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Bureau of Land Management

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WPX Energy Production, LLC's Chaco 2308-24H Nos. 153H &154H and Chaco 2308-24I Nos.155H & 156H Oil and Natural Gas Wells Chaco Trunk No. 2 Extension No. 4 Pipeline Project

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

WPX Energy Production, LLC (WPX), has submitted four Applications for Permit to Drill (APDs) and three Right-of-Way (ROW) Grant Applications to the Bureau of Land Management – Farmington Field Office (BLM-FFO) for the following oil and natural gas well projects:

- Chaco 2308-24H Nos. 153H and 154H (153H/154H) oil and natural gas wells
- Chaco 2308-24I Nos. 155H and 156H (155H/156H) oil and natural gas wells and Chaco Trunk No. 2 Extension No. 4 Pipeline

The proposed action is the approval of the APDs and ROW Grants by the BLM-FFO, located in Farmington, New Mexico.

The proposed projects would involve the horizontal drilling, possible production, and final abandonment of four wells that would be drilled to BLM-FFO-managed minerals. Each of the four wells would be permitted under an approved APD issued by the BLM-FFO. The two proposed wells associated with each project would be twinned with one another on a 600-foot-by-400-foot well pad (including construction zone). Both of the proposed projects would involve the construction, usage, and reclamation of a well pad; well pad construction zone, and access road. Additionally, a well-connect pipeline corridor would be associated with the 153H/154H project, and the Chaco Trunk No. 2 Extension No. 4 pipeline corridor would be associated with the 155H/156H project. The proposed projects are described further in the table and sub-sections below.

Table 1. Proposed Project Details

Proposed Project	Access Road Length (Feet)	Pipeline Corridor Length (Feet)	Mineral Pool	NMNM Lease No.	Land Ownership/ Management
153H/154H	1,902	2,217	Basin Mancos	110324	BLM-FFO and Fee
155H/156H and Chaco Trunk No. 2 Extension No. 4	10,436	23,349	Basin Mancos	110324	BLM-FFO and Fee

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 is also exported to other countries (U.S. Department of Energy 2011). Within the U.S., oil and natural gas reserves are concentrated within distinct fields. The

BLM-FFO management area is within the San Juan Basin, one of the most prolific gas-producing basins in the country. Currently, the San Juan Basin produces small amounts of oil.

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

The proposed project area is under the jurisdiction of the BLM-FFO and is located within the San Juan Basin in San Juan County, New Mexico. The proposed project is approximately 40 to 42 miles southeast of the town of Bloomfield, New Mexico, and 3 miles south of U.S. Highway 550 (see Figure A.1, Appendix A).

1.1.1. 153H/154H Permit/Approval Type

The proposed 153H/154H wells would each be permitted by an approved APD. The associated well pad (including construction zone), access road, and well-connect pipeline corridor would be authorized/ approved by a Surface Owner Agreement (project features located on Fee surface) or under the approved APDs (on-lease project features located on BLM-FFO-managed surface). Two of the potential staging areas would not require permitting and one of the potential stating areas would be authorized by a Surface Owner Agreement. The table below lists the permit/approval type for each of the proposed project features.

Table 2. Permit/Approval Type by Proposed Project Feature

Proposed Project Feature	Permit/Approval Type
Well Pad and Construction Zone	APD
Access Road	
0+00.0 to 12+91.5	Surface Owner Agreement
12+91.5 to 19+02.3	APD
Well-Connect Pipeline Corridor	
0+00.0 to 12+71.8	Surface Owner Agreement
12+71.8 to 22+16.8	APD
Potential Staging Areas	
WPX's proposed 155H/156H well pad	- [1]
Elm Ridge Exploration Company, LLC's (Elm Ridge's) active Dome Federal 24 No. 21 well pad	- [2]
Access Road/Well-Connect Pipeline Corridor Staging Area	Surface Owner Agreement

[1] Since this staging area is a WPX location, no permitting would be needed for this staging area.
[2] A Final Abandonment Notice (FAN) has not been issued for this staging area. Therefore, the use of this staging area would be authorized under an agreement between WPX and Elm Ridge.

1.1.2. 155H/156H and Chaco Trunk No. 2 Extension No. 4Permit/Approval Type

The proposed 155H/156H wells would each be authorized by an approved APD. The associated well pad (including construction zone), access road, and Chaco Trunk No. 2 Extension No. 4 pipeline corridor would be authorized/approved by a Surface Owner Agreement (project features located on Fee surface), under the approved APDs (on-lease project features located on BLM-FFO-managed surface), or ROW Grant (off-lease project features on BLM-FFO-managed surface). The two potential staging areas would not require permitting and the seven potential temporary use areas (TUAs) would be permitted by an approved ROW Grant. The table below lists the permit/approval type for each of the proposed project features.

Table 3. Permit/Approval Type by Proposed Project Feature

Proposed Project Feature	Permit/Approval Type
Well Pad and Construction Zone	Surface Owner Agreement
Access Road	
6,678 feet within the western half of Section 24, Township 23 North, Range 8 West	APD
1,302 feet within southeastern quarter of Section 23, Township 23 North, Range 8 West	ROW Grant
2,456 feet within southeastern quarter of Section 24, Township 23 North, Range 8 West	Surface Owner Agreement
Pipeline Corridor	
0+00.0 to 120+61.3 160+53.9 to 172+85.7	ROW Grant
120+61.3 to 160+53.9 172+85.7 to 205+83.5	APD
205+83.5 to 233+49.0	Surface Owner Agreement
Potential Staging Areas/TUAs	
Seven Access Road and/or Pipeline Corridor TUAs	ROW Grant
WPX's proposed 153H/154H well pad staging area	- [1]
Elm Ridge's active Dome Federal 24 No. 21 well pad staging area	- [2]

[1] Since this staging area is a WPX location, no permitting would be needed for this staging area.
[2] A Final Abandonment Notice (FAN) has not been issued for this staging area. Therefore, the use of this staging area would be authorized under an agreement between WPX and Elm Ridge.

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 leases.

The need for the proposed action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, as amended (MLA; 30 U.S. Code [USC] 181 et seq.), and the Federal Land Policy and Management Act of 1976 (FLPMA, 43 USC 1701 et seq.). The MLA authorizes the BLM to lease public lands for the development of mineral deposits (including oil, gas, and other hydrocarbons) and permit the development of those leases. The FLPMA authorizes the BLM to grant, issue, or renew ROW Grants over public lands for multiple uses. It is the policy of the BLM, as derived from several laws, including the MLA and FLPMA, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. Per 43 Code of Federal Regulations (CFR) 3160 (Onshore Oil and Gas Operations), the BLM is required to respond to a request for an APD and ROW Grant.

1.3. Decision to be Made

The BLM-FFO will decide whether or not to issue the APDs and ROW Grants associated with the proposed projects, 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 the 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

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 access road and well-connect pipeline corridors, 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 projects would be obtained prior to project implementation.

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

1.5.1. Clean Water Act

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

Under Section 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).

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.

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.) 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.

153H/154H

There are several shallow ephemeral watercourses located throughout the proposed project area. There is one ephemeral watercourse located towards the west-northwestern edge of the proposed well pad and well pad construction zone. Additionally, the proposed access road/well-connect pipeline corridor crosses the Betonnie Tsotsie Wash (a USGS blue-line wash). If the Betonnie Tsotsie Wash within the proposed project area is considered jurisdictional by the USACE, proposed project activities associated with the crossings would be permitted under Nationwide Permits No. 12 (for Utility Line Activities) and 14 (for Linear Transportation Projects). The tributaries to Betonnie Tsotsie Wash are not considered to be USACE jurisdictional by the BLM-FFO (BLM 2013a).

155H/156H and Chaco Trunk No. 2 Extension No. 4

There are several ephemeral drainages in the general project area; many of these are within the proposed project area. The proposed pipeline crosses four USGS watercourses at five locations, and the proposed access road, which parallels a portion of the proposed pipeline, would also cross two USGS watercourses at two locations. If the watercourses within the proposed project area are considered jurisdictional by the USACE, proposed project activities associated with the crossings would be permitted under Nationwide Permits No. 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).

A pre-disturbance onsite meeting was held at both proposed project areas on October 23, 2013. An additional pre-disturbance onsite meeting was held at the proposed 155H/156H and Chaco Trunk No. 2 Extension No. 4 project area on October 31, 2013. WPX, BLM-FFO representatives, and an environmental consultant (Nelson Consulting Inc. [NCI]) attended the pre-disturbance onsite meetings. The Nageezi Chapter House of the Navajo Nation was invited to the pre-disturbance onsite meetings by the BLM-FFO; no representatives from the chapter house attended the meetings.

Public invitations to the pre-disturbance onsite meetings were 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 attended the meetings. A BLM-FFO Interdisciplinary Team meeting was held for both proposed projects 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 projects impact air resources?
- Portions of the proposed project areas are classified by the BLM-FFO as having fragile soils. How would vegetation-clearing, proposed project activities, and final reclamation impact soils, including fragile soils?
- Would drilling the proposed wells impact groundwater?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed projects impact upland vegetation?
- Would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed projects result in an increase in noxious weeds and invasive species in the proposed project area?
- 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): Azteec gillia (*Aliciella formosa*), Brack's Fishhook cactus (*Sclerocactus cloveriae* var. *brackii*), Bendire's thrasher (*Toxostoma bendirei*), pinyon jay (*Gymnorhinus cyanocephalus*), ferruginous hawk (*Buteo regalis*), and golden eagle (*Aquila chrysaetos*)?

- How would surface-disturbing activities associated with construction of the proposed projects impact cultural resources?
- How would surface-disturbing activities associated with construction of the proposed projects impact paleontological 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; BLM 2003a). Based on a review of species currently listed by the USFWS as occurring in San Juan County (USFWS 2014), as well as the location of the proposed project areas and habitat within the proposed project areas, the potential does not exist for USFWS-listed species to occur within the proposed project areas (see Biological Survey Report [BSR], Appendix B). Water for drilling would be obtained from the permitted Blanco Trading Post (SJ-2105) water well; no unaccounted-for water depletions within USFWS-listed fish habitat would occur. Therefore, there is no need for additional Section 7 consultation.

Native American Religious Concerns

For the proposed action, identification efforts for Native American Religious Concerns were limited to a review of existing published and unpublished literature (e.g., Van Valkenburgh 1941, 1974; Brugge 1993; Kelly, et al. 2006), development of the site-specific Class III survey report prepared for the proposed action (La Plata Archaeological Consultants [LAC] Report No. 2013-5k [LAC 2014]) 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) within the proposed project area. The proposed action would not impact any known TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with or hinder the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996) or Executive Order (EO) 13007.

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

The proposed action is the BLM-FFO approval of two APDs associated with WPX's proposed 153H/154H project and approval of two APDs and three ROW Grants associated with the proposed 155H/156H project. The proposed projects would include the drilling, production, and final abandonment of four oil and natural gas wells; the construction, use, and reclamation of two associated well pads (with construction zones), two access roads, a well-connect pipeline corridor associated with the 153H/154H project, and the Chaco Trunk No. 2 Extension No. 4 pipeline corridor associated with the 155H/156H project; and the use and potential reclamation of up to ten staging areas and TUAs.

The proposed well-connect pipeline corridor and trunk pipeline corridor would each contain two 6-inch-diameter, steel, natural gas/liquids pipelines and two 4-inch-diameter, poly, natural gas/liquids pipelines. The proposed pipelines would carry natural gas and oil; WPX would seek authorization to transport water within one of the poly lines for each proposed project. The pipelines would be in operation year-round for the lifetime of the proposed projects. The volume of natural gas, oil, and water carried by the pipelines is not known at this time.

The primary objective of the wells would be to produce oil; however, it is likely that natural gas would be a byproduct.

Commencement of the proposed 153H/154H and 155H/156H projects is projected for 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 Areas

Maps of the proposed project areas and staging areas/TUAs are provided in Appendix A. The proposed project areas are plotted on the Lybrook and 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 areas are located on BLM-FFO-managed and Fee surface within the San Juan Basin in San Juan County, New Mexico. The proposed project areas are located approximately 40 miles southeast of the town of Bloomfield, New Mexico, and 3 miles south of U.S. Highway 550. Both of the proposed well pad portions of the projects are located within Hutton Canyon. The proposed well pads are located within approximately 0.3 miles of one another.

The general region surrounding the proposed project areas is characterized by rolling badland hills with broad basins. The elevation of the proposed project areas ranges from approximately 6,840 to 6,910 feet above mean sea level.

Oil and gas development (existing well pads, access roads, and pipeline corridors) and livestock grazing disturbances are present throughout the general region. There are no rural residences in the general region.

The legal location of the proposed project areas and staging areas/TUAs are provided in the table below.

Table 4. Legal Land Description for Proposed Projects Features

Township, Range	Section	Quarter-Quarter	Proposed Project Feature
Township 23 North, Range 8 West	**153H/154H**		
	24	SE ¼ of the NE ¼	well pad and construction zone, access road, and well-connect pipeline corridor
		NE ¼ of the NW ¼	Elm Ridge's Dome Federal 24 No. 21 well pad staging area
			access road, well-connect pipeline corridor, WPX's proposed 155H/156H well pad, and153H/154H access road/well-connect pipeline corridor staging area
	155H/156H and Chaco Trunk No. 2 Extension No. 4		
	13	SE ½ of the NW ¼ SE ¼ of the SW ¼	pipeline corridor
		N ½ of the SW ¼	pipeline corridor and TUA 4
	14	S ½ of the NE ¼	pipeline corridor
		SW ¼ of the NE ¼	TUA 1
		SE ¼ of the NE ¼	TUA 2 and TUA 3
		S ½ of the NW ¼ N ½ of the SW ¼	pipeline corridor
	15	SE ¼ of the NE ¼	pipeline corridor
	23	E ½ of the SE ¼	pipeline corridor and access road
	24	E ½ of the NW ¼ SW ¼ of the NW ¼ NW ¼ of the SW ¼	pipeline corridor and access road
		NE ¼ of the NE ¼	Elm Ridge's Dome Federal 24 No. 21 well pad staging area
		SW ¼ of the SW ¼	pipeline corridor, access road, TUA 5, and TUA 6
		SE ¼ of the SW ¼	pipeline corridor, access road, and TUA 7
		S ½ of the SE ¼	pipeline corridor and access road
		NE ¼ of the SE ¼	pipeline corridor, access road, well pad, and construction zone
		SE ¼ of the NE ¼	WPX's proposed 153H/154H well pad staging area

The latitude and longitude of the proposed bottom holes and surface holes (wellheads) for both projects are provided in the table below.

Table 5. Bottom Hole and Surface Hole Locations for the Proposed Projects

Project Feature	North American Datum 1983[1]		Footages (within Section 24, Township 23 North, Range 8 West, NMPM)[2]
	Latitude	Longitude	
153H			
Bottom Hole	36.21860° N	107.64160° W	380 feet FNL 230 feet FWL
Surface Hole (Wellhead)	36.21507° N	107.62495° W	1722 feet FNL 195 feet FEL
154H			
Bottom Hole	36.21338° N	107.64151° W	2279 feet FNL 230 feet FWL
Surface Hole (Wellhead)	36.21501° N	107.62495° W	1744 feet F NL 195 feet FEL

Project Feature	North American Datum 1983[1]		Footages (within Section 24, Township 23 North, Range 8 West, NMPM)[2]
	Latitude	Longitude	
155H			
Bottom Hole	36.21129° N	107. 64147° W	2420 feet FSL, 230 feet FWL
Surface Hole (Wellhead)	36. 20939° N	107.62516 ° W	1524 feet FSL, 255 feet FEL
156H			
Bottom Hole	36. 20610° N	107. 64138° W	1201 feet FSL, 230 feet FWL
Surface Hole (Wellhead)	36. 20939° N	107. 62509° W	1524 feet FSL, 233 feet FEL

[1] N: North, W: West
[2] FNL: from the north line, FEL: from the east line, FSL: from the south line, FWL: from the west line

153H/154H

The proposed project area is located on the northern edge of Hutton Canyon, near the headwaters of the Betonnie Tsotsie Wash. The proposed pipeline will begin at the proposed 153H/154H well pad and terminate at the proposed 155H/156H well pad.

Terrain within the proposed project area is even to gently rolling and there is a gentle slope to the southwest, towards Betonnie Tsotsie Wash. The western portion of the proposed well pad construction zone is located next to a badland formation at the edge of the Betonnie Tsotsie Wash. There are several shallow ephemeral watercourses located throughout the proposed project area. There is one ephemeral watercourse located towards the west-northwestern edge of the proposed well pad and construction zone. Additionally, the proposed access road/well-connect pipeline corridor crosses Betonnie Tsotsie Wash and a Federal Emergency Management Agency (FEMA)-designated floodplain.

Three potential staging areas (two previously disturbed and one yet to be disturbed) would be used for the proposed project. Elm Ridge's active Dome Federal 24 No. 21 well pad is located approximately 0.6 mile west-northwest of the proposed project area. WPX's proposed 155H/156H well pad is located approximately 0.3 mile south of the proposed 153H/154H project area. The proposed 153H/154H access road/well-connect pipeline corridor staging area is located approximately 0.2 mile south of the proposed well pad construction zone at pipeline stationing 3+02.6 to 8+52.6.

155H/156H and Chaco Trunk No. 2 Extension No. 4

The proposed 155H/156H well pad is located on the southern edge of Hutton Canyon and Betonnie Tsotsie Wash. The proposed Chaco Trunk No. 2 Extension No. 4 will begin at the proposed 155H/156H well pad and terminate at the Chaco 2308-14E No. 151H and 152H (151H/152H) well pad .

Terrain within the proposed project area is even to gently rolling with is a gentle to moderate slope. The proposed well pad slopes to the west-northwest towards the Bettonie Tsotsie Wash. There are many ephemeral drainage in the general area; several of these are within the proposed project area. The proposed pipeline corridor crosses four USGS watercourses, and the proposed access road crosses two USGS watercourses. Most prominent of the proposed access road and pipeline corridor watercourse crossings is Bettonie Tsotsie Wash. The proposed access road and pipeline corridor also cross multiple FEMA-designated floodplains.

There are nine potential staging areas/TUAs associated with the proposed project, all of which are located on BLM-FFO-managed surface. These potential staging areas/TUAs are listed below:

- Proposed 155H/156H access road and/or pipeline corridor TUAs:
    - TUA 1: pipeline stationing 40+35.3 to 41+35.3

- TUA 2: pipeline stationing 61+19.9 to 64+19.9
- TUA 3: pipeline stationing 66+03.5 to 68+28.5
- TUA 4: pipeline stationing 101+00.6 to 102+00.6
- TUA 5: pipeline stationing 172+88.0 to 178+13.0
- TUA 6: pipeline stationing 178+13.0 to 188+13.0
- TUA 7: pipeline stationing 193+64.7 to 196+64.7

- Elm Ridge's Dome Federal 24 No. 21 well pad staging area: This active well pad is located at the start of the proposed 155H/156H access road.
- WPX's proposed 153H/154H well pad staging area: This proposed well pad is approximately 0.3 miles north of the proposed 155H/156H well pad..

2.1.2. Description of Proposed Project

For a detailed description of design features and construction practices associated with the proposed projects, refer to the APDs and ROW Grants 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 ROW Grants. The following general design features and best management practices (BMPs) would occur.

Control of Waste

Drilling operations would utilize a closed-loop system. Drilling of the horizontal lateral would be accomplished with water-based mud. All cuttings would be hauled to a commercial disposal facility or land farm. 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, operation, and removal of closed-loop systems. No blow pit would be used. All cuttings would be hauled to a commercial disposal facility or land farm.

Protection of Paleontological Resources

The proposed project areas are located within the Lybrook Fossil Specially Designated Area (SDA), which was established to protect paleontological resources. Paleontology mitigation would occur, if any is listed in the approved APDs or 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.

