of the Navajo Nation attended the meeting. A BLM-FFO Interdisciplinary Team meeting was held on August 26, 2013, to discuss the proposed action. At the aforementioned meetings, potential issues of concern were identified by the BLM-FFO and NCI.

Based on the size and scale, routine nature, and potential impacts associated with the proposed action, no additional external scoping was conducted. No public comments were received for the proposed action.

1.6.2. Issues

Issues Analyzed

The following issues were identified as potential issues of concern for the proposed action. These issues will be addressed in this EA.

- How would dust and equipment emissions association with the project impact air resources?
- How would vegetation-clearing, project activities, and final reclamation impact soils?
- Would drilling the proposed well impact groundwater?
- How would vegetation-clearing, project activities, and final reclamation associated with the project impact upland vegetation?
- How would vegetation-clearing, project activities, and final reclamation impact migratory birds?
- How would vegetation-clearing, project activities, and final reclamation impact the following BLM Special Status Species: Bendire’s thrasher (*Toxostoma bendirei*), ferruginous hawk (*Buteo regalis*), and golden eagle (*Aquila chrysaetos*)?
- How would surface-disturbing activities associated with the proposed project impact cultural resources?

Issues Considered but not Analyzed

The following issues were identified as issues of concern that would not be impacted by the proposed action or that have been covered by prior environmental review. These issues will not be analyzed in this EA.

U.S. Fish and Wildlife Service (USFWS)-Listed Species

Under Section 7 of the Endangered Species Act of 1973 (ESA; 16 USC 1531-1544), all federal agencies are required to consult with the USFWS or National Marine Fisheries Service if they are proposing an action that may affect listed species or designated habitat. Consultation with the USFWS was conducted as part of the PRMP/FEIS to address the cumulative effects of RMP implementation (Consultation No. 2-22-01-1-389, Appendix M of the PRMP/FEIS). Based on a review of species currently listed by the USFWS as occurring in Sandoval County (USFWS 2013), as well as the location of the proposed project area and habitat within the proposed project area, the potential does not exist for USFWS-listed species to occur within the proposed project area. Water for drilling would be purchased from the San Juan Basin Water Haulers Association; no unaccounted-for water depletions within USFWS-listed fish habitat would occur. Therefore, there is no need for additional Section 7 consultation.

Native American Religious Concerns

For the proposed action, identification efforts for Native American Religious Concerns were limited to a review of existing published and unpublished literature (e.g., Van Valkenburgh 1941, 1974; Brugge 1993; Kelly, et al. 2006), development of the site-specific Class III survey report prepared for the proposed action (La Plata Archaeological Consultants [LAC] Report No. 2013-5hh [LAC 2013]), and a review by the BLM's cultural resources program regarding the presence of Traditional Cultural Properties (TCPs) 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 (NAGPRA; 25 USC 3001) or the Archaeological Resources Protection Act (ARPA; 16 USC 470) within the proposed project area. The proposed action would not impact any known TCPs, 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 (AIRFA; 42 USC 1996) or Executive Order (EO) 13007.

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

The proposed action is the BLM-FFO approval of WPX's Chaco 2306-20M No. 208H APD and two ROW Grants. The proposed project would include the drilling, production, and final abandonment of the 2306-20M No. 208H oil and natural gas well and the construction, use, and reclamation of one associated well pad (with construction zone) and access road. The primary objective of the Chaco 2306-20M No. 208H well would be to produce oil; however, it is likely that natural gas would be a byproduct.

Two staging areas would be used for the proposed project:

- Elm Ridge Exploration Company LLC's reclaimed Lybrook South No. 12 well pad
- WPX's recently permitted Chaco 2306-19E Nos. 188H/189H well pad (APD No. 30-043-21136)

When using these locations as staging areas, WPX would stay within the boundaries of the existing well pad disturbance areas. A sundry was submitted to the BLM-FFO in order to use the Lybrook South No. 12 well pad as a staging area for the Chaco 2306-19E No. 188H /189H well project.

A pipeline would not be constructed as part of the proposed project, as it is not yet known whether or not the proposed well would produce oil and/or natural gas. If it is determined that a pipeline is required for the well, the pipeline would be permitted separately.

Commencement of the project is proposed for November 2013.

Construction plats associated with the proposed project are provided in Appendix B. Photographs of the proposed project area are provided in Appendix C.

2.1.1. Location of Proposed Project Area

Maps of the proposed project area are provided in Appendix A. The proposed project area is plotted on the Lybrook and Counselor, New Mexico, 7.5-minute USGS quadrangle maps (Figure A.2) and the 2011 Sandoval County National Agriculture Imagery Program aerial photograph (Figure A.3).

The proposed project area is located within the BLM-FFO management area in Sandoval County, New Mexico. The proposed project area is located on BLM-FFO surface within the San Juan Basin. The proposed project area is located approximately 51 road miles south-southeast of the town of Bloomfield. More specifically, the proposed well pad is located 2.3 miles west of the community of Counselor and 1.4 miles south of U.S. Highway 550. The proposed well pad and access road are located within an unnamed arm of Escrito Canyon (see Figures A.1 and A.2, Appendix A).

The general region is characterized by valleys, rolling hills, and low mesas. Within the proposed well pad and access road area, there is a very gentle, north-northwestern slope toward an unnamed tributary of Escrito Canyon. The terrain within the proposed well pad and access road area is even. There are two vegetated swales and one erosional headcut within the proposed well pad area. The elevation within the proposed well pad and access road ranges from 7030 to 7050 feet above mean sea level (AMSL). An access road to Union Texas Petroleum Corp.'s Lybrook B No. 1 well pad once travelled through the site where the proposed well pad is located. The Lybrook B No. 1 well was plugged in 1989, and the associated road was subsequently reclaimed. This road is no longer visible.

The staging areas associated with the proposed project would be located approximately 1.6 road miles northwest of the proposed project area on public lands. These staging areas are located within another unnamed arm of Escrito Canyon.

The location of the proposed project area, wellhead, and bottom hole are provided in

Table 1, below.

Table 1. Location of Project Area

Feature	Geographical Coordinate System (Universal Transverse Mercator, North American Datum of 1983) [1]		Legal Land Description (New Mexico Principal Meridian)		
	Latitude	Longitude	Location within Section [2]	Section	Township & Range
Bottom Hole	36.20508° N	107.51742° W	380 feet FSL, 230 feet FWL	19	Township 23 North, Range 6 West
Wellhead	36.20516° N	107.49972° W	485 feet FSL, 155 feet FWL	20	
Well Pad (Including Construction Zone)	-		southeastern quarter of southeastern quarter	19	
			southwestern quarter of southwestern quarter	20	
Access Road					
Staging Area: Lybrook South No. 12 Well Pad (Reclaimed)			southwestern quarter of northwestern quarter	19	
Staging Area: Chaco 2306-19E Nos. 188H/189H Well Pad (Active)					

[1] N: North, W: West
[2] FSL: from south line, FWL: from west line

2.1.2. Description of Proposed Project

For a detailed description of design features and construction practices associated with the project, please refer to the APD and ROW Grant applications on file at the BLM-FFO. The plats (Appendix B) provide additional details. WPX would comply with BLM guidance and standards established in *The Gold Book: Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (*Gold Book*; BLM and U.S. Forest Service [USFS] 2007).

Design Features and Best Management Practices

WPX would adhere to stipulations listed in the stipulations attached to the approved APD and ROW Grants. The following general design features and best management practices (BMPs) would occur.

Control of Waste

Liquid and solid wastes would be disposed of at an appropriate waste-disposal site. The proposed project area would be maintained in a sanitary condition. Hazardous substances would be handled and disposed of according to federal law.

Protection of Paleontological Resources

If a paleontological site is discovered, the BLM would be notified and the site would be avoided by personnel, personal vehicles, and company equipment. Workers would be informed that it is illegal to collect, damage, or disturb some such resources, and that such activities are punishable by criminal and/or administrative penalties.

Protection of Cultural Resources

All BLM-FFO cultural resources stipulations would be followed as indicated in the Cultural Resource Records of Review, attached to the stipulations in the approved APD and ROW Grants. These stipulations could include, but would not be limited to, temporary or permanent fencing.

Employees, contractors, and sub-contractors associated with the project would be informed by WPX that cultural sites are to be avoided by personnel, personal vehicles, and company equipment. These individuals would 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 ARPA. All BLM-FFO cultural resources stipulations would be followed as indicated in the Cultural Resource Records of Review attached to the ROW Grant. In the event of a cultural discovery during construction, WPX would immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM. The BLM would then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., eligible for the National Register of Historic Places [NRHP] or protected under NAGPRA or ARPA), it would be protected in place until mitigating measures could be developed and implemented according to guidelines set by the BLM.

Protection of Wildlife, including Special Status Species

Since the proposed project would disturb more than 4.0 acres of vegetation, if construction activities would occur during the migratory bird breeding season (May 15 through July 31), a migratory bird nest survey would take place one to two days prior to construction. This survey would be conducted by a BLM-FFO-approved biologist following BLM-FFO protocol. If, during the nest survey or during construction, active nests are located within or adjacent to the proposed project area, the BLM-FFO biologist would be notified and project activities would not be permitted until fledging has occurred. If postponement is not an option, the operator would contact the USFWS's Migratory Bird Permit Office regarding permitting.

Should any active raptor nests be observed within one-third mile of the proposed project area or should any Special Status Species be observed within the proposed project area prior to or during construction, construction would cease and the BLM-FFO would be immediately contacted. The BLM-FFO would then ensure evaluation of the resource. Should a discovery be evaluated as significant (protected under the ESA, etc.), it would be protected in place until mitigation could be developed and implemented according to guidelines set by the BLM.

Wildlife hazards associated with the project would be fenced, covered, and/or contained in storage tanks, as necessary.

The well associated with the connected action would have a closed-loop system; there would be no reserve pit associated with the well.

Protection of Water Resources

The well associated with the connected action would have a closed-loop system; there would be no reserve pit associated with the well.

Protection of Livestock

Livestock grazing operators in the vicinity of the proposed project area would be contacted by WPX at least 10 days prior to construction. No holes or trenches would be left open overnight. Open holes would be barricaded to ensure the safety of livestock.

Prevention and Control of Weeds

It would be WPX's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the project. WPX's weed-control contractor would contact the BLM-FFO regarding acceptable weed-control methods. If the contractor does not hold a current Pesticide Use Permit, a Pesticide Use Permit would be submitted prior to pesticide application. Only pesticides authorized for use on BLM lands would be used. The use of pesticides would comply with federal and state laws. Pesticides would be used only in accordance with their registered use and limitations. WPX's weed-control contractor would contact the BLM-FFO prior to using these chemicals.

Protection of Air Resources

The BLM's regulatory jurisdiction over field production operations has resulted in the development of BMPs designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures could include flaring hydrocarbons and gases at high temperatures in order to reduce emissions of incomplete combustion, requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored, ensuring that compressor engines 300 horsepower or less have nitrogen oxide (NO_x) emissions limited to 2 grams per horsepower hour, revegetating areas not required for production facilities to reduce the amount of dust, and watering dirt roads during periods of high use in order to reduce fugitive dust emissions. Magnesium chloride, organic-based compounds, or polymer compounds could be also be applied to roads or other surfaces to reduce fugitive dust. Petroleum-based products or produced water would not be used.

