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WPX Energy Production, LLC's Chaco 2308-14E Nos. 151H & 152H Oil and Natural Gas Wells Project

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

WPX Energy Production, LLC (WPX) has submitted two Applications for Permit to Drill (APDs) and five Right-of-Way (ROW) Grants to the Bureau of Land Management – Farmington Field Office (BLM-FFO) for the Chaco 2308-14E Nos. 151H and 152H (151H/152H) project. The proposed action is the approval of the APDs and ROW Grants by the BLM-FFO, located in Farmington, New Mexico.

The proposed project area is located on surface managed by the BLM-FFO. The proposed project would include the horizontal drilling, possible production, and final abandonment of two Nageezi Gallup natural gas and oil wells and the construction, usage, and reclamation of one well pad, one well pad construction zone, two access roads, one pipeline corridor, and one temporary use area (TUA). One to two additional, previously disturbed TUAs would also be used during the construction phase of the proposed project. The proposed wells would access federal minerals associated with valid, existing lease NMNM 18463.

The proposed 151H and 152H wells would each be authorized by an approved APD. The proposed well pad, access roads (access road 1 and access road 2), pipeline ties, and previously undisturbed TUA (TUA 3) would each be authorized by a ROW Grant. The two previously disturbed TUAs (TUA 1 and TUA 2) would be authorized via a previous WPX TUA authorization for WPX's Chaco 2308-16I Nos. 147H/148H (147H/148H) project (147H API No. 30-045-35439, 148H API No. 30-045-35500) and via an operator's agreement with Elm Ridge Exploration Company, respectively.

New surface disturbance associated with the proposed project would be 13.60 acres. This would include approximately 1.55 acres (2,257 feet) of new access road disturbance, 5.39 acres of new well pad/construction zone disturbance, 5.43 acres (9,134 feet) of new pipeline corridor disturbance, and 1.23 acres (1,340 feet) of new TUA disturbance. Of this new surface disturbance, 1.96 acres would be reseeded (but not recontoured) during interim reclamation and 9.67 acres would be fully reclaimed during interim reclamation. The remainder (1.97 acres) would remain disturbed throughout the life of the project, and would be fully reclaimed during final reclamation.

Two action alternatives were identified for the 151H/152H project. These alternatives will be analyzed in this Environmental Assessment (EA).

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 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 (BLM 2003a, 3-9).

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 San Juan Basin in San Juan County, New Mexico. The proposed project area is located approximately 37 miles south-southeast of the town of Bloomfield, New Mexico; 5 miles east-southeast of the community of Nageezi; 1 mile south of U.S. Highway 550; and 1 mile east of County Road 7900 (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.), which 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. 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. Additionally, it is the BLM's responsibility under the Federal Land Policy and Management Act of 1976 (FLPMA; 43 USC 1701 et seq.) to respond to a request for a ROW Grant over BLM surface. 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.

1.3. Decision to be Made

The BLM-FFO will decide whether or not to issue the two APDs and five ROW Grants associated with the proposed project, 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 APDs and ROW Grants with design features as submitted
- To approve the APDs and ROW Grants with additional mitigation added
- To analyze the effects of the proposed action in an EIS
- To deny the APDs 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 off-lease well pads, pipeline ties, and access roads, 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, 2-11).

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 proposed 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.).

Section 401

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).

Section 402

Under Section 402 of the CWA, the U.S. Environmental Protection Agency (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.

Section 404

Under Section 404 of the CWA, the 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 Office have determined that jurisdictional waters (i.e., waters of the U.S.) within the BLM-FFO planning area 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.

The proposed pipeline ties would cross three ephemeral USGS watercourses at four points. Proposed access road 2, which parallels a portion of the proposed pipeline tie, would also cross one of the aforementioned USGS watercourses at one location. These three watercourses ultimately have a significant nexus to Betonnie Tsosie Wash, which is located approximately five river-miles southwest of the proposed project area. Proposed activities associated with these crossings would be permitted under Nationwide Permit Nos. 12 (for Utility Line Activities) and 14 (for Linear Transportation Projects).

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 on-site meeting, attended by WPX, BLM-FFO representatives, and an environmental consultant (Nelson Consulting, Inc. [NCI]), was held at the proposed project area on October 31, 2013. The Naggizee chapter of the Navajo Nation was invited to the on-site meeting by the BLM-FFO; no members of the Navajo Nation attended. A public invitation to the on-site meeting was posted online (http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html); no private citizens or groups. A BLM-FFO Interdisciplinary Team meeting was held on November 18, 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 during internal scoping as potential issues of concern for the proposed action. These issues will be addressed in this EA.

- How would dust and equipment emissions associated with the proposed project impact air resources?
- How would vegetation-clearing, proposed project activities, and final reclamation impact soils?
- Would drilling the proposed wells impact groundwater?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact upland vegetation?
- How would vegetation-clearing, proposed project activities, and final reclamation impact wildlife, including migratory birds?
- How would vegetation-clearing, proposed project activities, and final reclamation impact the following BLM Special Status Species (SSS): Aztec gilia (*Aliciella formosa*), Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*), Bendire's thrasher (*Toxostoma bendirei*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), pinyon jay (*Gymnorhinus cyanocephalus*), and prairie falcon (*Falco mexicanus*)?
- How would surface-disturbing activities associated with construction of the proposed project impact cultural resources?

Issues Considered but not Analyzed

The following issues were identified during scoping 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 San Juan 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 (refer to Biological Survey Report [BSR] in Appendix B). Water for drilling would be obtained from the permitted Turtle Mountain (SJ-960-S-3) and Blanco Trading Post (WR711) water wells; 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 reports prepared for the proposed action (La Plata Archaeological Consultants [LAC] Report Nos. 2012-5uu [LAC 2013a; BLM Report No. 2014(I)046F)] and 2012-5uu#2 [LAC 2013b; BLM Report No. 2014(II)005F]), 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.

Paleontology

The proposed project area is within Lybrook Fossil Specially Designated Area (SDA), which is managed to facilitate scientific study and protect paleontological resources (BLM 2003a, N-94). The BLM-FFO paleontologist, who attended the on-site meeting, determined that, with mitigation, no impacts to paleontological resources are anticipated as a result of the proposed project. Mitigation would include paleontological construction monitoring within portions of the proposed project area; these areas are to be determined by the BLM-FFO paleontologist.

2. PROPOSED ACTION AND ALTERNATIVE(S)

Four feasible alternatives were identified for the 151H/152H project. Under the No Action Alternative, the 151H/152H project would not occur. The three action alternatives differ regarding the route of the 151H/152H pipeline tie and whether or not access road 2 and TUA 3 would be constructed. The three action alternatives are depicted on Figure A.4 (Appendix A). The differences between the three action alternatives are briefly summarized below:

- Alternative A (Proposed Action): Under the proposed action, access road 2 would be constructed to avoid travel along a portion of an existing access road that crosses Navajo Nation Tribal Trust surface. A portion of the 151H/152H pipeline ties would parallel access road 2. TUA 3 would be located immediately south of access road 2.

- Alternative B: Under Alternative B, access road 2 would not be constructed. As a result, this portion of the pipeline corridor would travel cross-country (rather than paralleling access road 2), following the same route described for the proposed action. TUA 3 would be located immediately south of the pipeline corridor; therefore, this TUA would be approximately 15 feet north of its proposed (Alternative A) location.

  Because access road 2 would not be constructed, WPX would be required to travel along the existing access road, which crosses Navajo Nation Tribal Trust surface. Travel along this road would require a lengthy Bureau of Indian Affairs (BIA) permitting process to obtain a Navajo Nation ROW Grant. It could take more than one year to obtain the 20-year ROW Grant; when the ROW Grant expires, WPX would be required to start the process over to renew the ROW Grant.

- Alternative C: Under Alternative C, neither access road 2 nor TUA 3 would be constructed. The pipeline ties would follow the existing access road.

  Because access road 2 would not be constructed, WPX would be required to travel along the existing access road, which crosses Navajo Nation Tribal Trust surface. In addition, the 151H/152H pipeline ties would cross Navajo Nation Tribal Trust surface. Both of these features would require a Navajo Nation ROW Grant; the procedure for obtaining these ROW Grants is described briefly above, under Alternative B.

A summary of project features and new surface disturbance associated with each of the action alternatives is provided below.

Table 1. Summary of Project Features and New Surface Disturbance Associated with Action Alternatives

	Alternative A (Proposed Action)	Alternative B	Alternative C
Project Features	• Well Pad • Access Road 1 • Access Road 2 • Pipeline Ties • TUA 1 • TUA 2 (potential) • TUA 3	• Well Pad • Access Road 1 • Pipeline Ties • TUA 1 • TUA 2 (potential) • TUA 3	• Well Pad • Access Road 1 • Pipeline Ties • TUA 1 • TUA 2 (potential)
New Surface Disturbance (acres)	13.60	12.82	12.23
Reclaimed Disturbance (acres; new surface disturbance that would be fully reclaimed or reseeded during interim reclamation)	11.63	11.55	10.96
Unreclaimed Disturbance (acres; new surface disturbance that would remain unreclaimed [flat and unvegetated] until final abandonment)	1.97	1.27	1.27

2.1. Alternative A (Proposed Action)

The proposed action is the BLM-FFO approval of two APDs and BLM-FFO issuance of five ROW Grants associated with WPX's proposed 151H/152H project. The proposed project would include the drilling, production, and final abandonment of two oil and natural gas wells and the construction, usage, and reclamation of one well pad, one well pad construction zone, two access roads, one pipeline corridor, and one TUA (TUA 3). One to two previously disturbed TUAs (TUAs 1 and 2) would also be used during construction. These features are described below:

- 151H/152H wells: The primary objective of the wells would be to produce oil from the Nageezi Gallup formation. However, it is likely that natural gas would be a byproduct.

- Well pad and construction zone: The wells would be drilled and produced from the proposed well pad. Drilling and production equipment would be located on the proposed well pad. The proposed well pad construction zone would be used during the construction phase of the proposed project for the movement of construction equipment and stockpiling of soil.

- Access road 1: This road, which would be 64 feet long, would provide access to the proposed well pad from an existing access road.

- Access road 2: This road, which would be 2,193 feet long, would provide shortened access between two points along an existing road. Access road 2 would be located between proposed pipeline tie stations 10+71.6 and 32+28.7. This purpose of the proposed access road is to allow WPX to avoid travel along a portion of the existing access road that crosses Navajo Nation Tribal Trust surface; reasons for avoidance are described in the introduction of Chapter 2 of this EA.

- Pipeline corridor: The proposed pipeline corridor would include four pipes within two trenches. These pipes would carry natural gas, water, and liquids (oil) from the proposed 151H/152H well pad to an existing pipeline corridor at the existing 147H/148H well pad. The volume of natural gas, oil, and water is not known at this time. The pipeline corridor would parallel an existing access road, proposed access road 1, and proposed access road 2; a short segment (525 feet) of the pipeline corridor would travel cross-country.

- TUA 1: TUA 1, which is being permitted as part of the 147H/148H project and would be cleared of vegetation prior to commencement of the proposed 151H/152H project, would be used to stage equipment during construction.

- TUA 2 (potential): TUA 2, located within the active Dome Federal 24 No. 21 well pad, could potentially be used for staging equipment during construction. This well pad is primarily unvegetated.

- TUA 3: TUA 3, which would be 1,340 feet long, would parallel a portion of proposed access road 2 and the proposed pipeline corridor. This TUA would be used during the construction phase of the proposed project, due to the cuts and fills associated with this portion of the pipeline corridor and access road 2.

The commencement of the proposed project is proposed for spring 2014.

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

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 Northwest, New Mexico, 7.5-minute USGS quadrangle map (Figure A.2) and the 2011 San Juan County National Agriculture Imagery Program aerial photograph (Figure A.3).

The proposed project area is located within the BLM-FFO management area in San Juan County, New Mexico. The proposed project area is located approximately 37 miles south-southeast of the town of Bloomfield, New Mexico; 5 miles east-southeast of the community of Nageezi; 1 mile south of U.S. Highway 550; and 1 mile east of County Road 7900.

The general region surrounding the proposed project area is characterized by rolling badlands, low mesas, and broad lowland valleys. The elevation within the proposed project area ranges from 6,820 to 6,900 feet above mean sea level (AMSL). Terrain is rolling to hilly. The local slope, which is gentle to moderate, varies in direction. There are many unnamed, ephemeral drainages in the general area; several are located within the proposed project area. The proposed pipeline corridor crosses three USGS watercourses at four locations; proposed access road 2, which parallels a portion of the proposed pipeline tie, would also cross one of these aforementioned USGS watercourse at one location.

Existing and proposed access roads, well pads, and pipeline corridors are in the general vicinity of the proposed project area. The majority of the proposed pipeline corridor would parallel an existing access road. TUA 1 will already have been cleared of vegetation as part of the permitted 147H/148H project. TUA 3 (which would potentially be used) is located within the active Dome Federal 24 No. 21 well pad.

The legal location of the proposed project area is described in the below table (New Mexico Principal Meridian [NMPM]).

Table 2. Legal Land Description for the Proposed Project

Township, Range	Section	Quarter-Quarter	Project Feature
Township 23 North, Range 8 West	14	western ½ northwestern ¼	well pad, construction zone, & pipeline corridor
	15	southeastern ¼ northeastern ¼	well pad, construction zone, access road 1, & pipeline corridor
		southwestern ¼ northeastern ¼ northwestern ¼ southeastern ¼ northeastern ¼ southwestern ¼	pipeline corridor
		southwestern ¼ southwestern ¼	pipeline corridor, access road 2, & TUA 3
		southeastern ¼ southeastern ¼	pipeline corridor & access road 2
	16	southeastern ¼ southeastern ¼	pipeline corridor, access road 2, TUA 1, & TUA 3
		northeastern ¼ southeastern ¼	pipeline corridor
	24	northeastern ¼ northwestern ¼	TUA 2

The location of the proposed 151H and 152H bottom holes and surface holes (wellheads) are provided in

Table 3, below.

Table 3. Bottom Hole and Surface Hole Locations

Project Feature	North American Datum 1983		Footages (NMPM)
	Latitude	Longitude	
151H			
Bottom Hole	36.23334° North	107.67706° West	380 feet from the north line, 230 feet from the west line
Surface Hole (Wellhead)	36.23038° North	107.65902° West	1420 feet from the north line, 312 feet from the west line
152H			
Bottom Hole	36.22813° North	107.67726° West	2275 feet from the north line, 230 feet from the west line
Surface Hole (Wellhead)	36.23038° North	107.65916° West	1420 feet from the north line, 273 feet from the west line

2.1.2. Description of Proposed Project

For a detailed description of design features and construction practices associated with the proposed project, refer to the APDs and ROW Grant Applications on file at the BLM-FFO. The plats (Appendix C) 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* (*The Gold Book*; BLM and U.S. Forest Service [USFS] 2007).

Design Features and Best Management Practices

WPX would adhere to the Conditions of Approval (COAs) attached to the approved APDs and stipulations attached to the approved 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. Waste resulting from construction activities would be removed from the proposed project area and disposed of in an authorized area, such as an approved landfill.

The wells would each have a closed-loop system. WPX would follow NMOCD “Pit Rule” guidelines and Onshore Order No. 1 (issued under Onshore Oil and Gas Operations [43 CFR 3160]) regarding closed-loop systems. No blow pit would be used for the proposed project. Drilling of the horizontal lateral may be done with water-based mud. All water-based mud cuttings would be hauled to a commercial disposal facility or land farm.

Protection of Paleontological Resources

Paleontological monitoring would occur within portions of the proposed project area during the construction phase of the proposed project; these areas are to be determined by the BLM-FFO paleontologist and would be outlined in the COAs attached to the approved APDs and stipulations attached to the ROW Grants. 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 cultural resource stipulations would be followed as indicated in the Cultural Resource Records of Review, attached to the COAs in the approved APDs and stipulations attached to the ROW Grants. These stipulations could include, but would not be limited to, temporary or permanent fencing or other

physical barriers, monitoring of earth-disturbing construction, reduction of the proposed project area and/or establishment of specific construction avoidance zones, and employee education.

Employees, contractors, and sub-contractors associated with the proposed 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 the ARPA.

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 Flora and Fauna, including SSS and Livestock

Because 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 of the proposed project area 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.

The proposed wells would each have a closed-loop system.

During biological surveys, approximately 250 Brack's fishhook cacti (a BLM SSS) were recorded within the proposed project area (see BSR, Appendix B). Following BLM-FFO protocol (BLM 2013d and BLM 2013e), 30 to 50 percent of these cacti would be transplanted off-site prior to the construction phase of the proposed project. Details of the transplant process are provided in the BSR (Appendix B).

Should any active raptor nests be observed within one-third mile of the proposed project area or should any SSS (other than Brack's fishhook cactus) be observed within the proposed project area prior to or during project implementation, 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 proposed project would be fenced, covered, and/or contained in storage tanks, as necessary.

Livestock grazing operators in the vicinity of the proposed project area would be contacted by WPX at least 10 days prior to construction. Open holes would be barricaded to ensure the safety of livestock and wildlife. If present, any range improvements (such as fences, gates, cattleguards, or waterlines) disturbed by construction activities would be repaired to the condition they were in prior to disturbance. Repairs, if needed, would take place immediately following construction. The following design features would apply to the proposed pipe trenches:

- No more than a half mile of trench, or the amount of trench that could be worked in a day, would be opened at one time.
- Backfilling operations would be performed within a reasonable amount of time to ensure that the trench would not be left open for more than 24 hours. If a trench is left open overnight, it would be monitored by a night watchman or fenced with a temporary fence.

- The ends of the trenches would be sloped (3-to-1) to allow animals to escape.
- The ends of the pipes would be plugged to prevent animals from crawling into the pipe.
- Escape ramps would be constructed every 1,320 feet within open trenches. In areas where livestock are actively grazing, escape ramps would be placed every 500 feet within open trenches. The escape ramps would have a minimum 3-to-1 slope to allow for wildlife and/or livestock to escape the trench.
- Established wildlife and/or livestock trails would be left in place as crossovers. Crossovers would be constructed every 1,320 feet above open trenches, would have a minimum 3-to-1 slope, would be a minimum of 10 feet wide, and would not be fenced.
- Before trenches are closed, they would be inspected for wildlife and/or livestock. Any trapped wildlife/livestock would be promptly removed and released at least 150 yards from the trench.

Protection of Water Resources

The proposed wells would each have a closed-loop system. As stated above (Design Features and Best Management Practices - Control of Waste), WPX would follow NMOCD “Pit Rule” guidelines and Onshore Order No. 1 (issued under Onshore Oil and Gas Operations [43 CFR 3160]) regarding the placement and operation of closed-loop systems.

Where the proposed pipeline corridor would cross ephemeral watercourses, the pipes would be buried approximately 6 feet beneath the watercourses. The pipeline corridor would be recontoured to original conditions, as closely as possible. Where the proposed access roads would cross ephemeral watercourses, low-water crossings or culverts would be utilized.

Protection of Topsoil

Topsoil, which would be stripped during the construction phase of the proposed project, would be stored and protected until it is redistributed during reclamation. Topsoil would be stored separately from subsoil material. The topsoil would be free of brush, tree limbs, trunks, and roots. Vehicle/equipment traffic would not be allowed to cross topsoil stockpiles. The topsoil would be protected using wattles or other BMPs so that erosion is minimized. If topsoil is stored for a length of time such that nutrients are depleted from the topsoil, amendments would be added to the topsoil as advised by the WPX environmental scientist or appropriate agent/contractor.

Protection of the Public

The hauling of equipment and materials on public roads would comply with Department of Transportation regulations. No toxic substances would be stored or used within the proposed project area. WPX would have inspectors present during construction. Any accidents involving persons or property would immediately be reported to the BLM-FFO. WPX would notify the public of potential hazards by posting signage, as necessary.

Prevention and Control of Weeds

Prior to construction equipment entering the proposed project area, construction equipment would be inspected for noxious weeds and cleaned.

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. Neither petroleum-based products nor produced water would be used.

BMPs for dust suppression would be utilized within the proposed project area to reduce fugitive dust during the construction phase of the proposed project. Water application, using a rear-spraying truck or other suitable means, would be the primary method of dust suppression within the proposed project area. Any additional dust-suppression practices would include the BLM-standard BMPs found in the *Gold Book* (BLM and USFS 2007) and the BMPs outlined in the COAs attached to the approved APDs and/or stipulations attached to the approved ROW Grants.

Noise

Production would comply with noise standards outlined in NTL 04-2 FFO (BLM 2004). WPX would adhere to the noise stipulations, if any, included in the COAs attached to the approved APDs and/or stipulations attached to the approved ROW Grants.

Additional Design Features and BMPs

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

No construction or routine maintenance activities would be performed during periods when the soil is too wet to adequately support construction equipment. If equipment would create ruts deeper than six inches, the soil would be deemed too wet for construction or maintenance.