<u>155H/156H</u>
During the construction phase of the proposed 155H/156H project, a paleontological monitor would be utilized for the "mudstone" areas crossed by the proposed access road/pipeline corridor.

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 COAs/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 areas and/or establishment of specific construction avoidance zones, and employee education.

Employees, contractors, and sub-contractors associated with the proposed projects would be informed by WPX that cultural sites are to be avoided by personnel, personal vehicles, and company equipment. These individuals would be informed that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and/or administrative penalties under the provisions of ARPA.

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

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

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

The wells associated with the connected action would 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.

Livestock grazing operators in the vicinity of the proposed project areas would be contacted by WPX at least 10 days prior to construction. WPX would not cease or delay construction unless directed by the authorized BLM-FFO officer. No holes would be left open overnight. Open holes would be barricaded to ensure the safety of livestock and wildlife. A 16-foot-wide cattleguard and gate would be installed at the BLM-Fee property boundaries. The cattleguards would be installed on BLM-FFO-managed surface. If any additional range improvements (such as fences, gates, cattleguards, or waterlines) would be disturbed by construction activities, they 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 well-connect corridors:

- No more than 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 trenches are not left open for more than 24 hours. If a trench is left open overnight, it would be fenced with a temporary fence or a night watchman would be utilized
- The ends of the pipe 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.
- If livestock is actively grazing within the proposed project areas, escape ramps would be placed every 500 feet within the open trenches. The escape ramps would have a minimum 3-to-1 slope to allow for wildlife and/or livestock to escape the trenches.
- Established wildlife and/or livestock trails would be left in place as a crossover. Crossovers would be constructed above an open trench, would have a minimum 3-to-1 slope, would be a minimum of 10 feet wide, and would not be fenced.
- Before the trenches are closed, the trenches would be inspected for wildlife and/or livestock. Any trapped wildlife/livestock would be promptly removed and released at least 150 yards from the trenches.

Protection of Water Resources

The wells associated with the connected action would 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 corridors cross a watercourse, the trenches would be deep enough to allow 6 feet of soil cover between the pipelines and the bottom of the watercourse.

Protection of Topsoil

Topsoil, which would be stripped from the surface of the proposed project areas during the construction phase of the proposed projects, would be stored and protected until it is redistributed during reclamation. Topsoil would be stored within the construction zones or pipeline corridors 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 for the proposed projects on public roads would comply with Department of Transportation regulations. WPX would notify the public of potential hazards by posting signage, as necessary.

Inspectors would be present during pipeline construction.

Prevention and Control of Weeds

It would be WPX’s responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project areas throughout the life of the proposed projects. 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 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 to reduce fugitive dust during the construction phase of the proposed projects. Water application, using a rear-spraying truck or other suitable means, would be the primary method of dust suppression.

Noise

Production would comply with noise standards outlined in Notice to Lessees (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 stipulations attached to the ROW Grants.

Additional Design Features and BMPs

Vehicles would be restricted to the 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 6 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 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 location of the wells would 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 corridors, would be applied as specified by the BLM-FFO Authorized Officer. If waterbars are constructed, the spacing requirements by hillslope grade are provided in the table below. The waterbars would follow the horizontal contour of the hillslope on which they would be placed. The placement of other water diversions within the proposed project areas would be determined during reclamation.

Table 6. 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

Proposed Project Phases

Under the proposed action, the following phases would occur.

During all phases of the proposed projects, vehicles would use the 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).

Construction of Access Roads and Well Pads

The BLM-FFO would be notified at least 48 hours prior to the start of construction. The construction phase for the well pads and access roads associated with the proposed projects is expected to be at least two weeks.

The proposed well pads and access roads would be cleared of vegetation. The vegetation (including trees 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. 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 top 6 inches of topsoil, or as much as possible, would be stripped and stockpiled within the construction zones. The protection of topsoil is discussed in “Design Features and Best Management Practices – Protection of Topsoil,” above.

The proposed access roads and well pads would be leveled with a D-8 bulldozer to provide space and a level surface for vehicles and equipment. Excavated materials from cuts would be used on fill portions of the location. Construction would utilize native soil and materials available onsite. If sandstone is needed for surfacing, the sandstone would be retrieved from a permitted location.

The proposed roads (both 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). The 30-foot-wide road corridor would accommodate clearing, cut-and-fill slopes, and drainage ditches. Within the corridor, there would be a 14-foot-wide running surface and adequate crowning and drainage on both sides. The proposed access road would be built up 18 to 24 inches following *The Gold Book* (BLM and USFS 2007) standards. The roads would be constructed to meet the standards for anticipated traffic flow and all-weather requirements.

The two proposed well pads would each measure 500 feet by 300 feet. The associated 50-foot-wide well pad construction zones would surround each of the proposed well pads. The size of the proposed well pads 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.

<u>153H/154H</u>
The proposed access road would be 1,902 feet long. The maximum road grade would be 4 to 6 percent.

The maximum well pad cut would be 6 feet on the northeastern corner (corner 5). The maximum well pad fill would be 5 feet on the southwestern corner (corner 2).

<u>155H/156H</u>
The proposed access road would be 10,736 feet long. The maximum road grade would be 8 percent.

The maximum well pad cut would be 5 feet at the northeastern corner (corner 3). The maximum well pad fill would be 3 feet at both the southeastern corner (corner 5) and southwestern corner (corner 6).

Culverts (24 or 48 inch) would be placed at the points where washes are crossed along the length of the proposed access road corridor. A low-water crossing would be constructed where the proposed access road crosses Betonnie Tsotsie Wash. Other water/erosion control diversions would be determined at interim reclamation, as needed.

Drilling and Completion

Once construction is complete within the proposed project areas, a drilling rig would be transported to the well pads and assembled. Horizontal drilling typically takes approximately 30 days per well. Once drilling is complete, the wells would be completed (the process in which the wells are able to produce oil and natural gas). Completion typically takes 30 days per well.

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

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 obtain and truck their water from permitted water well (the Blanco Trading Post [SJ-2105] well). 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 for the proposed projects. Any fluids or hazards on the location would be contained or fenced and properly maintained to ensure the safety of livestock and wildlife.

Construction of 153H/154H Well-Connect Pipeline and Chaco Trunk No. 2 Extension No. 4 Pipeline

If the proposed wells are productive, pipeline corridor construction would commence. Four well-connect pipelines associated with the proposed 153H/154H project and four trunk pipelines associated with the proposed Chaco Trunk No. 2 Extension No. 4 project would be constructed. Each proposed pipeline corridor would include two trenches within one corridor. Construction of the proposed 153H/154H well-connect pipelines would take approximately two to three weeks, and construction of the proposed Chaco Trunk No. 2 Extension No. 4 would take approximately twelve to thirteen weeks.

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

Prior to construction commencement, WPX would notify the BLM-FFO of additional types of construction equipment (aside from equipment previously discussed) that would be used.

The proposed pipeline corridors 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 road.

Trenching activities would be conducted using a trencher or backhoe. Within each of the proposed 40-foot-wide pipeline corridors, two trenches, off-set from one another by 5 feet, would be excavated. Soft plugs would be placed within the trenches every quarter mile. The trenches would each contain one 6-inch-diameter, steel, natural gas/liquids pipeline and one 4–inch-diameter, poly, natural gas/liquids pipeline. The proposed pipelines would carry natural gas and oil; WPX would seek authorization to transport water within one of the poly lines. The trenches 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 one of the trenches.

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

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

Pipeline markers would be installed along the proposed pipeline corridors within the line of sight, without voiding safety issues. Within 90 days of installation, aboveground structures not subject to safety requirements would be painted Juniper Green to blend with the surrounding landscape and reduce visual resource impacts.

Post-Construction Reclamation

If the proposed wells prove to be productive, portions of the proposed project areas that would not be required for production would be reclaimed following the drilling and completion phases. The post-construction reclamation phase would include interim reclamation within portions of the proposed well pads (including construction zones) and access road corridors and final reclamation within the proposed pipeline corridors. Areas that would be fully reclaimed, reseeded only, or left unreclaimed during this phase are described in Section 2.1.3 (Proposed Surface Disturbance).

During this phase, WPX would also repair any damage to the staging areas and TUAs. The staging areas and TUAs would be reseeded (with the exception of any portions of the staging areas that the facility operator prefers to remain unseeded).

Reclamation details (including species included in the Sagebrush-Grass Community Seed Mixture) and subsequent monitoring and reporting are provided in the Surface Reclamation Plans (Appendix E). Although the Surface Reclamation Plan applies only to portions of the proposed project area that are on BLM-FFO surface, the entirety of the proposed project area would be reclaimed in the same manner, unless otherwise stipulated in the Surface Owner Agreement.

Interim reclamation within the proposed well pads (including construction zones) and access road corridors would be initiated within 120 days of construction. Final reclamation within each of the proposed pipeline corridors would occur following the completion of pipeline construction. The BLM-FFO would be notified at least 48 hours prior to the start of reclamation activities. Reclamation could occur simultaneously with production.

Production

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

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

Production facilities would be located within a 300-foot-by-100-foot facility area on the southern end of the proposed 153H/154H well pad and on the western end of the proposed 155H/156H well pad. The teardrop for the proposed well pads would consist of a looped, 35-foot-wide driving surface; the teardrop would be used to access the proposed wellheads and other facilities. A majority of the production facilities would be located on the proposed 155H/156H well pad. A 33-foot-diameter tank would be placed on the proposed 153H/154H well pad.

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 pads 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 proposed 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 pads but would not be used for daily activities.

Final Abandonment and Post-Production Reclamation

If the proposed wells prove to be unproductive, or when the wells are no longer commercially viable, the wells 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 each of the plugged holes. The markers would contain individual well identification information.

The underground pipelines would typically be plugged and left in place.

Final reclamation of the proposed well pads 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 Sagebrush-Grass Community Seed Mixture) are provided in the Surface Reclamation Plans (Appendix E).

The final reclamation phase is anticipated to take less than one week for the proposed project locations. 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.

Post-production reclamation and subsequent monitoring and reporting are described in detail in the Surface Reclamation Plan (Appendix E). Although the Surface Reclamation Plan applies only to portions of the proposed project area that are on BLM-FFO surface, the entirety of the proposed project area would be reclaimed in the same manner, unless otherwise stipulated in the Surface Owner Agreement.

2.1.3. Proposed Surface Disturbance

There would be approximately 40.2 acres of new surface disturbance. Of this, approximately 29.5 acres would be located on BLM-FFO-managed surface and approximately 10.7 acres would be located on Fee surface. Of this new disturbance, approximately 6.7 acres (4.2 acres on BLM-FFO-managed surface and 2.5 acres on Fee surface) would be reseeded but not recontoured and 27.3 acres (21.4 acres on BLM-FFO-managed surface and 5.9 acres on Fee surface) would be fully reclaimed (reseeded and recontoured) during post-construction reclamation. The remainder (6.2 acres [3.9 acres on BLM-FFO-managed surface and 2.3 acre on Fee surface]) would remain disturbed throughout the life of the proposed projects.

153H/154H

There would be 8.4 acres of new surface disturbance. Of this, approximately 6.3 acres would be located on BLM-FFO-managed surface and approximately 2.1 acres would be located on Fee surface. Of the 8.4 acres of new disturbance, approximately 1.8 acres (1.3 acre on BLM-FFO surface and 0.5 acre on Fee surface) would be reseeded but not recontoured and 4.9 acres (3.7 acres on BLM-FFO surface and 1.2 acre on Fee surface) would be fully reclaimed (reseeded and recontoured) during post-construction reclamation. The remainder (1.7 acres total [1.3 acres on BLM-FFO surface and 0.4 acre on Fee surface]) would remain disturbed throughout the life of the proposed project.

Table 7. Surface Disturbance Associated with Proposed 153H/154H Project

Feature	Acreage				Description of Acreage Following Post-Construction Reclamation					
	Total		New Disturbance		Fully Reclaimed (Reseeded and Recontoured)		Reseed Only		Unreclaimed	
	Fee	BLM-FFO	Fee	BLM-FFO	Fee	BLM-FFO	Fee	BLM-FFO	Fee	BLM-FFO
Surface Disturbance										
Access Road Corridor	0.9	0.4	0.9	0.4	-	-	0.5[1]	0.2[1]	0.4[1]	0.2[1]
Well Pad	-	3.4	-	3.4	-	1.2	-	1.1[1]	-	1.1[1]
Construction Zone	-	2.1	-	2.1	-	2.1	-	-	-	-
Well-Connect Pipeline Corridor	1.1	0.9	0.7	0.4	0.7	0.4	-	-	-	-
Total	**2.0**	**6.8**	**1.6**	**6.3**	**0.7**	**3.7**	**0.5[1]**	**1.3[1]**	**0.4[1]**	**1.3[1]**
	8.8		**7.9**		**4.4**		**1.8[1]**		**1.7[1]**	
Staging Areas										
Elm Ridge's Dome Federal 24 No. 21 Well Pad Staging Area	-	1.1	-	-	-	-	1.1 [2]	-	-	-
Proposed 155H/156 Well Pad Staging Area	-[3]	-	-		-	-	-[3]	-	-	-
153H/154H Access Road/Well-Connect Corridor Staging Area	0.5	-	0.5	-	0.5[2]	-	-	-	-	-
Total	**0.5**	**1.1**	**0.5**	**-**	**0.5**	**-**	**1.1[2]**	**-**	**-**	**-**
	1.6		**0.5**		**0.5**		**1.1**		**0.0**	

[1] These areas would be fully reclaimed when the proposed wells are plugged.
[2] Portions of staging areas would be reseeded, as described in text below.
[3] The proposed 155H/156H well pad would be utilized as a staging area if the 155H/156H well pad is constructed prior to the proposed 153H/154H project. The surface disturbance and reclamation acreages are described below.

The proposed 153H/154H project features are described further below.

Access Road Corridor

The proposed access road corridor would be 30 feet wide and 1,902 feet long, totaling 1.3 acres. Of this, 611 feet (0.4 acre) would be located on BLM-FFO-managed surface and 1,291 feet (0.9 acre) would be located on Fee surface.

The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (0.6 acre, total [0.4 acre on Fee surface and 0.2 acre on BLM-FFO-managed surface]) would remain disturbed for the lifetime of the proposed project. The remainder of the proposed access road corridor (0.7 acre total [0.5 acre on Fee surface and 0.2 acre on BLM-FFO-managed surface]) would be reseeded during post-construction reclamation.

Well Pad

The proposed well pad would be entirely on BLM-FFO-managed surface and would measure approximately 500 feet by 300 feet (3.4 acres).

Of the 3.4 acres of new disturbance, approximately 1.1 acres, known as the "non-reseed working area," would remain disturbed for the lifetime of the proposed project. The non-reseed working area would consist of the following:

- A 300-foot-by-100-foot (0.7-acre) facility area would be located on the southern end of the proposed well pad.

- A teardrop with a 35-foot-wide (0.4-acre) driving surface would be located within the center of the proposed well pad.

Approximately 1.1 acre, known as the “reseed working area,” would be reseeded (but not recontoured) during post-construction reclamation. The reseed working area would consist of the following:

- The reseed working area would include the center of the teardrop (0.4 acre).

- It would also include an approximately 210-foot-by180-foot (0.9-acre) workover area around each wellhead. After accounting for the portions of these polygons that overlap one another, the teardrop, and the teardrop center, this region would measure 0.7 acre.

The remainder of the proposed well pad (1.2 acres) would be fully reclaimed during post-construction reclamation.

Construction Zone

A proposed 50-foot-wide (2.1-acre) construction zone would surround the proposed well pad and would be located entirely on BLM-FFO-managed surface. Less than 0.1 acre would overlap the proposed access road. Therefore, the construction zone would add 2.1 acres of new disturbance to the proposed project area. All new disturbance associated with the proposed construction zone would be fully reclaimed during post-construction reclamation.

Well-Connect Pipeline Corridor

The proposed well-connect pipeline corridor would be 2,217 feet long and 40 feet wide (2.0 acres [0.9 acre on BLM-FFO-managed surface and 1.1 acres on Fee surface]). Approximately 335 feet (0.3 acre) of the corridor would overlap the proposed 153H/154H well pad, and the remainder (1.1 acres) would travel parallel and adjacent to the proposed 153H/154H access road. Along this section of the proposed corridor, approximately 15 feet of the corridor width would overlap the access road. The remainder of the proposed corridor width (25 feet, or 1.1 acres) would result in new surface disturbance (0.7 acre [1,272 feet] on Fee surface and 0.4 acre [945 feet] on BLM-FFO-managed surface). All of this disturbance would be fully reclaimed following construction.

Staging Areas

Three proposed staging areas (two previously disturbed and one undisturbed) would be used for the proposed project. These staging areas are listed below:

- Elm Ridge’s Dome Federal 24 No. 21 well pad: This active well pad is approximately 1.1 acres (based on aerial photography). This well pad is located on BLM-FFO-managed surface.

- WPX’s proposed 155H/156H well pad: This proposed well pad would be approximately 5.5 acres. This well pad would be located on Fee surface and would only be used as a staging area if the 155H/156H well pad was built prior to construction of the proposed 153H/154H project.

- 153H/154H access road/well-connect pipeline corridor staging area: This staging area is located on Fee surface and is approximately 0.5 acre.

155H/156H and Chaco Trunk No. 2 Extension No. 4

The proposed project would result in 31.8 acres of new disturbance. Of this, approximately 23.2 acres would be located on BLM-FFO-managed surface and 8.6 acres would be located on Fee surface. Of the 31.8 acres of new disturbance, approximately 4.9 acres would be reseeded (but not recontoured) and 23.5 acres would be fully reclaimed (reseeded and recontoured) during post-construction reclamation.

The remainder (4.5 acres) would remain disturbed (unvegetated) throughout the life of the proposed project. All portions of the proposed project area that were not fully reclaimed during post-construction reclamation would be reclaimed during post-production reclamation, when the wells are finally abandoned.

Table 8. Surface Disturbance Associated with Proposed 155H/156H and Chaco Trunk No. 2 Extension No. 4 Project

Feature	Acreage				Description of Acreage Following Post-Construction Reclamation					
	Total		New Disturbance		Fully Reclaimed (Reseeded and Recontoured)		Reseed Only		Unreclaimed	
	Fee	BLM-FFO	Fee	BLM-FFO	Fee	BLM-FFO	Fee	BLM-FFO	Fee	BLM-FFO
Surface Disturbance										
Access Road Corridor	1.7	5.5	1.7	5.5	-	-	0.9[1]	2.9[1]	0.8[1]	2.6[1]
Well Pad	3.4	-	3.4	-	-	1.2	-	1.1[1]	-	1.1[1]
Construction Zone	2.1	-	2.1	-	-	2.1	-	-	-	-
Pipeline Corridor	2.5	18.9	1.4	16.0	1.4	16.0	-	-	-	-
Total	**9.7**	**24.4**	**8.6**	**21.5**	**1.4**	**19.3**	**0.9[1]**	**4.0[1]**	**0.8[1]**	**3.7[1]**
	34.1		**30.1**		**20.7**		**4.9[1]**		**4.5[1]**	
Staging Areas/TUAs										
Elm Ridge's Dome Federal 24 No. 21 Well Pad Staging Area	-	1.1	-	-	-	1.1 [2]-	-	-	-	-
Proposed 153H/154H Well Pad Staging Area	-[3]	-	-	-	-	-	-[3]	-	-	-
TUA 1	-	0.1	-	0.1	-	0.1[2]	-	-	-	-
TUA 2	-	0.3	-	0.3	-	0.3[2]	-	-	-	-
TUA 3	-	0.2	-	0.2	-	0.2[2]	-	-	-	-
TUA 4	-	<0.1	-	<0.1	-	<0.1[2]	-	-	-	-
TUA 5	-	0.5	-	0.5	-	0.5[2]	-	-	-	-
TUA 6	-	0.5	-	0.5	-	0.5[2]	-	-	-	-
TUA 7	-	0.1	-	0.1	-	0.1[2]	-	-	-	-
Total	**-**	**2.8**	**-**	**1.7**	**-**	**2.8**	**-**	**-**	**-**	**-**
	2.8		**1.7**		**2.8**		**0.0**		**0.0**	

[1] These areas would be fully reclaimed when the proposed wells are plugged.
[2] Portions of staging areas would be reseeded, as described in text below.
[3] The proposed 153H/154H well pad would be utilized as a staging area if the 153H/154H well pad is constructed prior to the proposed 155H/156H project. The surface disturbance and reclamation acreages are described in the above section.