Additional Design Features and BMPs

The hauling of equipment and materials for the project on public roads would comply with Department of Transportation regulations. WPX would notify the public of potential hazards by posting signage, as necessary.

Vehicles would be restricted to proposed disturbance areas and existing areas of surface disturbance, such as existing roads and well pads.

Worker safety incidents would be reported to the BLM-FFO as required under Notice to Lessees (NTL) - 3A (USGS 1979). WPX would adhere to company safety policies, Occupational Safety and Health Administration regulations, and Department of Transportation regulations.

WPX would comply with Onshore Oil and Gas Order No. 2, issued under Onshore Oil and Gas Operations (43 CFR 3160).

The well location would have an informational sign, as required by Onshore Oil and Gas Operations regulations (43 CFR 3160).

Proposed Project Phases

Under the proposed project, the following phases would occur.

Construction

The construction phase of the proposed project is expected to be approximately one week.

The proposed well pad and access road would be cleared of vegetation. Slash and brush would be chipped or mown and used on the access road shoulders or elsewhere within the proposed project area. The "chips" would be distributed in a manner which would not impede seeding with machinery and

the establishment of successful revegetation. There is one small tree within the proposed project area; it would be treated as slash.

The top 6 inches of topsoil would be stripped and stockpiled within the well pad construction zones for redistribution during reclamation. Topsoil would be stored separately from subsoil material.

The proposed access road and well pad would be leveled with a D-8 bulldozer to provide space and a level surface for vehicles and equipment. Excavated materials from cuts would be used on fill portions of the location. Construction would utilize native soil and materials available onsite.

The proposed access road would be 30 feet wide and 235 feet long (0.16 acre). The 30-foot-wide road workspace would accommodate clearing, cut-and-fill slopes, and drainage ditches. Within the 30-foot-wide road workspace, there would be a 14-foot-wide running surface with turnouts, as necessary, and adequate crowning and drainage on both sides. The proposed access road would be built up 18 to 24 inches following *Gold Book* standards. The maximum road grade would be 2 percent. The road would be constructed to meet the standards for anticipated traffic flow and all-weather requirements. Surfacing material would be used, as necessary. The road would be recessed in, in order for equipment to safely maneuver when entering the proposed well pad. A 24-inch-diameter culvert would be installed beneath the road, just northeast of the well pad entrance. Additional culverts would be installed beneath the road where needed. The road would be designed and maintained in accordance with the *Gold Book* (BLM and USFS 2007) standards and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e).

The proposed well pad would measure 500 by 300 feet (3.44 acres). A 50-foot-wide (2.07-acre) construction zone would surround the well pad. The size of the proposed well pad is slightly larger than typical well pads in the BLM-FFO area because the equipment (such as tanks) associated with the new hydraulic fracturing design requires a larger area. The maximum well pad cut would be 6 feet on the southeastern side (corners 3 to 5). The maximum well pad fill would be 4 feet on the northwestern side (corner 6 to mid-point 1).

Within the staging areas, vegetation (if present) could be mown, but the locations would not be stripped. Topsoil would not be removed.

Drilling and Completion

Once construction is complete, a drilling rig would be transported to the well pad and assembled. Horizontal drilling typically takes approximately 30 days. Once drilling is complete, the well would be completed (the process in which the well is enabled to produce oil and natural gas). Completion typically takes 30 days.

Facilities and equipment on the location during this time could include the following:

- Drilling rig
- Generator(s)
- Water and mud tanks
- Mud pumps
- Safety stations
- Equipment and material storage units
- Fuel storage
- Dog House (equipment control room)
- Construction trailers
- Various service company equipment (cement trucks, fracturing trucks & equipment, wireline trucks, etc.)

Approximately 10 to 40 personnel would be on the proposed site at any time during drilling and completion.

During this process, vehicles would use existing access roads, as well as developed roads and highways in the region. Traffic would include light vehicles (such as cars and pick-up trucks) and heavy vehicles (such as water trucks and large tractor-trailers hauling equipment).

It is estimated that 23,000 barrels of useable water would be required to drill the well. Of the 23,000 barrels, approximately 10,000 to 11,000 barrels would be recovered for reuse. Water for drilling would be obtained from San Juan Basin Water Haulers Association and trucked to the location. WPX would ensure that water would be obtained legally and that all required permits would be obtained prior to obtaining water.

Surface casing would be installed to a depth necessary to penetrate past freshwater zones. The casing would be pressure-tested to ensure that a seal has been created.

Drill cuttings, drill water, and completion fluids would be placed in the closed-loop system. Any other fluids or hazards on the location would be contained or fenced and properly maintained to ensure the safety of livestock and wildlife.

Interim Reclamation

If the well proves to be productive, portions of the proposed project area that would not be required for production would be reclaimed. This would include the non-working area, or the construction zone and portions of the well pad. This would also include the staging areas, if required by the BLM-FFO.

Interim reclamation would be initiated within 120 days of construction. The BLM-FFO would be notified at least 48 hours prior to the start of interim reclamation activities. Interim reclamation could occur simultaneously with production.

During this phase, a bulldozer and a tractor with seeding capabilities would be used for reclamation purposes. Approximately four personnel would be required to conduct interim reclamation at the location.

Slopes would be re-contoured to pre-construction topographical contours, if possible. The goal of interim reclamation would be to diminish the evidence of cuts, fills, and flat well pad surfaces. Stockpiled topsoil would be redistributed and reclamation areas would be ripped and seeded. Sediment- and erosion-control features (including water diversions and silt traps) would be installed, as necessary. The Sagebrush/Grass Community Seed Mixture would be used. Details of the interim reclamation process (including species included in the seed mixture) are provided in the Surface Reclamation Plan (Appendix D).

Production

The production phase of wells varies; the lifetime is anticipated to be 30 to 50 years.

Production equipment that would remain on the well pad could include the following:

- Wellhead
- Production unit
- Meter run
- Compressor
- Flare stack
- Water tanks
- Oil tanks

Production equipment would be located within a 100-by-300-foot (0.69-acre) working area on the southeastern side of the proposed well pad. An approximately 150-by-210-foot (0.72-acre) teardrop within the central portion of the proposed well pad would be used to access the wellhead and other facilities.

Site security guidelines would be followed, as identified in 43 CFR 3162.7-5 and Onshore Oil and Gas Order No. 3. With the exception of equipment subject to safety requirements, equipment would be painted

Juniper Green to blend with the surrounding environment. Production facilities would be placed, to the extent practical, to minimize visual impacts.

Production would comply with noise standards outlined in NTL 04-2 FFO (BLM 2004).

During production, normal upkeep would be required to monitor production and resolve any problems. It is anticipated that one pick-up truck would visit the proposed well pad daily during the normal work week. Trucks would be used to remove wastewater stored in tanks at the location. The frequency of water-hauling would depend upon the amount of water produced by the proposed well; the frequency could vary from once a day to once a month. Oil transport trucks would also visit the location; frequency would depend upon production.

Occasionally, workover or recompletion of the proposed well would be necessary to ensure that efficient production is maintained. Workovers and recompletions would be scheduled as needed to improve and maintain production of the well. Workover activities could include repairs to the wellbore equipment (e.g., casing, tubing, rods, and pump), wellheads, or production facilities.

Final Reclamation and Abandonment

If the well proves to be unproductive, or when it is no longer commercially viable, it would be plugged and abandoned. Downhole well abandonment would be carried out under current BLM-FFO and state regulations. The bore would be plugged with cement and the production facilities would be removed. An aboveground marker would be placed over the plugged hole. The marker would contain individual well identification information.

Final reclamation of the proposed well pad and access road would take place, unless the BLM-FFO considers the retention of these facilities necessary for the management of multiple uses of natural resources. The final reclamation phase is anticipated to take less than one week. WPX would provide the BLM-FFO with technical and environmental aspects of the final plugging, abandonment, and reclamation procedures. Details of the final reclamation process are provided in the Surface Reclamation Plan (Appendix D).

During this phase, a bulldozer and a tractor with seeding capabilities would be used. Approximately four personnel would be required.

The goal of final reclamation would be to return disturbed areas associated with the project to pre-construction conditions, if possible, by diminishing the evidence of cuts, fills, and flat surfaces. Disturbed areas would be re-contoured to pre-construction topographical contours, covered with salvaged topsoil, and seeded. Sediment- and erosion-control measures would be implemented, as necessary. Water bars would be installed across the road(s), and dead-end ditches and earthen barricades would be constructed at the entrance to reclaimed areas. Measures would be taken to control sedimentation and erosion, as necessary.

2.1.3. Surface Disturbance

The proposed well pad and access road would encompass 5.64 acres. Of this, 4.07 acres would be reclaimed during interim reclamation, and 1.57 acres would be reclaimed during final reclamation. Details are provided below:

- The proposed access road would be 30 feet wide and 235 feet long (0.16 acre). The access road would remain active throughout the life of the well, and would be reclaimed during final reclamation.
- The proposed well pad would measure 500 by 300 feet (3.44). A 50-foot-wide (2.07-acre) construction zone would surround the well pad. Approximately 0.03 acre of the proposed access road would overlap the proposed construction zone. Therefore, there would be approximately

5.48 acres of new surface disturbance associated with the proposed well pad and construction zone.

Of this 5.48 acres of new surface disturbance, 1.41 acres would be considered the working area (area necessary for the routine, long-term operation and maintenance of an authorized site); this acreage would be active throughout the life of the well, and would be reclaimed during final reclamation. The remaining 4.07 acres would be reclaimed during interim reclamation.

There would also be two staging areas associated with the proposed project. These proposed staging areas encompass a total of 3.85 acres. WPX would stay within the original well pad boundaries of these areas. These staging areas would be reclaimed during interim reclamation, if the BLM-FFO requests so. Details are provided below:

- The reclaimed Lybrook South No. 12 well pad: The disturbance area for this well pad measures approximately 1.10 acres (estimated from an aerial photo).
- The recently permitted Chaco 2306-19E Nos. 188H/189H well pad: This well pad measures approximately 2.75 acres.

2.2. No Action

Under the No Action Alternative, the Chaco 2306-20M No. 208H APD and ROW Grants would not be approved. The proposed well would not be drilled and the proposed well pad and access road would not be constructed. Current land and resource uses would continue to occur in the proposed project area.

2.3. Alternatives Considered but Eliminated from Detailed Study

Natural gas and oil wells can be drilled vertically or directionally/horizontally. Vertical drilling places a well pad directly above the bottom hole, while directional/horizontal drilling allows for flexibility in the placement of the well pad and associated surface facilities. Directional/horizontal drilling often allows for “twinning,” or drilling two or more wells from one shared well pad. Directional/horizontal drilling applications throughout the San Juan Basin have become relatively routine. Generally, the use of this technology is applied when it is necessary to avoid or minimize impacts to surface resources.

Factors such as reservoir depth, angle of deviation, lateral displacement, completion technique, and risk are considered before deciding on the use of directional drilling applications. In addition, operating factors such as production efficiency; rod, pump, and tubing wear; and workover frequency is also a consideration. Generally, directional well completion and operating costs are 20 to 25 percent higher than vertical well drilling costs. The primary economic factors that determine the feasibility of directional applications include, but are not limited to, incremental drilling, completion, and operating costs; oil and gas reserves; rates of production; oil and gas prices; royalties and taxes; and return on investment.