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 proposed wells would each have an informational sign, as required by Onshore Oil and Gas Operations regulations (43 CFR 3160).

Erosion-control features, such as waterbars along the proposed pipeline corridor, would be applied as specified by the BLM-FFO Authorized Officer. If waterbars are constructed, the spacing requirements by hillslope grade are provided in Table 4, below. The waterbars would follow the horizontal contour of the hillslope on which they would be placed.

Table 4. Waterbar Spacing Requirements by Percent Grade of Hillslope

Hillslope Percent Grade (%)	Waterbar Spacing (feet)
Less than 1	400
1-5	300
5-15	200
15-25	100

Project Phases

Under the proposed action, the following phases would occur.

Upgrade of Existing Road (Potential)

If necessary, existing BLM access roads leading to the proposed project area would be upgraded to standards established by *The Gold Book* (BLM and USFS 2007) and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e).

Construction of Access Roads and Well Pad

The BLM-FFO would be notified at least 48 hours prior to the start of construction.

The construction phase for the proposed access roads and well pad is expected to be less than four weeks.

The top 6 inches of topsoil, or as much as possible, would be stripped and stockpiled within the well pad construction zone or along the edge of the access road corridors. The protection of topsoil is discussed in "Design Features and Best Management Practices – Protection of Topsoil," above.

The proposed well pad and access roads would be cleared of vegetation. Vegetation, including trees that measure less than 3 inches in diameter (at ground level) and slash/brush, would be chipped or mulched and incorporated into the topsoil as additional organic matter. Trees 3 inches in diameter or greater (at ground level) would be cut to ground level and delimbed. Tree trunks (left whole) and cut limbs would be placed along the access roads in a manner that would not create additional disturbance or degrade any reclamation. The subsurface portion of trees (tree stumps) would be placed in adjacent areas needing soil stabilization or would be hauled to an approved facility.

The proposed access roads 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 proposed project area. Construction would utilize native soil and materials available onsite. If sandstone is needed for surfacing, the sandstone would be retrieved from a permitted location.

TUA 1 and potentially TUA 2 would be used for staging equipment. Within these previously disturbed TUAs, vegetation (if present) would be cleared, but topsoil would not be removed and the ground surface would not be leveled.

<u>Access Roads</u>
The proposed access roads (resource roads) 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).

Due to the topography associated with the proposed access road 2 corridor, TUA 3 would be utilized as extra construction space for this portion of the proposed project. Within TUA 3, vegetation and topsoil could be cleared, and the ground surface could be contoured to allow for equipment to travel within this portion of the proposed project area.

Each proposed access road would have a 30-foot-wide corridor, which would accommodate clearing, cut-and-fill slopes, and drainage ditches. Within the corridors, there would be a 14-foot-wide running surface and adequate crowning and drainage on both sides. The proposed access roads would be built up 18 to 24 inches following *The Gold Book* (BLM and USFS 2007) standards. The maximum road grade associated with each of the proposed access roads would be less than 8 percent. There would be 24- to 48-inch-diameter culverts placed beneath the proposed access roads as needed.

The proposed access roads would be constructed to meet the standards for anticipated traffic flow and all-weather requirements. Surfacing material would be used, if economically viable.

Well Pad
The proposed well pad would measure 300 feet by 500 feet. The associated 50-foot-wide construction zone would surround the pad. The maximum well pad cut would be 4 feet within the central portion of the pad. The maximum fill would be 15 feet on the southern corner (Corner 6) of the 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.

Drilling and Completion

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

Facilities and equipment on the proposed well pad 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 well pad at any time during drilling and completion.

During this process, vehicles would use existing and proposed 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 each 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 the San Juan Basin Water Haulers Association, who would retrieve and truck their water from permitted water wells (the Turtle Mountain [SJ-960-S-3] and Blanco Trading Post [WR711] wells). 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.

As stated in “Design Features and Best Management Practices – Control of Waste,” above, WPX would follow NMOCD “Pit Rule” guidelines and Onshore Order No. 1 (issued under Onshore Oil and Gas Operations [43 CFR 3160]) regarding the placement and operation of closed-loop systems. No blow pits would be used. WPX would utilize a cuttings pit. Any other fluids or hazards on the location would be contained or fenced and properly maintained to ensure the safety of livestock and wildlife.

Construction of Pipeline Ties

If the proposed wells are productive, pipeline tie construction would commence. The four pipeline ties would be constructed simultaneously within one pipeline corridor.

Design features and mitigation associated with pipeline construction are listed in “Design Features and Best Management Practices,” above.

During this phase, TUA 1 and TUA 2 could be used to store equipment. TUA 3 would be used as extra work space during pipeline construction.

The proposed pipeline corridor would be cleared of vegetation and the top 6 inches of topsoil would be stored in the same manner as described for the proposed well pad and access roads.

Trenching activities would be conducted using a trencher or backhoe. Within the 40-foot-wide pipeline corridor, the two pipeline trenches would be off-set from one another by 5 feet. One trench would contain a 6-inch-diameter, steel, natural gas pipe and a 6-inch-diameter, flex, water pipe. The second trench would contain a 6-inch-diameter, steel, natural gas pipe and a 6-inch-diameter, steel, liquids (oil) pipe. Each trench would be 4 to 5 feet in depth. The trenches would be 16 inches in width if a trencher is used or 24 inches in width if a backhoe is used. When stringing pipe, one joint of pipe would be set back every quarter mile.

After the pipes have been welded and coated, a side-boom tractor would be used to place them into the trenches. Prior to construction commencement, WPX would notify the BLM-FFO of additional types of construction equipment to be used.

After trenching and pipe placement in the trench, the soils excavated from the trench would be returned and compacted to prevent subsidence. Approximately 2 feet of fill would be placed in the trench, and the ground surface would be leveled. The trench would then be compacted.

Prior to the pipelines being placed in service, the pipes would be pressure tested.

Pipeline markers would be installed along the pipeline corridor within the line of sight, without voiding safety issues.

Interim Reclamation

If the proposed wells prove to be productive, some portions of the proposed project area would be fully reclaimed (recontoured and reseeded) and some portions would only be reseeded. Remaining portions would remain disturbed throughout the life of the proposed wells. Areas that would be fully reclaimed, reseeded only, or left unreclaimed during this phase are described in Section 2.1.3 (Surface Disturbance).

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. Details of the interim reclamation process (including species included in the seed mixtures) are provided in the Surface Reclamation Plan (Appendix E).

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

In areas that would be fully reclaimed, slopes would be re-contoured to pre-construction topographical contours, if possible. WPX would diminish the evidence of cuts, fills, and flat well pad surfaces.

In areas that are to be fully reclaimed or reseeded, stockpiled topsoil would be redistributed and the surface would be ripped and seeded. Sediment- and erosion-control features (including water diversions, silt traps, and culverts) would be installed, as necessary. The BLM-FFO Saltbush Shadscale/Winterfat and Sagebrush-Grass Community Seed Mixtures would be used.

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013c), monitoring reclaimed surfaces is required to document successful reclamation. Monitoring and reporting are discussed in the Surface Reclamation Plan (Appendix E).

Production and Operation

The production phase of wells varies; the lifetime of the proposed wells is anticipated to be 30 to 50 years. Production equipment that would remain on the proposed well pad could include the following:

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

Production facilities would be located within a 300-by-100-foot facility area on the southwestern side of the proposed well pad. The tear drop for the proposed well pad would consist of a looped, 35-foot-wide driving surface; the tear drop would be used to access the proposed wellheads 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.

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.

Occasionally, workover or recompletion of the proposed wells 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 wells. Workover activities could include repairs to the wellbore equipment (e.g., casing, tubing, rods, and pump), wellheads, or production facilities. A 210-foot-by-180 foot workover area would surround each of the proposed wellheads. This workover area could be used for future activities within the proposed well pad but would not be used for daily activities.

During the operation phase of the proposed pipeline ties, WPX personnel would rarely perform routine or emergency maintenance on the proposed pipeline ties and any associated facilities.

Final Reclamation and Abandonment

If the proposed wells prove to be unproductive, or when the proposed wells are no longer commercially viable, they would be plugged and abandoned. Downhole well abandonment would be carried out under current BLM-FFO and state regulations. The bore holes would be plugged with cement and the production facilities would be removed. An aboveground marker would be placed over the plugged holes. The markers would each contain individual well identification information.

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.

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 proposed project to pre-construction conditions, if possible, by diminishing the evidence of cuts, fills, and flat surfaces. Portions of the proposed project area that were not fully reclaimed during interim reclamation would be cleared (if vegetated), 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 roads, 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.

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013c), monitoring reclaimed surfaces is required to document successful reclamation. Monitoring and reporting are discussed in the Surface Reclamation Plan (Appendix E).

Well Pad and Access Roads
Final reclamation of the proposed well pad and access roads would take place, unless the BLM-FFO considers the retention of these facilities necessary for the management of multiple uses of natural resources. Details of the final reclamation process (including species included in the seed mixtures) are provided in the Surface Reclamation Plan (Appendix E).

Pipeline Ties
Final reclamation would occur within any portion of the proposed pipeline corridor (such as locations of aboveground structures) that would be disturbed to bare soil during the abandonment phase of the proposed pipeline ties, if these areas meet the acreage requirements for reclamation (BLM 2013c). These acreage requirements are summarized below:

- If final abandonment activities would disturb less than or equal to 0.1 acre to bare soil, the area(s) would be expected to revegetate naturally (no reclamation or monitoring activities would be required).
- If final abandonment activities would disturb more than 0.1 acre to bare soil, final abandonment reclamation activities would be the same as described for interim reclamation (discussed in the Surface Reclamation Plan [Appendix E]).

2.1.3. Surface Disturbance

New surface disturbance associated with the proposed project would be 13.60 acres. Of this, 1.96 acres would be reseeded (but not recontoured) during interim reclamation and 9.67 acres would be fully reclaimed during interim reclamation. The remainder (1.97 acres) would remain disturbed throughout the life of the proposed project, and would be fully reclaimed during final reclamation.

The following table summarizes the disturbance and reclamation acreage associated with the proposed project.

Table 5. Surface Disturbance Acreage Associated with Proposed Project

Feature	Acreage		Description of New Disturbance Acreage Following Interim Reclamation		
	Total	New Disturbance	Fully Reclaimed (Reseeded and Recontoured)	Reseed Only	Unreclaimed
Access Road 1 Corridor	0.04	0.04	-	0.02	0.02
Access Road 2 Corridor	1.51	1.51	-	0.81	0.70
Well Pad & Construction Zone	5.51	5.39	3.01	1.13	1.25
Pipeline Corridor	8.77	5.43	5.43	-	-
TUA 1*	0.92	-	-	-	-
TUA 2 (potential)*	1.00	-	-	-	-
TUA 3	1.23	1.23	1.23	-	-
Total	**18.98**	**13.60**	**9.67**	**1.96**	**1.97**
*Previously disturbed TUAs would be reseeded during interim reclamation, unless facility operator prefers that area remain unseeded.					

Proposed project features are described further below.

Access Road 1

Proposed access road 1 (located adjacent to the proposed well pad) would be 64 feet long and 30 feet wide (0.04 acre).

- The 14-foot-wide running surface of the road and the bottoms of the bar ditches alongside the road (approximately 0.02 acre, total) would remain disturbed for the lifetime of the project. No reclamation would occur within these areas during interim reclamation.
- The remainder of the access road corridor (0.02 acre) would be reseeded during interim reclamation.

Access Road 2

Proposed access road 2 (located between proposed pipeline tie stations 10+71.6 and 32+28.7) would be 2,193 feet long and 30 feet wide (1.51 acres).

- The 14-foot-wide running surface of the road and the bottoms of the bar ditches alongside the road (approximately 0.70 acre, total) would remain disturbed for the lifetime of the project. No reclamation would occur within this area during interim reclamation.
- The remainder of the access road corridor (0.81 acre) would be reseeded during interim reclamation.

Well Pad & Construction Zone

The proposed well pad would measure 300 by 500 feet (3.44 acres). The surrounding construction zone would be 50 feet wide (2.07 acres). Therefore, the proposed well pad and construction zone would encompass a 5.51-acre area. However, approximately 0.09 acre of the construction zone would overlap an existing road, and 0.03 acre would overlap proposed access road 1. Therefore, the proposed well pad and construction zone would result in 5.39 acres of new surface disturbance.

- Non-Reseed Working Area: Within the 1.25 acres known as the “non-reseed working area,” no reclamation would occur during interim reclamation. The non-reseed working area would consist of the following areas:
    - A 300-by-100-foot (0.69-acre) facility area would be located on the southwestern side of the proposed well pad.
    - A teardrop with a 35-foot-wide (0.56-acre) driving surface would be located within the center of the proposed well pad.
- Reseed Working Area: The 1.13 acres known as the “reseed working area” would be reseeded (but not recontoured) during interim reclamation. The reseed working area would consist of the following:
    - The center of the teardrop would encompass approximately 0.49 acre.
    - An approximately 210-by-180-foot area around each of the proposed wellheads would be required for potential future activities, but would not be used for daily activities. After accounting for the portion of this polygon that overlaps the teardrop and teardrop center, this region measures 0.64 acre.
- The remainder of the proposed well pad and construction zone (3.01 acres) would be fully reclaimed during interim reclamation.

Pipeline Corridor

The proposed pipeline corridor would be 9,551 feet long and 40 feet wide (8.77 acres). Of this length, 416 feet would overlap the proposed 151H/152H or existing 147H/148H well pads, 8,609 feet would overlap existing access roads or proposed 151H/152H access roads by 15 feet, and 525 feet would travel cross-country. New surface disturbance would be 5.43 acres. All of this acreage would be fully reclaimed during interim reclamation.

TUA 1

This 200-by-200-foot (0.92-acre) TUA, which is currently being permitted as part of the permitted 147H/148H project, would be disturbed prior to the proposed 151H/152H project. There would be no new surface disturbance resulting from the proposed 151H/152H project. During interim reclamation, if TUA 1 is not needed for additional WPX projects before the TUA authorization's expiration date, WPX would repair any damage to this TUA and reseed it.

TUA 2 (Potential)

TUA 2 would be located within the approximately 1.00-acre active Dome Federal 24 No. 21 well pad. There would be no new surface disturbance resulting from the proposed 151H/152H project. During interim reclamation, WPX would repair any damage to this TUA and reseed it (with the exception of areas that Elm Ridge Exploration Company does not want reseeded).

TUA 3

This 1,340-foot-long, 40-foot-wide (1.23-acre) TUA would run parallel to proposed access road 2. It is currently undisturbed. During interim reclamation, WPX would fully reclaim this TUA.

2.2. No Action

Under the No Action Alternative, the 151H/152H APDs and ROW Grants would not be approved. The proposed wells would not be drilled and the proposed well pad, access roads, pipeline ties, and TUA 3 would not be constructed. Current land and resource uses would continue to occur in the proposed project area.

2.3. Alternatives Analyzed in Detail

2.3.1. Alternative B

Alternative B is the BLM-FFO approval of two APDs (for the 151H and 152H wells) and BLM-FFO issuance of four ROW Grants (for the well pad/construction zone, access road 1, pipeline corridor, and TUA 3). In addition, a Navajo Nation ROW Grant would be required for the use of the existing access road.

Alternative B would be similar to the proposed action, with the following exception: access road 2 would not be constructed, and TUA 3 would move approximately 15 feet north of its proposed (Alternative A) location. Because access road 2 would not be built, the pipeline corridor would travel cross-country between pipeline tie stations 10+71.6 and 32+28.7.

Because access road 2 would not be built, WPX would be required to drive along the existing access road to access the 151H/152H well pad. A portion of the existing access road crosses Navajo Nation Tribal Trust surface. The usage of this road would require a Navajo Nation ROW Grant; the permitting associated with this ROW Grant is described in the introduction of Chapter 2 of this EA.

Otherwise, the project location and description, including mitigation and best management practices, would be the same under the proposed project (Alternative A) and Alternative B.

Surface Disturbance

New surface disturbance associated with Alternative B would be 12.82 acres. Of this, 1.15 acres would be reseeded (but not recontoured) during interim reclamation and 10.40 acres would be fully reclaimed during interim reclamation. The remainder (1.27 acres) would remain disturbed throughout the life of the project, and would be fully reclaimed during final reclamation.

The following table summarizes the disturbance and reclamation acreage associated with Alternative B.

Table 6. Surface Disturbance Acreage Associated with Alternative B

Feature	Acreage		Description of New Disturbance Acreage Following Interim Reclamation		
	Total	New Disturbance	Fully Reclaimed (Reseeded and Recontoured)	Reseed Only	Unreclaimed
Access Road 1 Corridor	0.04	0.04	-	0.02	0.02
Well Pad & Construction Zone	5.51	5.39	3.01	1.13	1.25
Pipeline Corridor	8.77	6.16	6.16	-	-
TUA 1*	0.92	-	-	-	-
TUA 2 (potential)*	1.00	-	-	-	-
TUA 3	1.23	1.23	1.23	-	-
Total	**17.47**	**12.82**	**10.40**	**1.15**	**1.27**
*Previously disturbed TUAs would be reseeded during interim reclamation, unless facility operator prefers that area remain unseeded.					

Alternative B project features are described further below.

Access Road 1, Well Pad & Construction Zone, TUA 1, & TUA 2 (Potential)

These project features would be the same as described for the proposed project (Alternative A).

Pipeline Corridor

The pipeline corridor would be the same as described for the proposed project, with the following exception: Because the pipeline corridor would travel cross-country between stations 10+71.6 and 32+28.7, rather than partially overlapping access road 2, this 2,157-foot-long portion of the pipeline corridor would have 40 feet of new surface disturbance width, rather than 25 feet of new disturbance width. Therefore, new surface disturbance associated with the pipeline corridor would be 6.16 acres.

TUA 3

TUA 3 would be located adjacent to the pipeline corridor (rather than adjacent to the access road 2 corridor, as described for the proposed action). The disturbance acreage associated with TUA 3 would be the same under the proposed project (Alternative A) and Alternative B.

2.3.2. Alternative C

Alternative C is the BLM-FFO approval of two APDs (for the 151H and 152H wells) and BLM-FFO issuance of three ROW Grants (for the well pad/construction zone, access road 1, and pipeline corridor). In addition, two Navajo Nation ROW Grants would be required for the use of the existing access road and for the Navajo Nation Tribal Trust portion of the pipeline corridor.

Alternative C would be similar to the proposed action, with the following exception: neither access road 2 nor TUA 3 would be constructed. The portion of the pipeline corridor that would have paralleled access

road 2 (under the proposed action) or travelled cross-country (under Alternative B) would instead parallel the existing access road, which crosses Navajo Nation surface.

As under Alternative B, WPX would be required to drive along the existing access road to access the 151H/152H well pad; a portion of this road crosses Navajo Nation Tribal Trust surface. In addition, a portion of the pipeline ties would cross Navajo Nation Tribal Trust surface. WPX would have to obtain Navajo Nation ROW Grants for the usage of the existing road and the construction/usage of the pipeline ties. The permitting associated with these ROW Grants is described in the introduction of Chapter 2 of this EA.

Otherwise, the project location and description, including mitigation and best management practices, would be the same under the proposed project (Alternative A) and Alternative C.

Surface Disturbance

New surface disturbance associated with Alternative C would be 12.23 acres. Of this, 1.15 acres would be reseeded (but not recontoured) during interim reclamation and 9.81 acres would be fully reclaimed during interim reclamation. The remainder (1.27 acres) would remain disturbed throughout the life of the project, and would be fully reclaimed during final reclamation.

The following table summarizes the disturbance and reclamation acreage associated with Alternative C.

Table 7. Surface Disturbance Acreage Associated with Alternative C

Feature	Acreage		Description of New Disturbance Acreage Following Interim Reclamation		
	Total	New Disturbance	Fully Reclaimed (Reseeded and Recontoured)	Reseed Only	Unreclaimed
Access Road 1 Corridor	0.04	0.04	-	0.02	0.02
Well Pad & Construction Zone	5.51	5.39	3.01	1.13	1.25
Pipeline Corridor	10.96	6.80	6.80	-	-
TUA 1*	0.92	-	-	-	-
TUA 2 (potential)*	1.00	-	-	-	-
Total	**18.43**	**12.23**	**9.81**	**1.15**	**1.27**

*Previously disturbed TUAs would be reseeded during interim reclamation, unless facility operator prefers that area remain unseeded.

Alternative C project features are described further below.

Access Road 1, Well Pad & Construction Zone, TUA 1, & TUA 2 (Potential)

These project features would be the same as described for the proposed project (Alternative A).