The proposed project features are described further below.

Access Road Corridor

The proposed access road corridor would be 30 feet wide and 10,436 feet long, totaling 7.2 acres. Of this, 7,980 feet (5.5 acres) would be located on BLM-FFO-managed surface and 2,456 feet (1.7 acres) would be located on Fee surface.

The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (3.4 acre, total [0.8 acre on Fee surface and 2.6 acres on BLM-FFO-

managed surface]) would remain disturbed for the lifetime of the proposed project. The remainder of the proposed access road corridor (3.8 acre total [0.9 acre on Fee surface and 2.9 acres on BLM-FFO-managed surface]) would be reseeded during post-construction reclamation.

A 100-foot-by-8-foot (less than 0.1 acre) turnout would be constructed on each side of a steep topographic portion of the proposed access road at TUA 5 (Figures A.2 and A.3 [Appendix A]). The turnout would remain disturbed for the lifetime of the proposed project and would be reclaimed during post-production reclamation.

Well Pad

The proposed well pad would be entirely on Fee surface and would measure approximately 500 feet by 300 feet (3.4 acres).

Of the 3.4 acres of new disturbance, approximately 1.1 acres, known as the “non-reseed working area,” would remain disturbed for the lifetime of the proposed project. The non-reseed working area would consist of the following:

- A 300-foot-by-100-foot (0.7-acre) facility area would be located on the western end of the proposed well pad.
- A teardrop with a 35-foot-wide (0.4-acre) driving surface would be located within the center of the proposed well pad.

Approximately 1.1 acre, known as the “reseed working area,” would be reseeded (but not recontoured) during post-construction reclamation. The reseed working area would consist of the following:

- The reseed working area would include the center of the teardrop (0.4 acre).
- It would also include an approximately 210-feet-by180-foot (0.9-acre) workover area around each wellhead. After accounting for the portions of these polygons that overlap one another, the teardrop, and the teardrop center, this region would measure 0.7 acre.

The remainder of the proposed well pad (1.2 acres) would be fully reclaimed during post-construction reclamation.

Construction Zone

A proposed 50-foot-wide (2.1-acre) construction zone would surround the proposed well pad and would be located entirely on Fee surface. Less than 0.1 acre would overlap the proposed access road. Therefore, the construction zone would add 2.1 acres of new disturbance to the proposed project area. All new disturbance associated with the proposed construction zone would be fully reclaimed during post-construction reclamation.

Pipeline Corridor

There would be one 23,349-foot-long, 40-foot-wide (21.4-acre) pipeline corridor. Portions of the pipeline corridor would overlap existing disturbance and disturbance associated with other portions of the proposed 155H/156H project. New disturbance associated with the proposed pipeline corridor would be 17.4 acres. Of the 17.4 acres, 16.0 acres would be located on surface managed by the BLM-FFO and 1.4 acres would be located on Fee surface. Additional detail about the proposed pipeline corridor is provided below and summarized in the table below.

- Approximately 7,974 feet (7.3 acres) of the proposed pipeline corridor length would travel parallel to the proposed 155H/156H access road. Approximately 15 feet of the proposed pipeline corridor would overlap the proposed access road corridor. Therefore new surface disturbance associated with this portion of the proposed pipeline corridor would be 4.6 acres.

- Approximately 214 feet (0.2 acre) of the proposed pipeline corridor would travel through Elm Ridge's active Dome Federal 24 No. 21 well pad. There would be no new surface disturbance associated with this portion of the proposed pipeline corridor.

- Approximately 6,614 feet (6.1 acres) of the proposed pipeline corridor would parallel a proposed Encana pipeline (not constructed as of October 2013 pre-disturbance onsite meetings) and existing road corridor. The proposed pipeline corridor is offset from Encana's proposed pipeline by 15 feet. The proposed pipeline corridor is offset from the existing road by 28 to 148 feet; there would be no overlap with the existing road. Therefore, all surface disturbance along this portion of the proposed pipeline corridor is being considered new surface disturbance.

- Approximately 5,782 feet (5.3 acres) of the proposed pipeline corridor would parallel an existing, reclaimed Bee Line Gas Systems (Bee Line) pipeline corridor, Encana's proposed pipeline corridor, and the existing road. The proposed pipeline corridor is offset from the Bee Line pipeline by 25 to 35 feet, the Encana proposed pipeline by 15 feet, and the existing road by 32 to 132 feet. All surface disturbance along this portion of the proposed pipeline corridor is being considered new surface disturbance.

Table 9. Proposed Pipeline Corridor Surface Disturbance

Surface Disturbance Description (Approximate Stationing)	Overlapping Existing/Proposed Disturbance		New Surface Disturbance	
	Fee	BLM-FFO	Fee	BLM-FFO
0+00.0 – 40+35.3 (parallels proposed Encana pipeline – existing road corridor)	-	-	-	4035.3' long x 40.0' wide (3.7 acres)
40+35.3 – 80+75.3 (parallels Bee Line pipeline – proposed Encana pipeline – existing road corridor)	-	-	-	4040.0' long x 40.0' wide (3.7 acres)
80+75.3 – 101+100.6 (parallel proposed Encana pipeline – existing road corridor)	-	-	-	2025.3' long x 40.0' wide (1.9 acres)
101+100.6 – 115+92.6 (parallels Bee Line pipeline – proposed Encana pipeline – existing road corridor)	-	-	-	1492.0' long x 40.0' wide (1.4 acres)
115+92.6 – 121+45.3 (parallels proposed Encana pipeline – existing road corridor)	-	-	-	552.7' long x 40.0' wide (0.5 acre)
121+45.3 – 123+95.3 (parallels Bee Line pipeline – proposed Encana pipeline – existing road corridor)	-	-	-	250.0' long x 40.0' wide (0.2 acre)
123+95.3 – 126+09.1 (travels through Elm Ridge's Dome Federal 24 No. 21 well pad)		213.8' long x 40.0' wide (0.2 acre)	-	-
126+09.1 – 205+83.5 (parallels proposed 155H/156H access road on surface managed by BLM-FFO)	-	7974.4' long x 15' wide (2.7 acres)	-	7974.4' long x 25' wide (4.6 acres)
205+83.5 – 230+45.8 (parallels proposed 155H/156H access road on Fee surface)	2462.3' long x 15.0' wide (0.8 acres)	-	2462.3' long x 25.0' wide (1.4 acres)	-
230+45.8 – 233+49.0 (overlaps proposed 155H/156H well pad and construction zone)	300.2' long x 40.0' wide (0.3 acre)	-	-	-
Total Pipeline Disturbance (acres)	**1.1**	**2.9**	**1.4**	**16.0**
	4.0		**17.4**	
	21.4			

Staging Areas and TUAs

There are nine potential staging areas/TUAs associated with the proposed project, all of which are located on BLM-FFO-managed surface. These potential staging areas/TUAs are listed below.

- Proposed 155H/156H access road and/or pipeline corridor TUAs:
    - TUA 1 (pipeline stationing 40+35.3 to 41+35.3): approximately 0.1 acre
    - TUA 2 (pipeline stationing 61+19.9 to 64+19.9): approximately 0.3 acre
    - TUA 3: (pipeline stationing 66+03.5 to 68+28.5): approximately 0.2 acre
    - TUA 4: (pipeline stationing 101+00.6 to 102+00.6): less than 0.1 acre
    - TUA 5: (pipeline stationing 172+88.0 to 178+13.0): approximately 0.5 acre
    - TUA 6: (pipeline stationing 178+13.0 to 188+13.0): approximately 0.5 acre
    - TUA 7: (pipeline stationing 193+64.7 to 196+64.7): approximately 0.1 acre
- Elm Ridge's Dome Federal 24 No. 21 well pad staging area: This active well pad is approximately 1.1 acres (based on aerial photography).
- WPX's proposed 153H/154H well pad staging area: This proposed well pad is approximately 5.5 acres. This proposed well pad would only be used as a staging area if it is built prior to construction of the proposed 155H/156H project.

2.2. No Action

Under the No Action Alternative, the 153H/154H APDs and the 155H/156H APDs and ROW Grants would not be approved. The proposed wells would not be drilled and the proposed well pad, access road, 153H/154H well-connect pipelines, and the Chaco Trunk No. 2 Extension No. 4 Pipelines would not be constructed. Current land and resource uses would continue to occur in the proposed project area.

2.3. Alternatives Considered but Eliminated from Detailed Study

Natural gas and oil wells can be drilled vertically or directionally/horizontally. Vertical drilling places a well pad directly above the bottom hole, while directional/horizontal drilling allows for flexibility in the placement of the well pad and associated surface facilities. Directional/horizontal drilling often allows for "twinning," or drilling two or more wells from one shared well pad. Directional/horizontal drilling applications throughout the San Juan Basin have become relatively common. 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.

No feasible alternative surface locations were identified for either of the proposed projects that would result in less surface disturbance than the proposed locations.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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

3.1. Air Resources

3.1.1. Affected Environment

The proposed project area is located in San Juan County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the PRMP/FEIS (BLM 2003a, 3-48 – 3-53). In addition, new information about greenhouse gases (GHGs) and their effects on national and global climate conditions have 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 2014). 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 Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM10 and PM2.5), sulfur dioxide (SO2), and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. 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, except for tribal lands and within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and 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. EPA has proposed or completed actions recently to implement Clean Air Act requirements for greenhouse gas emissions. Climate has the potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

The Air Resources Technical Report describes the types of data used for description of the existing conditions of criteria pollutants, 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 (EPA 2013b) reports that all counties in the Farmington Field Office area are in attainment of all National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act (EPA 2012). The area is also in attainment of all state air quality standards (NMAAQS). The current status of criteria pollutant levels in the Farmington Field Office are described below. Total emissions of criteria

pollutants from each source sector were calculated by adding together the emissions from the four counties that are located in FFO: San Juan, McKinley, Rio Arriba, and Sandoval. “Design Concentrations” are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design concentrations of criteria pollutants are listed below in Table 10. There is no monitoring for CO and lead in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM10 design concentrations are not available for San Juan County.

Table 10. 2012 Criteria Pollutant Monitored Values in San Juan County

Pollutant	2012 Design Concentration	Averaging Time	NAAQS	NMAAQS
O_3	0.071 ppm	8-hour	0.075 ppm(1)	-
NO_2	13 ppb	Annual	53 ppb(2)	50ppb
NO_2	38ppb	1-hour	100 ppb(3)	-
$PM_{2.5}$	4.7µg/m(3)	Annual	12 µg/m(3,4)	60 µg/m(3,6)
$PM_{2.5}$	14µg/m(3)	24-hour	35 µg/m(3,3)	100 µg/m(3,6)
SO_2	19 ppb	1-hour	75ppb(5)	-

Source: EPA 2014a
(1) Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
(2) Not to be exceeded more than once per year
(3) 98th percentile averaged over 3 years
(4) Annual mean, averaged over 3 years
(5) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
(6) The MNAAQS for Total Suspended Particles (TSP)

In 2005, the EPA estimates that there was less than 0.01 ton per square mile of lead emitted in FFO counties, which is less than 2 tons total (EPA 2012). Lead emissions are not an issue in this area, and will not be discussed further.

Air quality in a given region can be measured by its Air Quality Index value. The air quality index (AQI) is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI<50), moderate (50-100), unhealthy for sensitive groups (100-150), unhealthy (>150), very unhealthy and hazardous. The AQI is a national index, the air quality rating and the associated level of health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

Mean AQI values for San Juan County were generally in the good range (AQI<50) in 2013 with 80% of the days in that range. The median AQI in 2013 was 42, which indicates “good” air quality. The maximum AQI in 2013 was 156, which is “unhealthy”.

Although the AQI in the region has reached the level considered unhealthy for sensitive groups on several days almost every year in the last decade, there are no patterns or trends to the occurrences (Table 11) On 8 days in the past decade, air quality has reached the level of “unhealthy” and on two days, air quality reached the level of “very unhealthy”. In 2009 and 2012, there were no days that were “unhealthy for sensitive groups” or worse in air quality. In 2005 and 2013, there was one day that was “unhealthy” during each year. In 2010, there were five “unhealthy” days and two “very unhealthy days”.

Table 11. Number of Days classified as “unhealthy for sensitive groups” (AQI 101-150) or worse

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Days	3	6	9	18	1	0	12	9	0	1

Source: EPA 2013a

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 2014a). The EPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the U.S. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. A review of the results of the 2005 NATA shows that cancer, neurological and respiratory risks in San Juan County are generally lower than statewide and national levels as well as those for Bernalillo County where urban sources are concentrated in the Albuquerque area (EPA 2012).

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 20's. 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 12 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 12. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (^{O}F)	Average Maximum Temperature (^{O}F)	Average Minimum Temperature (^{O}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: data collected at New Mexico State Agricultural Science Center - Farmington				

The Air Resources Technical Report summarizes information about greenhouse gas emissions from oil and gas development and their effects on national and global climate conditions. While it is difficult to determine the spatial and temporal variability and change of climatic conditions; what is known is that increasing concentrations of GHGs are likely to accelerate the rate of climate change.

Impacts from the Proposed Action

Methodology and assumptions for calculating air pollutant and greenhouse gas 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 gas well. The calculators give an approximation of criteria pollutant, HAP, and greenhouse gas (GHG) emissions to be compared to regional and national emissions levels (USDI/BLM 2013b). Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (BLM 2014).

Direct and Indirect Impacts

Criteria Pollutants

Table 13 shows estimated emissions from one proposed horizontal gas well for criteria pollutants, volatile organic compounds (VOC) and greenhouse gas (GHG). For comparison, Table 14 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on the EPA's 2011 emissions inventory (EPA 2014b).

Table 13. 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
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)								
Equipment Leaks	-	-	-	-	-	-	0.013	-
Filed Compression	0.14	0.29	0.10	0.01	0.01	-	-	19.30
Total	**6.13**	**1.64**	**0.55**	**2.54**	**0.29**	**0.11**	**0.01**	**671.54**

* nitrogen oxide

Table 14. Analysis Area Emissions in Tons/Year, 2011

County	NO_X (1)	CO (2)	VOC (3)	PM_{10} (4)	$PM_{2.5}$ (5)	SO_2 (6)
McKinley	11,952.9	17,007.8	3,891.2	70,096.4	7,645.2	1,381.1
Rio Arriba	12,012.3	27,344.6	19,149.8	33,761.2	4,130.6	60.4
San Juan	42,231.5	63,568.9	26,110.8	76,638.3	9,201.0	5,559.3
Sandoval	4,143.8	19,513.9	4,373.1	39,343.0	4,510.8	109.3
Total	**70,340.5**	**127,435.2**	**53,525.0**	**219,838.9**	**25,487.6**	**7,110.0**

(1) NO_X – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM_{10} – particulate matter with an aerodynamic diameter equal to or less than 10 microns
(5) $PM_{2.5}$ – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
(6) SO_2 – sulfur dioxide

Table 15 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one horizontal gas well.

Table 15. Percent Increase in Analysis Area Emissions from the Proposed Action

	NO_X[1]	CO[2]	VOC[3]	PM_{10}[4,5]	$PM_{2.5}$[5,6]	SO_2[5,7]
Total Emissions	70,340.5	127,435.2	53,525.0	219,838.9	25,487.6	7,110.0
Horizontal Gas Well Emissions	6.28	1.94	0.65	2.55	0.30	0.13
Percent Increase	**0.008**	**0.002**	**0.001**	**0.001**	**0.001**	**0.002**

(1) NO_X – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM_{10} – particulate matter with an aerodynamic diameter equal to or less than 10 microns
(5) Values derived from average emissions for any well drilling in the analysis area. Calculated results available upon request.
(6) $PM_{2.5}$ – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
(7) SO_2 – sulfur dioxide

Hazardous Air Pollutants

Chapter 3The 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/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% if their oil storage tanks emit over 6 tons of VOC emissions per year. A reduction of 95% of oil storage tank VOC emissions would reduce the estimated HAP emissions to 0.12 tons/year.

Total Greenhouse Gases

The available statewide GHG summary combines GHG emissions from CO_2 and CH_4. To compare the GHG emissions from the Proposed Action estimated by the calculator with statewide GHG emissions, CO_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 CO_2e (76.2 million metric tons; (NMED 2010). The estimated CO_2e metric tons emissions from one conventional gas well (623.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO_2 emissions.

Cumulative Impacts

The FFO manages Federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley Counties. There are approximately 21,150 wells in the San Juan Basin. About 14,843 of the wells in these counties are Federal wells. Analysis of cumulative impacts for reasonable development scenarios and RFDS of oil and gas wells on public lands in the FFO was presented in the 2003 RMP. This included modeling of impacts on air quality. A more detailed discussion of Cumulative Effects can be found in the Air Resources Technical Report (BLM 2014a).

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (BLM 2014a). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

The emissions calculator estimated that there could be very small direct and indirect increases in several criteria pollutants, HAPs, and GHGs as a result of implementing the proposed alternative. The very small increase in emissions that could result would not be expected to 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 alternative would not produce climate change impacts that differ from the No Action Alternative. This is because

climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the action alternatives cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the action alternatives on global or regional climate.

The Air Resources Technical Report (BLM 2014a) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.2. 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 areas and staging areas/TUAs. Complete soil information for the proposed project areas and staging areas/TUAs is available in the NRCS's *Soil Survey of San Juan County, New Mexico: Eastern Part*. Within the proposed 153H/154H project area and staging areas, one soil map unit is present, the Badland soil type. Three soil map units are present within the proposed 155H/156H project area, Chaco Trunk No. 2 Extension No. 4 pipeline corridor, and staging areas/TUAs: Badland, Fruitland-Persayo-Sheppard complex (hilly Slopes), and Blancot-Notal association (gentle slopes; NRCS 2009). These map units are described further in the BSR (Appendix B).

The BLM-FFO has developed procedures for reclamation and stabilization of fragile soils. Fragile soils are defined as having a high erosion risk due to a combination of soil erodibility characteristics, slope length, and slope gradient (BLM 2014b). Within areas with fragile soils, it can be difficult for project proponents to stabilize and reestablish vegetation. Three potentially fragile soil types were identified in San Juan County, one of which (Badland) is found within both of the proposed project areas. The slope gradient within the proposed 153H/154H project area and within the 155H/156H well pad and construction zone where fragile soils exist is gentle; however, the slope gradient along portions of the proposed 155H/156H access road and Chaco Trunk No. 2 Extension No. 4 pipeline corridor are moderate to rolling.

3.2.2. Impacts from the Proposed Action

Direct and Indirect Impacts

There would be 40.2 acres (29.5 acres on BLM-FFO-managed surface and 10.7 acres on Fee surface) of new surface disturbance associated with the proposed projects. Of this new disturbance, approximately 6.7 acres (4.2 acres on BLM-FFO-managed surface and 2.5 acres on Fee surface) would be reseeded but not recontoured and 27.3 acres (21.4 acres on BLM-FFO-managed surface and 5.9 acres on Fee surface) would be fully reclaimed (reseeded and recontoured) during post-construction reclamation. The remainder (6.2 acres [3.9 acres on BLM-FFO-managed surface and 2.3 acre on Fee surface]) would remain disturbed throughout the life of the proposed projects.