Twinning or co-locating the proposed well with Encana Oil & Gas (USA) Inc.’s recently permitted Lybrook E29-2306 No. 01H well was considered (Figure A.2, Appendix A); however, it was determined that this alternative was not feasible because the drilling reach to the proposed bottom hole was too far. No feasible alternative surface locations for the proposed well were identified that would result in less surface disturbance than the proposed location.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Under the No Action alternative, current land and resource issues within the proposed project area would continue; there would be no new impacts from oil and gas development. The No Action alternative will serve as the baseline for comparing the environmental impacts of the analyzed alternatives, and will not be further evaluated in this EA (BLM 2008b).

3.1. Air Resources

3.1.1. Affected Environment

The proposed project area is located in Sandoval County, New Mexico. General information on air quality in the area is contained in Chapter 3 of the PRMP/FEIS (BLM 2003a, 3-48 – 3-53). New information about 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, 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 back 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. These changes are 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 the Air Resource Technical Report; BLM 2013a). 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 EPA has the primary responsibility for regulating air quality, including the regulation of six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} & $PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). The EPA has established NAAQS for criteria air pollutants. The NAAQS are protective of human health and the environment. The EPA has approved New Mexico’s State Implementation Plan, and the state enforces state and federal air quality regulations on all public and private lands within the state, with the exception of tribal lands and Bernalillo County.

Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology, and terrain. Air quality also includes 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 EPA has proposed or completed actions recently to implement CAA requirements for GHG emissions. Climate has the potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

The Air Resource Technical Report describes the types of data used in the description of the existing conditions of criteria pollutants, describes how the criteria pollutants are related to the activities involved in oil and gas development, and provides a table of current national and state standards (BLM 2013a). The EPA Green Book web page reports that all counties in the BLM-FFO analysis area, including San Juan, McKinley, Rio Arriba, and Sandoval Counties in New Mexico and La Plata County in Colorado, are in attainment of all NAAQS as defined by the CAA (EPA 2012). In addition, the area 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 2 shows monitored design values for O_3 in recent years for each of the three San Juan County O_3-monitoring stations.

Table 2. Reported Ozone Values for San Juan County Ozone Monitoring Stations

State Air Monitoring Station	8-hour Ozone Design Value (ppm*)				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

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State Air Monitoring Station	8-hour Ozone Design Value (ppm*)				NAAQS
	2007-2009	2008-2010	2009-2011	2010-2012	2008
Navajo Lake	0.069	0.066	0.068	0.071	0.075
Source: NMED 2012 * parts per million					

Table 3 summarizes monitored design values for other criteria pollutants in San Juan County.

Table 3. 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 (3,4)	150 µg/m(3,4)
$PM_{2.5}$	4.5µg/m(3)	Annual	12 µg/m(3,5)	60 µg/m(3,4)
$PM_{2.5}$	14µg/m(3)	24-hour	35 µg/m(1,3)	--
SO_2	0.001ppm(7)	Annual	None	0.02 ppm
SO_2	20 ppb(8)	1-hour	75 ppb(6)	None
SO_2	0.008 ppm	24-hour	None	0.10 ppm

Source: EPA 2012
(1) 98th percentile, averaged over 3 years
(2) Not to be exceeded more than once per year
(3) Not to be exceeded more than once per year on average over 3 years
(4) The NMAAQS is a standard for total suspended particulate matter
(5) Annual mean, averaged over 3 years
(6) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
(7) ppm: parts per million
(8) ppb: parts per billion

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

Hazardous Air Pollutants

The Air Resources 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 (BLM 2013a). The EPA has identified 187 toxic air pollutants as HAPs. In March 2011, the EPA published the fourth in a series of National Scale Air Toxics Assessments (NATA) that quantifies HAP emissions for 2005 by U.S. county. 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 problems, and respiratory problems for each county and census tract. Because techniques have changed over the years, each NATA is not comparable to those previously issued. The EPA 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 analysis estimated tract level total cancer risk for the analysis area as 25 to 50 per one million; the estimated tract level total respiratory hazard index was zero to 1. The EPA estimates the average national cancer risk for 2005 was 50 per one million, meaning 1 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 their 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 semiarid 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 have dipped below zero 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 4 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 4. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (°F[1])	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	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: BLM 2013a; data collected at New Mexico State Agricultural Science Center - Farmington (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. This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one horizontal oil well. The calculators give an approximation of criteria pollutant, HAP, and GHG emissions to be compared to regional and national emissions levels. Also incorporated into this document are sections describing the assumptions used in developing the inputs for the calculator (BLM 2013a).

Direct and Indirect Impacts

Table shows estimated emissions from one proposed horizontal oil well for criteria pollutants, volatile organic compounds (VOCs) and GHGs. For comparison, Table 7 shows total human-caused emissions for each of the counties in the BLM-FFO management area and La Plata County, Colorado, based on the EPA's 2008 emissions inventory (EPA 2011).

Table 6. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well; Average 25 Days to Drill and Complete

Activity	NOx[(1)]	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH_4	CO_2
One time operations (tons)*								
Construction	5.5	1.5	0.5	2.5	0.25	0.1	0.007	598.85
Completion	0.5	0.1	0.03	0.025	0.025	-	-	55.00
Interim Reclamation	0.006	0.006	0.006	0.001	-	0.003	-	1.24
Final Reclamation	0.006	0.006	0.006	0.001	-	0.004	-	1.66
Ancillary Operations (tons)								
Workover	0.129	0.04	0.01	0.01	0.01	-	-	10.59

Table 6. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well; Average 25 Days to Drill and Complete

Activity	NOx[1]	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH_4	CO_2
Road Maintenance	-	-	-	-	-	-	-	0.26
Road Traffic	-	-	-	-	-	-	-	0.06
Annual operations (tons/yr)								
Oil Haul Truck and small truck (100 bbl/day)	0.009	0.006	0.0012	0.0009	0.0008	-	0.0001	3.88
Total	**6.13**	**1.64**	**0.55**	**2.54**	**0.29**	**0.11**	**0.01**	**671.54**

[1]nitrogen oxide

Table 7. Analysis Area 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**

Source: EPA 2008

Oil storage tanks on the well location may result in venting of VOCs. Oil well production is generally presented as barrels per day produced. The emissions calculator estimated that for every barrel per day produced there could be 0.12 tons of VOC vented per year. The average horizontal oil well in the BLM-FFO management area produces approximately 100 barrels per day. One hundred barrels per day is estimated to result in 12 tons of VOC emissions per year. Oil storage tanks would be subject to current EPA regulations regarding the capture or flaring of VOC emissions.

Table displays the percent increase in total emissions expected in the analysis area as a result of constructing and operating one horizontal oil well.

Table 8. Percent Increase in Analysis Area Emissions from the Proposed Action

	NO_X	CO	VOC	PM_{10} [1]	$PM_{2.5}$ [1]	SO_2 [1]
Total Emissions	57,303.4	147,078.1	160,079.0	218,800.3	23,897.3	13,343.3
Horizontal Oil Well Emissions	6.13	1.64	12.55(8)	2.54	0.29	0.11
Percent Increase	**0.01**	**0.001**	**0.009**	**0.001**	**0.001**	**0.0008**

[1]Values derived from average emissions for any well drilling in the analysis area. Calculated results available upon request.

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 1.25 tons per year should be considered a very gross estimate. Most of the VOC emissions estimated for one horizontal oil well result from venting from oil storage tanks. Current EPA regulations require operators to reduce VOC emissions by 95 percent if their oil storage tanks emit over 6 tons of VOC emissions per year. A reduction of 95 percent of oil storage tank VOC emissions would reduce the estimated HAP emissions to 0.12 tons per year.

Total Greenhouse Gases

The available statewide GHG summary combines GHG emissions from CO_2 and CH_4 (NMED 2010). To compare the GHG emissions from the proposed action (estimated by the calculator) with statewide GHG emissions, 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 of CO_{2e} (76.2 million metric tons; NMED 2010).

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The estimated CO_{2e} metric tons emissions from one horizontal oil well (609.2 metric tons) would represent a 0.0008-percent increase in New Mexico CO_2 emissions.

Cumulative Impacts

The BLM-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 reasonably foreseeable development scenarios for oil and gas wells on public lands in the BLM-FFO was presented in the RMP. This included modeling of impacts on air quality (BLM 2003b). A more detailed discussion of cumulative effects can be found in the Air Resources Technical Report (BLM 2013).

The primary sources/activities that contribute to levels of air pollutants and GHG emissions in the Four Corners area are electricity-generation stations, fossil fuel industries, and vehicle travel. The Air Resources 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 (BLM 2013). It includes a summary of emissions on the national and regional scale by industry source. Sources/activities 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 result in exceeding the NAAQS for any criteria pollutants in the analysis area.

The very small increase in GHG emissions that could result from implementing the proposed action 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 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 (BLM 2013). It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.2. Soil Resources

3.2.1. Affected Environment

Soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. This material has been mixed and sorted in transport and has a wide range of mineralogy and particle size. The parent material of sedimentary rock consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

The Natural Resources Conservation Service (NRCS) mapped the soils in the proposed project area. Complete soil information is available in the NRCS's *Soil Survey of Sandoval County, New Mexico: Parts of Los Alamos, Sandoval, and Rio Arriba Counties*. There are three soil types within the proposed project area: Blancot-Councelor-Tsosie association (0- to 5-percent slopes), Sparank clay loam, moderately saline (0- to 1-percent slopes), and Vessilla Menefee Orlie Association (0- to 33-percent slopes; NRCS 2008). Descriptions of these soil types are provided below.

Blancot-Councelor-Tsosie association (0- to 5-percent slopes)

The access road, the majority of the proposed well pad and construction zone, the Lybrook South No. 12 staging area, and the southeastern portion of the Chaco 2306-19E Nos. 188H/189H staging area are mapped as the Blancot-Councelor-Tsosie association (0- to 5-percent slopes). This soil association is composed of 40 percent Blancot soils, 30 percent Councelor soils, and 25 percent Tsosie soils (NRCS 2008).

This is considered a well-drained soil, with the depth to water table and restrictive layer being more than 80 inches. This soil type has a moderate potential for water erosion and very high potential for wind erosion (NRCS 2008).

This soil association is typically found along valley side/floor, ridge, fan remnant, stream terrace, and alluvial fan landforms and within loamy, sandy, and salt flat ecological sites. The potential plant community for this soil association includes James' galleta (*Pleuraphis jamesii*), Indian ricegrass (*Achnatherum hymenoides*), needleandthread (*Hesperostipa comata*), New Mexico feathergrass (*Hesperostipa neomexicana*), inland saltgrass (*Distichlis spicata*),western wheatgrass (*Pascopyrum smithii*), squirreltail (*Elymus elymoides*), blue grama (*Bouteloua gracilis*), dropseed (*Sporobolus* spp.), alkali sacaton (*Sporobolus airoides*), winterfat (*Krascheninnikovia lanata*), big sagebrush (*Artemisia tridentata*), Mormon tea (*Ephedra viridis*),greasewood (*Sarcobatus vermiculatus*),shadscale saltbush (*Atriplex confertifolia*), and fourwing saltbush (*Atriplex canescens;* NRCS 2008).