Pipeline Corridor

The pipeline corridor would be the same as described for the proposed project, with the following exception: The portion of the pipeline corridor that would have followed access road 2 (under the proposed action) or travelled cross-country (under Alternative B) would follow the existing access road. This would add approximately 2,382 feet of length to the pipeline corridor. All of this new length would overlap the existing road by 15 feet. Therefore, new surface disturbance associated with the pipeline corridor would be 6.80 acres.

2.4. 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.

WPX and the BLM considered moving the proposed well pad slightly to the south or northeast of its current location to avoid rugged topography. Moving the 151H/152H well pad to the south (toward the existing road) was not feasible because an Encana Oil & Gas (USA) Inc. (Encana) pipeline is currently staked along the northern side of this road. Additionally, this location would be outside of WPX's drilling window for the proposed wells. Moving the 151H/152H well pad to the northeast was undesirable due to the presence of a large, ephemeral drainage and the potential presence of sensitive paleontological resources.

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 and alternative project areas are located in San Juan 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 8 shows monitored design values for O_3 in recent years for each of the three San Juan County O_3-monitoring stations.

Table 8. 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
Navajo Lake	0.069	0.066	0.068	0.071	0.075

Source: NMED 2012
* parts per million

Table 9 summarizes monitored design values for other criteria pollutants in San Juan County.

Table 9. 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 10 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 10. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (°F*)	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 *degrees Fahrenheit				

3.1.2. Impacts from Alternative A (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 11 shows estimated emissions from one proposed horizontal oil well for criteria pollutants, volatile organic compounds (VOCs), and GHGs. For comparison, Table 12 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 11. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well; Average 25 Days to Drill and Complete

Activity	NOx*	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

Activity	NOx*	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH_4	CO_2
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
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**
*nitrogen oxide								

Table 12. 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 13 displays the percent increase in total emissions expected in the analysis area as a result of constructing and operating one horizontal oil well.

Table 13. Percent Increase in Analysis Area Emissions from the Proposed Action

	NO_X	CO	VOC	PM_{10} *	$PM_{2.5}$ *	SO_2 *
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**
*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). 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 2013a).

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 2013a). 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 2013a). It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.1.3. Impacts from Alternative B

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and Alternative B.

3.1.4. Impacts from Alternative C

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and Alternative C.

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) has mapped the soils in the proposed project area and two alternative project areas. Complete soil information is available in the NRCS's *Soil Survey of San Juan County, New Mexico: Eastern Part* (NRCS 2009). Within the proposed project area and two alternative project areas, two soil map units are present. These soils are described in the sections below. Soils in the proposed project area are classified as having a low to moderate water erosion potential and a moderate to high wind erosion potential (NRCS 2009). The proposed project area is located within rolling to hilly terrain.

Badland

Within the eastern portion of the proposed and alternative project areas, badland soils have been mapped.

The parent material of the Badland map unit primarily consists of shale. This soil is considered a somewhat excessively drained soil, with the depth to restrictive layer (paralithic bedrock) being zero to two inches. Available water capacity for the Badland soil unit is very low (zero inches). This soil type has a low to moderate potential for water erosion and moderate potential for wind erosion. Badland soils are typically found along the side slopes of break landforms (5- to 80-percent slopes), and are commonly used for wildlife habitat (NRCS 2009).

Fruitland-Persayo-Sheppard complex (hilly slopes)

Within the western portion of the proposed and alternative project areas, soils are mapped as the Fruitland-Persayo-Sheppard complex (hilly slopes).

The Fruitland-Persayo-Sheppard complex (hilly slopes) is composed of 40 percent Fruitland and similar soils, 30 percent Persayo and similar soils, and 25 percent Sheppard and similar soils. Available water capacity for this soil is very low to moderate. This soil complex has a low to moderate potential for water erosion and moderate to high potential for wind erosion. The Fruitland-Persayo-Sheppard complex (hilly slopes) is generally found within sandy, shale hills, and deep sand ecological sites (NRCS 2009).

The potential plant community for this soil complex is comprised of James' galleta (*Pleuraphis jamesii*), Indian ricegrass (*Achnatherum hymenoides*), needleandthread (*Hesperostipa comata*), New Mexico feathergrass (*Hesperostipa neomexicana*), grama (*Bouteloua* spp.), dropseed (*Sporobolus* spp.), purple threeawn (*Aristida purpurea*), sandhill muhly (*Muhlenbergia pungens*), squirreltail (*Elymus elymoides*), alkali sacaton (*Sporobolus airoides*), plains pricklypear (*Opuntia polycantha*), soaptree yucca (*Yucca elata*), Mormon tea (*Ephedra viridis*), fourwing saltbush (*Atriplex canescens*), sagebrush (*Artemisia* spp.), broom snakeweed (*Gutierrezia sarothrae*), rabbitbrush (*Chrysothamnus* spp.), piñon pine (*Pinus edulis*), and juniper (*Juniperus* spp.; NRCS 2009).

The parent material of Fruitland soils primarily consists of slope alluvium from sandstone and shale. This soil is considered a well-drained soil, with the depth to water table and depth to restrictive layer being more than 80 inches. Fruitland soils are typically found along alluvial fan and stream terrace landforms (5- to 30-percent slopes; NRCS 2009).

The parent material of Persayo soils primarily consists of residuum weathered from shale. 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 5 to 20 inches. Persayo soils are typically found along breaks, hill, and ridge landforms (5- to 30-percent slopes; NRCS 2009).

The parent material of Sheppard soils primarily consists of eolian deposits over mixed alluvium. This soil is considered a somewhat excessively drained soil, with the depth to water table and depth to restrictive layer being more than 80 inches.Sheppard soils are typically found along dune landforms (5- to 30-percent slopes; NRCS 2009).

3.2.2. Impacts from Alternative A (the Proposed Action)

Direct and Indirect Impacts

Under the proposed action, 13.60 acres of vegetation would be cleared, topsoil would be stripped, and surface would be leveled. Approximately 1.97 acres would remain as bare, relatively flat, compacted surface for the life of the proposed project; the remainder would be recovered with topsoil and reseeded during interim reclamation. As discussed in Section 2.1.2 (Description of Proposed Project), TUAs 1 and 2 would be reseeded during interim reclamation (unless otherwise requested).

The clearing of vegetation within the proposed project area would result in the exposure of soils to water, wind, and direct human disturbances. Therefore, erosion within the proposed project area would potentially increase. Construction activities would result in the mixing, displacement, and compaction of soils. The degree of erosion would be dependent upon precipitation and wind. 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.

Cumulative Impacts

The spatial analysis area for cumulative soil impacts is the proposed project area, immediately surrounding lands, and points immediately downstream. The following existing or reasonably foreseeable future soil disturbances are present within the spatial analysis area:

- An existing dirt access road, which is devoid of vegetation and thus susceptible to erosion, parallels and overlaps approximately 6,452 feet of the proposed pipeline corridor.
- In the reasonably foreseeable future, Encana is proposing the Chaco Trunk No. 2 pipeline. If the proposed 151H/152H project occurs, the Chaco Trunk No. 2 pipeline would skirt the southwestern edge of the proposed 151H/152H well pad construction zone for approximately 400 feet and parallel the proposed 151H/152H pipeline corridor for approximately 9,201 feet (from the proposed 151H/152H well pad to the existing 147H/148H well pad). The centerline of the 40-foot-wide Chaco Trunk No. 2 pipeline corridor would be off-set from the proposed 151H/152H pipeline corridor by approximately 15 feet. Therefore, the Chaco Trunk No. 2 pipeline corridor would contribute approximately 5.51 acres of temporary soil disturbance to the spatial analysis area. This acreage would be reclaimed during the interim reclamation phase of the Chaco Trunk No. 2 project.
- TUA 1, which is associated with the permitted 147H/148H project, will have been cleared of vegetation by the commencement of the proposed project. Topsoil will not be stripped from this TUA.
- TUA 2 is within a compacted, flat, relatively unvegetated, active well pad.

The proposed project would contribute to ongoing and reasonably foreseeable future soil erosion within and immediately downstream of the spatial analysis area.

3.2.3. Impacts from Alternative B

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. There would be 0.78 fewer acres of vegetation and soil disturbance, and 0.70 fewer acres of long-term barren soil, resulting from Alternative B, as compared to the proposed action. Therefore, soil impacts (including erosion) would likely be slightly less under Alternative B than under the proposed action.

Under Alternative B, 12.82 acres of vegetation would be cleared, topsoil would be stripped, and surface would be leveled during the construction phase. Approximately 1.27 acres would remain as bare, compacted surface for the life of the project; the remainder would be recovered with topsoil and reseeded during interim reclamation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. Therefore, cumulative impacts to soils would be slightly less under Alternative B than under the proposed action.

3.2.4. Impacts from Alternative C

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative C, with the following exceptions: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road. There would be 1.37 fewer acres of vegetative and soil disturbance, and 0.70 fewer acres of long-term barren soil, resulting from Alternative C, as compared to the proposed action. Therefore, soil impacts (including erosion) would likely be slightly less under Alternative C than under the proposed action or Alternative B.

Under Alternative C, 12.23 acres of vegetation would be cleared, topsoil would be stripped, and surface would be leveled during the construction phase. Approximately 1.27 acres would remain as bare, compacted surface for the life of the project; the remainder would be recovered with topsoil and reseeded during interim reclamation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative C, with the following exceptions: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road.

In addition, Encana's proposed Chaco Trunk No. 2 pipeline corridor would no longer follow the proposed (Alternative A) 151H/152H pipeline corridor route; instead, the Chaco Trunk No. 2 pipeline corridor would either diverge from the proposed 151H/152H pipeline corridor at 151H/152H pipeline tie station 86+92.2 (subsequently travelling west-northwestward, outside of the spatial analysis area) or parallel the Alternative C 151H/152H pipeline corridor along the existing access road. These two potential Chaco Trunk No. 2 pipeline routes would result in approximately 0.31 or 6.88 acres, respectively, of reasonably foreseeable future disturbance within the spatial analysis area. Under Alternative C, depending on which route is chosen for the Chaco Trunk No. 2 pipeline route, the cumulative soil disturbance within the spatial analysis area would be 5.20 fewer acres or 1.37 more acre than under the proposed action. This acreage would be reclaimed during the interim reclamation phase of the Chaco Trunk No. 2 project.

3.3. Groundwater Resources

3.3.1. Affected Environment

Within a 1-mile radius of the proposed well pad, there are no recorded water wells (New Mexico Office of the State Engineer 2011). Under Alternatives B or C, the 151H/152H well pad location would not change. Therefore, the depth to groundwater in the vicinity of the proposed and alternative project areas is unknown.

3.3.2. Impacts from Alternative A (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 1,000 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 bores would be about 5,000 feet below the ground surface. Fracking in the Basin Mancos formation is not expected to occur above depths of 4,000 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 wells.

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.

3.3.3. Impacts from Alternative B

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and Alternative B.

3.3.4. Impacts from Alternative C

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and Alternative C.

3.4. Upland Vegetation

3.4.1. Affected Environment

The proposed and alternative project areas are 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 2,165 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 (*Artemisia tridentata*), rabbitbrush, winterfat (*Krascheninnikovia lanata*), shadscale saltbush (*Atriplex confertifolia*), and greasewood (*Sarcobatus vermiculatus*); and grasslands of blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), and needleandthread grass. Higher elevations may support piñon pine and juniper 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).

The general region surrounding the proposed and alternative project areas is characterized by broad basins vegetated with sagebrush shrublands and desert scrub communities. Low mesas and hills are vegetated with piñon-juniper woodlands. Minimally vegetated badlands are also scattered throughout the region.

Desert scrub (dominated by shadscale saltbush, mound saltbush [*Atriplex obovata*], alkali sacaton, and blue grama) and piñon-juniper woodland (dominated by piñon pine, oneseed juniper (*Juniperus monosperma*), broom snakeweed, James' galleta, and blue grama) vegetation communities are found throughout the proposed and alternative project areas. Patches of sagebrush shrubland (dominated by big sagebrush, broom snakeweed, and James' galleta) are found within the western portions of the proposed and alternative project areas. There are small patches of desert riparian vegetation communities (dominated by greasewood, rabbitbrush, rock goldenrod [*Petradoria pumila*], tarragon [*Artemisia dracunculus*], and threadleaf ragwort [*Senecio flaccidus*]) found along some ephemeral drainages within the proposed and alternative project areas. These vegetation communities are described in detail in the BSR (Appendix B).

3.4.2. Impacts from Alternative A (the Proposed Action)

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation (including sagebrush shrubland, piñon-juniper woodland, desert scrub, and desert riparian vegetation) within the 13.60-acre proposed project area would be cleared. This would include 200 to 275 trees. During interim reclamation, approximately 9.67 acres of the proposed project area would be fully reclaimed (recontoured and reseeded). Approximately 1.96 acres (within portions of the proposed well pad and access road corridors) would be reseeded only. The remaining 1.97 acres would remain as compacted, barren surface for the life of the proposed wells. During final reclamation, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed during interim reclamation (3.93 acres). In order to fully reclaim the 1.96 acres of the proposed project area that were only reseeded during interim reclamation, WPX would need to first clear the vegetation from within these areas in order to recontour them.

During interim and final reclamation, the BLM Saltbush Shadscale/Winterfat and Sagebrush-Grass Community Seed Mixtures would be utilized; the species included in these mixtures are listed in the Surface Reclamation Plan (Appendix E). Re-established vegetation would consist of native grass, forb, and shrub species included in the seed mixtures, 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. Following the reclamation process, the resulting vegetation community could differ from the native plant communities surrounding the proposed project area. Within reclaimed areas, it is not expected that the vegetation community 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 and access roads, 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 and immediately adjacent lands. The existing and reasonably foreseeable disturbances within this spatial analysis area include the following:

- An existing dirt access road, Encana's proposed Chaco Trunk No. 2 pipeline, proposed TUA 1, and proposed TUA 2 are described in Section 3.2.4 (Soil Resources – Direct and Indirect Effects – Cumulative Impacts)
- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within a grazing allotment (Largo Community, Allotment No. 5083), which is permitted for year-round grazing by 145 head of cattle and 596 sheep.

Indirectly, fugitive dust or deposition associated with existing roads and well pads in the immediate area could impact the vegetation within the spatial analysis area, and could continue to do so throughout the life of the proposed project. The proposed project would contribute to direct vegetation disturbance and fugitive dust and/or deposition within the spatial analysis area.

3.4.3. Impacts from Alternative B

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. There would be 0.78 fewer acres of vegetative disturbance and 0.70 fewer acres of long-term barren surface resulting from Alternative B, as compared to the proposed action. Therefore, vegetative disturbance would be slightly less under Alternative B than under the proposed action.

Under Alternative B, 12.82 acres of vegetation (including 125 to 175 trees) would be cleared during the construction phase. Approximately 1.27 acres would remain as barren surface for the life of the proposed project; the remainder would be recovered with topsoil and reseeded during interim reclamation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. Therefore, cumulative impacts to upland vegetation would be slightly less under Alternative B than under the proposed action.

3.4.4. Impacts from Alternative C

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative C, with the following exceptions: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road. There would be 1.37 fewer acres of vegetative disturbance, and 0.70 fewer acres of long-term barren surface resulting from Alternative C, as compared

to the proposed action. Therefore, vegetative disturbance would be slightly less under Alternative C than under the proposed action and Alternative B.

Under Alternative C, 12.23 acres of vegetation (including 50 to 75 trees) would be cleared during the construction phase. Approximately 1.27 acres would remain as barren surface for the life of the project; the remainder would be recovered with topsoil and reseeded during interim reclamation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative C, with the following exceptions: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road.

In addition, Encana's Chaco Trunk No. 2 pipeline corridor would no longer follow the proposed (Alternative A) 151H/152H pipeline corridor route; instead, the Chaco Trunk No. 2 pipeline corridor would either diverge from the proposed 151H/152H pipeline corridor at 151H/152H pipeline tie station 86+92.2 (subsequently travelling west-northwestward, outside of the spatial analysis area) or parallel the Alternative C 151H/152H pipeline corridor along the existing access road. These two potential Chaco Trunk No. 2 pipeline routes would result in approximately 0.31 or 6.88 acres, respectively, of reasonably foreseeable future disturbance within the spatial analysis area. Under Alternative C, depending on which route is chosen for the Chaco Trunk No. 2 pipeline route, the cumulative upland vegetation disturbance within the spatial analysis area would be 5.20 fewer acres or 1.37 more acres than under the proposed action. This acreage would be reclaimed during the interim reclamation phase of the Chaco Trunk No. 2 project.

3.5. Wildlife

3.5.1. Affected Environment

General Wildlife

The vegetation communities found within the proposed and alternative project areas provide habitat for a variety of vertebrate and invertebrate species. The objectives of the BLM wildlife management program are to "ensure optimum populations and a natural abundance and diversity of fish and wildlife values by restoring, maintaining, and enhancing habitat conditions for consumptive and non-consumptive uses" (BLM 2003a, 2-24). A discussion of wildlife identified within the proposed project area is provided in the BSR (Appendix B). Based on the available habitat, the potential for wildlife species to occur within the proposed and alternative project areas would be similar.

Migratory Birds

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 the following:

- USFWS Birds of Conservation Concern
- New Mexico Partners in Flight New Mexico Bird Conservation Plan
- Comprehensive Wildlife Conservation Strategy for New Mexico
- Gray Vireo Recovery Plan
- The North American Waterbird Conservation Plan

- 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. These species and an evaluation of their potential to occur within the proposed project area are discussed in the BSR (Appendix B); a list of species identified within the proposed project area during the biological surveys is also provided. Based on the available habitat, the potential for bird species to occur within the proposed and alternative project areas would be similar.

3.5.2. Impacts from Alternative A (the Proposed Action)

Direct and Indirect Impacts

There is available, similar habitat in the region surrounding the proposed project area that wildlife could utilize. However, the clearing of vegetation and the transformation of the proposed project area to a reseed community would remove potential habitat and result in habitat fragmentation for numerous wildlife species, including priority bird species.

During the construction phase of the proposed project, all vegetation, including 200 to 275 trees, within the 13.60-acre proposed project area would be cleared. Approximately 1.97 acres would remain barren of vegetation for the long term. Reclaimed portions of the proposed project area would be converted to a reseed community following interim reclamation and final reclamation. The impacts to the vegetation communities are described in detail in Section 3.4 (Upland Vegetation). If interim and final reclamation are successful, sagebrush shrubland, piñon-juniper woodland, desert scrub, and desert riparian communities would become re-established within the proposed project area. However, as discussed in Section 3.4, the re-establishment of a mature, native plant community could require decades, and it is possible that the plant communities could never fully recover from disturbance (BLM 2003a, 4-18).

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). Fragmentation would result from construction within areas that are not adjacent to existing surface disturbance. There would be approximately 3,382 linear feet of initial habitat fragmentation resulting from the proposed project; this fragmentation would exist until interim reclamation is deemed successful. Portions of initial surface disturbance that would result in habitat fragmentation would include the 600-foot-long well pad/construction zone, 64-foot-long access road 1, 2,193-foot-long access road 2, and 525-foot-long cross-country portion of the pipeline ties. For the long term, the proposed well pad (with an approximately 700-foot-long, long-term, looped driving surface [or teardrop]), access road 1 (64 feet long), and access road 2 (2,193 feet long) would represent 2,957 linear feet of new, long-term habitat fragmentation.

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 proposed project could cause indirect habitat loss by deterring wildlife from using available habitat adjacent to the proposed project area.

Migratory Birds

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 Flora and Fauna, Including SSS and Livestock), 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 associated 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.

It is difficult to predict the effects of the proposed project on migratory birds. The increased activity, noise, and disturbed vegetation associated with the proposed project 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.

General Wildlife

It is possible that burrowing animals could be killed or injured during the construction phase of the proposed project, as equipment digs into the earth and rolls over the surface of the ground.

During the construction phase of the proposed pipeline ties, terrestrial wildlife could fall into the open pipeline trenches and be injured, stressed, or killed. The presence of open trenches could also disrupt normal wildlife movements to and from water and/or food sources. Wildlife could have to skirt the open-trench portions of the proposed pipeline corridor to access water and/or food. This disruption could stress wildlife and result in the loss of valuable energy resources. As discussed in Section 2.1.2 (Description of Proposed Project – Protection of Flora and Fauna, Including SSS and Livestock), design features and BMPs would be implemented during the construction phase of the proposed pipeline ties to assist in the prevention of injury, stress, or death of wildlife.