Soils within the proposed project areas are classified as having low to high potential for water erosion and low to high potential for wind erosion (NRCS 2009). Fragile soils (Badland) have been mapped within the majority of proposed project areas. However, because of the terrain in the proposed project areas where these soils are found, fragile soil erosion would likely be minimal (BLM 2014b). The clearing of vegetation within the proposed project areas would result in the exposure of soils to water, wind, and direct human disturbances; erosion in these areas would potentially increase, especially for fragile soils. Construction

activities within the proposed project areas 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 areas and staging areas/TUAs, immediately surrounding lands, and points immediately downstream. Within the spatial analysis area, existing disturbance and signs of erosion include the following:

- The active Elm Ridge Dome Federal 24 No. 21 well pad (a potential staging area for the proposed projects) is located at the beginning of the proposed 155H/156H access road. The proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor also travels through the Elm Ridge Federal 24 No. 21 well pad.
- An existing road leading to Elm Ridge's active Dome Federal 24 No. 21 well pad is located within close proximity to the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.
- An existing Bee Line pipeline corridor is located along portions of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.
- WPX's 151H/152H well pad and pipeline corridor is located at the northern terminus of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.

Within the spatial analysis area, proposed surface disturbance in the reasonably foreseeable future consists of the following:

- A proposed Encana pipeline corridor is located along portions of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.
- A proposed Encana oil and natural gas well project (Lybrook H14-2308) is located adjacent to a portion of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.

The proposed projects would contribute to ongoing soil erosion (associated with the aforementioned features) within and immediately downstream of the spatial analysis area.

3.3. Groundwater Resources

3.3.1. Affected Environment

There are no recorded water wells within an approximately one-mile radius of the proposed 153H/154H or the proposed 155H/156H well pads (New Mexico Office of the State Engineer 2011). Therefore, there is no depth-to-groundwater data available for the proposed projects.

3.3.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Stimulation (i.e., hydraulic fracturing or "fracking") is a process used to maximize the extraction of underground resources by allowing oil or natural gas to move more freely from the rock pores to production wells that bring the oil or gas to the surface. Fluids, commonly made up of water (99 percent) and chemical additives (1 percent), are pumped into a geologic formation at high pressure during fracking (EPA 2004). Chemicals added to stimulation fluids may include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents, and clay stabilizers. When the fracking pressure exceeds the rock strength, the fluids open or enlarge fractures that typically extend several hundred feet away from the well bore, and may occasionally extend up to 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 projects, there would be no cumulative impacts.

3.4. Upland Vegetation

3.4.1. Affected Environment

The proposed 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 (*Ericameria nauseosa*), winterfat (*Krascheninnikovia lanata*), shadscale (*Atriplex confertifolia*), saltbush (*Atrtiplex* sp.), and greasewood (*Sarcobatus vermiculatus*); and grasslands of blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), and needleandthread grass (*Hesperostipa comata*). 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 project areas is characterized by rolling badlands with broad basins.

There are four vegetation communities present within the proposed project areas: sagebrush shrubland, desert scrub, desert riparian, and open piñon-juniper woodland. It is estimated that there are 225 to 325 trees (80 to 90 percent mature, 5 percent juvenile, and 5 to 15 percent standing dead) within the proposed project areas. These vegetation communities are described below and in the BSR (Appendix B).

153H/154H

Sagebrush shrubland and desert scrub vegetation communities are found throughout the proposed project area. There are small patches of desert riparian vegetation communities found along the larger

ephemeral watercourses within the proposed project area. It is estimated that there are 25 trees (80 percent mature, 5 percent juvenile, and 15 percent standing dead) within the proposed project area.

155H/156H and Chaco Trunk No. 2 Extension No. 4

Sagebrush shrubland, desert scrub, and open piñon-juniper woodland vegetation communities are found throughout the proposed project area. There are small patches of desert riparian vegetation communities found along the larger ephemeral watercourses within the proposed project area. It is estimated that there are 200 to 300 trees (90 percent mature, 5 percent juvenile, and 5 percent standing dead) within the proposed project area.

3.4.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed projects would result in the removal of approximately 40.2 acres (29.5 acres on BLM-FFO-managed surface and 10.7 acres on Fee surface) of sagebrush shrubland, desert scrub, desert riparian and open piñon-juniper woodland vegetation communities, including approximately 225 to 325 trees. During post-construction reclamation, approximately 6.7 acres (4.2 acres on BLM-FFO-managed surface and 2.5 acres on Fee surface) would be reseeded but not recontoured and 27.3 acres (21.4 acres on BLM-FFO-managed surface and 5.9 acres on Fee surface) would be fully reclaimed (reseeded and recontoured). The remainder (6.2 acres [3.9 acres on BLM-FFO-managed surface and 2.3 acre on Fee surface]) would remain as compacted, barren surface for the life of the proposed wells.

During the construction phase of the proposed project, all vegetation within the proposed project areas and the staging areas/TUAs would be cleared.

Once the proposed wells are plugged, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed (recontoured and reseeded) during post-construction reclamation. This would include clearing the vegetation from within the portions of the well pads and access roads that were only reseeded (not recontoured) during post-construction reclamation.

During interim (post-construction) and final (post-production) reclamation, the BLM Sagebrush-Grass Community Seed Mixture would be utilized for the proposed project areas; the species included in this mixture are listed in the Surface Reclamation Plans (Appendix E). Re-established vegetation would consist of native grass, forb, and shrub species included in the seed mixture, as well as native species that are not deliberately planted. It is also possible that invasive, non-native species could become established within the proposed project areas, as such species could be transported by project equipment and tend to thrive in disturbed areas. Following the reclamation process, the resulting vegetation communities could differ from the native plant communities surrounding the proposed project areas. Within reclaimed areas, it is not expected that the vegetation communities would return to native conditions within 20 years (BLM 2003a, 4-18).

The deposition of fugitive dust generated during vegetation-clearing activities, during the use of the well pads/construction zones, 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 areas (Eveling and Bataille 1984), and result in injury to leaves of surrounding vegetation.

Cumulative Impacts

The spatial analysis area is the proposed project areas, staging areas/TUAs, and immediately adjacent lands.

Within the spatial analysis area, the following vegetative disturbances have occurred:

- The active Elm Ridge Dome Federal 24 No. 21 well pad (a potential staging area for the proposed projects) is located at the beginning of the proposed 155H/156H access road. The

proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor also travels through the Elm Ridge Federal 24 No. 21 well pad.

- An existing road leading to Elm Ridge's active Dome Federal 24 No. 21 well pad is located within close proximity to the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.
- Active wildlife and livestock grazing occurs in the area. The proposed project areas and staging areas/TUAs are within two BLM-FFO grazing allotments. The Largo Community (Allotment No. 5083) is permitted for grazing year round by 145 head of cattle and 596 head of sheep. The Eagle Rock (Allotment No. 5122) is permitted for grazing year round by 56 head of cattle.
- An existing Bee Line pipeline corridor is located along portions of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.
- WPX's 151H/152H well pad and pipeline corridor is located at the northern terminus of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.

Within the spatial analysis area, proposed surface disturbance in the reasonably foreseeable future consists of the following:

- A proposed Encana pipeline corridor is located along portions of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.
- A proposed Encana oil and natural gas well project (Lybrook H14-2308) is located adjacent to a portion of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.

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

The proposed projects would contribute to direct and indirect vegetation disturbance and fugitive dust and/or deposition within the spatial analysis area.

3.5. Noxious Weeds and Invasive Species

3.5.1. Affected Environment

Management of invasive and non-native plant species is mandated under several pieces of legislation, including the Lacey Act, as amended (16 USC 3371-3378); the Federal Noxious Weed Act of 1974, as amended (7 USC 2801 et seq.); the New Mexico Noxious Weed Management Act of 1998; and EO 13112 regarding Invasive Species. Under EO 13112, Federal agencies are ordered not to authorize or carry out actions that would cause or promote the introduction of invasive species.

In the San Juan Basin, invasive plants are frequently found in areas that have been disturbed by surface activities. A mission of the BLM-FFO is to detect new invasive plant species populations, prevent the spread of these new populations, manage existing populations, and eradicate invasive populations. This is to be accomplished in a timely manner, using the safest environmental methods available. For all actions on BLM-FFO lands that involve surface disturbance or reclamation, reasonable steps are required to prevent the introduction or spread of invasive plants (BLM 2003a, 3-34 – 3-35).

The U.S. Department of Agriculture has designated certain plants as federally listed noxious weeds (NRCS 2010). The New Mexico Department of Agriculture (NMDA) has designated certain plants as state-listed noxious weeds (NMDA 2009). A total of 212 invasive and poisonous weed species have been identified on BLM-FFO lands. The PRMP/FEIS lists the invasive, non-native plant species of concern in the BLM-FFO area (BLM 2003a, 3-34 – 3-35).

No federally listed noxious weeds were identified within the proposed project areas during the biological surveys. (Delete)

153H/154H

During the biological surveys of the proposed project area, saltcedar (*Tamarix ramosissima*) was identified. Saltcedar is a NMDA-designated invasive species and BLM-FFO invasive weed. Please refer to the BSR (Appendix B) for additional information regarding this species and its classifications.

155H/156H and Chaco Trunk No. 2 Extension No. 4

During the biological surveys of the proposed project area, halogeton (*Halogeton glomeratus*) and saltcedar were identified. Halogeton and saltcedar are NMDA-designated invasive species. Saltcedar is also a BLM-FFO invasive weed. Please refer to the BSR (Appendix B) for additional information regarding these species and their classifications.

Russian thistle (*Salsola tragus*) and redstem filaree (*Erodium cicutarium*) are scattered throughout the proposed project area. Although these species are not included on the federal, BLM-FFO, or NMDA noxious weed lists, they are known to outcompete desirable, native vegetation (Whitson, et al. 1992, Colorado Department of Agriculture 2008)

3.5.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Noxious weeds and invasive species are generally tolerant of disturbed conditions, and the disturbed soils within the proposed project areas may provide an opportunity for the introduction and establishment of non-native, invasive species. Seeds or other propagules of invasive species may be transported to the proposed project areas from infested areas by heavy equipment or other vehicles associated with the proposed projects.

Invasive species may also spread from established populations near the proposed project areas and colonize soils disturbed by proposed project activities. The longer time periods required for the re-establishment of plant communities in arid regions may create an increased potential for the establishment and spread of invasive species. Invasive plant species typically develop high population densities and tend to exclude most other plant species, thereby reducing species diversity and potentially resulting in long-term effects. The establishment of invasive species within or adjacent to the proposed project areas may greatly reduce the success of native plant community restoration efforts and create a source of future colonization and degradation of adjacent undisturbed areas.

The establishment of invasive species, particularly annual grasses, such as cheatgrass (*Bromus tectorum*), which produce large amounts of easily ignitable fuel over large contiguous areas, may also alter fire regimes. This situation may result in an increase in the frequency and intensity of wildfires, and in some areas, such as in some desert-scrub communities, a fire regime may be created where none was present before. In plant communities that are not adapted to frequent or intense fires, native species, particularly shrubs and trees, may be adversely affected, and their populations may be greatly reduced, creating opportunities for greater increases in invasive species populations (Brooks and Pyke 2001). Increases in fire frequency or severity may thus result in a reduction of biodiversity and may promote the conversion of some habitats (such as forest, shrubland, or shrub-steppe) to other types, prolonging or preventing the development of mature native habitats (BLM and U.S. Department of Energy 2010).

WPX will be responsible for control of noxious weeds associated with thier activities on these sites for the life of the project.

Cumulative Impacts

The spatial analysis area is the proposed project areas, staging areas/TUAs, and immediately adjacent lands. Existing disturbance within this spatial analysis area is listed in Section 3.4.2 (Upland Vegetation –

Impacts from the Proposed Action – Cumulative Impacts). Existing disturbance has resulted in the introduction of halogeton, saltcedar, Russian thistle, and redstem filaree to the region. The proposed projects would potentially contribute to the spread of these species, as well as the introduction of additional species.

3.6. Wildlife

3.6.1. Affected Environment

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 areas 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 list of priority species with potential to occur within the proposed project areas are provided in the BSRs (Appendix B). Based on habitat and range, the potential exists for numerous migratory birds to occur within the proposed project areas. Bird species identified during the site surveys of the proposed project areas are also found in the BSRs (Appendix B).

General Wildlife

The vegetation communities found within the proposed 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 2003b, 2-24). They both receive year-long use by mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) and lesser small mammals. Their significance to the overall Lybrook/Upper Largo ecosystem is that they represent a metapopulation with respect to mule deer and elk.

No prairie dog colonies have been recorded by the BLM-FFO within or adjacent to the proposed project areas (BLM 2012b); the closest recorded colony is approximately 11.6 miles north of the proposed project areas. No sign of prairie dogs was observed during the biological surveys.

A discussion of wildlife identified within the proposed project areas is provided in the BSRs (Appendix B).

3.6.2. Impacts from the Proposed Action

Direct and Indirect Impacts

During the construction phase of the proposed projects, all vegetation within the proposed project areas would be cleared. The proposed projects would result in the removal of approximately 40.2 acres (29.5 acres on BLM-FFO-managed surface and 10.7 acres on Fee surface) of sagebrush shrubland, desert scrub, desert riparian and open piñon-juniper woodland vegetation communities, including approximately 225 to 325 trees. The proposed project areas would be converted to a reseed community following interim (post-construction) reclamation and final (post-production) reclamation. The impacts to the vegetation communities are described in detail in Section 3.4 (Upland Vegetation).

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 13,538 linear feet (2.6 miles) of initial habitat fragmentation resulting from the proposed projects; this fragmentation would exist until post-construction reclamation is deemed successful. Initial habitat fragmentation would result from the following:

- Proposed 153H/154H Project Features
    - Access Road: 1,902 feet
    - Well Pad/Construction Zone: 600 feet (along longest side)
    - Pipeline Corridor: 2,217 (335 feet overlaps proposed 153H/154H well pad and remainder parallels proposed 153H/154H access road)
- Proposed 155H/156H and Chaco Trunk No. 2 Extension No. 4 Project Features
    - Access Road: 10,436 feet
    - Well Pad/Construction Zone: 600 feet (along longest side)
    - Pipeline Corridor: 23,349 feet (300 feet overlaps proposed 155H/156H well pad and remained parallels proposed 155H/156H access road and existing disturbance)

There is available, similar habitat in the surrounding area that wildlife could utilize. However, the clearing of vegetation would remove potential habitat within the proposed project areas. The transformation of the proposed project areas to a reseed community could remove potential habitat for numerous wildlife species. Displacing these animals would add competition for food, water, and space in other areas that are already occupied.

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

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

Migratory Birds

Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed projects. 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 proposed project areas. Therefore, it is unlikely that nests, eggs, or young birds within the proposed project areas would be directly harmed. If project activities occur during migratory bird breeding season, birds nesting outside of but near the proposed project areas could abandon existing nests as a result of visual and audial disturbances.

It is difficult to predict the effects of the projects on migratory birds. The increased activity, noise, and disturbed vegetation associated with the proposed projects 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 projects, as equipment digs into the earth and rolls over the surface of the ground. The disruption to the proposed project areas 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 corridors to assist in the prevention of injury, stress, or death of wildlife.

Cumulative Impacts

The spatial analysis area includes the proposed project areas, staging areas, and an approximately 2-mile radius around the proposed project areas. Within this spatial analysis area, disturbance exists, and the region has been fragmented. Existing and reasonably foreseeable future disturbances within the spatial analysis area include the following:

- 8 active oil and/or gas wells and associated well pads
- 11 plugged oil and/or gas wells
- 15 proposed oil and/or gas well pads and associated access roads and utility corridors
- Approximately 18 miles of existing roads
- Numerous utility corridors
- Active wildlife and livestock grazing occurs in the area. The proposed project areas and staging areas/TUAs are within two BLM-FFO grazing allotments (Largo Community and Eagle Rock). The Largo Community (Allotment No. 5083) is permitted for grazing year round by 145 head of cattle and 596 head of sheep. The Eagle Rock (Allotment No. 5122) is permitted for grazing year round by 56 head of cattle.

Habitat disturbance and fragmentation in the spatial analysis area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors). The direct and indirect habitat disturbance, fragmentation, and human activities associated with these disturbances could deter 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.

3.7. Special Status Species

3.7.1. 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 project areas. These species and their habitat requirements are discussed in detail in the BSRs (Appendix B). The SSS with the potential to occur within the proposed project areas are as follows:

- Aztec gilia: Appropriate habitat (desert scrub vegetation and Nacimiento soils) is present within the proposed project areas.
- Bracks's fishhook cactus: Appropriate habitat (desert scrub vegetation and Nacimiento soils) is present within the proposed project areas. Brack's fishhook cactus was recorded during the biological surveys of both of the proposed project areas; details regarding the surveys and their results are provided in the BSRs (Appendix B).
- Bendire's thrasher: Appropriate foraging and nesting habitat (shrublandsand open piñon-juniper woodlands) is present within the proposed project areas.
- Pinyon Jay: Appropriate foraging (shrublands and woodlands) and nesting (piñon-juniper woodlands) habitat is present within the proposed project areas.
- Ferruginous hawk: Appropriate foraging habitat (sagebrush shrublands and desert scrub vegetation communities) within proposed project areas.
- Golden Eagle: Appropriate foraging habitat (desert scrub, sagebrush shrubland, and open piñon-juniper woodland vegetation communities) within proposed project areas.

3.7.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Aztec Gillia

No Aztec gilia were identified during the biological surveys, so no direct impacts to individuals are anticipated as a result of the proposed projects. However, the biological surveys were conducted in November, outside of the blooming period (late April to June) for this species; based on the small size of Aztec gilia plants and the timing of the biological surveys, it is possible that Aztec gilia individuals could have been overlooked during the biological surveys. If so, it is possible that these individuals could be killed during the vegetation-clearing phase of the proposed projects.

Brack's Fishhook Cactus

The proposed projects would result in the disturbance of up to 40.2 acres (29.5 acres on BLM-FFO-managed surface and 10.7 acres on Fee surface) of Brack's fishhook cactus habitat. Of this, approximately 6.7 acres (4.2 acres on BLM-FFO-managed surface and 2.5 acres on Fee surface) would be reseeded but not recontoured and 27.3 acres (21.4 acres on BLM-FFO-managed surface and 5.9 acres on Fee surface) would be fully reclaimed (reseeded and recontoured) during post-construction reclamation. The remainder (6.2 acres [3.9 acres on BLM-FFO-managed surface and 2.3 acre on Fee surface]) would remain disturbed throughout the life of the proposed projects. It is possible that Brack's fishhook cacti could grow within reclaimed portions of the proposed project areas, although the likelihood of these species populating disturbed areas is unknown.

During final (post-production) reclamation, WPX would reclaim all portions of the proposed project areas that were not fully reclaimed during post-construction reclamation. This would include clearing the vegetation from within the reseed working area that was only reseeded (not recontoured) during post-construction reclamation. It is possible that if Brack's fishhook cacti become established within this

reseed-only areas following post-construction reclamation, they could be killed during the clearing-and-recontouring phase of final reclamation.

153H/154H
Approximately 22 Brack's fishhook cacti were recorded within the proposed project area. Under BLM-FFO guidance and following BLM-FFO protocol (BLM 2014c, BLM 2013b), transplanting of cacti populations under 35 individuals is not necessary. The existing population of Brack's fishhook cacti would be killed during the vegetation-clearing phase of the proposed project.

155H/156H and Chaco Trunk No. 2 Extension No. 4
Approximately 1,332 Brack's fishhook cacti were recorded within the proposed project area. Under BLM-FFO guidance and following BLM-FFO protocol (BLM 2014c, 2013b), 30 to 50 percent (400 to 666) of these cacti should be transplanted by NCI in the spring (late March through early May) or fall (early September through late October). Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the proposed project on these Brack's fishhook cacti is not yet known. The remaining, un-transplanted Brack's fishhook cacti would be killed during the vegetation-clearing phase of the proposed project.

Ferruginous Hawk and Golden Eagle

These two BLM SSS could potentially utilize the proposed project areas for foraging. Due to the mobility of adult birds and the lack of available nesting habitat in the immediate vicinity, it is unlikely that these raptors would be directly harmed by activities associated with the proposed projects. Indirect effects associated with disturbance to foraging habitat are described in Section 3.6 (Wildlife – Direct and Indirect Impacts – Migratory Birds).