Vessilla-Menefee-Orlie association (0- to 33-percent slopes)

The west-southwestern portion of the proposed well pad and construction zone are mapped as the Vessilla-Menefee-Orlie association (0- to 33-percent slopes). This association is composed of 35 percent Vessilla and similar soils, 30 percent Menefee and similar soils, and 25 percent Orlie and similar soils (NRCS 2008).

This soil is considered a well-drained soil, with the depth to water table being more than 80 inches and depth to restrictive layer ranging from 4 to more than 80 inches. Available water capacity for this soil association is very low to high (approximately 1.8 to 11.9 inches). This soil type has a high potential for water erosion and very high potential for wind erosion (NRCS 2008).

This soil type is typically found along mesa, hill, break, ridge, mountainside, and cuesta landscapes and gravelly loam, piñon pine (*Pinus edulis*)-skunkbush sumac (*Rhus trilobata*)-blue grama, and piñon pine-oneseed juniper (*Juniperus monosperma*)-Gambel oak (*Quercus gambelii*)-blue grama ecological sites (NRCS 2008).

Sparank clay loam, moderately saline, sodic (0- to 1-percent slopes)

The majority of the Chaco 2306-19E Nos. 188H/189H staging area is mapped as Sparank clay loam, moderately saline, sodic (0- to 1-percent slopes). Approximately 85 percent of this soil type is composed of Sparank, moderately saline, sodic, and similar soils (NRCS 2008).

This soil is considered a well-drained soil, with the depth to water table and depth to restrictive layer being more than 80 inches. Available water capacity for Sparank clay loam, moderately saline, sodic is high (approximately 10.3 inches). This soil type has a very low potential for water erosion and high potential for wind erosion (NRCS 2008).

Sparank clay loam, moderately saline, sodic is typically found along floodplain, valley side, alluvial fan, stream terrace, and valley floor landforms and within salty bottomland ecological sites. The potential plant community for this soil type includes James' galleta, western wheatgrass, alkali sacaton, greasewood, and fourwing saltbush (NRCS 2008).

3.2.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

During construction, 5.64 acres of vegetation would be cleared from within the proposed access road and well pad/construction zone area. Within this area, topsoil would be stripped and the location would be leveled. Of this acreage, approximately 1.57 acres would remain as bare, compacted surface for the life of the proposed project; the remainder (4.07 acres) would be reclaimed during interim reclamation.

Construction activities within the proposed well pad and access road would result in the mixing, displacement, and compaction of soils. Soils in these areas are classified as having a moderate to high water erosion potential and a very high wind erosion potential (NRCS 2008). The removal of vegetation could result in increased soil erosion during construction activities. The degree of erosion would be dependent upon precipitation and wind. The terrain within the area is even, which would limit erosion. In addition, following construction, the compaction of soils, reclamation of portions of the proposed project area, and implementation of erosion-control measures would limit soil impacts due to erosion.

Within the 3.85 acres associated with the staging areas, vegetation (if present) would be mowed but not cleared of vegetation; topsoil would not be removed from within these areas, and the locations would not be leveled. Therefore, soil impacts resulting from the proposed project are expected to be minor within the staging areas.

Cumulative Impacts

The spatial analysis area for cumulative soil impacts is the proposed project area, immediately surrounding lands, and points immediately downstream of the proposed project area. Overland sheetflow is apparent within the spatial analysis area, and there are vegetated swales present within the proposed project area. Within the spatial analysis area, direct soil disturbance has occurred within an existing access road immediately northeast of the proposed access road. By the time the proposed project commences, it is likely that the Chaco 2306-19E Nos. 188H/189H staging area would already be cleared of vegetation as part of the Chaco 2306-19E Nos. 188H/189H well project. It is possible that these existing and pending disturbances result/would result in slightly increased erosion within and downstream of the proposed project area; however, terrain within the spatial analysis area is even and the soils within the existing road and pending Chaco 2306-19E Nos. 188H/189H well pad have been/will be compacted. The Lybrook South No. 12 well pad was previously disturbed, but has since become revegetated; it is unlikely that there is any existing erosion associated with this location. The proposed project could contribute slightly to ongoing erosion within and immediately downstream of the spatial analysis area.

3.3. Groundwater Resources

3.3.1. *Affected Environment*

It is anticipated that groundwater is more than 200 feet below the surface of the proposed well pad. This depth is based on groundwater data obtained from the only water well located within a 2-mile radius of the proposed project area. The water well, SJ 01156, is located approximately 2 miles north-northwest of the proposed well pad. The water well is at an elevation of approximately 6900 feet AMSL and has a depth to groundwater of 200 feet (New Mexico Office of the State Engineer 2011). Because the proposed Chaco 2306-20M No. 208H well pad is approximately 140 feet higher in elevation than the SJ 01156 water well, it is estimated that groundwater is more than 200 feet below the surface of the proposed Chaco 2306-20M No. 208H well pad.

3.3.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Stimulation (i.e., hydraulic fracturing or “fracking”) is a process used to maximize the extraction of underground resources by allowing oil or natural gas to move more freely from the rock pores to

production wells that bring the oil or gas to the surface. Fluids, commonly made up of water (99 percent) and chemical additives (1 percent), are pumped into a geologic formation at high pressure during fracking (EPA 2004). Chemicals added to stimulation fluids may include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents, and clay stabilizers. When the fracking pressure exceeds the rock strength, the fluids open or enlarge fractures that typically extend several hundred feet away from the well bore, and may occasionally extend up to 1000 feet from the well bore. After the fractures are created, a propping agent (usually sand) is pumped into the fractures to keep them from closing when the pumping pressure is released. After fracking is completed, a portion of the injected fracking fluids returns to the wellbore and is recovered for future fracking operations (EPA 2004) or disposal. Stimulation techniques have been used in the U.S. since 1949 and in the San Juan Basin since the 1950s. Over the last 10 years, advances in multi-stage and multi-zone fracking have allowed for the development of gas fields that previously were uneconomic, including the San Juan Basin.

Fracking is a common process in the San Juan Basin and applied to nearly all wells drilled. The producing zone targeted by the proposed project is well below any underground sources of drinking water. The Mancos Shale formation is also overlain by a continuous confining layer. The geological confining layer is the Lewis Shale formation, which is located above both the Mancos Shale and Mesaverde formations. The Lewis Shale formation provides an impermeable layer that isolates the Mancos Shale and Mesaverde formations from both identified sources of drinking water and surface water. On average, the total depth of the proposed well bore would be about 5000 feet below the ground surface. Fracking in the Basin Mancos formation is not expected to occur above depths of 4000 feet below the ground surface. Fracking could possibly extend into the Mesaverde formation overlying the Basin Mancos; however, the formation has not been identified as an underground source of drinking water based on its depth and relatively high levels of total dissolved solids. No impacts to surface water or freshwater-bearing groundwater aquifers are expected to occur from fracking of the proposed well.

Cumulative Impacts

As no direct or indirect impacts to groundwater are anticipated as a result of the proposed project, there would be no cumulative impacts.

3.4. Upland Vegetation

3.4.1. Affected Environment

The proposed project area is located within the Arizona/New Mexico Plateau ecological region. This ecological region occurs primarily in Arizona, Colorado, and New Mexico; a small portion is located within Nevada. This ecological region encompasses approximately 45,870,500 acres (185,632 square kilometers), and the elevation ranges from 2165 to 11,949 feet AMSL. The ecological region's landscapes include low mountains, hills, mesas, foothills, irregular plains, alkaline basins, some sand dunes, and wetlands. This ecological region is a large transitional region between the semiarid grasslands to the east; the drier shrublands and woodlands to the north; and the lower, hotter, less-vegetated areas to the west and south. Vegetation communities include shrublands with big sagebrush, rabbitbrush (*Ericameria* spp.), winterfat, shadscale saltbush, and greasewood; and grasslands of blue grama, western wheatgrass, green needlegrass (*Nassella viridula*), and needleandthread grass. Higher elevations may support piñon pine and juniper (*Juniperus* spp.) woodlands. This ecological region includes the urban areas of Santa Fe and Albuquerque, New Mexico. Important land uses within this ecological region include irrigated farming, recreation, rangeland, wildlife habitat, and some natural gas production (Griffith, et al. 2006).

Sagebrush shrublands with widely scattered trees are found within the unnamed arm of Escrito Canyon in which the proposed well pad and access road are located. Open to dense piñon-juniper woodlands are present on the low mesas and rolling hills surrounding the canyon arm.

The proposed well pad and access road are located within a sagebrush shrubland vegetation community. The location has been treated, and much of the big sagebrush is leafless. The dominant species are big sagebrush, James' galleta, and blue grama. Additional species identified within the proposed project area

include fourwing saltbush, rabbitbrush, Russian thistle (*Salsola tragus*), broom snakeweed (*Gutierrezia sarothrae*), goosefoot (*Chenopodium* sp.), hairy false goldenaster (*Heterotheca villosa*), vervain (*Verbena* sp.), scarlet globemallow (*Sphaeralcea coccinea*), dropseed, alkali sacaton, crested wheatgrass (*Agropyron cristatum*), and brittle pricklypear (*Opuntia fragilis*). There is 1 juvenile piñon pine within the proposed well pad and access road area. Ground cover is estimated at 40 to 50 percent.

A vegetation survey was not conducted within the Lybrook South No. 12 reclaimed well pad, which would serve as a staging area. However, this well has been plugged and abandoned, and aerial photos indicate that the well pad has since become revegetated. The Chaco 2306-19E Nos. 188H/189H well pad has been recently permitted; when it is used as the staging area, it is anticipated that it will either be barren of vegetation or recently reclaimed as part of the Chaco 2306-19E Nos. 188H/189H project. The vegetation community surrounding both staging areas is sagebrush shrubland.

3.4.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed project would result in the removal of approximately 5.64 acres of sagebrush shrubland within the proposed access road and well pad area. During the construction phase of the proposed project, all vegetation within the limits of these features would be cleared. Of this disturbance, approximately 1.57 acres would remain as compacted, barren surface for the life of the proposed well. The remainder (4.07 acres) would be reclaimed during interim reclamation.

The vegetation within the staging areas (if present) would be mowed. The staging areas encompass 3.85 acres; it is not known how much of this acreage would be vegetated prior to the commencement of the proposed project. Vegetation remaining within the staging areas could be trampled. During interim reclamation, previously vegetated areas within the staging area would be reclaimed, if necessary.

During reclamation, the BLM Sagebrush/Grassland Community Seed Mixture would be utilized; the species included in this mixture are listed in the Surface Reclamation Plan (Appendix D). The re-establishment of vegetation within reclaimed areas is expected to take three to five growing seasons, depending on precipitation. Re-established vegetation would consist of native grass, forb, and shrub species included in the seed mixture, as well as native species that are not deliberately planted. It is also possible that invasive, non-native species could become established within the proposed project area, as such species could be transported by project equipment and tend to thrive in disturbed areas (BLM 2003a, 4-18). Following the reclamation process, the resulting vegetation communities could differ from the native plant communities surrounding the proposed project area. Within reclaimed areas, it is not expected that the vegetation communities would return to native conditions within 20 years (BLM 2003a, 4-18).