Cumulative Impacts

The spatial analysis area for wildlife includes the proposed project area and an approximately 2-mile radius around the proposed project area. Within the spatial analysis area, there is existing and proposed disturbance, and the region has been fragmented. Existing and reasonably foreseeable future disturbance within the spatial analysis area includes the following:

- 10 active oil and/or gas well pads
- 9 plugged (reclaimed) oil and/or gas well pads
- 5 proposed oil and/or gas well pads
- Approximately 3 miles of existing U.S. Highway 550
- Approximately 6 miles of existing County Roads (including County Roads 7900, 7940, and 7944)
- Approximately 4 miles of other existing access roads
- Approximately 1 mile of proposed oil and gas access road
- Numerous existing and proposed utility ROWs, most of which parallel existing or proposed roads
- Several existing and proposed TUAs or staging areas, most of which parallel existing or proposed roads
- Active wildlife and livestock grazing; the spatial analysis area is within a grazing allotment (Largo Community, Allotment No. 5083), which is permitted for year-round grazing by 145 head of cattle and 596 sheep
- Scattered residential development

Under the proposed action, Encana's proposed Chaco Trunk No. 2 pipeline corridor would parallel the proposed 151H/152H pipeline corridor for much of the Chaco Trunk No. 2 length (between the proposed 151H/152H and existing 147H/148H well pads).

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

3.5.3. Impacts from Alternative B

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. As a result, habitat disturbance would be slightly less under Alternative B than under the proposed action. There would be 0.78 fewer acres of direct vegetative disturbance and 0.70 fewer acres of long-term barren surface resulting from Alternative B, as compared to the proposed action. In addition, because access road 2 would not be constructed, there would be approximately 36 fewer feet of initial habitat fragmentation and 2,193 fewer feet of long-term habitat fragmentation under Alternative B than under the proposed action.

During the construction phase, all vegetation, including 125 to 175 trees, within the 12.82-acre project area would be cleared. Approximately 1.27 acres would remain barren of vegetation for the long term.

There would be approximately 3,346 linear feet of initial habitat fragmentation resulting from Alternative B. Portions of initial surface disturbance that would result in habitat fragmentation would include the 600-foot-long well pad/construction zone; 64-foot-long access road 1; 525-foot-long, cross-country portion of the pipeline ties, immediately southwest of the proposed well pad; and 2,157-foot-long, cross-country portion of the pipeline ties. For the long term, the proposed well pad (with an approximately 700-foot-long, looped, long-term driving surface [or teardrop]) and access road 1 (64 feet long) would represent 764 linear feet of new, long-term habitat fragmentation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. Therefore, cumulative impacts to wildlife would be slightly less under Alternative B than under the proposed action.

3.5.4. Impacts from Alternative C

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative C, with the following exception: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road. As a result, habitat disturbance would be slightly less under Alternative C than under the proposed action and Alternative B. There would be 1.37 fewer acres of direct vegetative disturbance and 0.70 fewer acres of long-term barren surface resulting from Alternative C, as compared to the proposed action. In addition, because access road 2 would not be constructed and the aforementioned, 2,157-foot-long, cross-country portion of the pipeline ties would not be constructed, there would be approximately 2,193 fewer feet of initial and long-term habitat fragmentation under Alternative C than under the proposed action.

During the construction phase, all vegetation, including 50 to 75 trees, within the 12.23-acre project area would be cleared. Approximately 1.27 acres would remain barren of vegetation for the long term.

There would be approximately 1,189 linear feet of initial habitat fragmentation resulting from Alternative C. Portions of initial surface disturbance that would result in habitat fragmentation would include the 600-foot-long well pad/construction zone; 64-foot-long access road 1; and 525-foot-long, cross-country portion of the pipeline ties. For the long term, the proposed well pad (with an approximately 700-foot-long, looped, long-term driving surface [or teardrop]) and access road 1 (64 feet long) would represent 764 linear feet of new, long-term habitat fragmentation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative C, with the following exceptions: under Alternative C, access road 2 and TUA 3 would not be constructed, and a portion of the pipeline corridor would follow an existing access road. In addition, if WPX's Alternative C pipeline corridor route were chosen, a portion of Encana's proposed Chaco Trunk No. 2 pipeline corridor route would subsequently change. Because Encana has not yet determined what route would be taken in this situation, it is not possible to determine whether cumulative impacts to wildlife would be greater or lesser under Alternative C as compared to the proposed action.

If Alternative C is chosen, Encana's Chaco Trunk No. 2 pipeline corridor would no longer follow the proposed (Alternative A) 151H/152H pipeline corridor west of the 151H/152H well pad; instead, the Chaco Trunk No. 2 pipeline corridor would either diverge from the 151H/152H pipeline corridor at station 86+92.2 (subsequently travelling west-northwestward, following a primarily cross-country route) or parallel the Alternative C pipeline corridor along the existing access road. The final route determined for the Chaco Trunk No. 2 pipeline corridor could result in either more or less cumulative vegetation disturbance and cross-country length (and thus new habitat fragmentation) than that associated with the proposed action. This acreage would be reclaimed during the interim reclamation phase of the Chaco Trunk No. 2 project.

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 SSS 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.

Based on known range and habitat, several BLM SSS have the potential to occur within the proposed and alternative project areas. These species and their habitat requirements are discussed in detail in the BSR (Appendix B). Potential SSS habitat is similar within the proposed and alternative project areas. The SSS with the potential to occur within the proposed and alternative project areas are as follows:

- Aztec gilia (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat "zone" (BLM 2013b), potential habitat present
- Brack's fishhook cactus (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat "zone" (BLM 2013b), potential habitat present; individuals identified within proposed and alternative project areas
    - Alternative A (Proposed) Project Area: Approximately 250
    - Alternative B Project Area: Approximately 250
    - Alternative C Project Area: Approximately 240
- Bendire's thrasher (BLM Sensitive): potential foraging and nesting habitat available

- Ferruginous hawk (BLM Sensitive and SMS): potential foraging habitat available
- Golden eagle (BLM SMS): potential foraging habitat available
- Pinyon jay (BLM Sensitive): potential foraging and nesting habitat available
- Prairie falcon (BLM SMS): potential foraging habitat available

3.6.2. Impacts from Alternative A (the Proposed Action)

Direct and Indirect Impacts

Aztec Gilia and Brack's Fishhook Cactus

Approximately 250 Brack's fishhook cacti were identified within the proposed project area; no Aztec gilia were identified. As discussed in Section 2.1.2 (Description of Proposed Project), 30 to 50 percent (75 to 125) of these cacti would be transplanted following BLM-FFO protocol (BLM 2013d and BLM 2013e); details of this process are provided in the BSR (Appendix B). Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the proposed project on transplanted Brack's fishhook cacti is not yet known. The remaining, untransplanted Brack's fishhook cacti would be killed during the vegetation-clearing phase of the proposed project. Based on the small size of Aztec gilia and Brack's fishhook cacti and the timing of the biological surveys (November 2013) conducted for the proposed project, it is possible that Aztec gilia and Brack's fishhook cacti individuals could have been overlooked during the surveys; if so, it is possible that these individuals could also be killed during the vegetation-clearing phase of the proposed project.

The proposed project would result in the disturbance of up to 13.60 acres of Aztec gilia/Brack's fishhook cactus habitat. Approximately 1.97 acres would remain as compacted, barren surface for the life of the proposed wells; for the long-term, this acreage would not provide potential habitat for these species. The remaining acreage would be reclaimed during interim reclamation, as described in Section 3.4 (Upland Vegetation); it is possible that Aztec gilia and Brack's fishhook cacti could become established within these reclaimed areas, although the likelihood of these species becoming reestablished in a recently disturbed area is unlikely. During final reclamation, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed during interim reclamation (3.93 acres). In order to fully reclaim the 1.96 acres of the proposed project area that were only reseeded during interim reclamation, WPX would need to first clear the vegetation from within these areas in order to recontour them; during this process, it is possible that Aztec gilia and/or Brack's fishhook cacti that become established or reestablished within post-interim reclamation areas could be killed.

Bendire's Thrasher and Pinyon Jay

Impacts to Bendire's thrashers and pinyon jays would be similar to those described for migratory birds (Section 3.5.2 [Wildlife– Impacts from Alternative A (the Proposed Action) – Migratory Birds]).

Ferruginous Hawk, Golden Eagle, and Prairie Falcon

Due to the mobility of adult raptors and the lack of appropriate nesting sites for ferruginous hawks, golden eagles, and prairie falcons in the vicinity of the proposed project area, it is unlikely that these raptors would be directly harmed by activities associated with the proposed project.

There is similar habitat available in the surrounding area that these SSS raptors could utilize for foraging. However, the proposed project would result in the disturbance of 13.60 acres of foraging habitat for these species. Of this, 1.97 acres would remain active and unvegetated throughout the lifetime of the proposed project. The remaining acreage would be reclaimed (reseeded only or recontoured and reseeded) during interim reclamation; these reclaimed areas could be used by raptors for foraging. If interim and final reclamation are successful, native vegetation communities 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 native plant communities could never fully recover from disturbance (BLM 2003a, 4 – 18).

Well equipment would cause increased noise levels in the vicinity of the proposed project area. Occasional human and vehicle presence within the vicinity of the proposed project area would increase above present levels. Audial and visual disturbances associated with the proposed project could cause indirect habitat loss by deterring these raptors from using available habitat adjacent to the proposed project area.

Cumulative Impacts

The spatial analysis area includes the proposed project area and an approximately 2-mile radius around the proposed project area. Within the spatial analysis area, there is existing disturbance. This disturbance is described in detail in Section 3.5 (Wildlife). Habitat disturbance in the area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors).

Aztec Gilia and Brack's Fishhook Cactus

The spatial analysis area is entirely within the Aztec gilia and Brack's fishhook cactus potential habitat "zone" (BLM 2013b). Within this zone, actual appropriate Aztec gilia/Brack's fishhook cactus habitat has not been determined; therefore, the amount of existing and reasonably foreseeable future disturbance within appropriate habitat cannot be quantified. It can be safely assumed, however, that existing and reasonably foreseeable future disturbance within the spatial analysis area has and will continue to reduce the amount of habitat available to these species. The proposed project, which is within appropriate habitat for these species, would contribute to the reduction of available Aztec gilia/Brack's fishhook cactus habitat.

Bendire's Thrasher, Pinyon Jay, Ferruginous Hawk, Golden Eagle, and Prairie Falcon

Cumulative impacts to these wildlife SSS would be similar to those described for wildlife (Section 3.5.2 [Wildlife - Impacts from Alternative A (the Proposed Action)]).

3.6.3. Impacts from Alternative B

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. As a result, habitat disturbance and long-term wildlife habitat fragmentation would be slightly less under Alternative B than under the proposed action. There would be 0.78 fewer acres of direct vegetative disturbance and 0.70 fewer acres of long-term barren surface resulting from Alternative B, as compared to the proposed action. In addition, because access road 2 would not be constructed, there would be 2,193 fewer feet of long-term habitat fragmentation under Alternative B than under the proposed action. Alternative B habitat disturbance and fragmentation is discussed in detail in Section 3.5.3 (Wildlife – Impacts from Alternative B).

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative B, with the following exception: under Alternative B, access road 2 would not be constructed. Therefore, cumulative impacts to wildlife would be slightly less under Alternative B than under the proposed action.

3.6.4. Impacts from Alternative C

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and Alternative C, with the following exception: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road. As a result, it is estimated that up to 10 fewer Brack's fishhook cacti would be killed under Alternative C than under the proposed action or Alternative B. In addition, habitat disturbance and short- and long-term wildlife habitat fragmentation would be slightly less under Alternative C than under the proposed action and Alternative B. There would be 1.37 fewer acres of direct vegetative disturbance and 0.70 fewer acres of long-term barren surface resulting from Alternative C, as compared to the proposed action. In addition, because access road 2 would not be constructed and the Alternative C pipeline corridor would follow an existing road, there would be 2,193 fewer feet of initial and long-term habitat fragmentation under Alternative C than under the proposed action. Alternative C habitat disturbance and fragmentation is discussed in detail in Section 3.5.4 (Wildlife – Impacts from Alternative C).

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and Alternative C, with the following exceptions: under Alternative C, access road 2 and TUA 3 would not be constructed, and the pipeline corridor would follow an existing access road. In addition, if WPX's Alternative C pipeline corridor route were chosen, a portion of Encana's proposed Chaco Trunk No. 2 pipeline corridor route would subsequently change. Because Encana has not yet determined what route would be taken in this situation, it is not possible to determine whether cumulative impacts to SSS would be greater or lesser under Alternative C as compared to the proposed action (details are provided in Section 3.5.4 [Wildlife – Impacts from Alternative C]).

3.7. Cultural Resources

3.7.1. Affected Environment

The proposed and alternative project areas are 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.] 10,000 B.C. to 5,500 B.C.); Archaic (ca. 5,500 B.C. to A.D. 400); Basketmaker II-III and Pueblo I-IV (aka Anasazi; A.D. 1-1,540); and historic (A.D. 1,540 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.

Alternative A (The Proposed Action)

The entire Area of Potential Effect (APE) for the proposed action was archaeologically surveyed by LAC at a BLM Class III (100-percent) level. The archaeological reports, LAC Report Nos. 2012-5uu (2013a, BLM 2014[I]046F) and 2012-5uu#2 (2013b; BLM 2014[II]005F), were prepared and submitted to the BLM in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (BLM 2005).

The Class III inventory resulted in three cultural sites being discovered and registered (LA 177608 , 177896, 177897) and five isolates being recorded within the APE. Only LA 177896 is Recommended as eligible for nomination to the NRHP (LAC 2013a and LAC 2013b). No TCPs are known to exist in the APE.

Alternative B

The entirety of the Alternative B project area is located within the APE surveyed for the proposed action.

Alternative C

The only portion of the Alternative C project area that would not be located within the APE surveyed for the proposed action is a portion of the Alternative C pipeline route which travels parallel to the existing access road. A portion of this area has been previously surveyed for archaeological resources (Huse, Noisat, and Halasi 1978). However, this survey was conducted 36 years ago. Previously recorded sites from that survey are known to be in the proximity of this portion of Alternative C but their specific relationship to the road is unknown.If Alternative C is chosen, this portion of the Alternative C project area would require a new cultural survey.

3.7.2. Impacts from Alternative A (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, reduction of construction areas, installation of temporary barriers, and site monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the COAs in the approved APDs and stipulations attached to the 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. A positive cumulative effect is the additional scientific information yielded by the archaeological survey.

3.7.3. Impacts from Alternative B

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and Alternative B.

3.7.4. Impacts from Alternative C

A current cultural survey for a portion of the Alternative C pipeline corridor does not exist. If Alternative C is chosen, a cultural survey would be conducted and design features and/or mitigation would be developed to ensure that no direct or indirect impacts to significant cultural sites (e.g., sites eligible for the NRHP) would result from the implementation of Alternative C. As a result, no cumulative impacts would be anticipated.

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:

- Heather Riley, WPX
- Larry Higgins, WPX
- Andrea Felix, WPX
- Lacey Granillo, WPX
- Mark Lepich, WPX
- Steven Fuller, LAC
- Leslie Sesler, LAC
- Fred Harden, LAC
- Navajo Nation local Chapter House

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:

- Jenny Holmen, Senior Environmental Scientist, NCI
- Amber Ballman, Environmental Scientist, NCI
- Amanda Nisula, Planning and Environmental Specialist, BLM-FFO
- Barney Wegener, Natural Resources Specialist, BLM-FFO
- Sheila Williams, District Botanist, BLM-FFO
- John Hansen, Wildlife Biologist, BLM-FFO
- John Kendall, Wildlife Management Biologist, BLM-FFO
- Jim Copeland, Archaeologist, BLM-FFO
- Sherrie Landon, Paleontologist and Environmental Protection Specialist, BLM-FFO
- Esther Willetto, Tribal Program Coordinator, BLM-FFO
- Roger Herrera, Environmental Protection Specialist, BLM-FFO
- Vera Matthews, Realty Specialist, BLM-FFO

4.3. References

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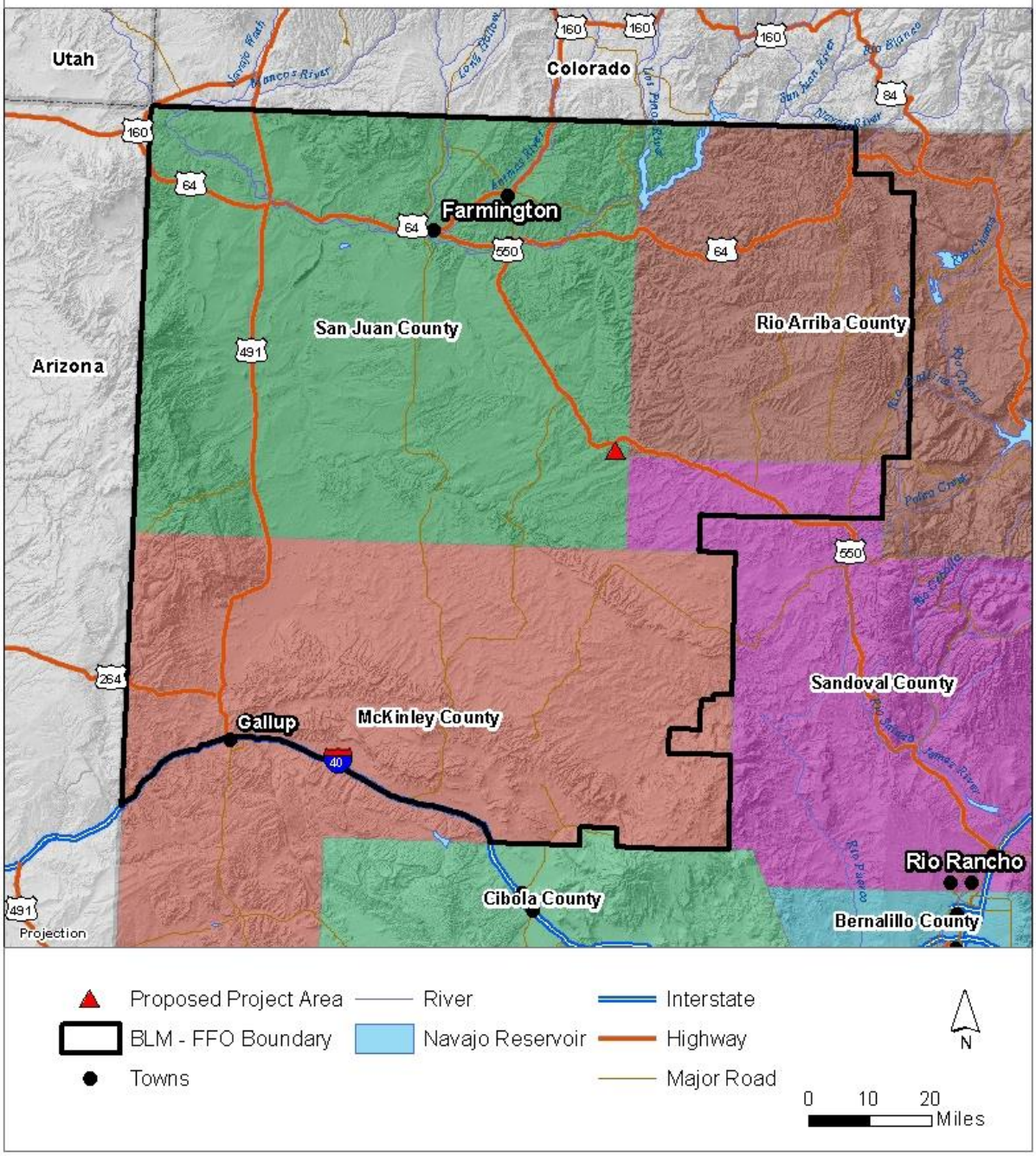
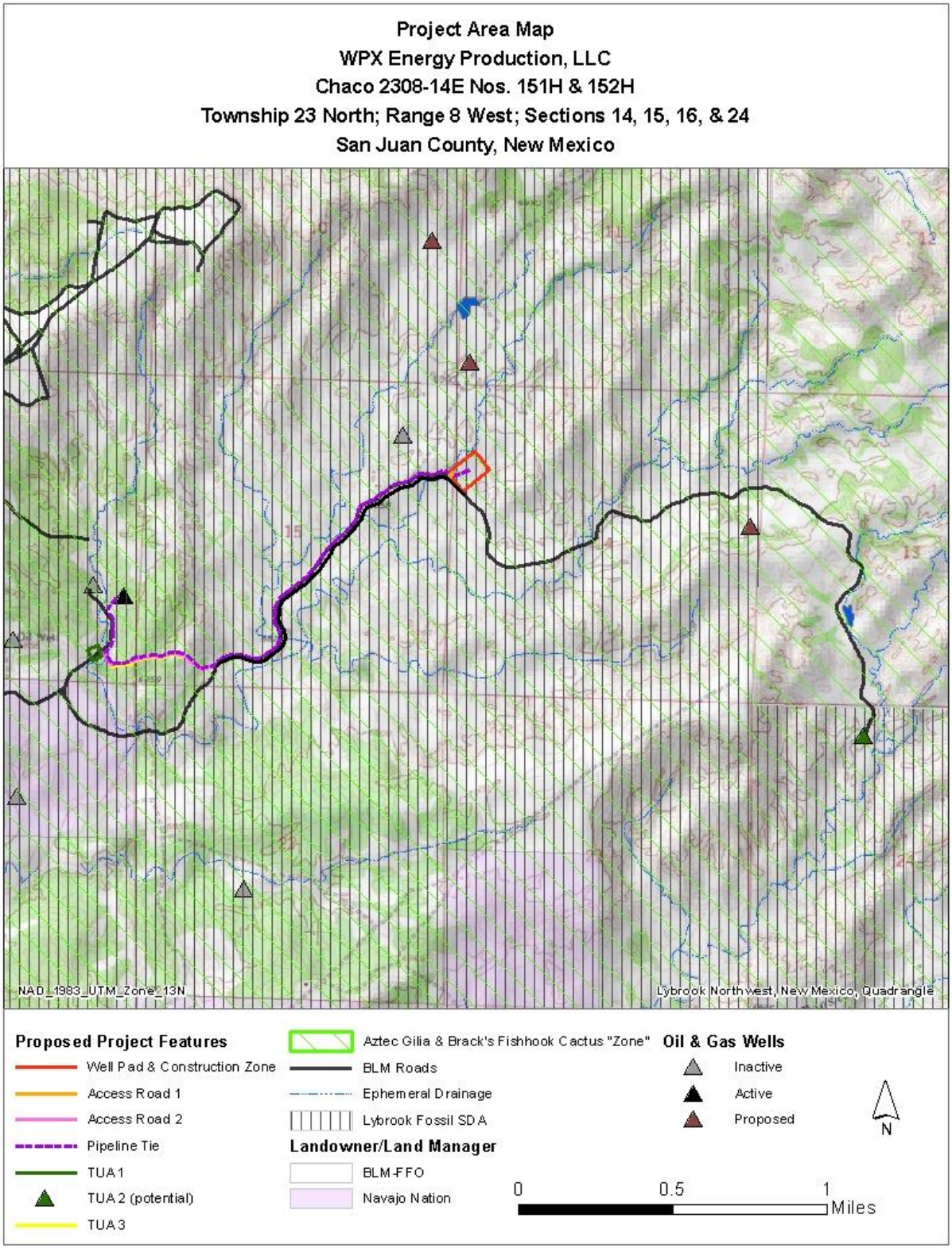
APPENDIX A. MAPS