Bendire's Thrasher and Pinyon Jay

Direct and indirect impacts to Bendire's thrashers and pinyon jays would be similar to those described for migratory birds (Section 3.6 [Wildlife – Direct and Indirect Impacts – Migratory Birds]).

Cumulative Impacts

The spatial analysis area includes the proposed project areas, staging areas/TUAs, and an approximately 2-mile radius around the proposed project areas. Within the spatial analysis area, there is existing and proposed disturbance, and the region has been fragmented. Existing and reasonably foreseeable future disturbances within the spatial analysis area are listed in Section 3.6.2 (Wildlife – Direct and Indirect Impacts – Cumulative Impacts).

Cumulative impacts to these wildlife SSS would be similar to those described for wildlife (Section 3.6.2 [Wildlife – Impacts from the Proposed Action – Cumulative Impacts]).

Brack's Fishhook Cactus

The spatial analysis areas are entirely within the BLM-FFO-designated Brack's fishhook cactus potential habitat "zone" (2013c). However, the amount of actual preferred habitat for Brack's fishhook cactus within this "zone" has not been quantified. Patches of preferred habitat within the spatial analysis area do exist, and past and reasonably foreseeable future disturbances have and would impact this habitat. The proposed projects would increase the amount of disturbance within the "zone."

3.8. Cultural Resources

3.8.1. Affected Environment

The proposed 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.

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 report, LAC Report No. 2013-5k (2014; BLM(III)058F) was 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 2014BLM 2005).

153H/154H

The Class III inventory identified no cultural sites within the APE (LAC 2014). No TCPs are known to exist in the APE.

155H/156H and Chaco Trunk No. 2 Extension No. 4

The Class III inventory resulted in the identification of two newly discovered and three previously discovered cultural sites within the APE. Three of the sites (one is located along the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor and two are located along the proposed 155H/156H access road corridor) are recommended as being eligible for inclusion in the NRHP, and two of the sites (both are located along the proposed 155H/156H access road corridor) are ineligible for listing (LAC 2014). No TCPs are known to exist in the APE.

3.8.2. Impacts from the Proposed Action

Direct and Indirect Impacts

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

Significant cultural sites (e.g., sites eligible for the NRHP) would be avoided with the implementation of design features such as, but not limited to, 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 the 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.

3.9. Paleontology

3.9.1. Affected Environment

Fossils found on BLM-managed lands are considered part of our national heritage and are afforded protection. The BLM manages fossil resources for their scientific, educational, and recreational values. On public lands, paleontological resources are managed under authorities and policies that govern the preservation of the resource. These authorities include the BLM-FFO PRMP/FEIS and ROD (BLM 2003b); OPLA-PRP; (FLPMA, P.L. 94-579, USC 1701 et seq.); as amended (NEPA, P.L. 91-190, 42 USC 4321-4347 et seq.); BLM's System for Paleontological Resources on Public Lands (Instruction Manual [IM] 2008-009); and BLM's Assessment and Mitigation of Potential Impacts to Paleontological Resources (IM 2009-011). These authorities provide for civil and criminal penalties and also require that public lands be managed to preserve and protect the quality of the paleontological resources' scientific values.

The BLM's PFYC System is a predictive modeling tool that was developed to provide baseline guidance for assessing and mitigating paleontological resources. It is intended to be utilized at an intermediate point in analyses and should be used to assist in determining the need for further mitigation assessments or actions (BLM 2009). The PFYC System is based on the fact that occurrences of paleontological resources are often closely tied to the geologic units that contain them. This classification system does not reflect rare or isolated occurrences of significant fossils or individual localities; the system reflects the relative occurrence on a formation- or member-wide basis. However, it is recognized that local differences have to be taken into account. Under the PFYC System, geologic units are classified based on their relative abundance of vertebrate fossils or scientifically significant invertebrate/ plant fossils and their sensitivity to adverse impacts.

The proposed project areas are located within the paleontologically rich area of the San Juan Basin in northwestern New Mexico. The BLM used the PFYC System to identify areas with a high potential to produce significant fossil resources (BLM 2008d). Under this system, all lands within the BLM-FFO management area were designated as Class 5 (Very High Potential) for paleontological resources. Class 5 areas require an assessment of paleontological resources at the project level (BLM 2009).

Both project areas are located within the Lybrook Fossil Area SDA with the exception of approximately 1 mile of the proposed Chaco Trunk No. 2 Extension No. 4 pipeline corridor.

The proposed project areas are located within the Nacimiento Formation, a geologic unit ranked as PFYC Class 5 (BLM 2008d). The Nacimiento Formation is a heterogeneous, non-marine formation composed of shale, siltstone, and sandstone. This formation was deposited in floodplain, fluvial, and lacustrine settings during the early and middle Paleocene (approximately 64.5 to 61.0 million years ago). The formation outcrops very low in the section, deep in the canyons where years of erosion have exposed it.

Many fossils are known from the Nacimiento Formation. Fossils belonging to a number of different organisms have been found here, including plants (mostly dicotyledonous angiosperms), gastropods, freshwater bivalves, cartilaginous fish and bony fish, salamanders, turtles, champsosaurs, amphisbaenians, lizards, snakes, crocodilians, birds, and a variety of archaic mammals. Mammalian groups represented in the fossils include multituberculates, didelphid marsupials, insectivorans, plesiadapiforms, carnivorans, taeniodonts, mesonychids, condylarths, and cimolestans. Fauna recovered from this formation are the basis for the Puercan and Torrejonian North American Land Mammal Ages.

The proposed projects would be assessed individually based on the analyses conducted for the BLM-FFO PRMP/FEIS using the BLM's PFYC system, geographic information system (GIS)-based locality data, known paleontological locality information, existing paleontological reports for the area, aerial photographs, soils maps, site-specific paleontological surveys (if required), and scientific publications for the area. If preliminary analysis indicates that the proposed project areas fall within a paleontology SDA or that the proposed projects have a high probability of impacting paleontological resources, additional site-specific surveys, reporting, and stipulations could be required. These stipulations could include, but are not limited to, altering the location or scope of the projects, installing temporary or permanent fencing or other physical barriers, monitoring earth-disturbing construction, requiring project area reduction and/or specific construction avoidance zones, and educating employees.

3.9.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Based on a review of the paleontology report (if required) and the assessment of the proposed projects, the BLM paleontology resources staff would determine if the proposed projects would have an effect on paleontology resources or if no paleontological resources are present in the proposed project areas. This determination would be included with the BLM-FFO paleontology resources COAs/stipulations, if any, attached to the approved APDs and ROW Grants.

Direct effects of the proposed projects to fossil localities could result from ground-disturbing activities or the disturbance of the stratigraphic context in which the fossils are located. Alterations to the physical integrity of bedrock or potential fossil-yielding alluvium could occur, which could have a direct effect on unidentifiable or irretrievable fossil resources. The proposed projects could also create indirect impacts to areas by changing erosion patterns. Additionally, an increase in accessibility to the areas could increase human activity in the areas, which could lead to looting or vandalism of paleontological resources in the area.

Cumulative Impacts

The spatial analysis area is the Lybrook Fossil SDA. Development within this SDA has the potential to impact paleontological resources directly and indirectly. Paleontological surveys and subsequent mitigation are required for proposed projects that occur within paleontology SDAs. However, unidentified or irretrievable fossils could be directly damaged by disturbances to bedrock or alluvium. Indirectly, development has altered erosional patterns and increased human access to fossils. These impacts are not quantifiable. The proposed projects could contribute to potential paleontological impacts.

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
- Mark Heil, WPX
- Steven Fuller, LAC

4.2. List of Preparers

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

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- Eric Creeden, Environmental Scientist, NCI
- Eilene Lyon, Environmental Scientist, NCI
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- 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
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- Vera Mathews, Environmental Protection Specialist, BLM-FFO
- Sarah Scott, Natural Resource Specialist, BLM-FFO
- Stanley Dykes, Weeds Specialist, BLM-FFO
- Sherrie Landon, Paleontologist, BLM-FFO

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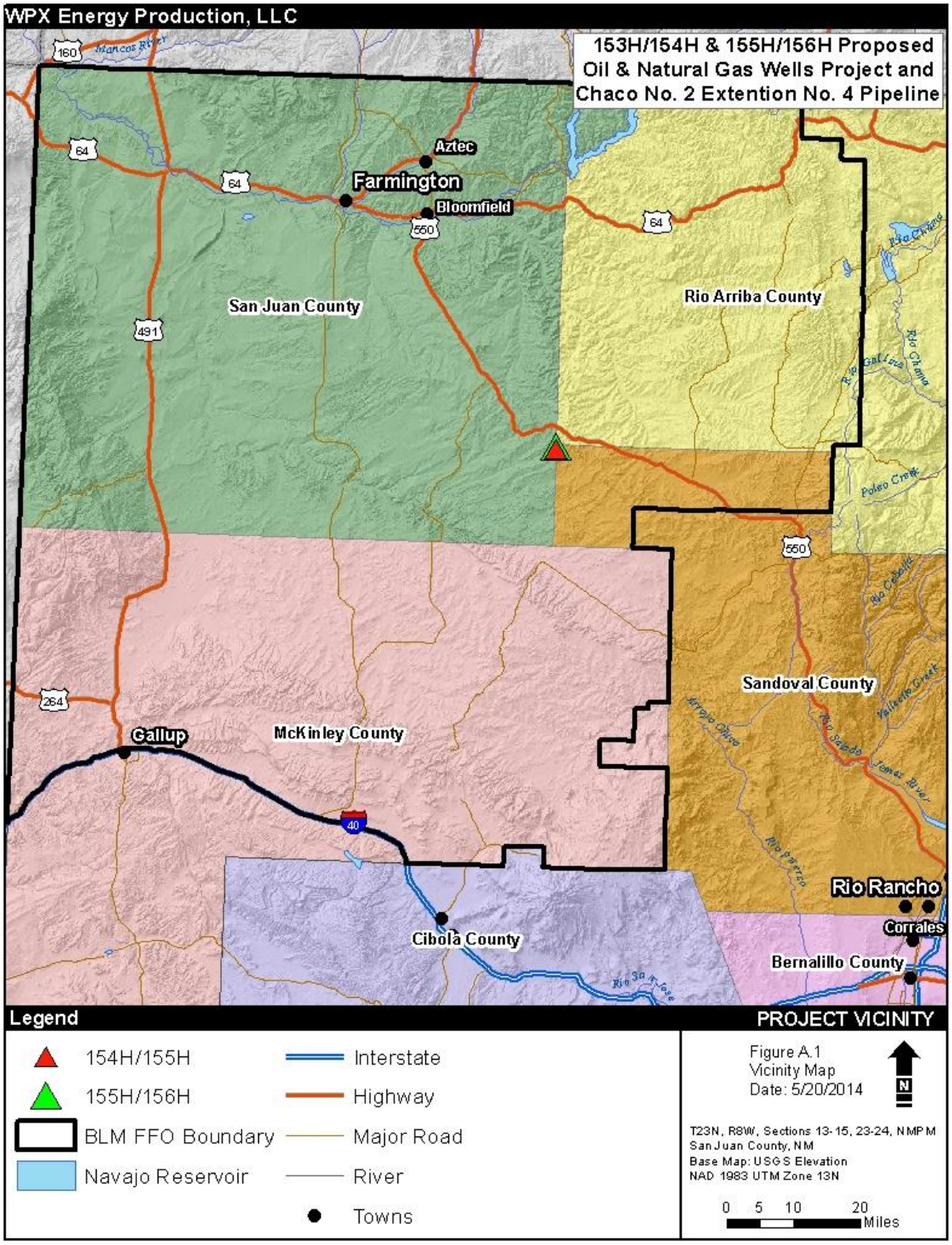
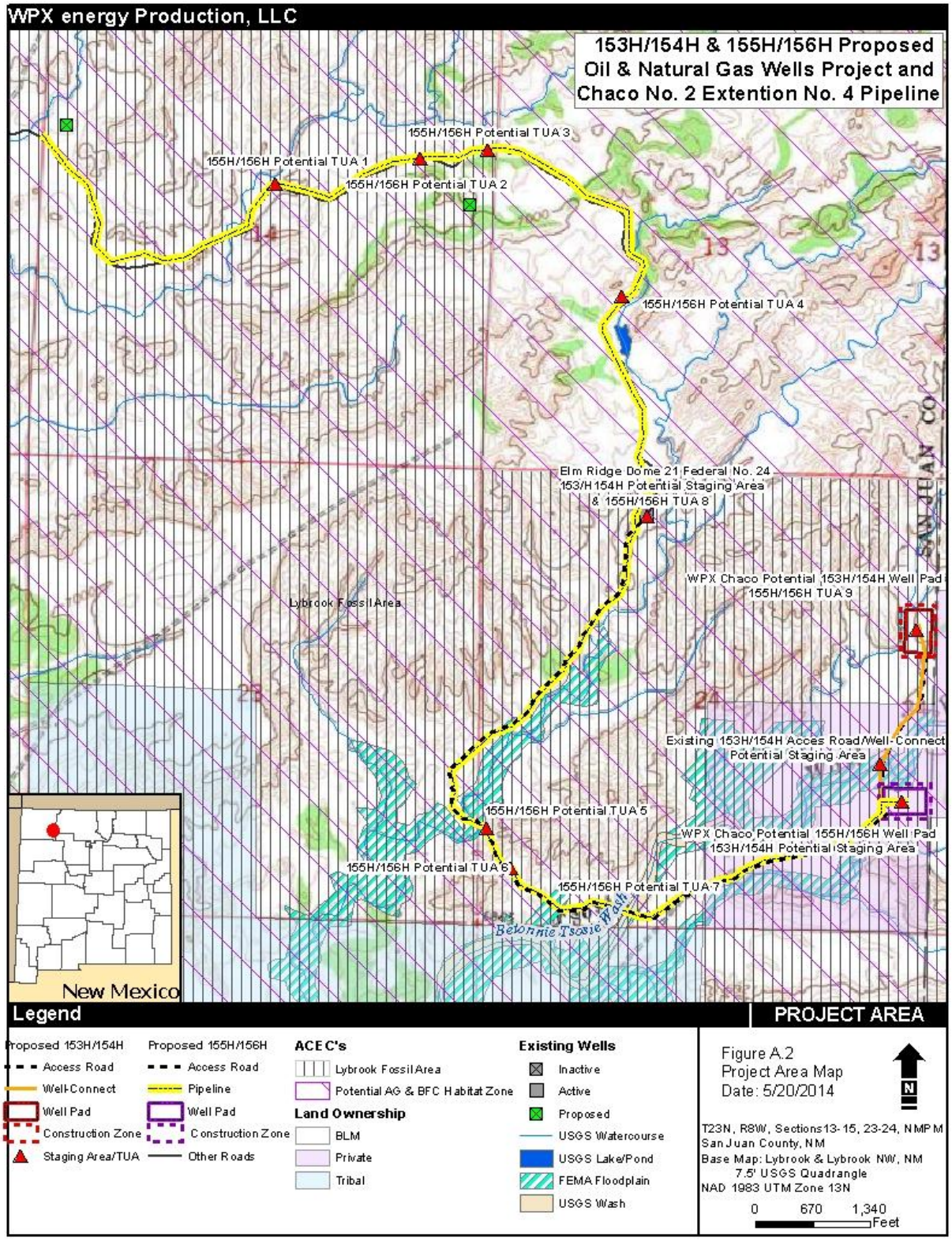
APPENDIX A. MAPS

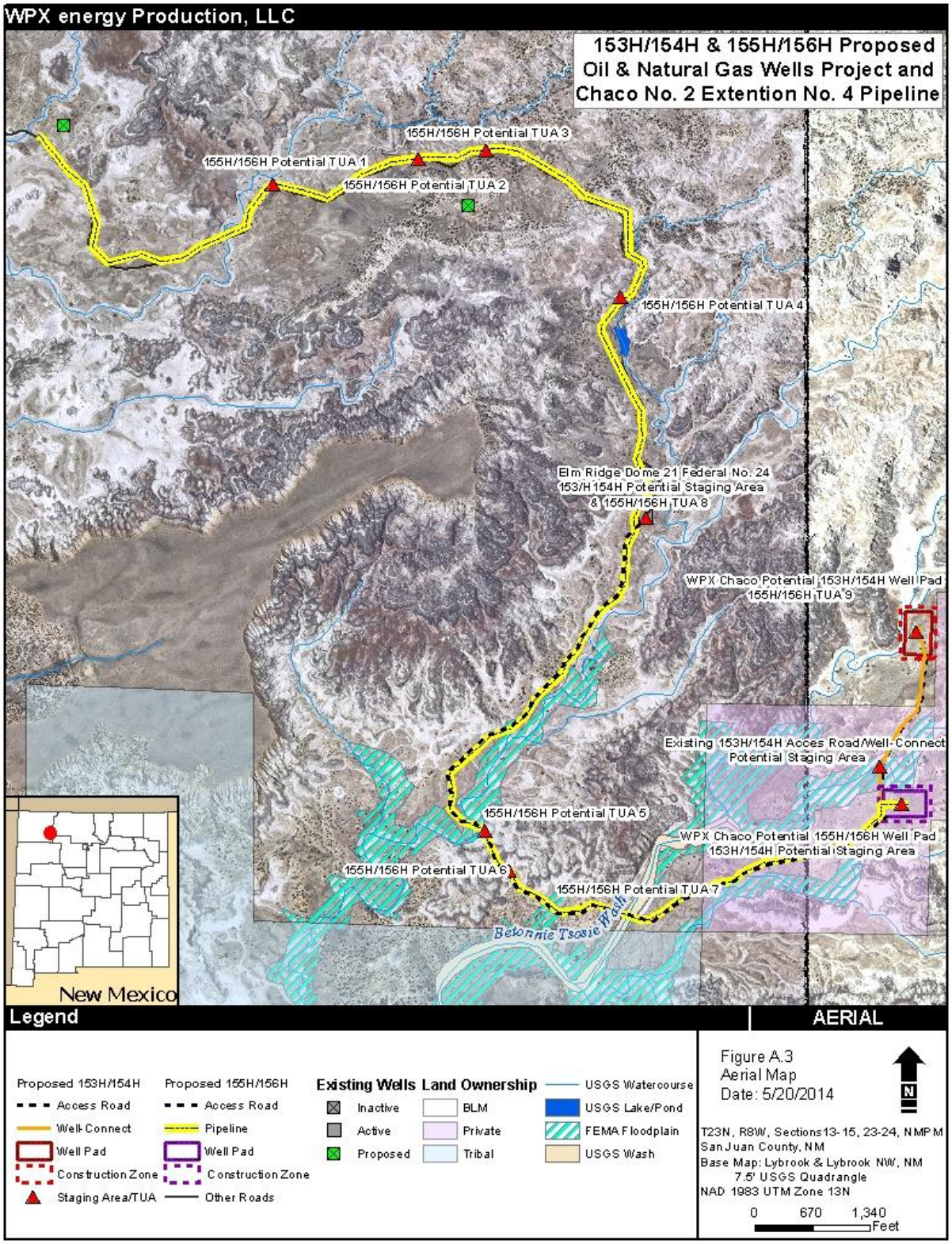
A.1. Vicinity Map



A.2. Project Area Map



A.3. Aerial Map



APPENDIX B. BIOLOGICAL SURVEY REPORTS

B.1. 153H/154H Biological Survey Report

B.2. 155H/156H and Chaco Trunk No. 2 Extension No. 4 Biological Survey Report

APPENDIX C. PLATS

C.1. 153H/154H Wells, Well Pad, Construction Zone, Access Road and Well-Connect Pipeline

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
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	CHACO 2308-24H	153H

[7] OGRID No.	[8] Operator Name	[9] Elevation
120782	WPX ENERGY PRODUCTION, LLC	6896'