The deposition of fugitive dust generated during vegetation-clearing activities, during the use of the well pad/construction zone expansion area, and during wind events could reduce photosynthesis and productivity of the surrounding vegetation (Thompson, et al. 1984; Hirano, et al. 1995), increase water loss in plants near the proposed project area (Eveling and Bataille 1984), and result in injury to leaves of surrounding vegetation.

Cumulative Impacts

The spatial analysis area is the proposed project area, staging areas, and immediately adjacent lands. Within the analysis area, direct vegetation removal has occurred along an existing access road immediately northeast of the proposed access road. The Lybrook South No. 12 well pad staging area was previously disturbed but reclaimed in 2012. It is anticipated that the recently permitted Chaco 2306-19E Nos. 188H/189H well pad staging area would be cleared of vegetation by the time the proposed project commences.

Indirectly, fugitive dust or deposition associated with existing roads and well pads in the immediate area could impact the vegetation within the analysis area, and could continue to do so throughout the life of the

project. Aside from those discussed, no additional impacts to vegetation are expected within the analysis area for the reasonably foreseeable future.

The proposed project would increase direct vegetation disturbance within the analysis area and could potentially increase fugitive dust and/or deposition in the area.

3.5. Migratory Birds

3.5.1. Affected Environment

EO 13186, dated January 17, 2001, calls for increased efforts to more fully implement the Migratory Bird Treaty Act of 1918. In keeping with this mandate, the BLM-FFO has issued an interim policy to minimize unintentional take, as defined by the EO, and to better optimize migratory bird efforts related to BLM-FFO activities. In keeping with this policy, a list of priority birds of conservation concern which occur ecological regions similar to the proposed project area was compiled through a review of existing bird conservation plans including:

- USFWS Birds of Conservation Concern,
- New Mexico Partners in Flight (NMPIF) New Mexico Bird Conservation Plan,
- Comprehensive Wildlife Conservation Strategy for New Mexico,
- Gray Vireo Recovery Plan,
- The North American Waterbird Conservation Plan, and
- Recovery plans and conservation plans/strategies prepared for federally-listed candidate species.

The selected species have a known distribution in the BLM-FFO area and may be affected by various types of perturbations.

Table 5, below, lists those species that have the potential to occur within the proposed project area; this potential is based on species range and the habitat found within and adjacent to the proposed project area.

Table 5. Migratory Birds with Potential to Occur in Proposed Project Area

Species Name	Habitat Associations
Bendire's thrasher (*Toxostoma bendirei*)	On the Colorado Plateau, open sagebrush with scattered junipers and a sparse or degraded understory. Prefers lower elevations. Avoids riparian areas and arroyos with dense shrub cover.
Brewer's sparrow (*Spizella breweri*)	Closely associated with sagebrush shrublands, preferring dense stands broken up with grassy areas.
Loggerhead shrike (*Lanius ludovicianus*)	Open country interspersed with improved pastures, grasslands, and hayfields. Nests in sagebrush areas, desert scrub areas, and woodland edges.
Mountain bluebird (*Sialia currucoides*)	Open piñon-juniper woodlands, mountain meadows, and sagebrush shrublands; requires larger trees and snags for cavity nesting.
Mourning dove (*Zenaida macroura*)	Open country, scattered trees, and woodland edges. Feeds on ground in grasslands and agricultural fields. Roost in woodlands in the winter. Nests in trees or on ground.
Sage sparrow (*Amphispiza belli*)	Large and contiguous areas of tall and dense sagebrush. Negatively associated with seral mosaics and patchy shrublands and abundance of greasewood.
Sage thrasher (*Oreoscoptes montanus*)	Shrub-steppe dominated by big sagebrush.
Scaled quail (*Callipepla squamata*)	Brushy arroyos, cactus flats, sagebrush or mesquite plains, desert grasslands, Plains grasslands, and agricultural areas. Good breeding habitat has a diverse grass composition, with varied forbs and scattered shrubs.
Vesper sparrow (*Pooecetes gramineus*)	Dry montane meadows, grasslands, prairie, and sagebrush steppe with grass component; nests on ground at base of grass clumps.

3.5.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed project. As discussed in Section 2.1.2 (Description of Proposed Project - Protection of Wildlife, including Special Status Species), if the vegetation-clearing phase of construction is scheduled to occur during migratory bird breeding season, a pre-construction migratory bird nest survey would be conducted within the proposed project area. Therefore, it is unlikely that nests, eggs, or young birds within the proposed project area would be directly harmed. If project activities occur during migratory bird breeding season, birds nesting outside of but near the proposed project area could abandon existing nests as a result of visual and audial disturbances.

Directly, the proposed action would result in the removal of 5.64 acre of sagebrush shrubland habitat within the proposed access road and well pad area. This acreage would be converted to a reseed community and barren surface following interim reclamation, and to a reseed community during final reclamation. One juvenile tree would be removed. Within the staging areas, vegetation (if present) would be mowed and trampled; these areas would be reclaimed during interim reclamation. The impacts to the vegetation community are described in detail in Section 3.4 (Upland Vegetation).

There is available, similar habitat in the surrounding area that birds could utilize. However, the clearing of vegetation would remove potential migratory bird foraging and breeding habitat. The transformation of the proposed project area to a reseed community and barren surface could remove potential habitat for numerous migratory birds, including the birds listed in Section 3.5.1, above.

For the long term, occasional human and vehicle presence within the vicinity of the proposed project area would increase above present levels. Additional well equipment could also cause increased noise levels in the vicinity. Audial and visual disturbances associated with the project could cause indirect habitat loss by deterring birds from using available habitat adjacent to the proposed project area.

If interim and final reclamation are successful, a sagebrush shrubland community would become re-established within the proposed project area. However, as discussed in Section 3.4. (Upland Vegetation), the re-establishment of a mature, native plant community could require decades, and it is possible that the plant community could never fully recover from disturbance (BLM 2003a, 4-18).

It is difficult to predict the effects of the project on migratory birds. The increased activity, noise, and disturbed vegetation associated with the proposed could result in the increased usage of the immediate area by some migratory bird species, while decreasing usage by other species. Studies have shown mixed impacts of oil and gas development on nesting migratory birds. According to a study by Ortega and Francis (2007), the presence of oil and gas compressors affected bird species differently; however, there was no difference in overall nest density on plots with and without compressors. A study by Holmes and King (2006) found that the sage sparrow had lower nest survival in an area with ongoing gas development; however, the Brewer's sparrow had higher nest survival rates in a developed gas field when compared with populations in an undeveloped control area.

Cumulative Impacts

The spatial analysis area includes the proposed project area and an approximately 1-mile radius around the proposed well pad. Within a 1-mile radius, there is existing disturbance, and the region has been fragmented. Existing and reasonably foreseeable future disturbances within a 1-mile radius of the proposed project area include the following:

- 11 existing active oil or gas well pads
- 1 plugged and abandoned oil or gas well pad
- Numerous oil and gas access roads
- Numerous utility ROWs
- Livestock grazing

Habitat disturbance and fragmentation in the area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors). The direct and indirect habitat disturbance, fragmentation, and human activities associated with these disturbances could deter migratory birds from utilizing portions of the analysis area. The proposed action would contribute to direct and indirect habitat disturbance and fragmentation in the analysis area.

3.6. Special Status Species

3.6.1. Affected Environment

The BLM manages certain species which are 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. BLM Special Status Species include BLM Sensitive Species and BLM-FFO Special Management Species (SMS).

New Mexico BLM State Directors have developed a list of BLM Sensitive Species for the State of New Mexico (BLM 2011a, BLM 2011b, BLM 2011c, BLM 2012a). In accordance with BLM Manual 6840, the BLM-FFO has prepared a list of BLM-FFO SMS to focus species management efforts toward maintaining habitats under a multiple-use mandate (BLM 2008a, BLM 2008c). BLM-FFO SMS include some BLM Sensitive Species and other species for which the BLM-FFO has determined special management is appropriate (BLM 2008c). The authority for this policy and guidance is established by the ESA; Title II of the Sikes Act, as amended (16 USC 670a-670o, 74 Stat. 1052); FLPMA; and Department of Interior Manual 235.1.1A.

BLM-FFO Sensitive Species and SMS that have the potential to occur within the proposed project area are listed in

Table 6, below. Potential for occurrence is based on species habitat requirements, known species range, and an evaluation of the habitat available within and adjacent to the proposed project area.

Table 6. BLM Special Status Species with Potential to Occur in Proposed Project Area

Species	Status		Occurrence Within BLM-FFO Region	Habitat	Potential to Occur in Proposed Project Area
	BLM	State of New Mexico			
Birds					
Bendire's thrasher (*Toxostoma bendirei*)	Sensitive	-	Summer range (Sibley 2000). Known to occur within BLM-FFO (BLM 2011a).	Sparse desert shrublands, degraded grasslands, and open woodlands with scattered shrubs. On the Colorado Plateau, open sagebrush shrublands with scattered junipers. Avoids riparian areas and arroyos with dense shrub cover (NMPIF 2007).	The vegetation community within the proposed project area is open sagebrush shrubland. This species could potentially forage and nest within the proposed project area.

Species	Status		Occurrence Within BLM-FFO Region	Habitat	Potential to Occur in Proposed Project Area
	BLM	State of New Mexico			
Ferruginous hawk (*Buteo regalis*)	SMS	-	Year-round range (NMPIF 2007). Known to nest in BLM-FFO (BLM 2012b).	Open areas with broad expanses of prairie grassland or shrub-steppe vegetation, areas with low to moderate agricultural coverage, transitional edges between grasslands and piñon-juniper woodlands, sagebrush shrublands, and desert scrub (NMPIF 2007, NatureServe 2012). Nests in elevated locations on the ground (if in grasslands), in isolated tree stands, on rock outcrops/spires, or on utility poles (NMPIF 2007).	The vegetation community within the proposed project area is sagebrush shrubland, which this species could use for foraging. There are no suitable nesting sites available in the vicinity of the proposed project area or staging areas. The nearest recorded ferruginous hawk nest is approximately 10 miles west-northwest of the proposed project area (BLM 2012b).
Golden eagle (*Aquila chrysaetos*)	SMS	-	Year-round range (Sibley 2000). Known to nest in BLM-FFO (BLM 2012b).	Open to semi-open country with elevated perches, including grasslands, prairies, open woodlands, shrublands, and barren areas. Prefers hilly or montane regions. Nests on rock ledges on cliffs or in large trees (NatureServe 2012, NMPIF 2007, Wheeler 2003).	Golden eagles could potentially use the sagebrush shrubland within the proposed project area for foraging. There are no appropriate nesting sites available in the vicinity of the proposed project area or staging areas. The nearest recorded golden eagle nest is 6 miles northeast of the proposed project area (BLM 2012b).
*Source: New Mexico Department of Game and Fish 2013					

The ferruginous hawk and golden eagle could potentially forage within the proposed project area. The Bendire's thrasher could potentially forage and nest within the proposed project area. No BLM Special Status species or sign of such species was observed during the site survey. There are no recorded BLM Special Status Species raptor nests in the vicinity of the proposed project area (BLM 2012b). No appropriate raptor nesting habitat was identified within or adjacent to the proposed project area.