A.1. Vicinity Map

Vicinity Map
WPX Energy Production, LLC
Chaco 2308-14E Nos. 151H & 152H
Township 23 North; Range 8 West; Sections 14, 15, 16, & 24
San Juan County, New Mexico

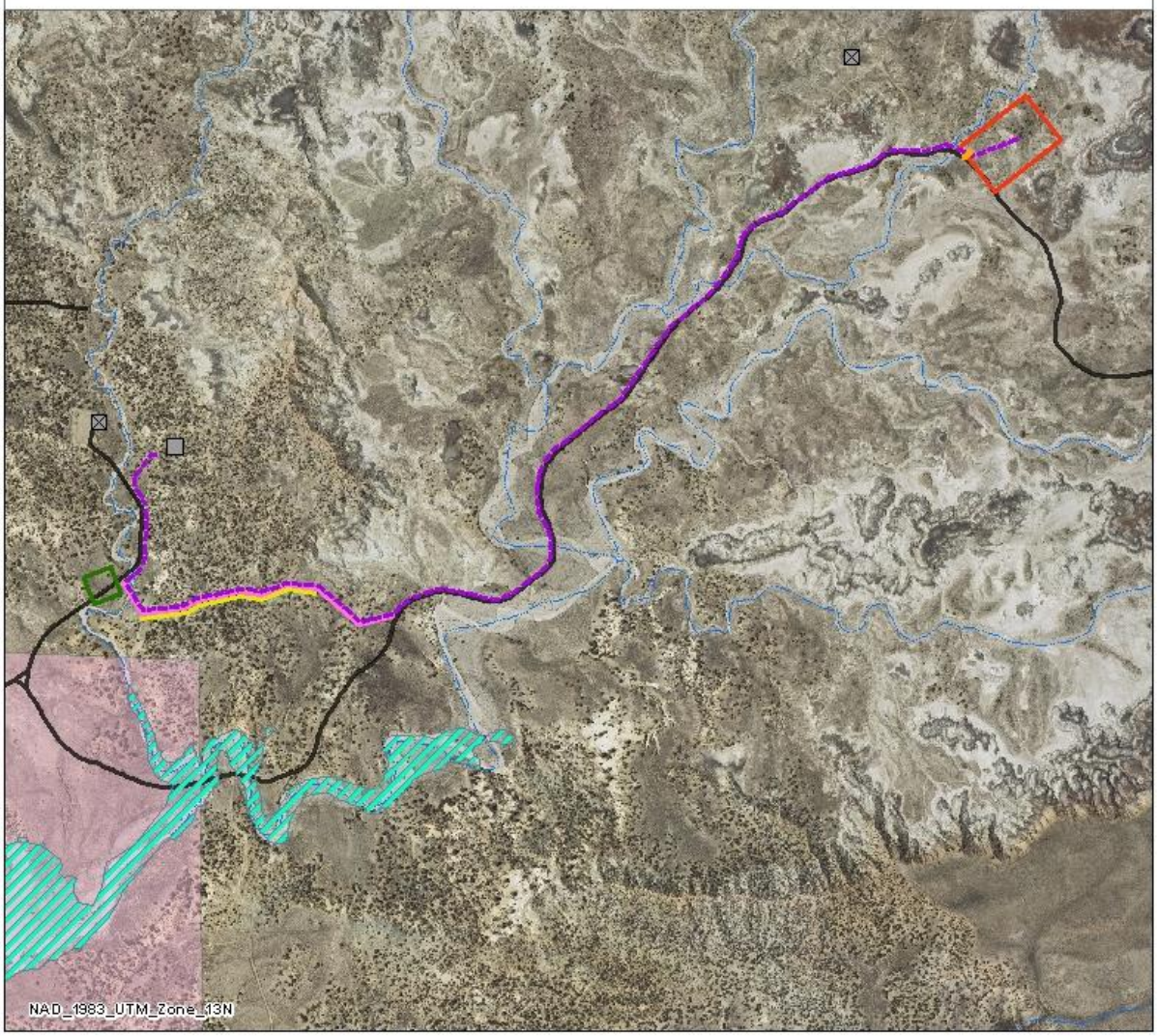


A.2. Project Area Map



A.3. Aerial Map

Aerial Map
WPX Energy Production, LLC
Chaco 2308-14E Nos. 151H & 152H
Township 23 North; Range 8 West; Sections 14, 15, 16, & 24
San Juan County, New Mexico



Proposed Project Features
- Well Pad & Construction Zone
- Access Road 1
- Access Road 2
- Pipeline Tie
- TUA 1
- TUA 3

- FEMA Floodplain
- BLM Roads
- USGS Watercourse

Oil & Gas Wells
- Inactive
- Active

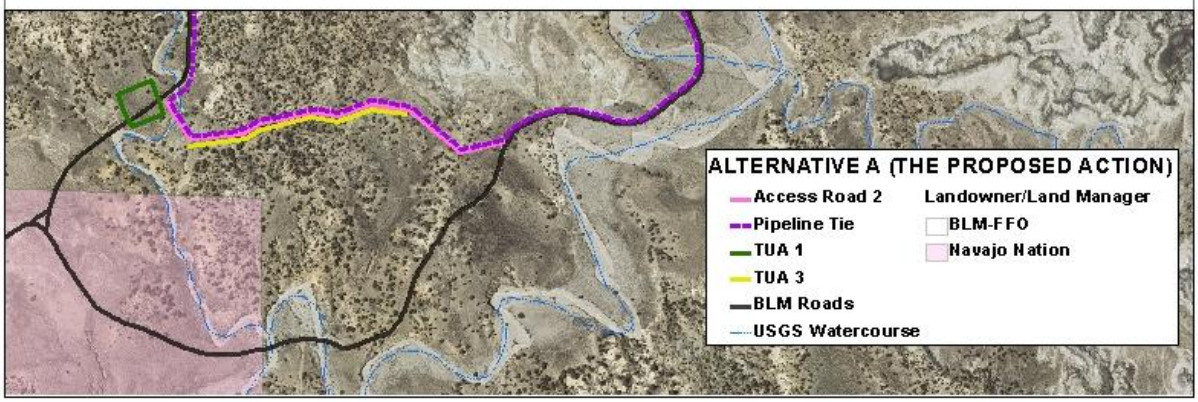
Landowner/Land Manager
- BLM-FFO
- Navajo Nation

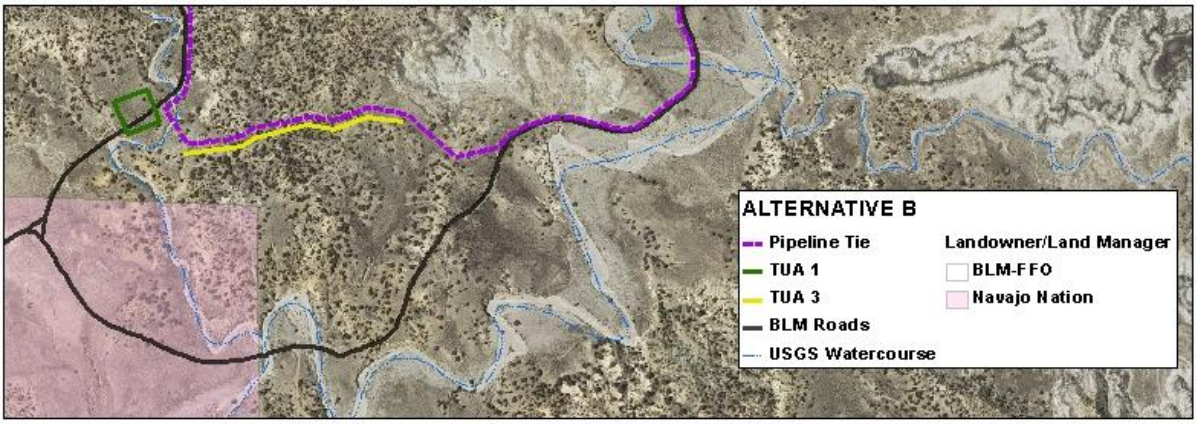
N

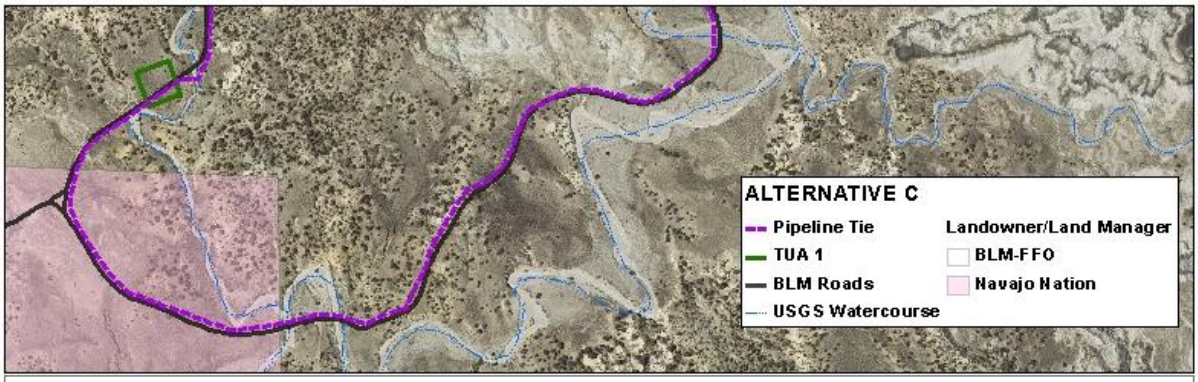
0 0.25 0.5 Miles

A.4. Alternatives Map

Alternatives Map
WPX Energy Production, LLC
Chaco 2308-14E Nos. 151H & 152H
Township 23 North; Range 8 West; Sections 14, 15, & 16
San Juan County, New Mexico







NAD_1983_UTM_Zone_13N

0 0.25 Miles

N

APPENDIX B. BIOLOGICAL SURVEY REPORT

APPENDIX C. 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
	47540	NAGEEZI GALLUP

[4] Property Code	[5] Property Name	[6] Well Number
	CHACO 2308-14E	151H

[7] OGRID No.	[8] Operator Name	[9] Elevation
120782	WPX ENERGY PRODUCTION, LLC	6889'

[10] Surface Location

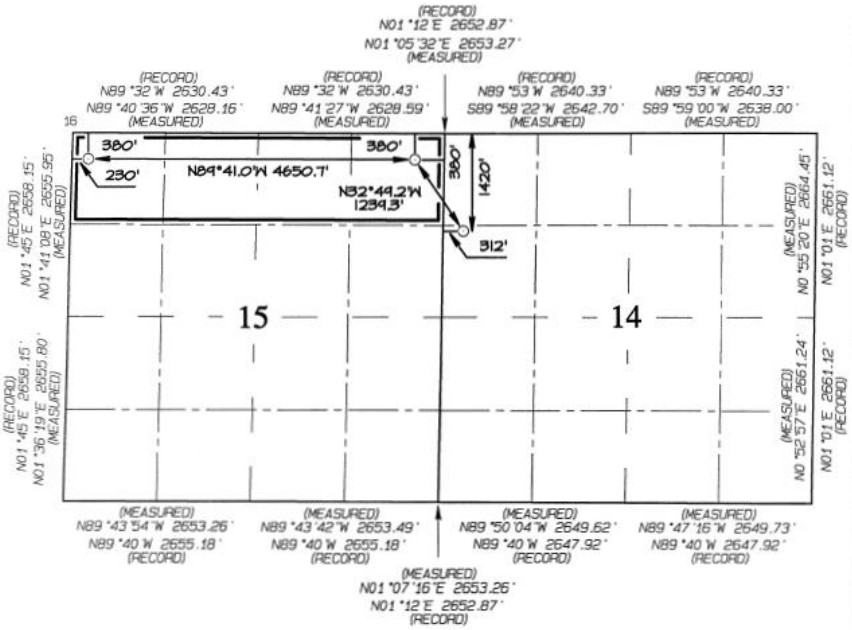
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	14	23N	8W		1420	NORTH	312	WEST	SAN JUAN

[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
D	15	23N	8W		380	NORTH	230	WEST	SAN JUAN

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

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' FNL 230' FWL
SECTION 15, T23N, R8W
LAT: 36.23332 °N
LONG: 107.67645 °W
DATUM: NAD1927

LAT: 36.23334 °N
LONG: 107.67706 °W
DATUM: NAD1983

POINT-OF-ENTRY
380' FNL 380' FEL
SECTION 15, T23N, R8W
LAT: 36.23323 °N
LONG: 107.66068 °W
DATUM: NAD1927

LAT: 36.23325 °N
LONG: 107.66130 °W
DATUM: NAD1983

SURFACE LOCATION
1420' FNL 312' FWL
SECTION 14, T23N, R8W
LAT: 36.23037 °N
LONG: 107.65841 °W
DATUM: NAD1927

LAT: 36.23038 °N
LONG: 107.65902 °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: DECEMBER 6, 2013
Date of Survey: SEPT 14, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

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Energy, Minerals & Natural Resources Department

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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
	47540	NAGEEZI GALLUP

[4] Property Code	[5] Property Name	[6] Well Number
	CHACO 2308-14E	152H

[7] OGRID No.	[8] Operator Name	[9] Elevation
120782	WPX ENERGY PRODUCTION, LLC	6889'

[10] Surface Location

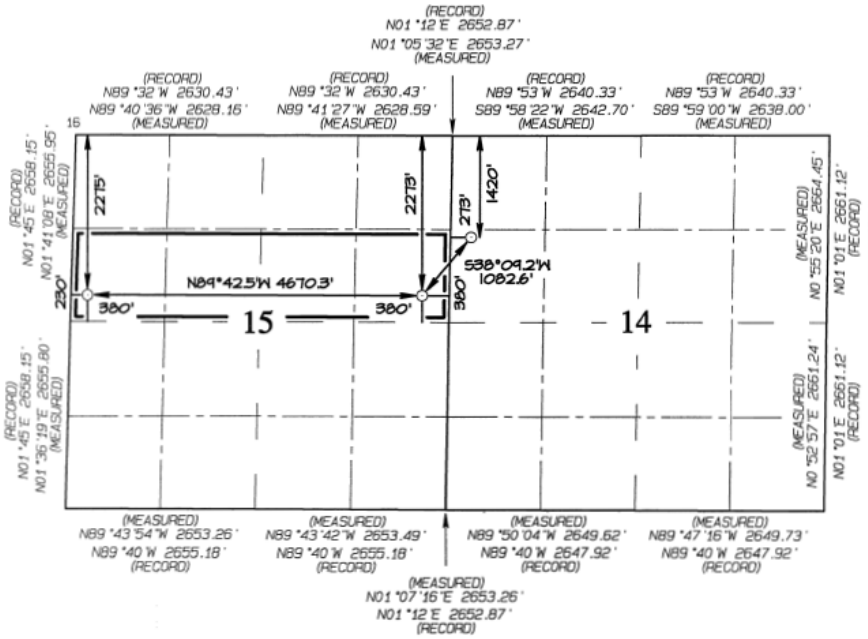
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	14	23N	8W		1420	NORTH	273	WEST	SAN JUAN

[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
E	15	23N	8W		2275	NORTH	230	WEST	SAN JUAN

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

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
2275' FNL 230' FWL
SECTION 15, T23N, R8W
LAT: 36.22812 °N
LONG: 107.67665 °W
DATUM: NAD1927

LAT: 36.22813 °N
LONG: 107.67726 °W
DATUM: NAD1983

POINT-OF-ENTRY
2273' FNL 380' FEL
SECTION 15, T23N, R8W
LAT: 36.22803 °N
LONG: 107.66082 °W
DATUM: NAD1927

LAT: 36.22805 °N
LONG: 107.66143 °W
DATUM: NAD1983

SURFACE LOCATION
1420' FNL 273' FWL
SECTION 14, T23N, R8W
LAT: 36.23037 °N
LONG: 107.65855 °W
DATUM: NAD1927

LAT: 36.23038 °N
LONG: 107.65916 °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.