[10] Surface Location

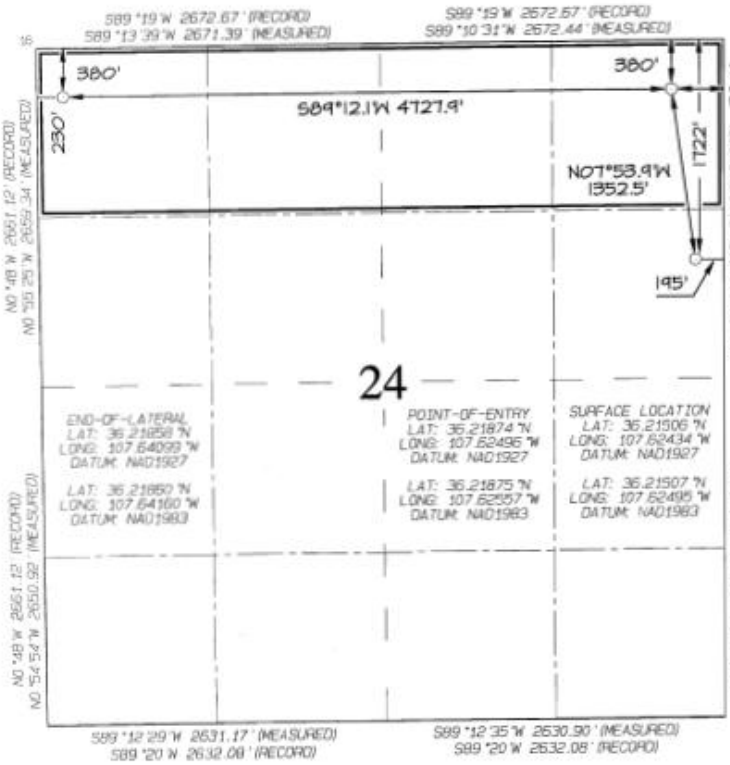
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	24	23N	8W		1722	NORTH	195	EAST	SAN JUAN

[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	24	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			

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



[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: APRIL 15, 2014
Survey Date: SEPTEMBER 12, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS

Certificate Number 15269

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
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	CHACO 2308-24H	154H

[7] OGRID No.	[8] Operator Name	[9] Elevation
120782	WPX ENERGY PRODUCTION, LLC	6896'

[10] Surface Location

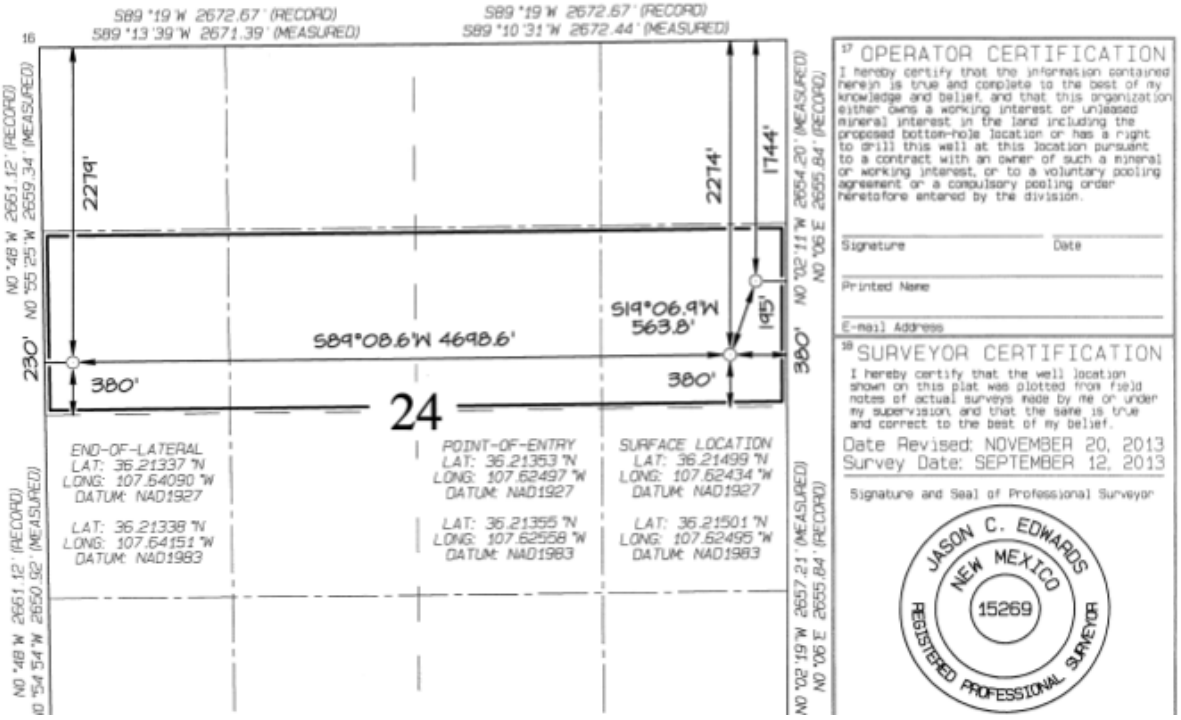
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	24	23N	8W		1744	NORTH	195	EAST	SAN JUAN

[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	24	23N	8W		2279	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			

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



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Signature Date

Printed Name

E-mail Address

[18] SURVEYOR CERTIFICATION

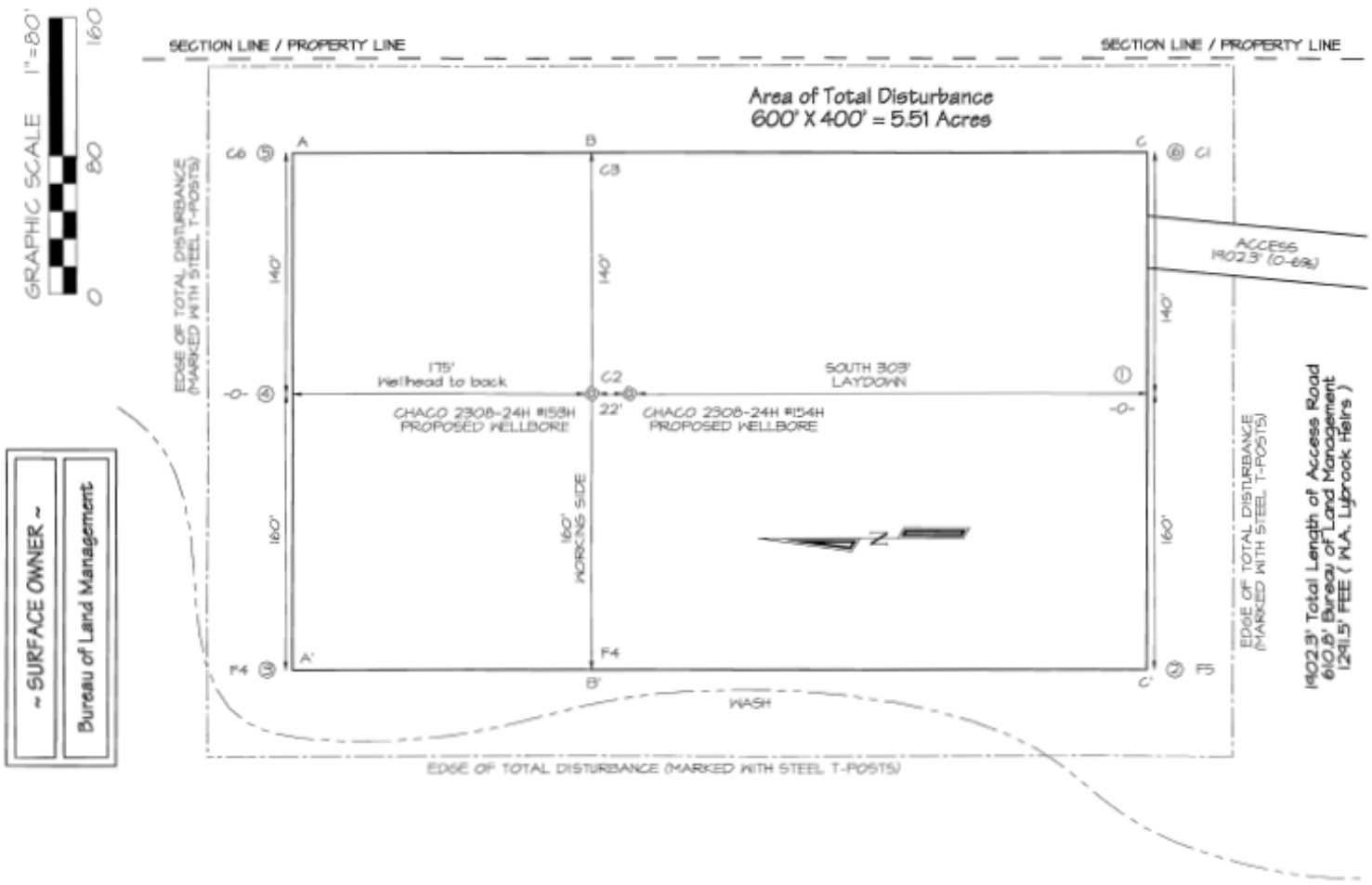
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Date Revised: NOVEMBER 20, 2013
Survey Date: SEPTEMBER 12, 2013

Signature and Seal of Professional Surveyor

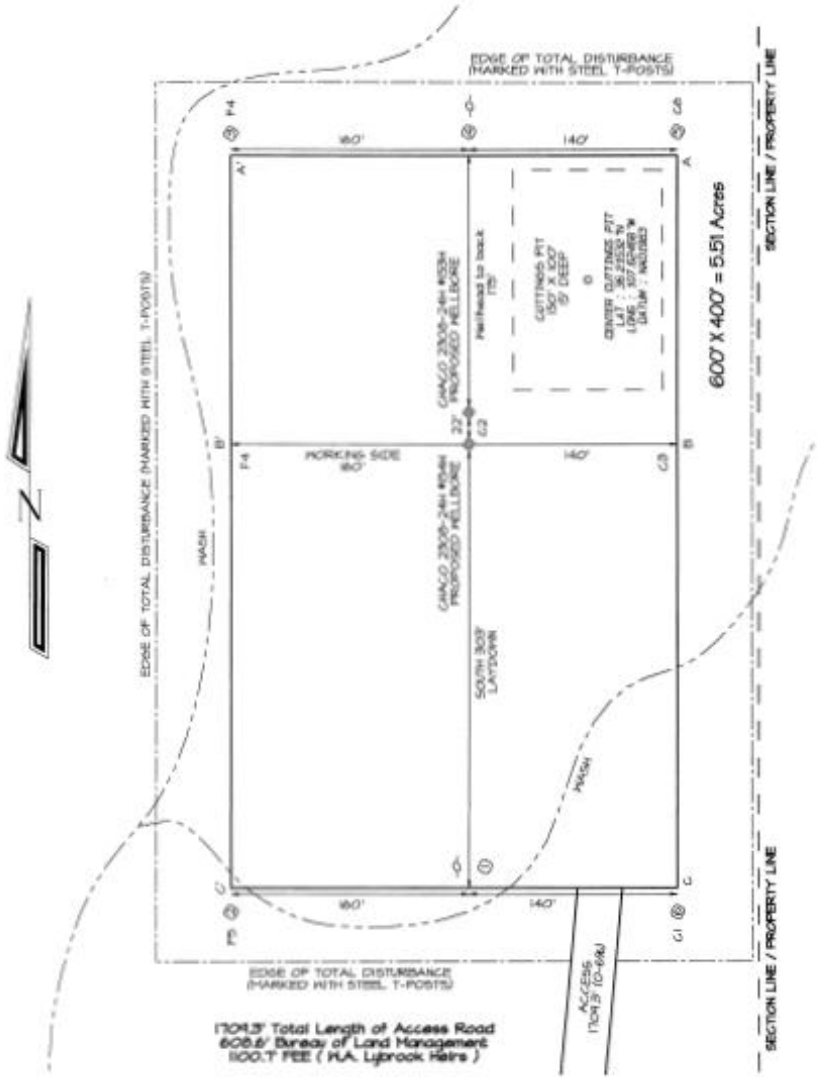
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

WPX ENERGY PRODUCTION, LLC CHACO 2308–24H #153H
1722' FNL & 195' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6896'
LAT: 36.21507°N LONG: 107.62495°W DATUM: NAD1983

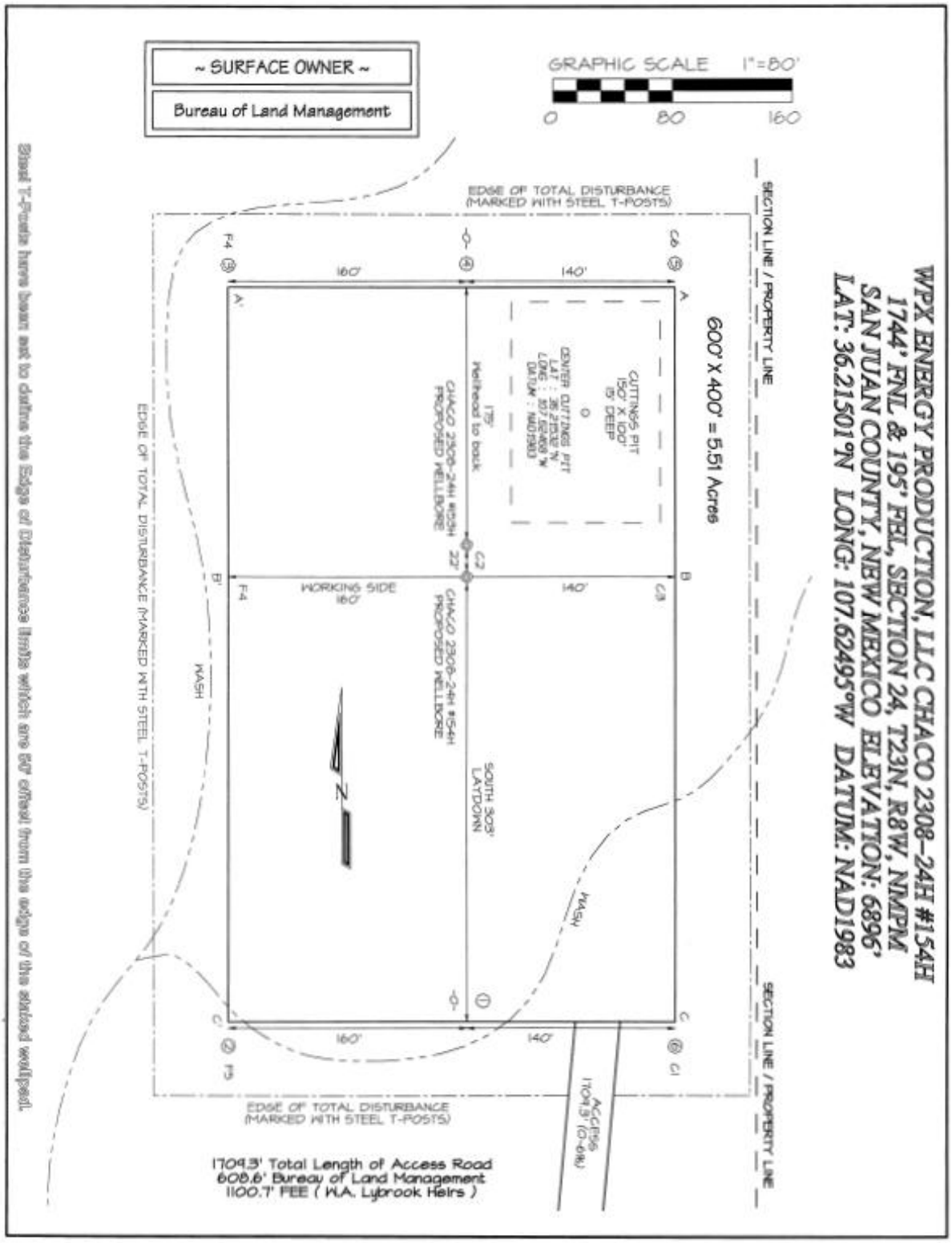


Steel T-Posts have been set to define the Edge of Disturbance limits which are 50' offset from the edge of the staked wellpad.

WPX ENERGY PRODUCTION, LLC CHACO 2308–24H #154H
1744' FNL & 195' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6896'
LAT: 36.21501°N LONG: 107.62495°W DATUM: NAD1983



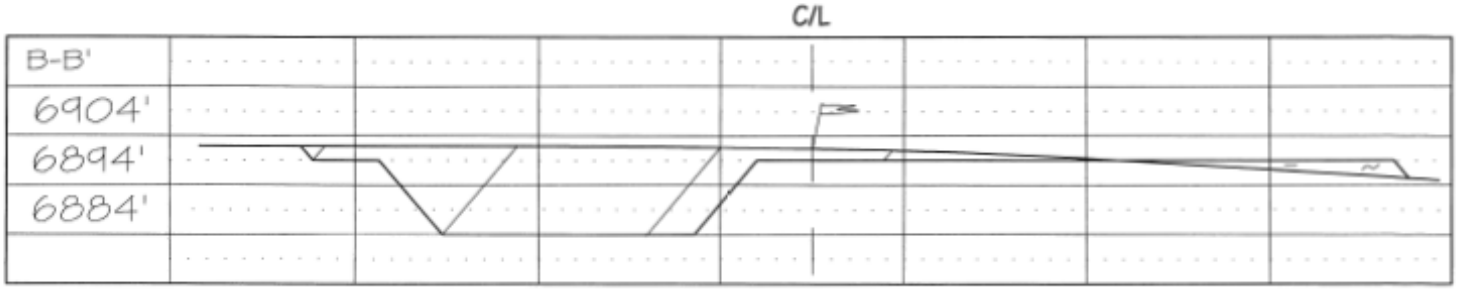
Steel T-Posts have been set to define Edge of Disturbance limits which are 50' offset from edge of staked wellpad.