3.6.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed project.

As discussed in Section 2.1.2 (Description of Proposed Project - Protection of Wildlife, including Special Status Species), if the vegetation-clearing phase of construction is scheduled to occur during migratory bird breeding season, a pre-construction migratory bird nest survey would be conducted within the

proposed project area. Therefore, it is unlikely that Bendire's thrasher nests, eggs, or young birds would be directly harmed. If project activities occur during migratory bird breeding season, Bendire's thrashers nesting outside of but near the proposed project area could abandon existing nests as a result of visual and audial disturbances.

There is available, similar habitat in the surrounding area that BLM Special Status Species could utilize. However, the transformation of 5.64 acres of sagebrush shrubland to a reseed community and barren surface would remove potential foraging habitat for the Bendire's thrasher, ferruginous hawk, and golden eagle. Habitat loss and fragmentation likely reduce the carrying capacity for wildlife, although the exact level of reduction cannot be quantified (BLM 2003a, 4-26 – 4-27).

For the long term, occasional human and vehicle presence within the vicinity of the proposed project area would increase slightly above present levels. In addition, additional well equipment could cause increased noise levels in the vicinity. Audial and visual disturbances associated with the proposed project could cause indirect habitat loss by deterring BLM Special Status Species birds from using available habitat adjacent to the proposed project area.

If interim and final reclamation are successful, a sagebrush shrubland would become re-established within the proposed project area. However, as discussed in Section 3.4. (Upland Vegetation), the re-establishment of mature, native plant communities could require decades, and it is possible that plant communities could never fully recover from disturbance (BLM 2003a, 4-18).

Cumulative Impacts

The spatial analysis area includes the proposed project area and an approximately 1-mile radius around the proposed well pad. Within a 1-mile radius, there is existing disturbance, and the region has been fragmented. These disturbances are described in detail in Section 3.5 (Migratory Birds).

Habitat disturbance and fragmentation in the area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors) and residential development. The direct and indirect habitat disturbance, fragmentation, and human activities associated with these disturbances could deter BLM Special Status Species from utilizing portions of the analysis area. The proposed action would contribute to direct and indirect habitat disturbance and fragmentation in the analysis area.

3.7. Cultural Resources

3.7.1. Affected Environment

The proposed project area is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the history of the San Juan Basin can be divided into five major periods: PaleoIndian (circa [ca.] 10000 B.C. to 5500 B.C.); Archaic (ca. 5500 B.C. to A.D. 400); Basketmaker II-III and Pueblo I-IV (aka Anasazi; A.D. 1-1540); and historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed descriptions of these various periods are provided in the BLM-FFO PRMP/FEIS (BLM 2003a, 3-65 – 3-84) and will not be reiterated here. Additional information can also be found in an associated documented, the Cultural Resources Technical Report (Science Applications International Corporation 2002).

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 (APE) for the proposed action was archaeologically surveyed by LAC. LAC submitted LAC Report 2013-5hh (2013) to the BLM-FFO in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (BLM 2005). The Class III inventory identified one cultural site (LA 177068) within the APE (BLM 2013(IV)033F). As discussed in Section 1.6.2 (Issues), no TCPs are known to exist in the APE.

3.7.2. 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 of or other alteration to cultural sites in the area.

Significant cultural sites (e.g., sites eligible for the NRHP) would be avoided with the implementation of design features such as, but not limited to, the installation of temporary barriers. These design features are detailed in the Cultural Resource Record of Review, attached to the stipulations in the approved APD and ROW Grants. The proposed action would not be expected to physically threaten any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with 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

There would be no negative cumulative impact on cultural resources as significant cultural sites would be avoided by the proposed project. A positive cumulative effect is the additional scientific information yielded by the archaeological survey.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

The following tribes, individuals, organizations, and/or agencies were consulted during the development of this EA:

- Larry Higgins, WPX
- Heather Riley, WPX
- Ben Mitchell, WPX
- Mark Lepich, WPX
- Steven Fuller, LAC
- Fred Harden, LAC

4.2. List of Preparers

This EA was prepared by NCI in conformance with the standards of and under the direction of the BLM-FFO. The following individuals assisted in the preparation of this EA:

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- John Kendall, Wildlife Management Biologist, BLM-FFO
- Sheila Williams, District Botanist, BLM-FFO
- Roger Herrera, Environmental Protection Specialist

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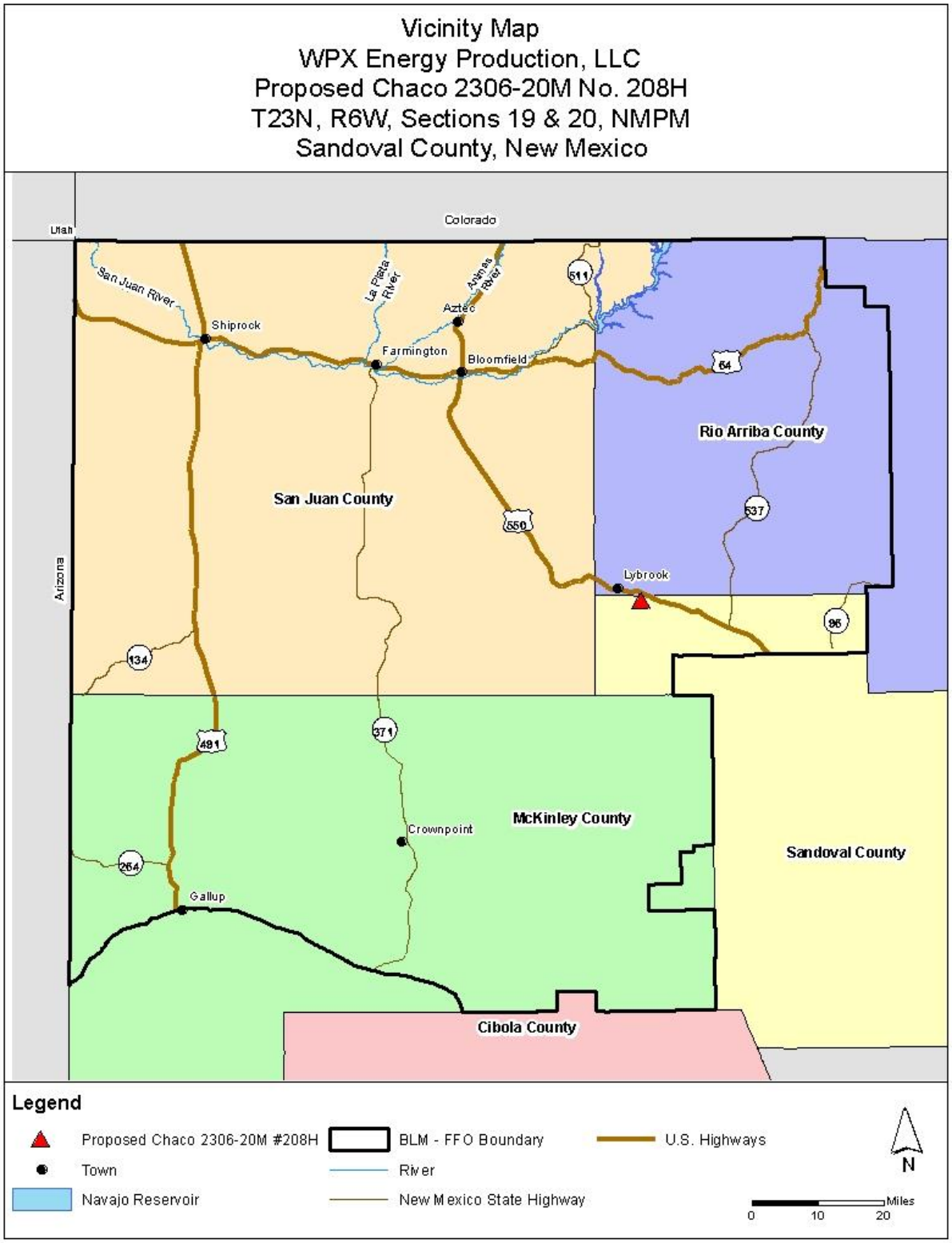
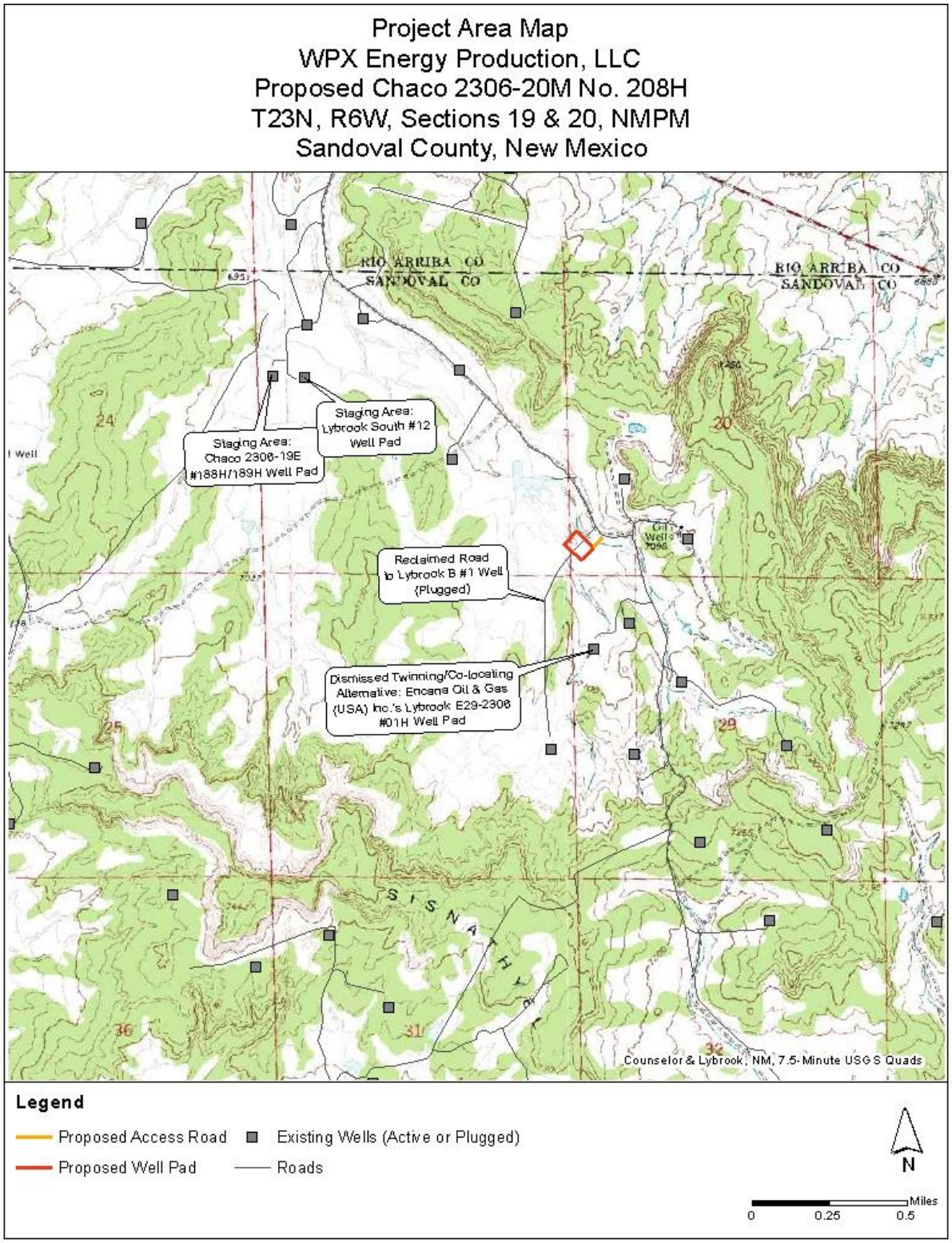
APPENDIX A. MAPS