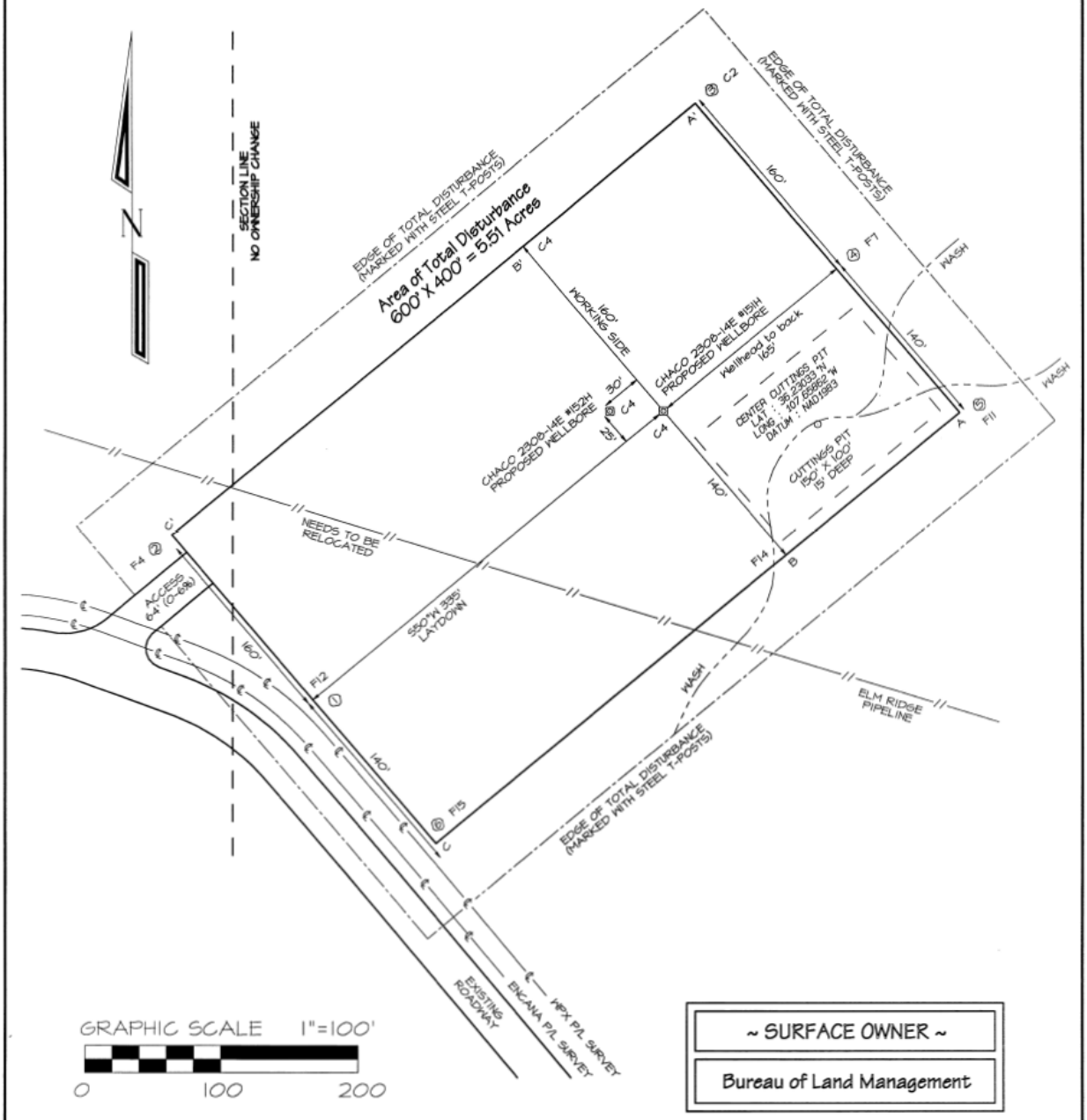
Date Revised: DECEMBER 6, 2013
Date of Survey: SEPT 14, 2013

Signature and Seal of Professional Surveyor

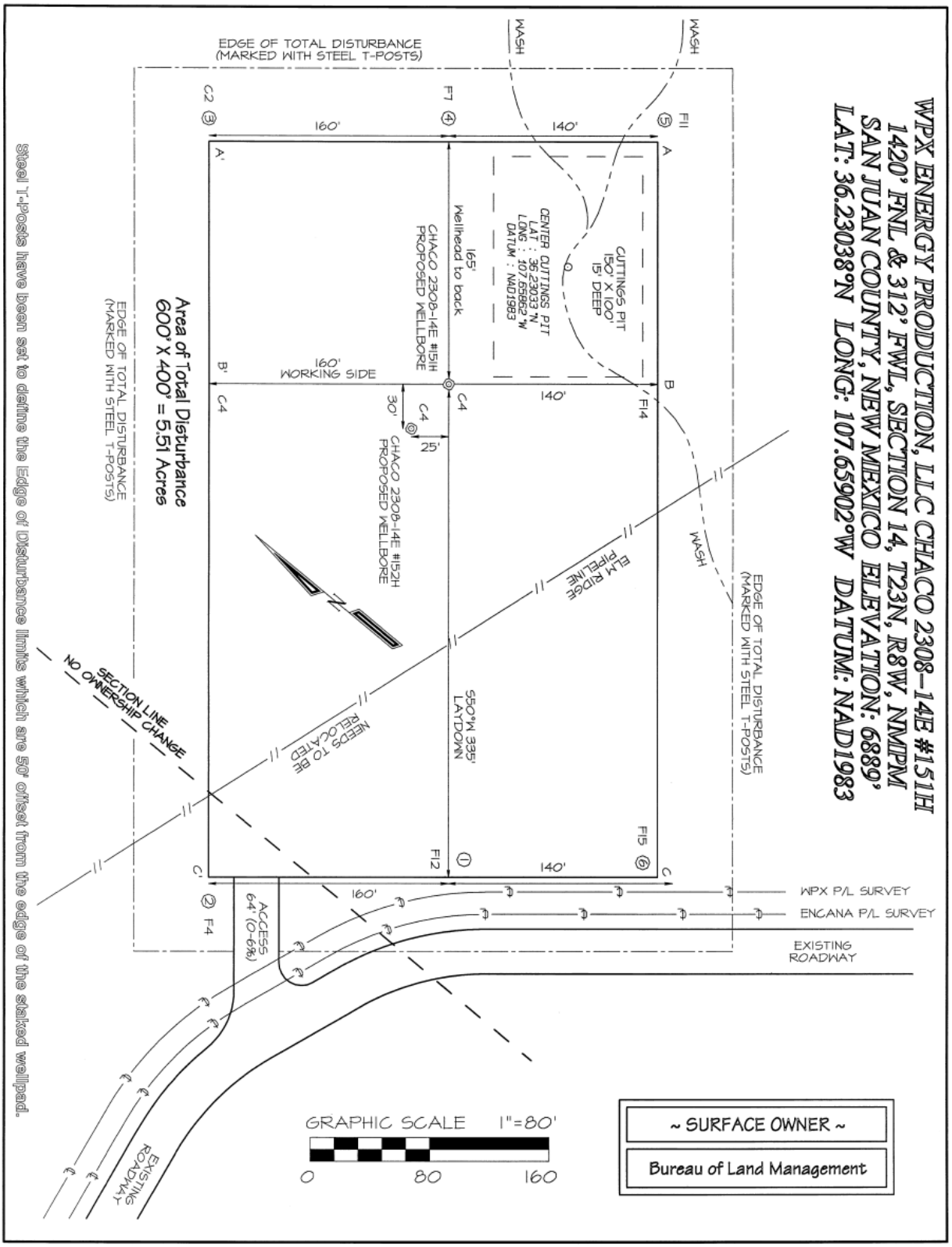
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
1420' FNL & 312' FWL, SECTION 14, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6889'
LAT: 36.23038°N LONG: 107.65902°W DATUM: NAD1983



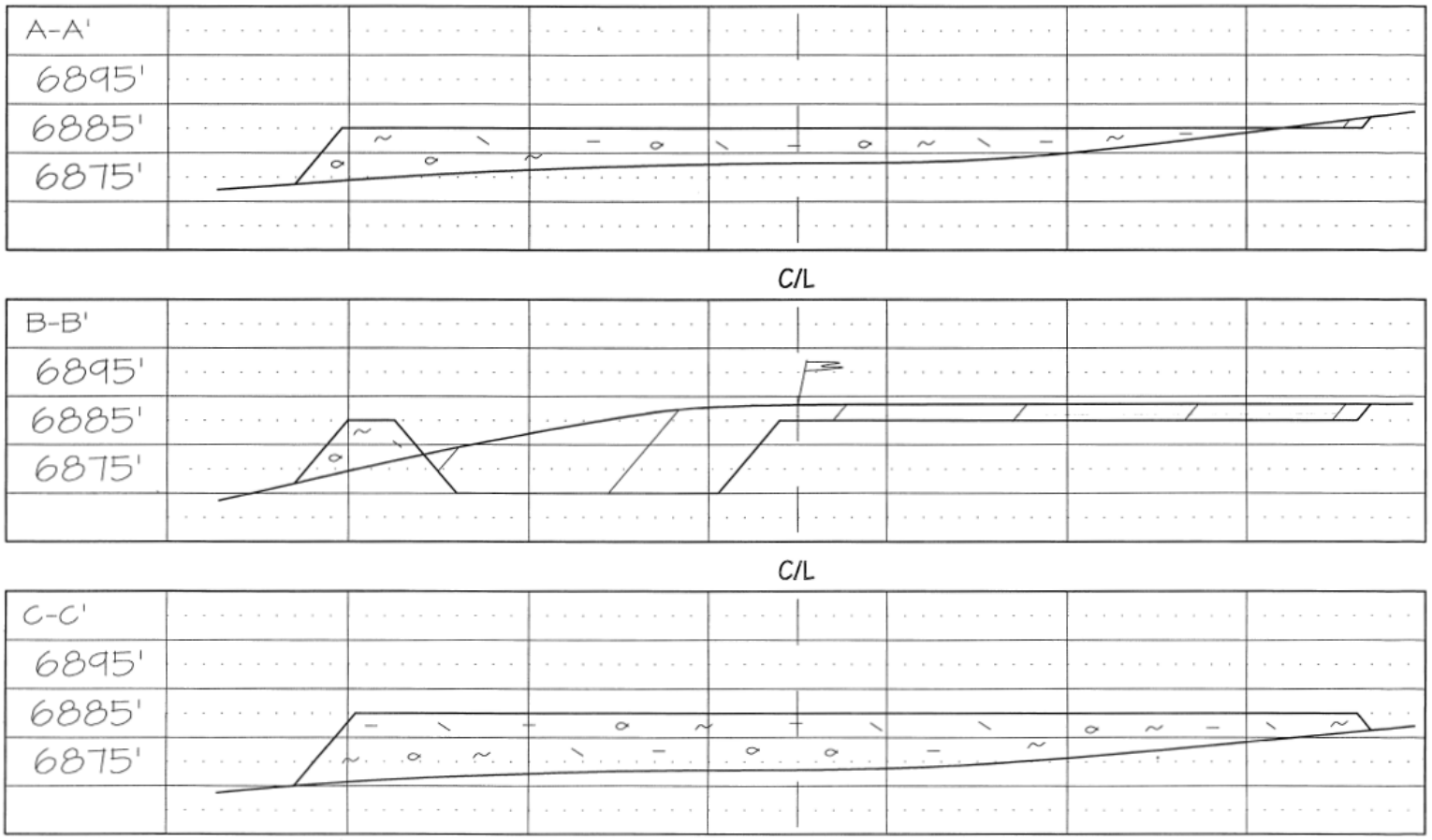
Steel T-Posts have been set to define Edge of Disturbance limits which are 50' offset from edge of staked wellpad.


WPX ENERGY PRODUCTION, LLC CHACO 2308-14E #151H
1420' FNL & 312' FWL, SECTION 14, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6889'
LAT: 36.23038°N LONG: 107.65902°W DATUM: NAD1983
EDGE OF TOTAL DISTURBANCE (MARKED WITH STEEL T-POSTS)
WASH
WASH
WASH
CUTTINGS PIT 150' X 100' 15' DEEP
CENTER CUTTINGS PIT LAT : 36.23033°N LONG : 107.65862°W DATUM : NAD1983
CHACO 2308-14E #151H PROPOSED WELLBORE
165' Wellhead to back
160' WORKING SIDE
CHACO 2308-14E #152H PROPOSED WELLBORE
30'
25'
Area of Total Disturbance
600' X 400' = 5.51 Acres
EDGE OF TOTAL DISTURBANCE (MARKED WITH STEEL T-POSTS)
EDGE OF TOTAL DISTURBANCE (MARKED WITH STEEL T-POSTS)
ELM RIDGE PIPELINE
NEEDS TO BE RELOCATED
550°W 335' LAYDOWN
SECTION LINE
NO OWNERSHIP CHANGE
ACCESS 64' (0-6%)
EXISTING ROADWAY
WPX P/L SURVEY
ENCANA P/L SURVEY
EXISTING ROADWAY
GRAPHIC SCALE 1"=80'
0 80 160
~ SURFACE OWNER ~
Bureau of Land Management
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 2308–14E #151H
1420' FNL & 312' FWL, SECTION 14, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6889'

HORIZONTAL SCALE
1"=40'

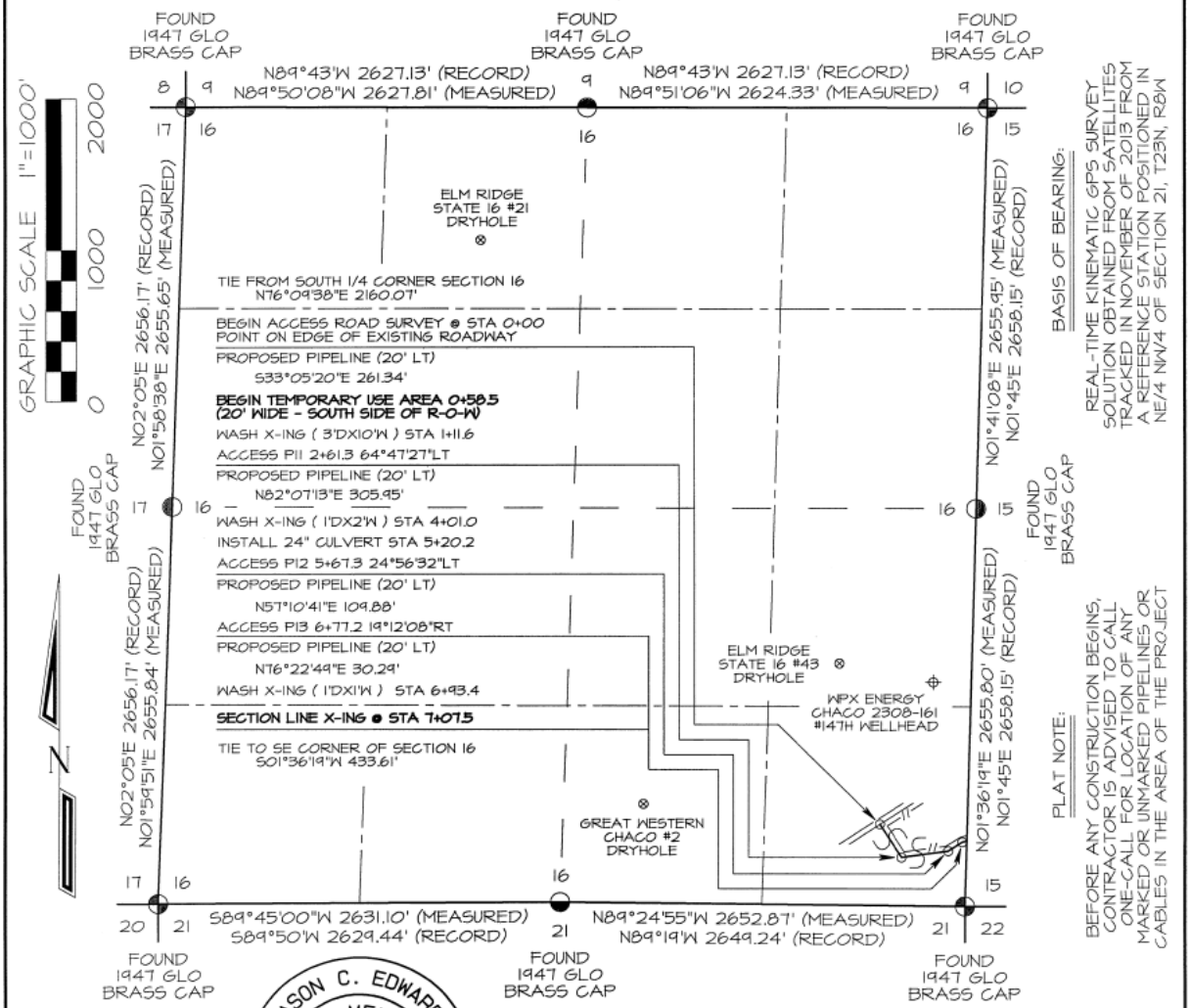
VERTICAL SCALE
1"=30'



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 2308–14E #151H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE E/2 SE/4 OF SECTION 16, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 7+07.5	707.5 FT / 42.9 RODS

JASON C. EDWARDS NEW MEXICO 15269 REGISTERED PROFESSIONAL SURVEYOR

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: December 18, 2013

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

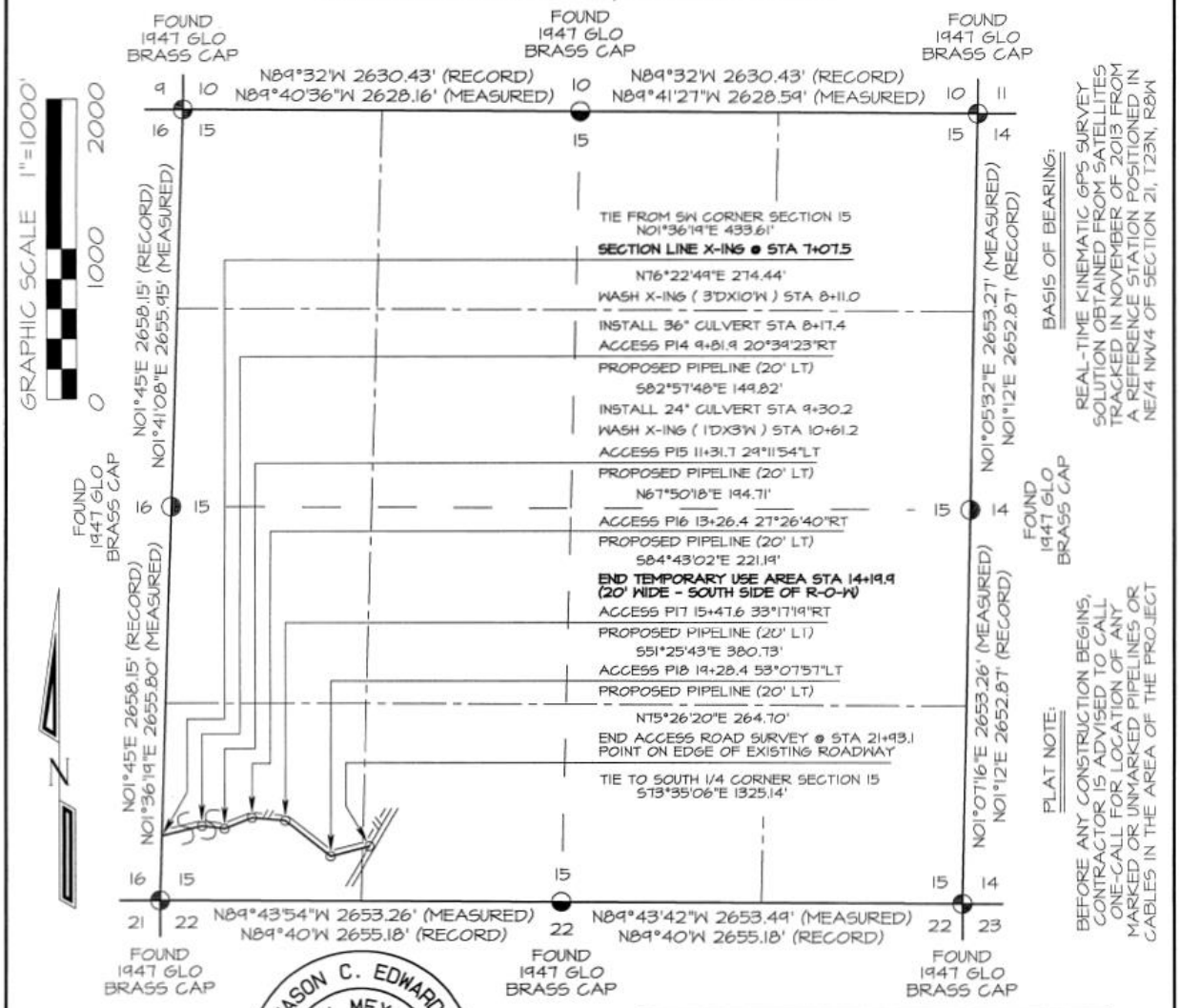
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

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 1 OF 3 | CHECKED BY: JCE | DRAWN BY: SLE | FILENAME: 23016AGI

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE SW/4 & E/2 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
7+07.5 TO 21+93.1	1485.6 FT / 90.0 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: December 18, 2013

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

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

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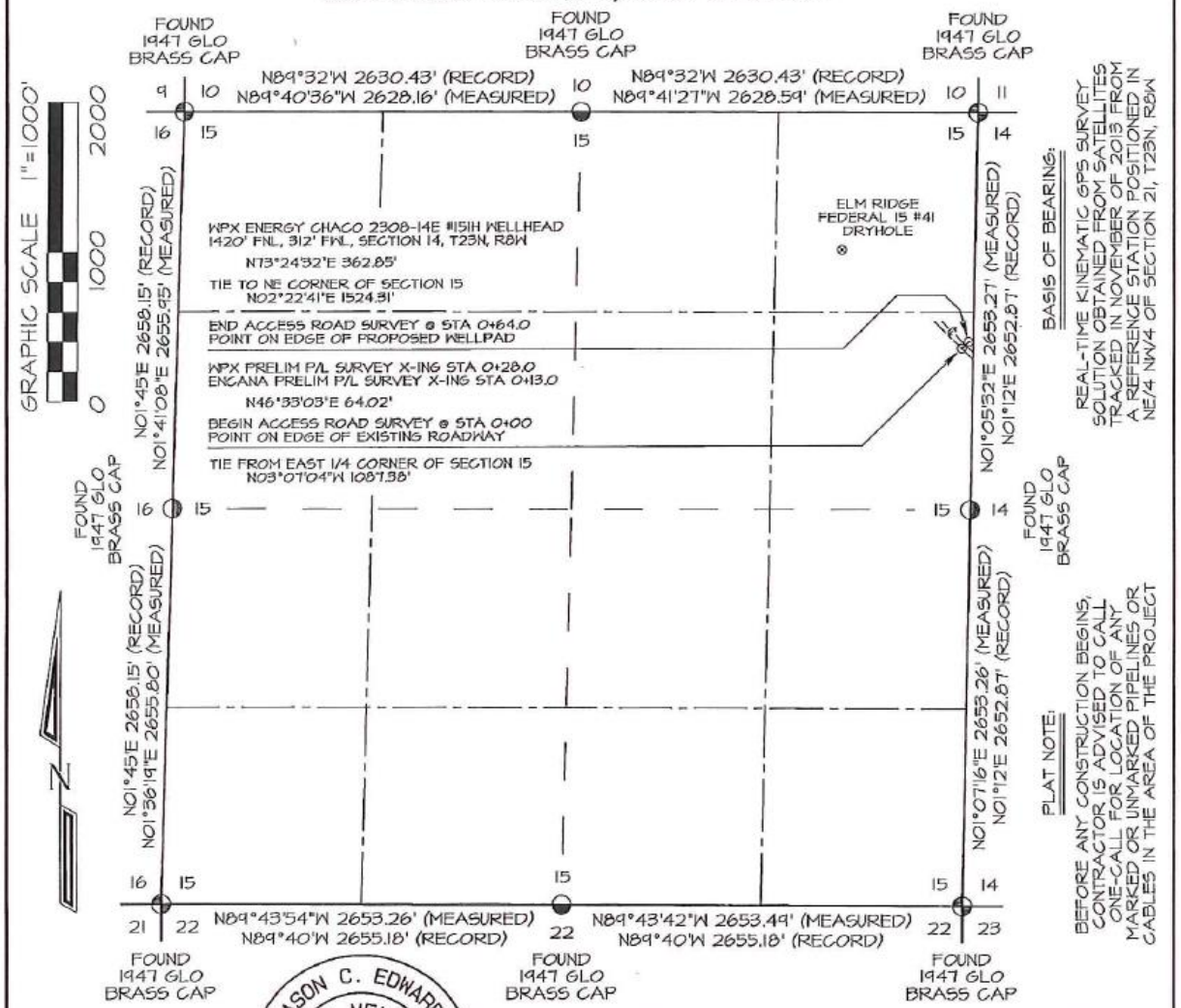
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 2 OF 3
FILENAME: 2301SA02