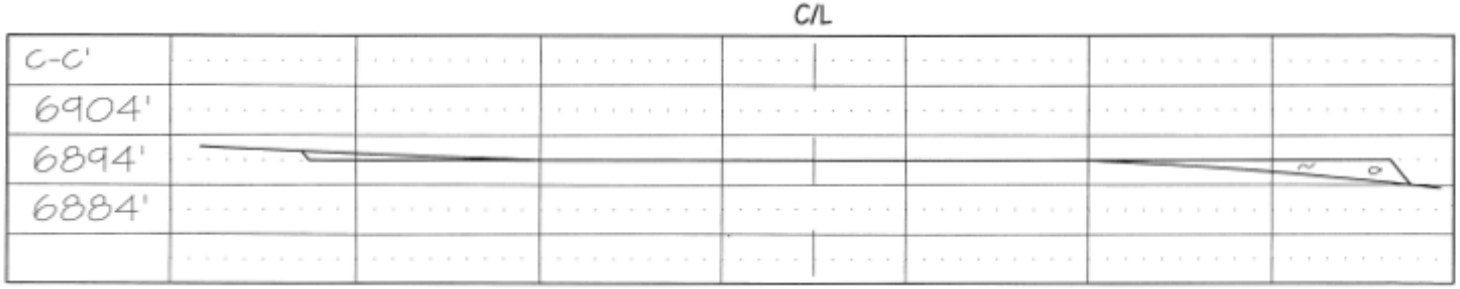

WPX ENERGY PRODUCTION, LLC CHACO 2308-24H #154H
1744' FNL & 195' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6896'
LAT: 36.21501°N LONG: 107.62495°W DATUM: NAD1983
~ SURFACE OWNER ~
Bureau of Land Management
GRAPHIC SCALE 1"=80'
0 80 160
SECTION LINE / PROPERTY LINE
EDGE OF TOTAL DISTURBANCE (MARKED WITH STEEL T-POSTS)
600' X 400' = 5.51 Acres
CUTTINGS PIT 150' X 100' 15' DEEP
CENTER CUTTINGS PIT LAT: 36.21534°N LONG: 107.62456°W DATUM: NAD1983
175' Wellhead to back
CHACO 2308-24H #154H PROPOSED WELLBORE
WORKING SIDE 160'
SOUTH 303' LATDONN
WASH
EDGE OF TOTAL DISTURBANCE (MARKED WITH STEEL T-POSTS)
ACCESS 1709.3' (0-6%)
1709.3' Total Length of Access Road
608.6' Bureau of Land Management
1100.7' FEE (W.A. Lybrook Heirs)
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 2308–24H #154H
1744' FNL & 195' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6896'

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=30'

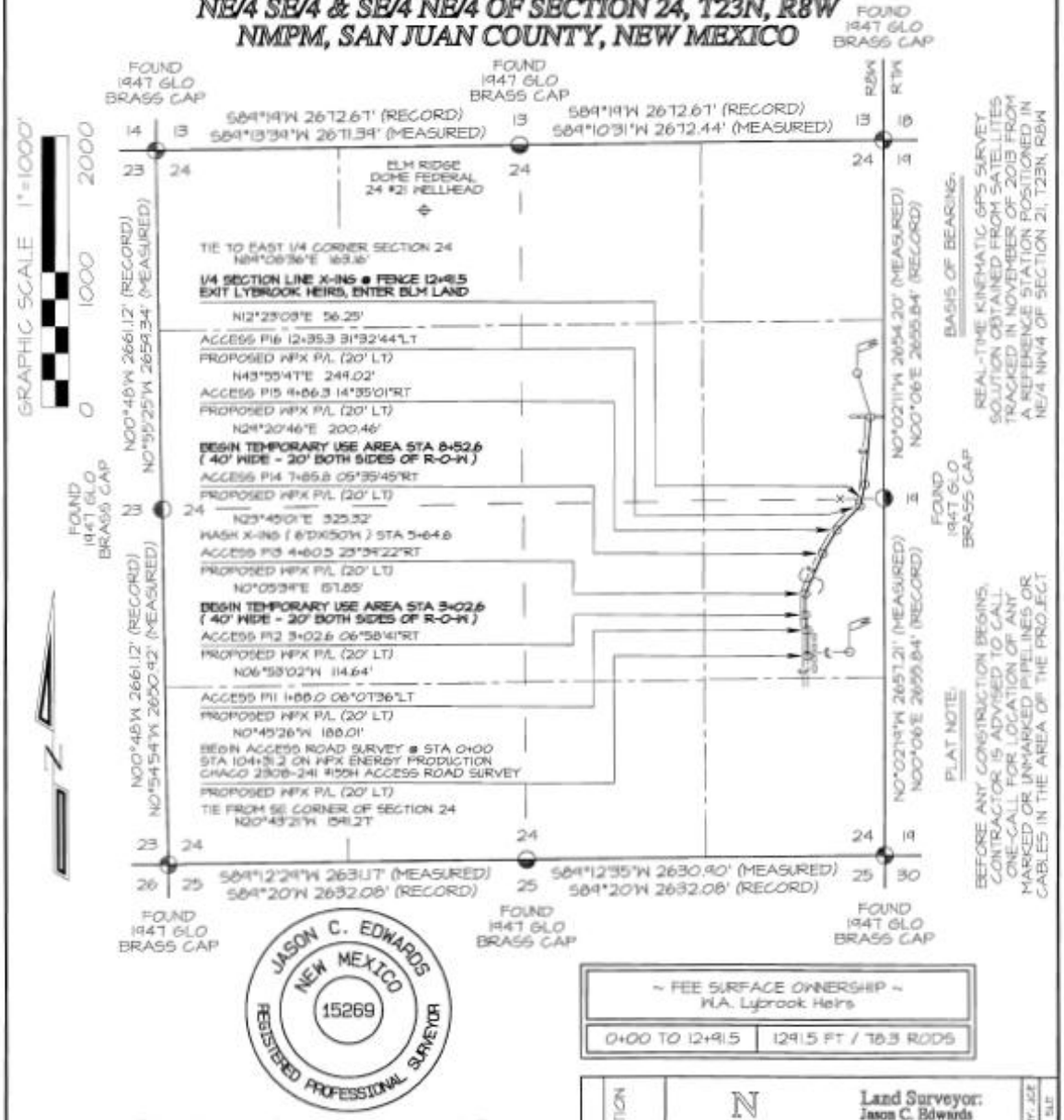




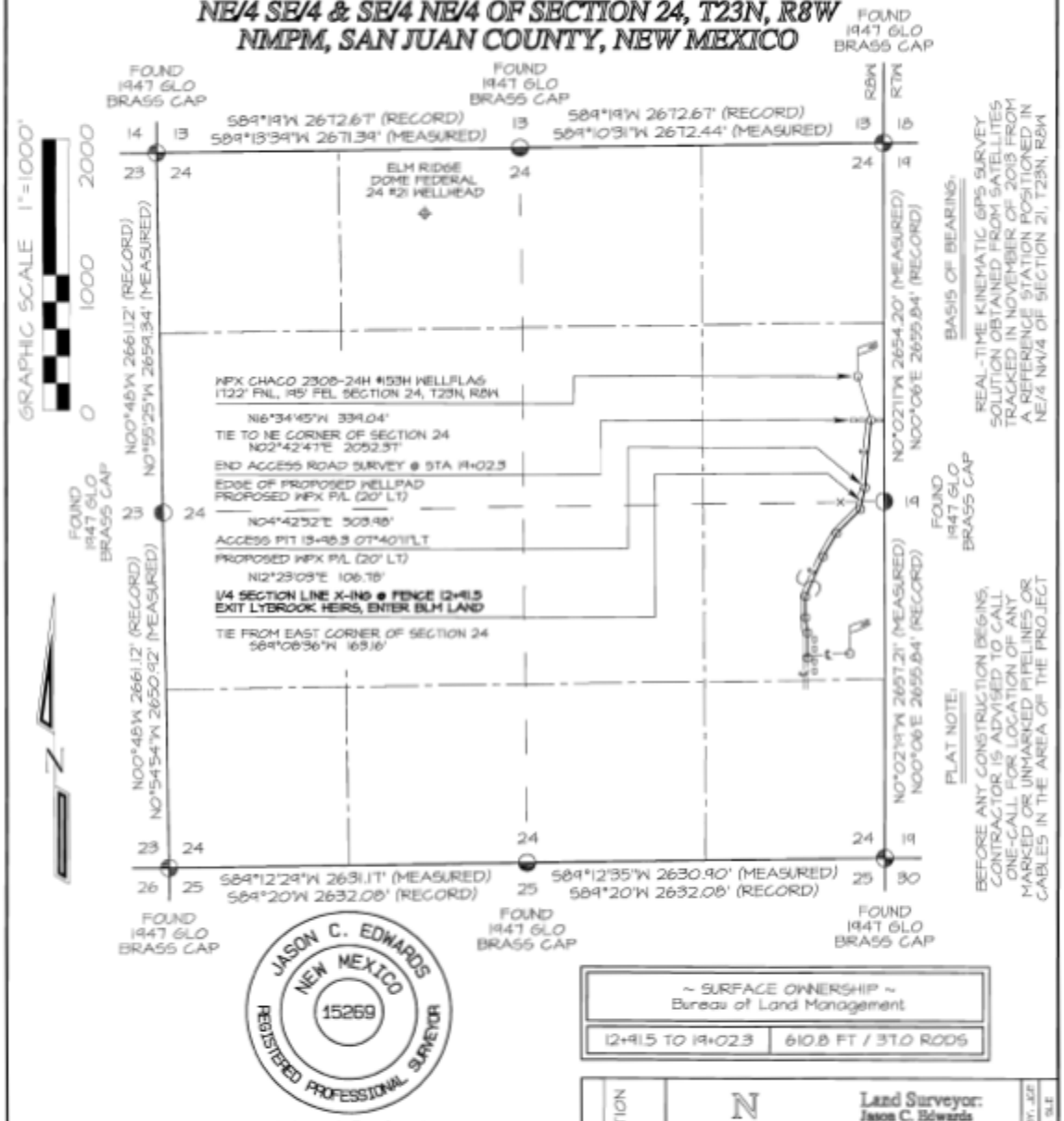
NCE SURVEYS IS NOT LIABLE FOR LOCATION OF UNDERGROUND UTILITIES OR PIPELINES.

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 2308–24H #153H PROPOSED ACCESS ROAD SURVEY LOCATED IN THE NE/4 SE/4 & SE/4 NE/4 OF SECTION 24, T23N, R8W NMPM, SAN JUAN COUNTY, NEW MEXICO



WPX ENERGY PRODUCTION, LLC CHACO 2308–24H #153H PROPOSED ACCESS ROAD SURVEY LOCATED IN THE NE/4 SE/4 & SE/4 NE/4 OF SECTION 24, T23N, R8W NMPM, SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
12+91.5 TO 19+02.3	610.8 FT / 37.0 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: April 15, 2014

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

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

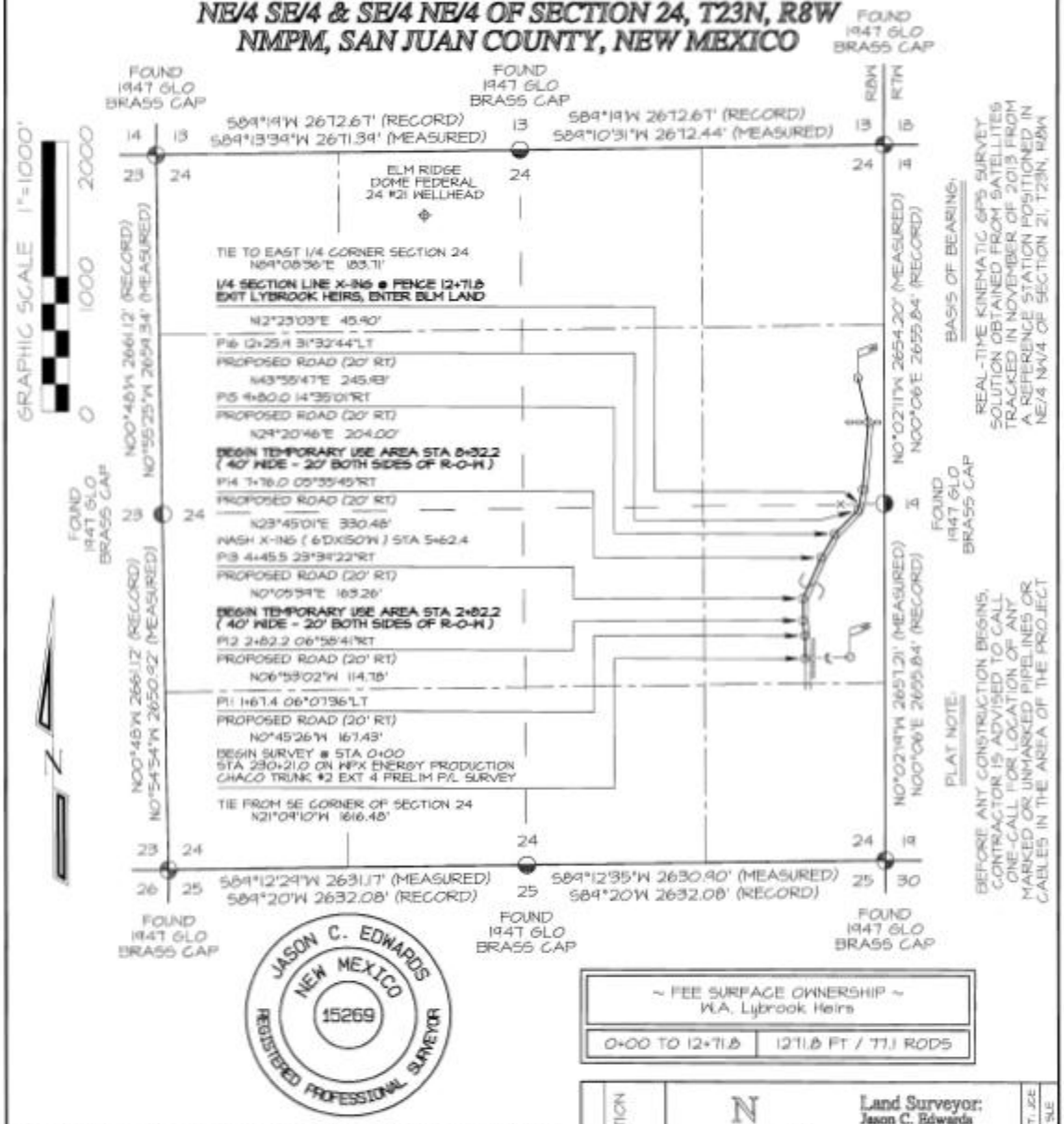
N C E

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 6 OF 10
FILENAME: 2362HW2

WPX ENERGY PRODUCTION, LLC CHACO 2308-24H #153H
PROPOSED PIPELINE SURVEY LOCATED IN THE
NE/4 SE/4 & SE/4 NE/4 OF SECTION 24, T23N, R8W
NMPM, SAN JUAN COUNTY, NEW MEXICO



~ FEE SURFACE OWNERSHIP ~ WLA, Lybrook Heirs	
0+00 TO 12+71.8	1271.8 FT / 77.1 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: April 13, 2014

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

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

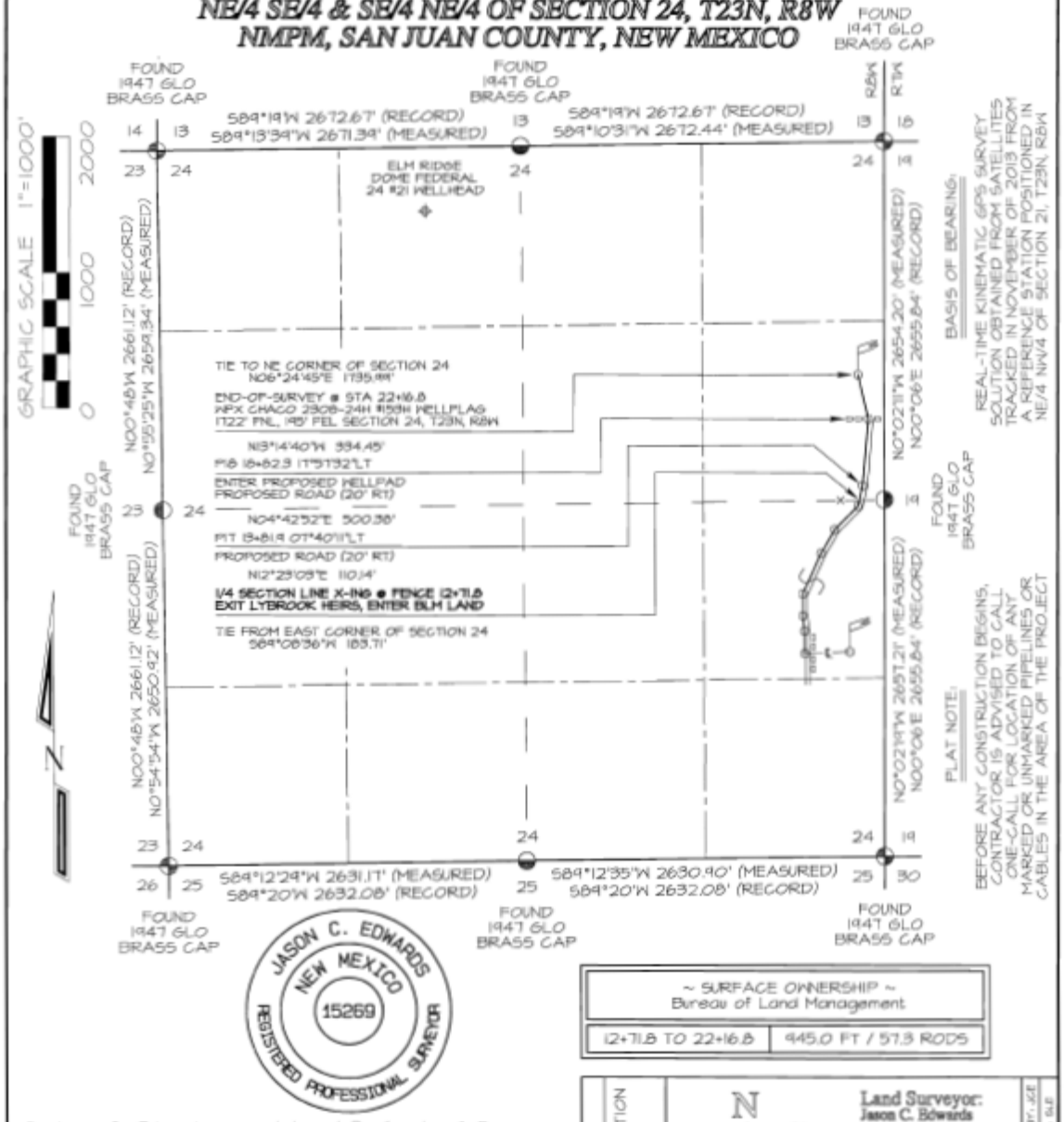
N C E

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 10 | CHECKED BY: JCE
FILENAME: 2308-24H | DRAWN BY: SLC

WPX ENERGY PRODUCTION, LLC CHACO 2308-24H #153H
PROPOSED PIPELINE SURVEY LOCATED IN THE
NE/4 SE/4 & SE/4 NE/4 OF SECTION 24, 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

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
12+71.8 TO 22+16.8	445.0 FT / 57.3 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: April 13, 2014

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

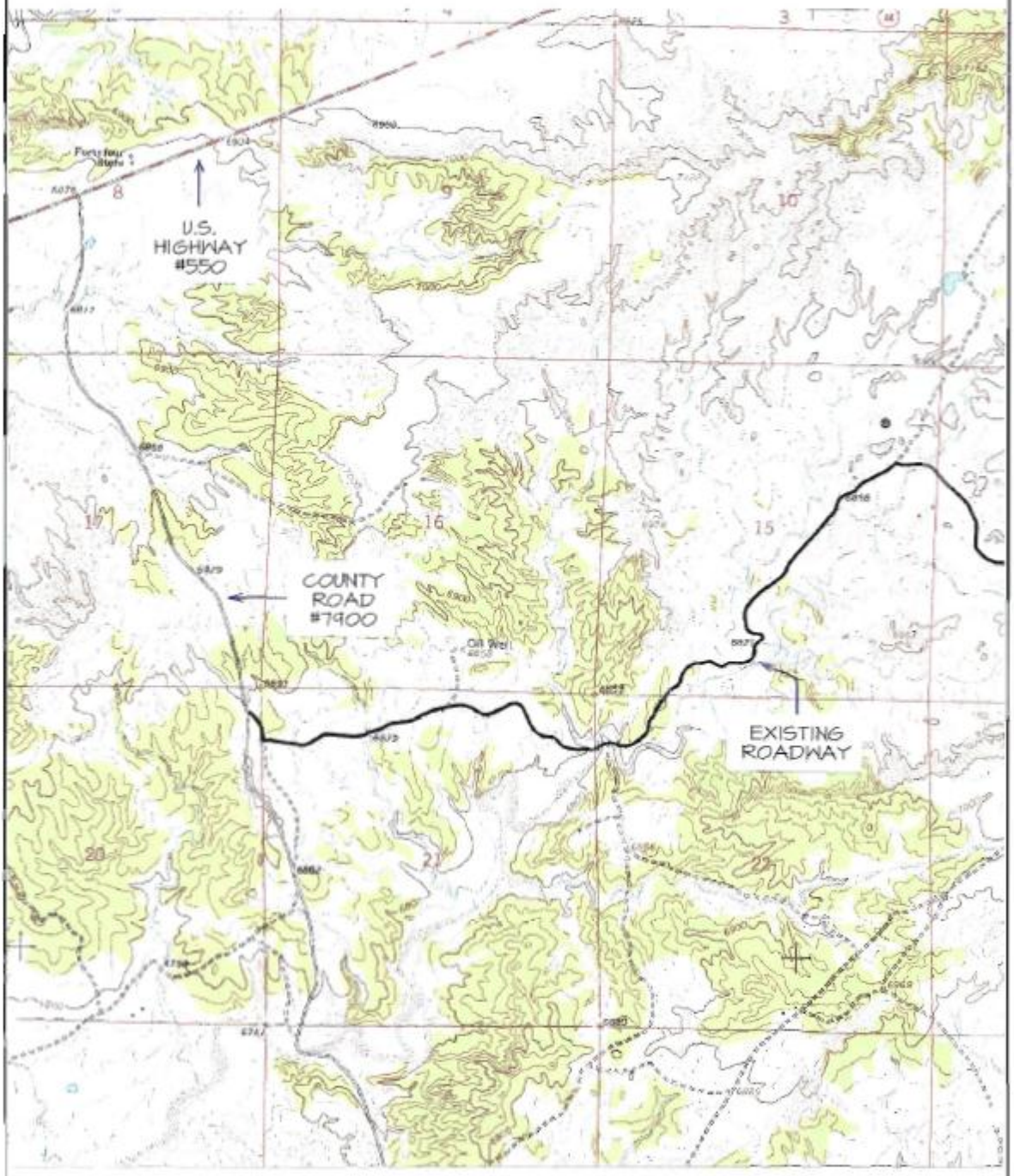
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

SURVEYS, INC.