A.1. Vicinity Map



A.2. Project Area Map



A.3. Aerial Map

Aerial Photo
WPX Energy Production, LLC
Proposed Chaco 2306-20M No. 208H
T23N, R6W, Section 19 & 20, NMPM
Sandoval County, New Mexico

Legend

- Proposed Well Pad
- Proposed Construction Zone
- Proposed Access Road
- USGS Waterway

N

0 250 500 Feet

APPENDIX B. PLATS

District I
1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First Street, Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Drive, Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Drive
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to
Appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	42289	LYBROOK GALLUP

[4] Property Code	[5] Property Name	[6] Well Number
	CHACO 2306-20M	208H

[7] OGRID No.	[8] Operator Name	[9] Elevation
120782	WPX ENERGY PRODUCTION, LLC	7037'

[10] Surface Location

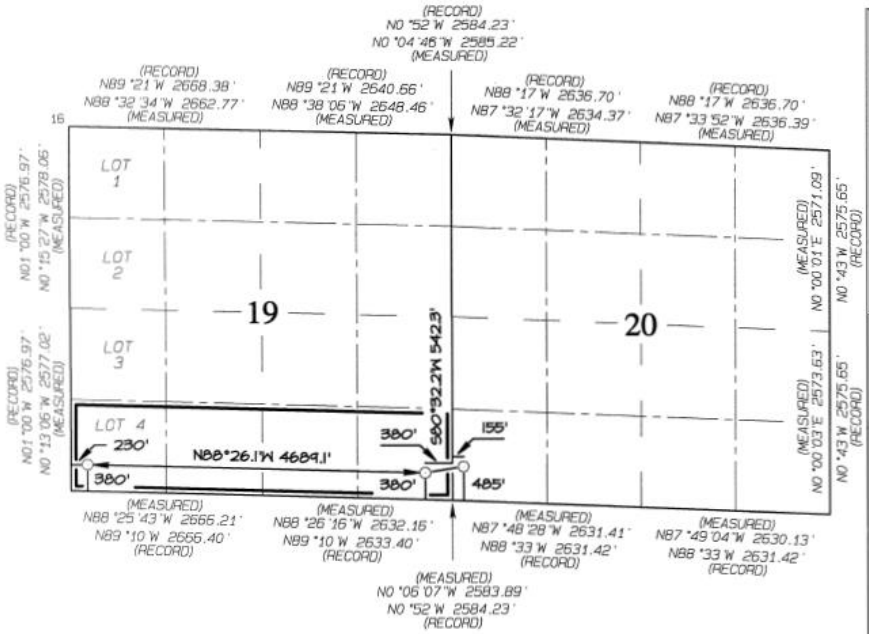
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	20	23N	6W		485	SOUTH	155	WEST	SANDOVAL

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	19	23N	6W	4	380	SOUTH	230	WEST	SANDOVAL

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
160.98 Acres S/2 S/2 - Section 19			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



END-OF-LATERAL
380' FSL 230' FWL
SECTION 19, T23N, R6W
LAT: 36.20507°N
LONG: 107.51681°W
DATUM: NAD1927

LAT: 36.20508°N
LONG: 107.51742°W
DATUM: NAD1983

POINT-OF-ENTRY
380' FSL 380' FEL
SECTION 19, T23N, R6W
LAT: 36.20488°N
LONG: 107.50092°W
DATUM: NAD1927

LAT: 36.20490°N
LONG: 107.50153°W
DATUM: NAD1983

SURFACE LOCATION
485' FSL 155' FWL
SECTION 20, T23N, R6W
LAT: 36.20515°N
LONG: 107.49911°W
DATUM: NAD1927

LAT: 36.20516°N
LONG: 107.49972°W
DATUM: NAD1983

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom-hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Date Revised: AUGUST 28, 2013
Date of Survey: JULY 9, 2013

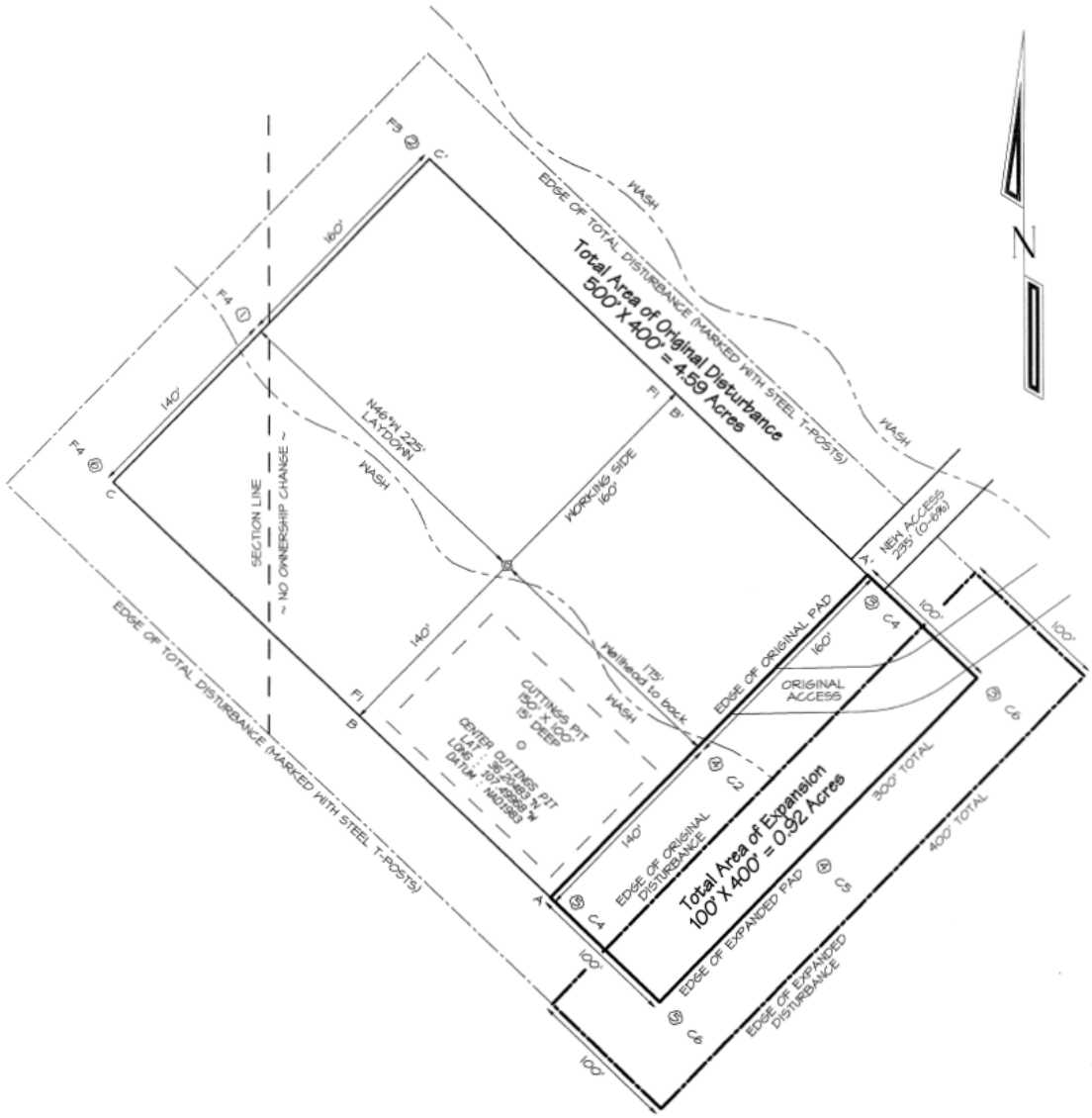
Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS

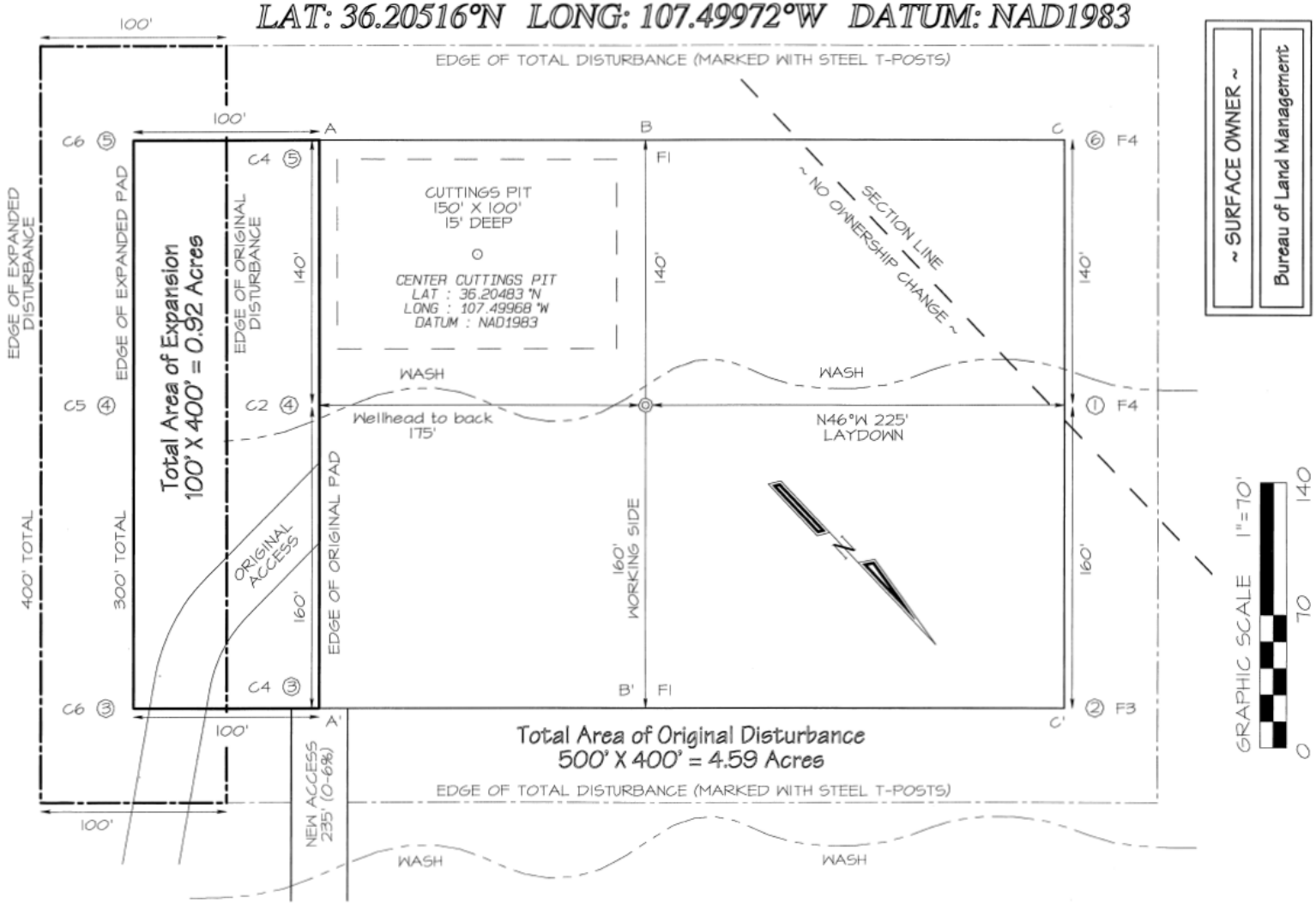
Certificate Number 15269

WPX ENERGY PRODUCTION, LLC CHACO 2306–20M 208H
485' FSL & 155' FWL, SECTION 20, T23N, R6W, NMPM
SANDOVAL COUNTY, NEW MEXICO ELEVATION: 7037'
LAT: 36.20516°N LONG: 107.49972°W DATUM: NAD1983



Steel T-Posts have been set to define Edge of Disturbance limits which are 50' offset from edge of staked wellpad.