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE SE/4 NE/4 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN NOVEMBER OF 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NW/4 OF SECTION 21, T23N, R8W

PLAT NOTE:
BEFORE ANY CONSTRUCTION BEGINS, CONTRACTOR IS ADVISED TO CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED PIPELINES OR CABLES IN THE AREA OF THE PROJECT

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 0+64.0	64.0 FT / 3.9 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: December 18, 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:
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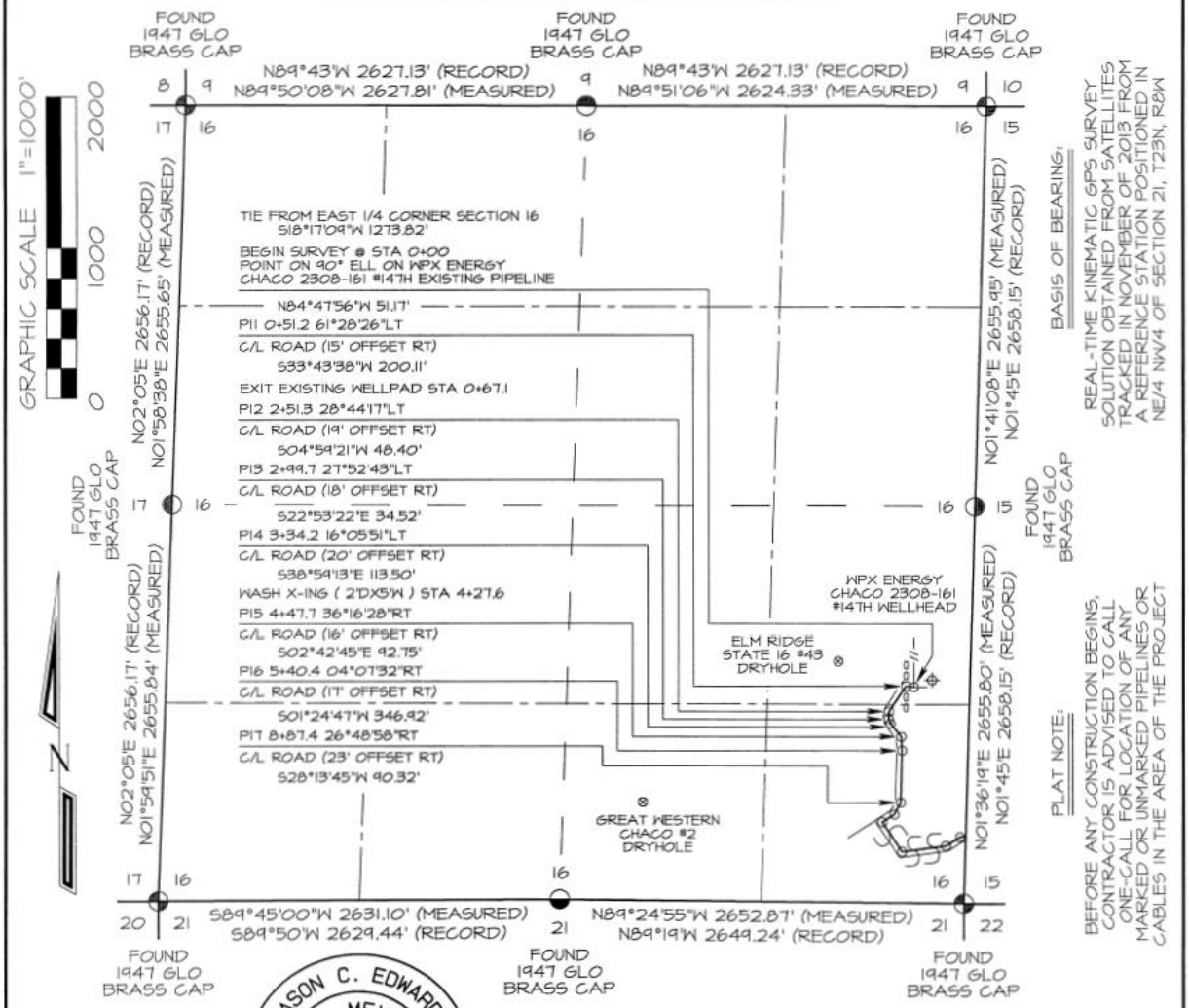
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 3 OF 3
FILENAME: 23015A03

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE
E/2 SE/4 OF SECTION 16, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN NOVEMBER OF 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NW/4 OF SECTION 21, T23N, R8W

PLAT NOTE:
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JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 17+45.4	1745.4 FT / 105.8 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: December 9, 2013
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

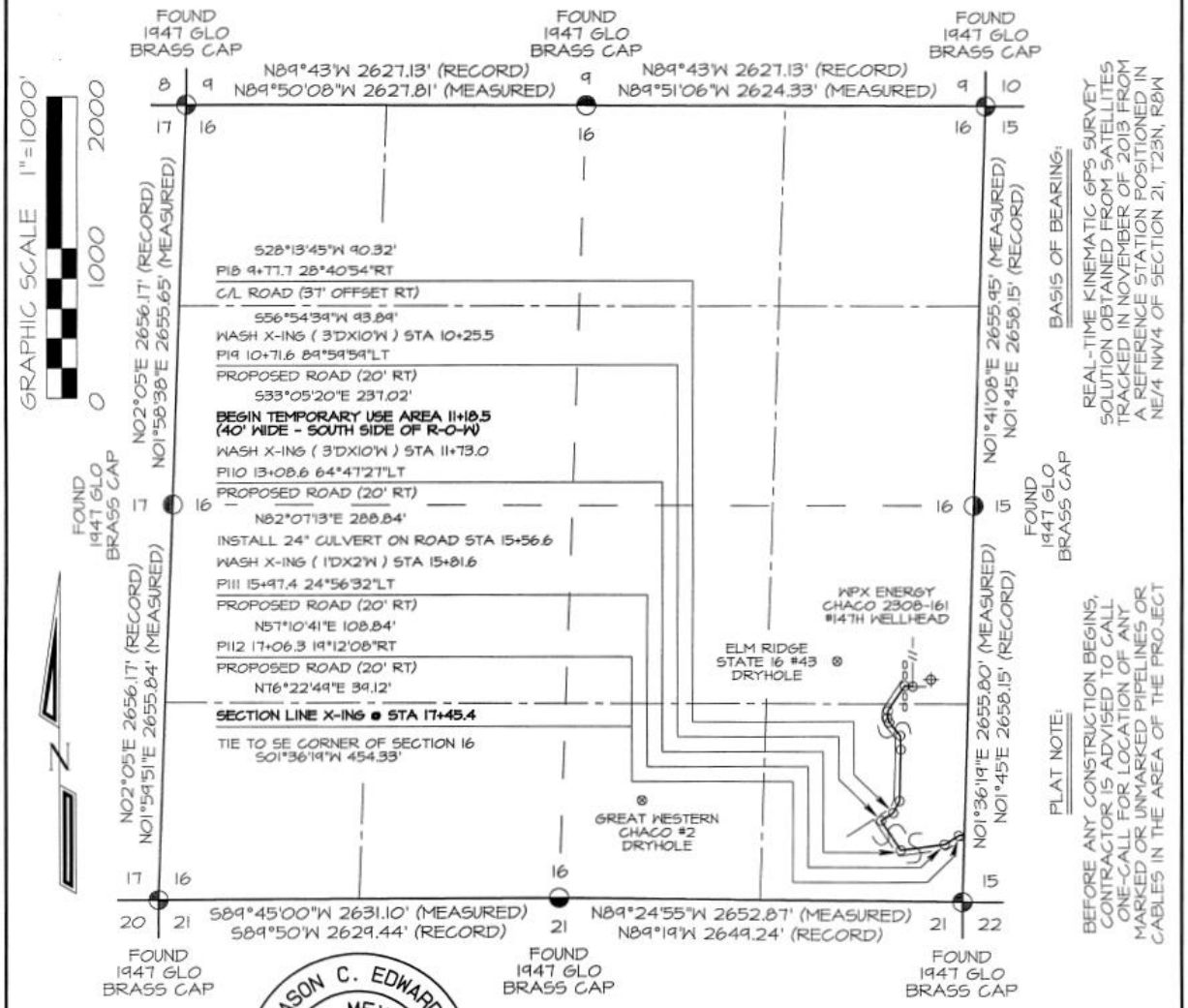
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

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 1 OF 8 | CHECKED BY: JCE
FILENAME: 2306P061 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE
E/2 SE/4 OF SECTION 16, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 17+45.4	1745.4 FT / 105.8 RODS

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

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JASON C. EDWARDS Date: December 9, 2013

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

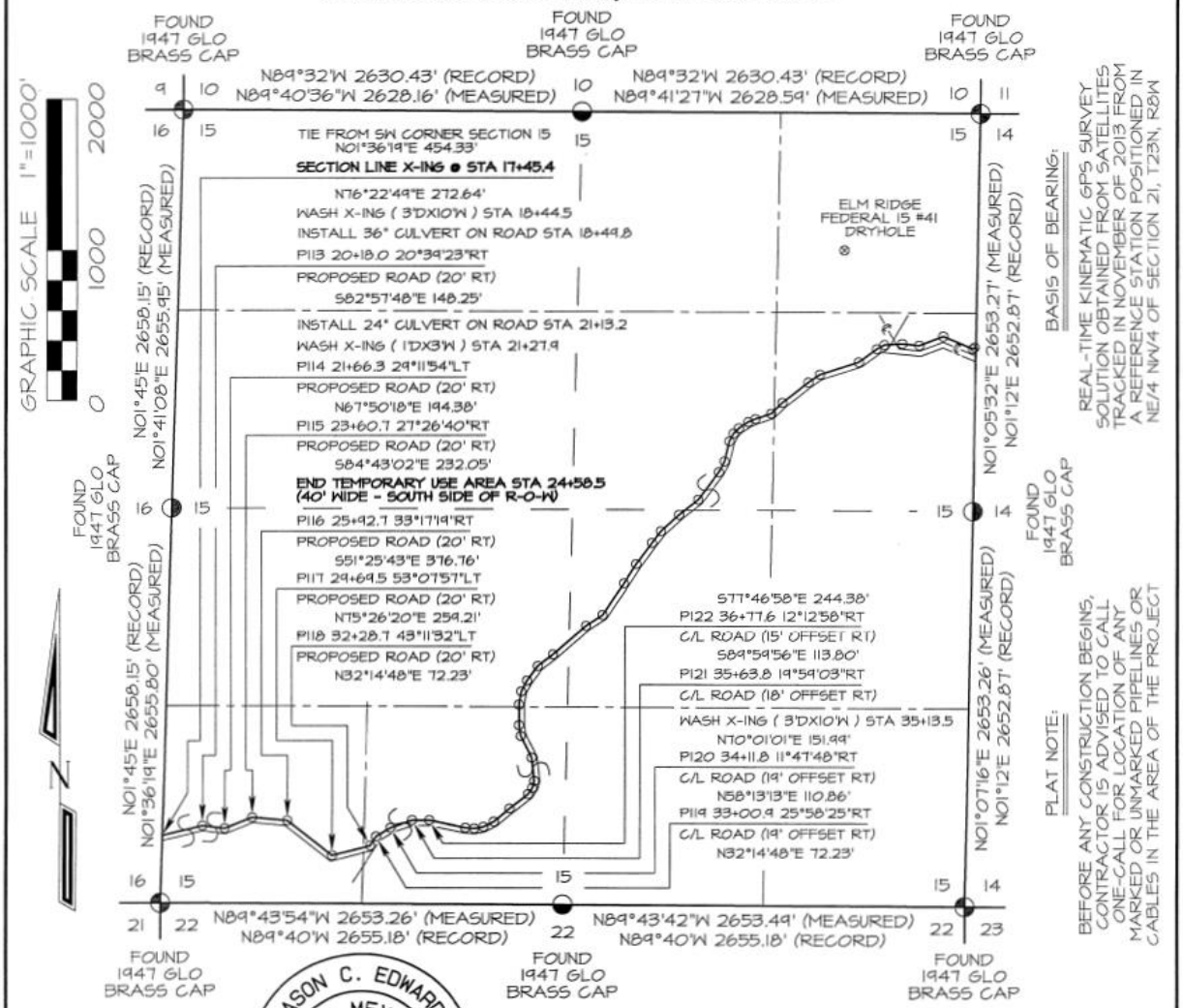
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

N C E

Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 5612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

SHEET 2 OF 8 | CHECKED BY: JCE
FILENAME: 23916P02 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 & E/2 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
17+45.4 TO 92+10.5	7465.1 FT / 452.4 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: December 9, 2013

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

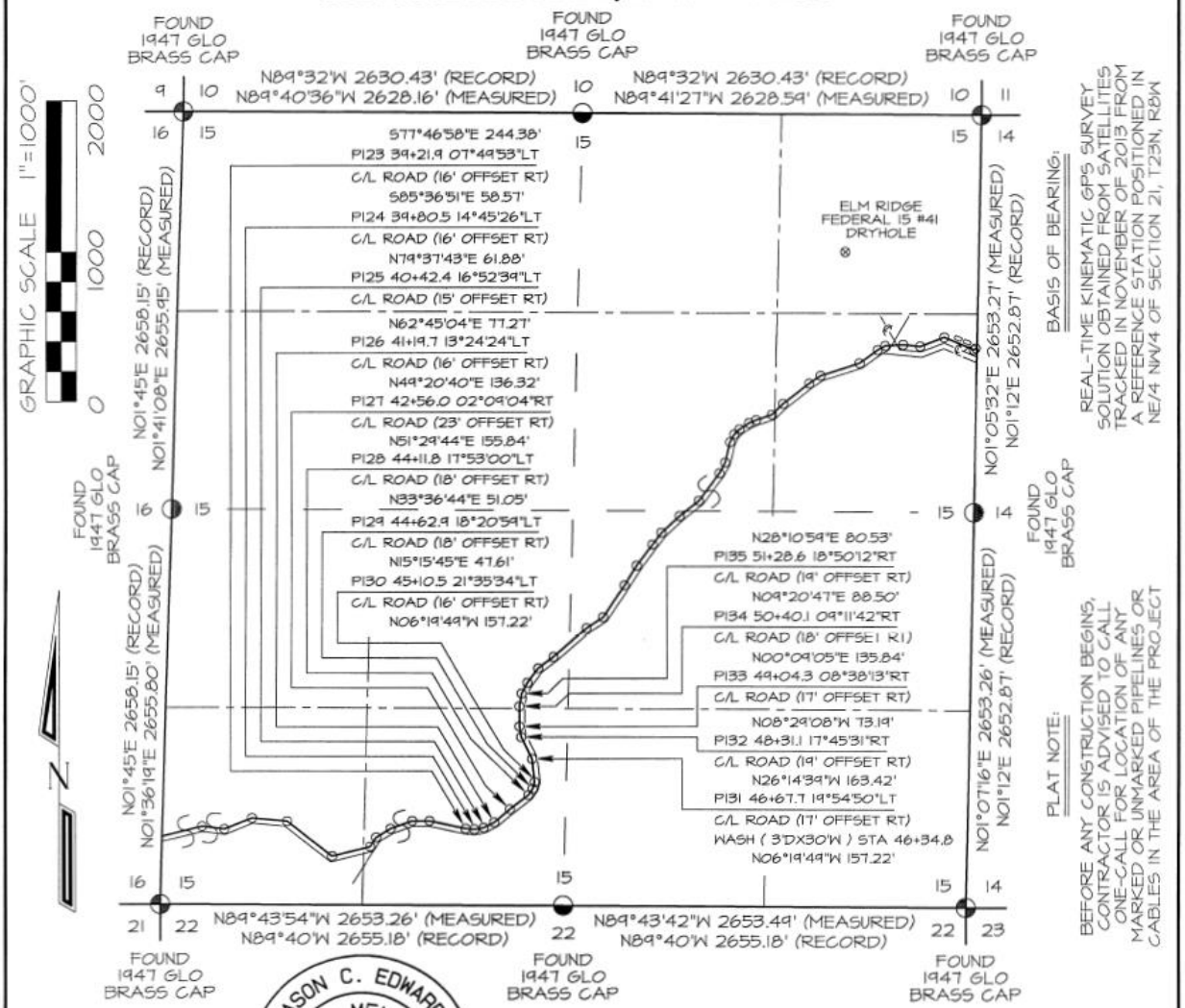
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

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 3 OF 8 | CHECKED BY: JCE
FILENAME: 2301PG3 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 & E/2 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN NOVEMBER OF 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NW/4 OF SECTION 21, T23N, R8W

PLAT NOTE:
BEFORE ANY CONSTRUCTION BEGINS, CONTRACTOR IS ADVISED TO CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED PIPELINES OR CABLES IN THE AREA OF THE PROJECT

JASON C. EDWARDS NEW MEXICO 15269 REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
17+45.4 TO 92+10.5	7465.1 FT / 452.4 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: December 9, 2013
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

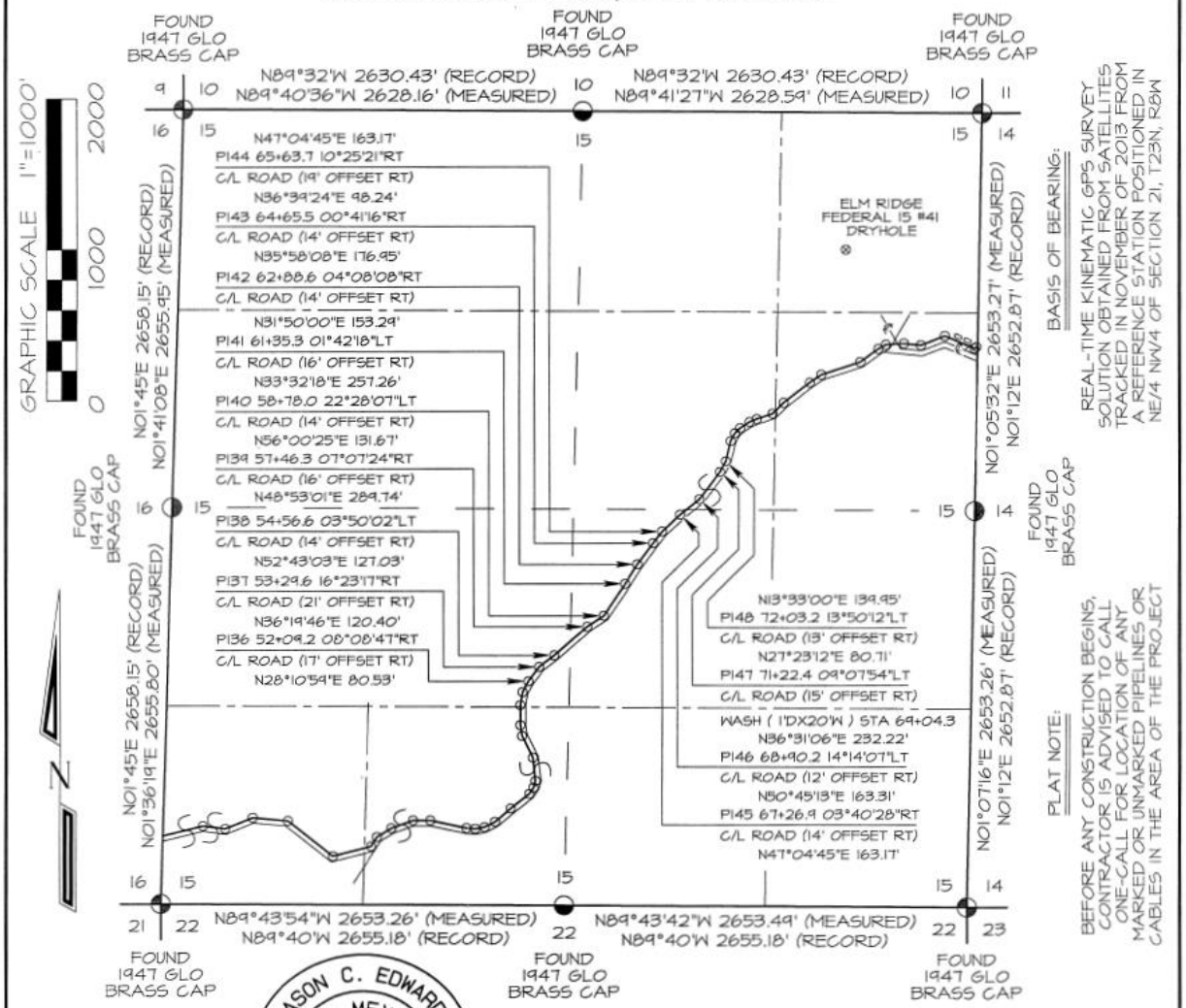
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

N C E SURVEYS, INC.