WPX ENERGY PRODUCTION, LLC CHACO 2306–20M 208H
485' FSL & 155' FWL, SECTION 20, T23N, R6W, NMPM
SANDOVAL COUNTY, NEW MEXICO ELEVATION: 7037'
LAT: 36.20516°N LONG: 107.49972°W DATUM: NAD1983

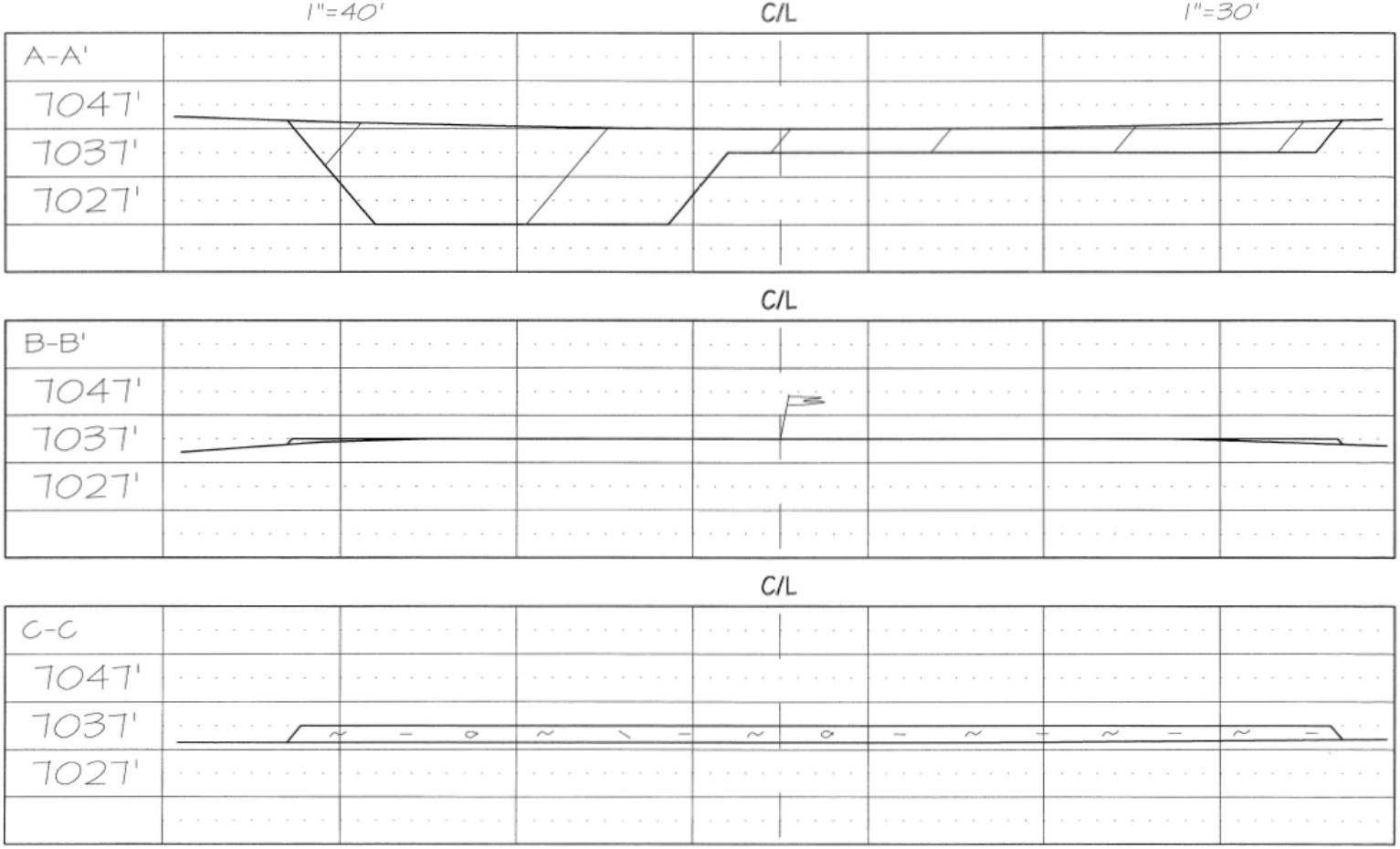


Steel T-Posts have been set to define the Edge of Disturbance limits which are 50' offset from the edge of the staked wellpad.

WPX ENERGY PRODUCTION, LLC CHACO 2306–20M #208H
485' FSL & 155' FWL, SECTION 20, T23N, R6W, NMPM
SANDOVAL COUNTY, NEW MEXICO ELEVATION: 7037'

HORIZONTAL SCALE
1"=40'

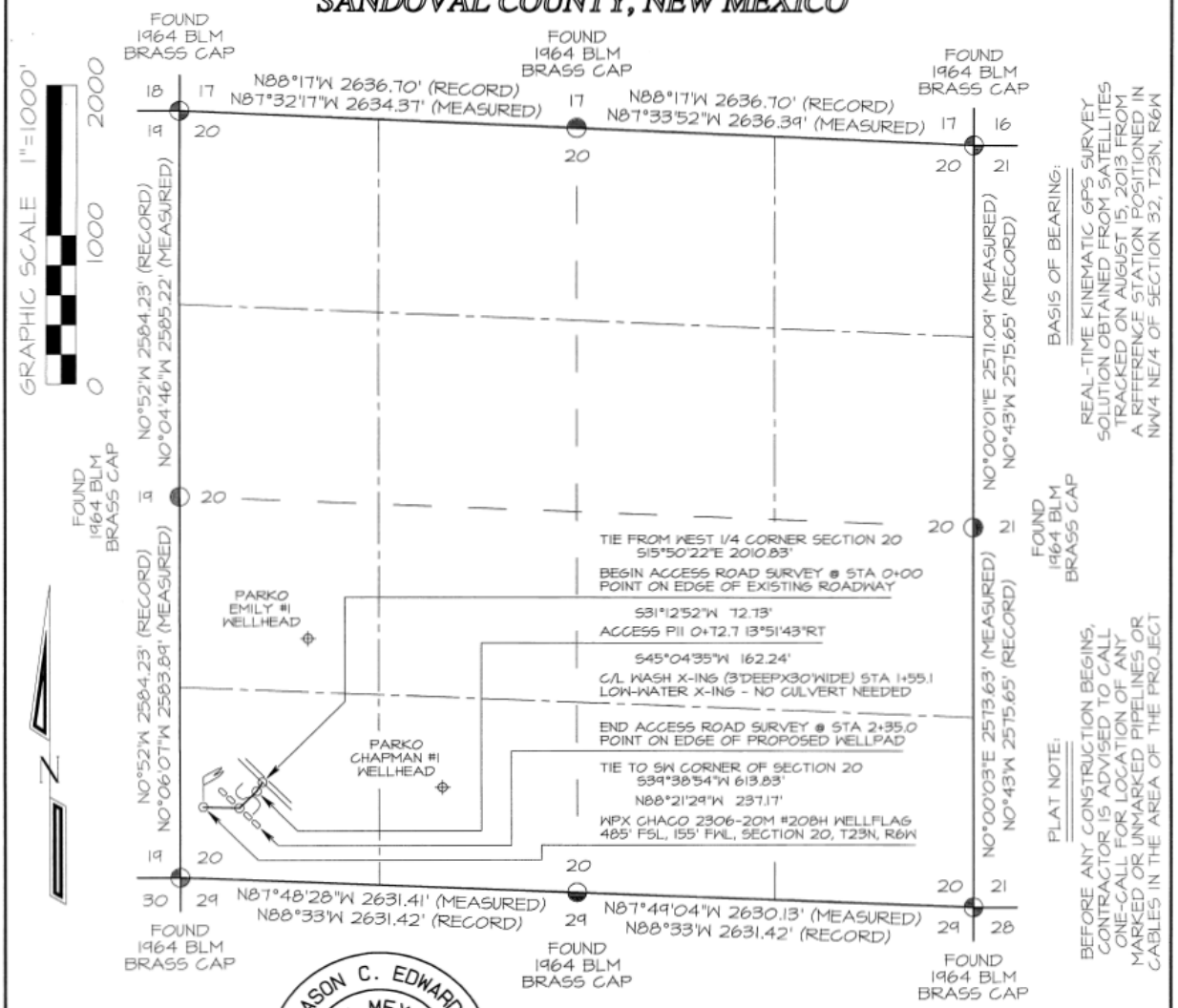
VERTICAL SCALE
1"=30'



NCE SURVEYS IS NOT LIABLE FOR LOCATION OF UNDERGROUND UTILITIES OR PIPELINES.

CONTRACTOR SHOULD CONTACT ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED UNDERGROUND UTILITIES OR PIPELINES ON WELLPAD AND/OR ACCESS ROAD AT LEAST TWO WORKING DAYS PRIOR TO CONSTRUCTION.

WPX ENERGY PRODUCTION, LLC CHACO 2306–20M #208H PROPOSED ACCESS ROAD SURVEY LOCATED IN THE SW/4 SW/4 OF SECTION 20, T23N, R6W, NMPM SANDOVAL COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 2+35.0	235.0 FT / 14.2 RODS

I, Jason C. Edwards, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.

JASON C. EDWARDS

Date: August 28, 2013

Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

N C E

Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

SHEET 5 OF 6 | CHECKED BY: JCE
FILENAME: 2306208M | DRAWN BY: SLE

APPENDIX C. PHOTOGRAPHS

Looking northward from proposed wellhead

Looking eastward from proposed wellhead

Looking southward from proposed wellhead

Looking westward from proposed wellhead

USGS watercourse (vegetated swale) crossed by proposed access road and construction zone; looking downstream (north-northwestward)

Vegetated swale within proposed well pad

Looking south-southwestward toward proposed well pad from start (north-northeastern end) of proposed access road

APPENDIX D. SURFACE RECLAMATION PLAN