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)

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 4 OF 8
FILENAME: 2361SP04

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 & E/2 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
17+45.4 TO 92+10.5	7465.1 FT / 452.4 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: December 9, 2013

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

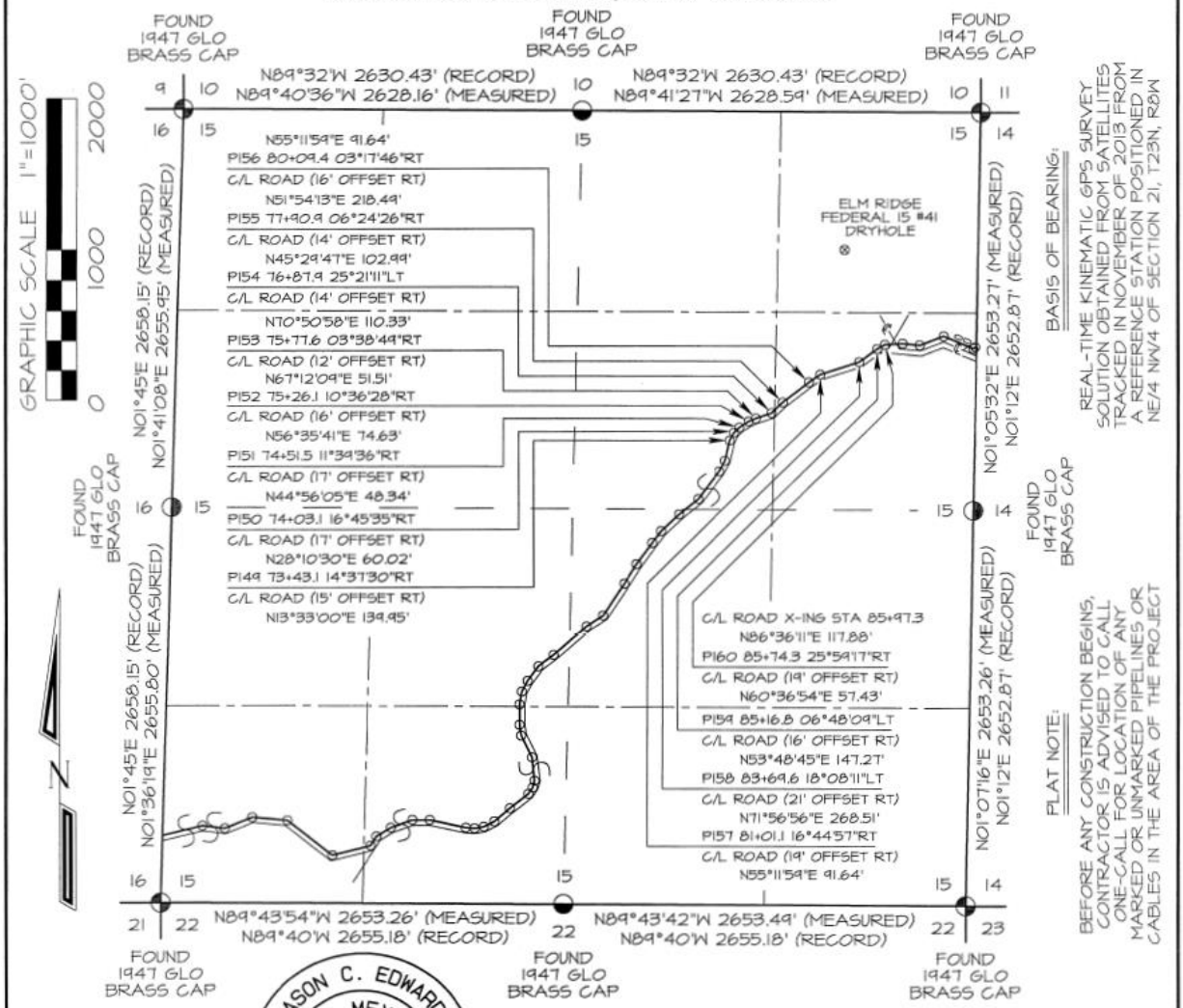
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

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.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 5 OF 8
FILENAME: 23015P05

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 & E/2 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



BASIS OF BEARING:

REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN NOVEMBER OF 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NW/4 OF SECTION 21, T23N, R8W

PLAT NOTE:

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~ SURFACE OWNERSHIP ~ Bureau of Land Management	
17+45.4 TO 92+10.5	7465.1 FT / 452.4 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: December 9, 2013

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

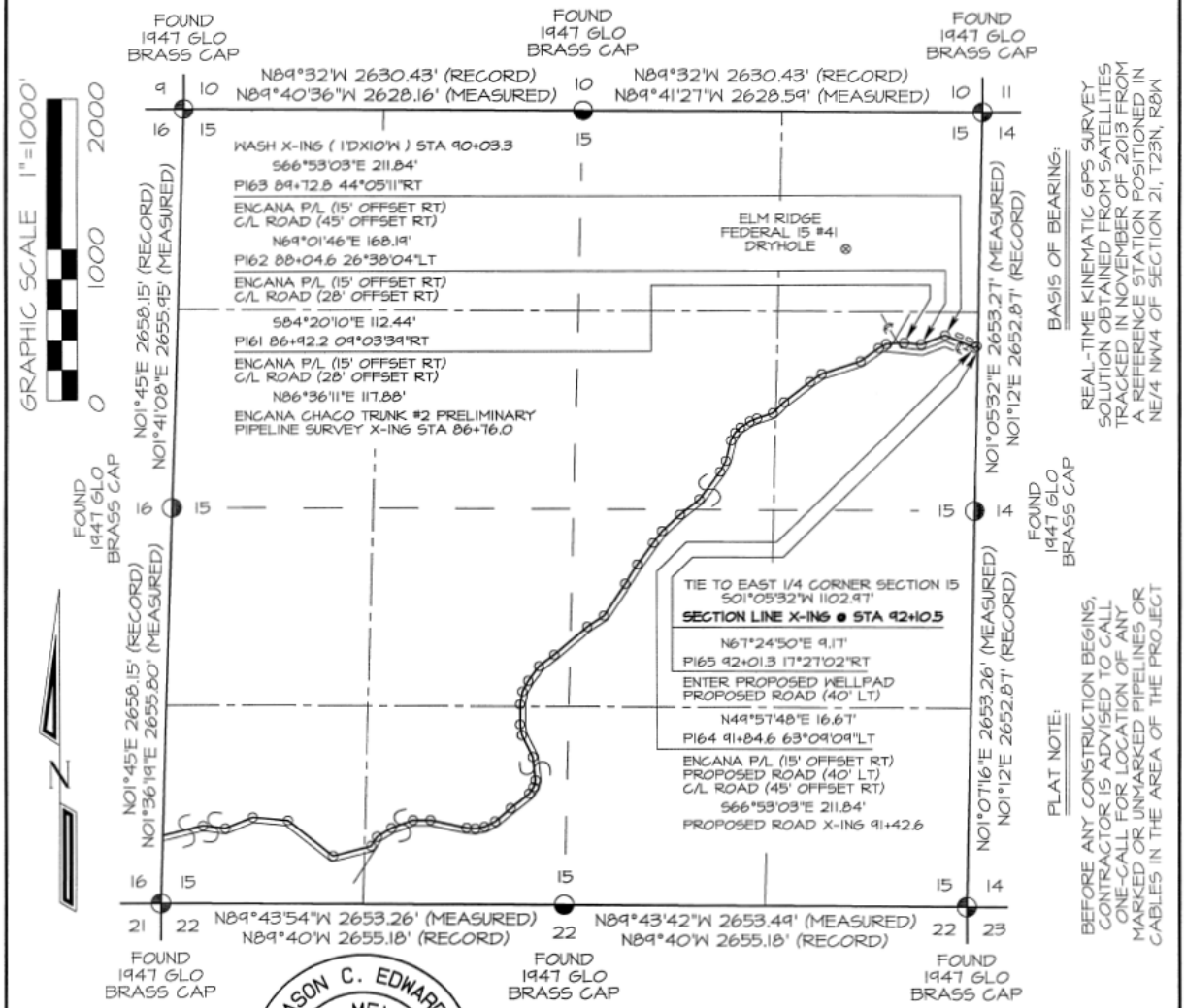
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

N C E

Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6512
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

SHEET 6 OF 8 | CHECKED BY: JCE
FILENAME: 2308SF56 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 & E/2 OF SECTION 15, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN NOVEMBER OF 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NW/4 OF SECTION 21, T23N, R8W

PLAT NOTE:
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JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
17+45.4 TO 92+10.5	7465.1 FT / 452.4 RODS

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JASON C. EDWARDS Date: December 9, 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:
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Business Address:
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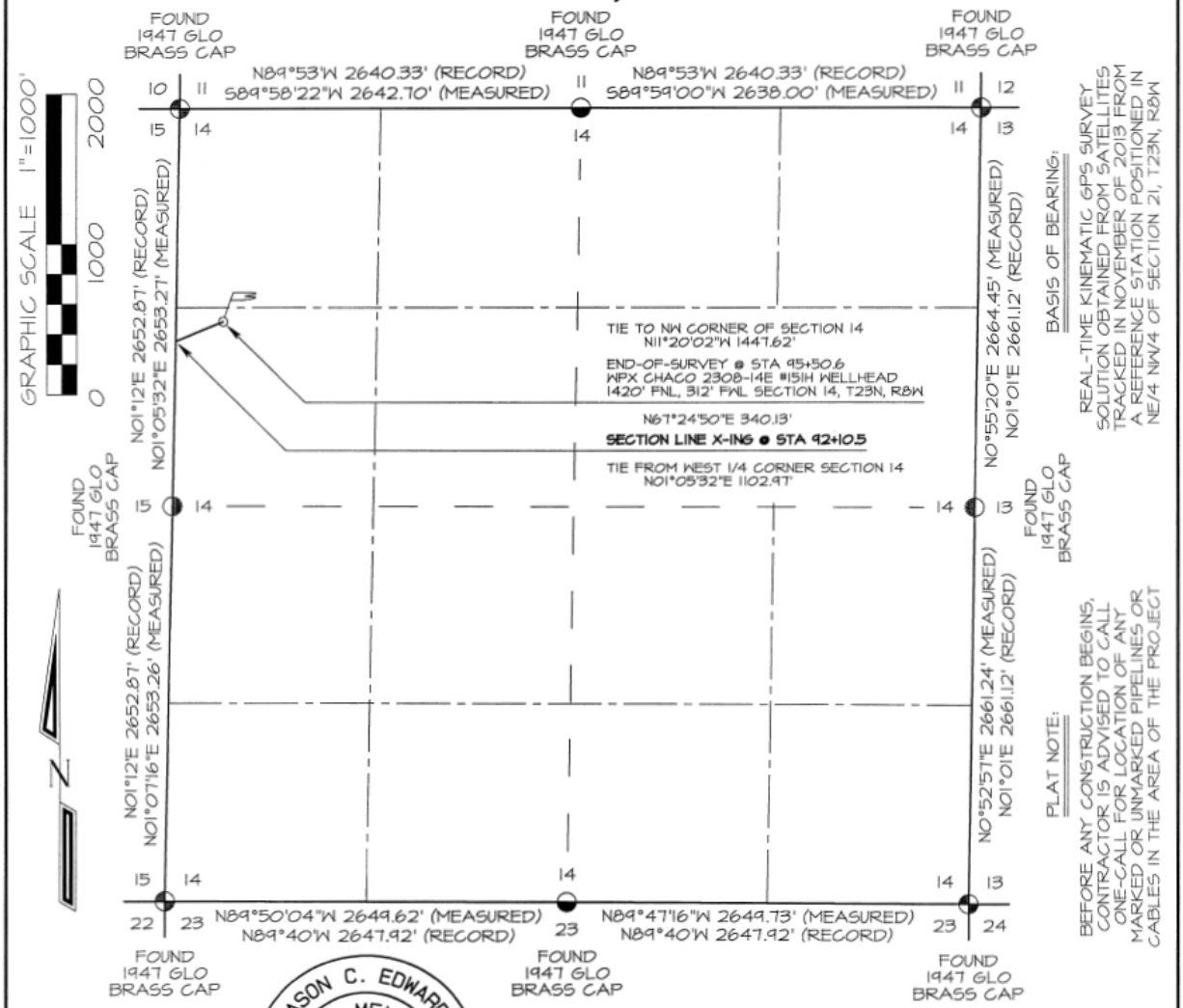
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 7 OF 8
FILENAME: 2308SP167

WPX ENERGY PRODUCTION, LLC CHACO 2308–14E #151H
PROPOSED PIPELINE SURVEY LOCATED IN THE
SW/4 NW/4 OF SECTION 14, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



BASIS OF BEARING:

REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN NOVEMBER OF 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NW/4 OF SECTION 21, T23N, R8W

PLAT NOTE:

BEFORE ANY CONSTRUCTION BEGINS, CONTRACTOR IS ADVISED TO CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED PIPELINES OR CABLES IN THE AREA OF THE PROJECT

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
92+10.5 TO 95+50.6	340.1 FT / 20.6 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: December 9, 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

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APPENDIX D. PHOTOGRAPHS

Access road 1, from start (southwestern terminus) looking toward well pad

Access road 1, from end (northeastern terminus) looking toward existing road

Well pad, looking northward from wellhead

Well pad, looking eastward from wellhead

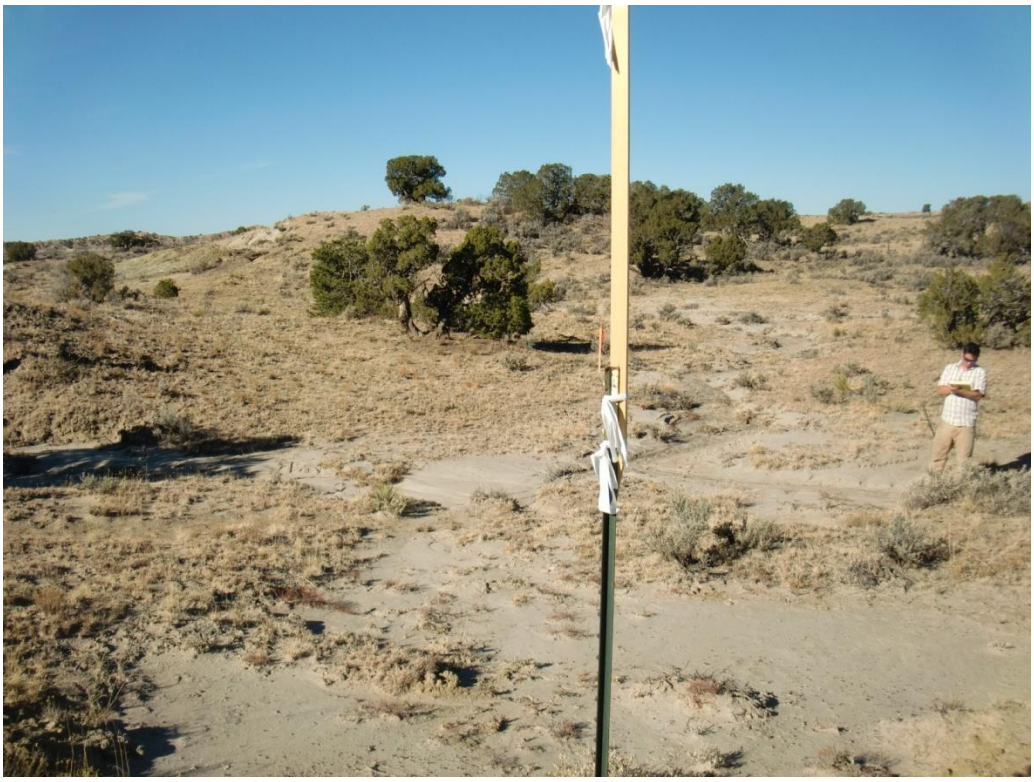
Well pad, looking southward from wellhead

Well pad, looking westward from wellhead

Well pad, looking northward from southern corner (corner 6)

Well pad, looking eastward from western corner (corner 2)

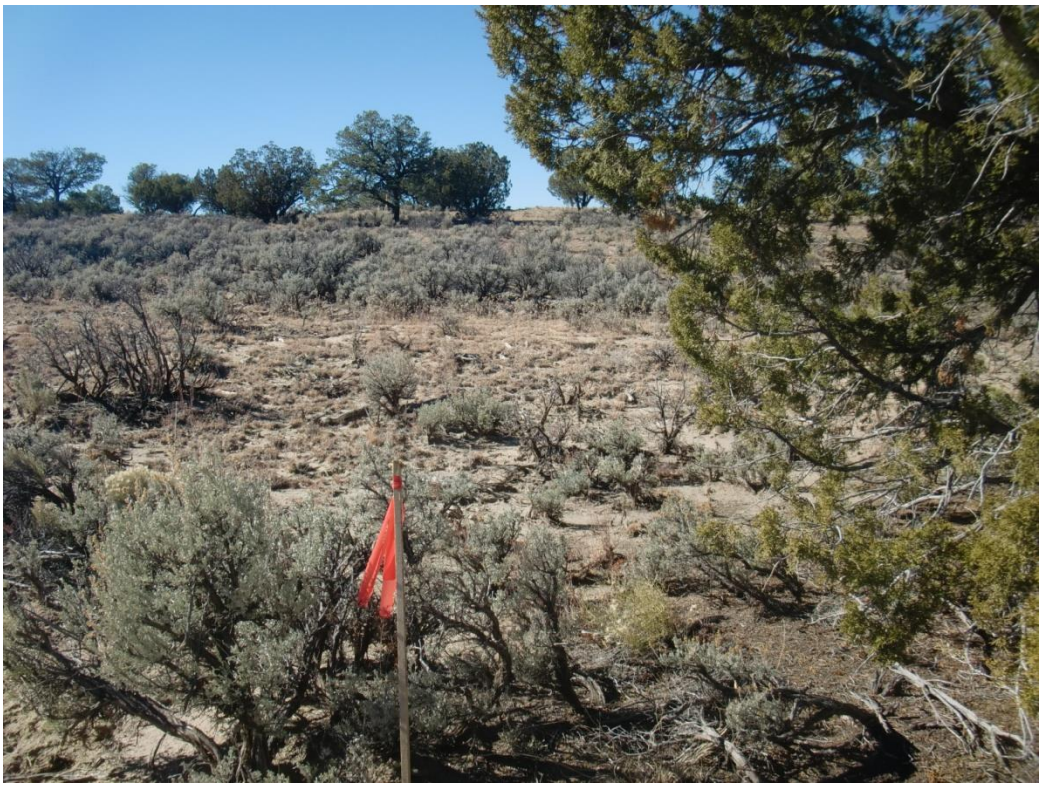
Well pad, looking southward from northern corner (corner 3)



Well pad, looking westward from eastern corner (corner 5)

Pipeline corridor, looking southward from start (northwestern terminus; southern edge of existing 147H/148H well pad)

Pipeline corridor and access road 2, looking eastward from start of access road 2 (western terminus)



Pipeline corridor and access road 2, looking westward from end of access road 2 (eastern terminus)

Pipeline corridor, looking westward from approximate Station 86+92.2

APPENDIX E. SURFACE RECLAMATION PLAN