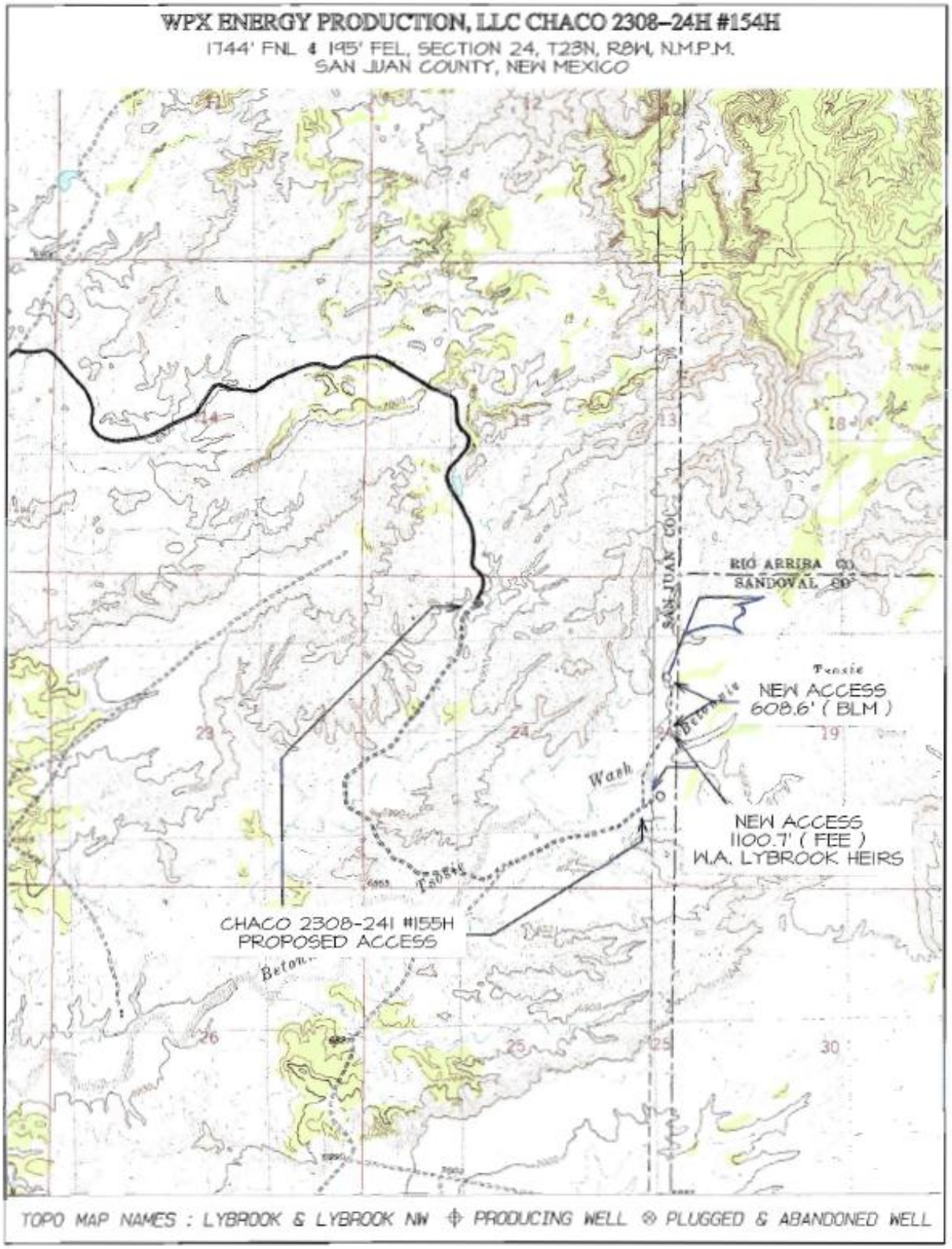
SHEET 8 OF 10 | CHECKED BY: JCE
FILENAME: 2308HB3 | DRAWN BY: GLE

WPX ENERGY PRODUCTION, LLC CHACO 2308-24H #154H

1744' FNL & 195' FEL, SECTION 24, T23N, R8W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



TOPO MAP NAMES : LYBROOK & LYBROOK NW ⊕ PRODUCING WELL ⊗ PLUGGED & ABANDONED WELL


WPX ENERGY PRODUCTION, LLC CHACO 2308-24H #154H
1744' FNL & 195' FEL, SECTION 24, T23N, R8W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
RIO ARRIBA CO.
SANDOVAL CO.
SAN JUAN CO.
NEW ACCESS
608.6' (BLM)
NEW ACCESS
1100.7' (FEE)
W.A. LYBROOK HEIRS
CHACO 2308-241 #155H
PROPOSED ACCESS
TOPO MAP NAMES : LYBROOK & LYBROOK NW ⊕ PRODUCING WELL ⊗ PLUGGED & ABANDONED WELL

C.2. 155H/156 Wells, Well Pad, Construction Zone, and Access Road

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
	97232	BASIN MANCOS

[4]Property Code	[5]Property Name	[6]Well Number
	CHACO 2308-24I	155H

[7]OGRID No.	[8]Operator Name	[9]Elevation
120782	WPX ENERGY PRODUCTION, LLC	6884'

[10] Surface Location

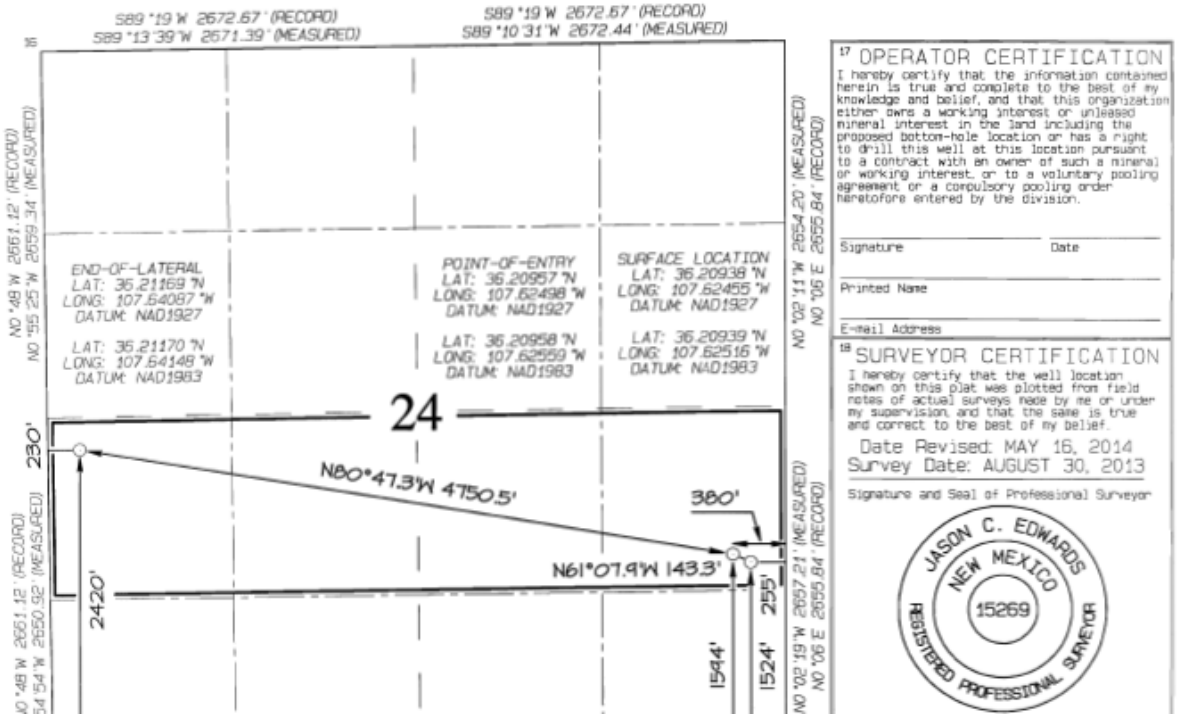
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	24	23N	8W		1524	SOUTH	255	EAST	SAN JUAN

[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
L	24	23N	8W		2420	SOUTH	230	WEST	SAN JUAN

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

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



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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: MAY 16, 2014
Survey Date: AUGUST 30, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

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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
	97232	BASIN MANCOS

[4]Property Code	[5]Property Name	[6]Well Number
	CHACO 2308-24I	156H

[7]OGRID No.	[8]Operator Name	[9]Elevation
120782	WPX ENERGY PRODUCTION, LLC	6884'

[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
I	24	23N	8W		1524	SOUTH	233	EAST	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
M	24	23N	8W		1201	SOUTH	230	WEST	SAN JUAN

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

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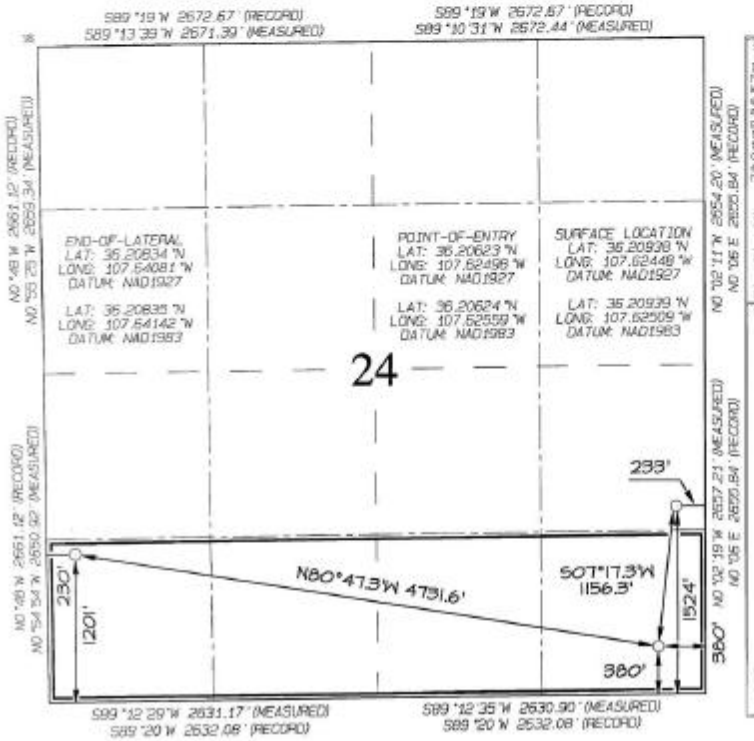

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Signature Date

Printed Name

E-mail Address

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Date Revised: MAY 16, 2014
Survey Date: AUGUST 30, 2013

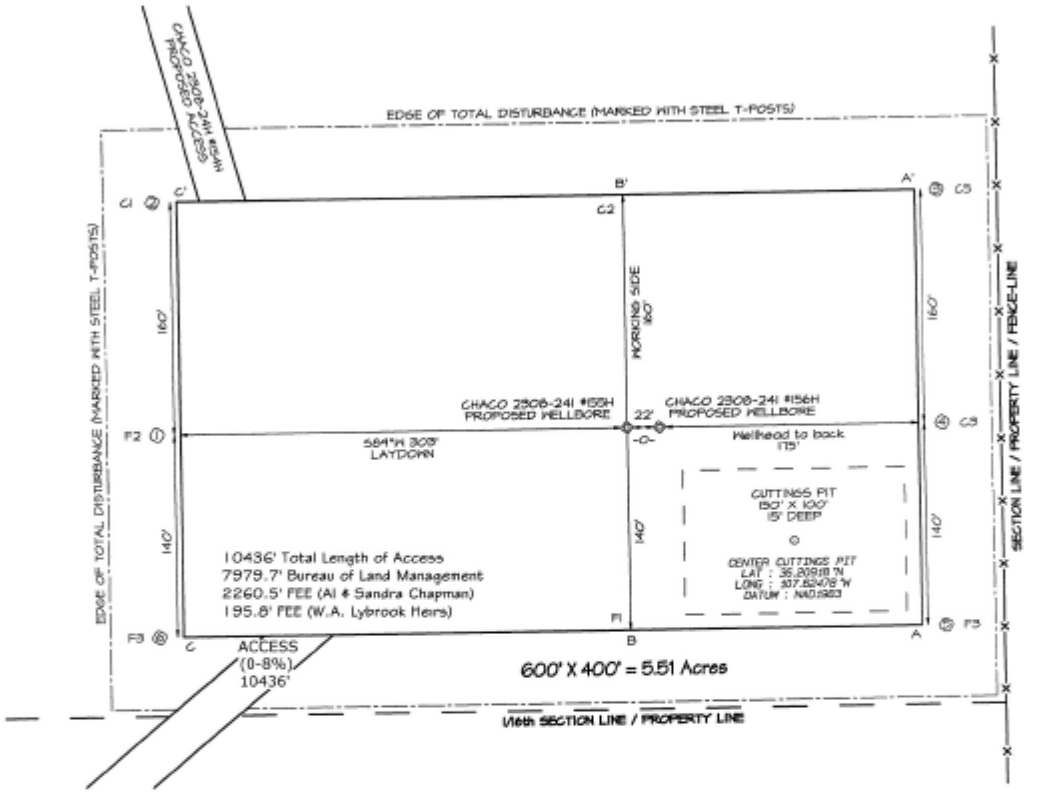
Signature and Seal of Professional Surveyor

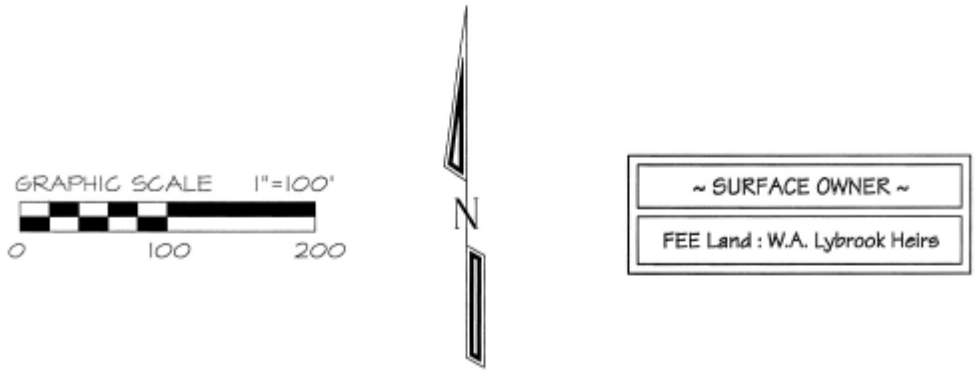
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS

Certificate Number 15269

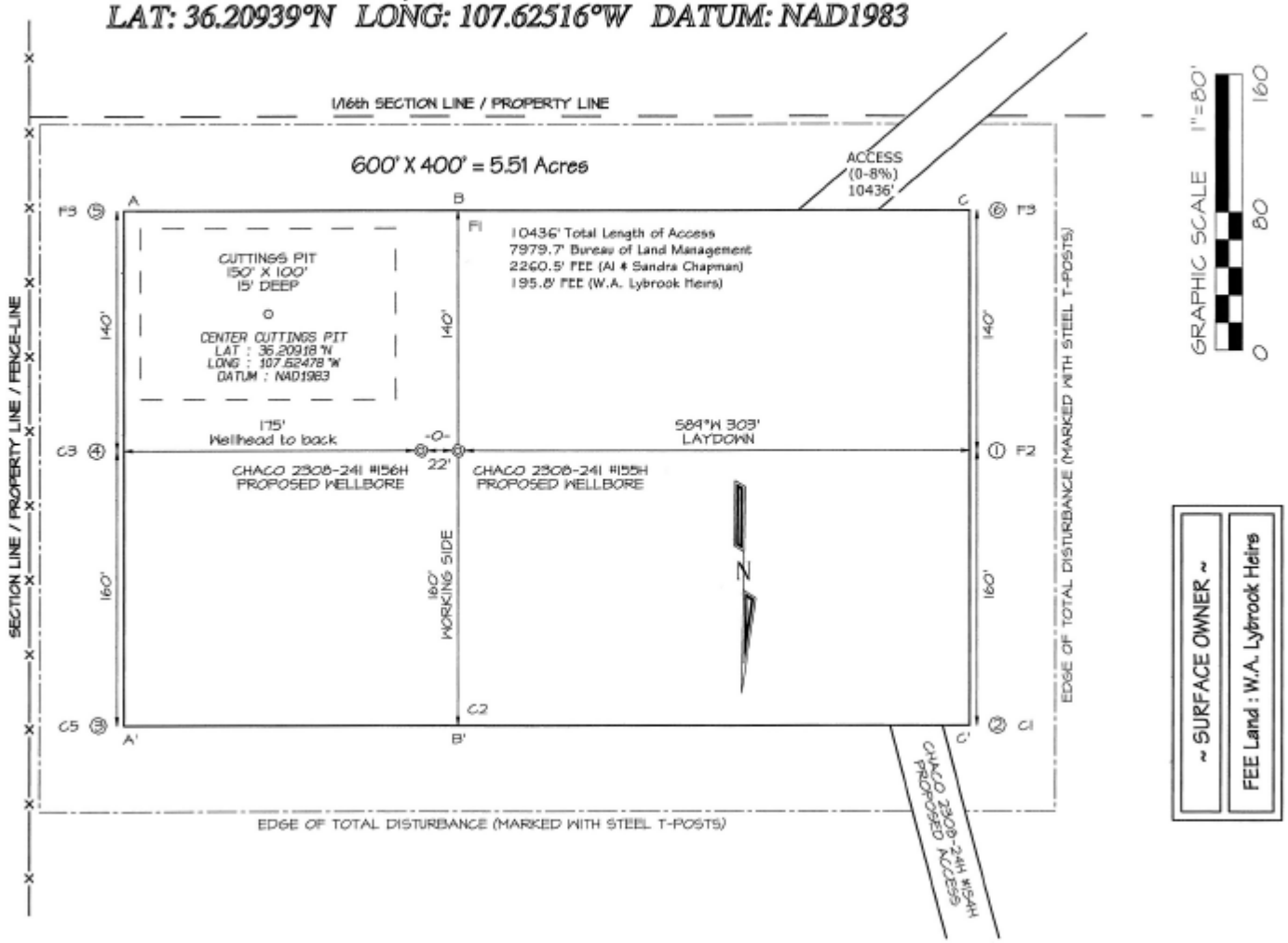
WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
1524' FSL & 255' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6884'
LAT: 36.20939°N LONG: 107.62516°W DATUM: NAD1983





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 2308–24I #155H
1524' FSL & 255' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6884'
LAT: 36.20939°N LONG: 107.62516°W DATUM: NAD1983



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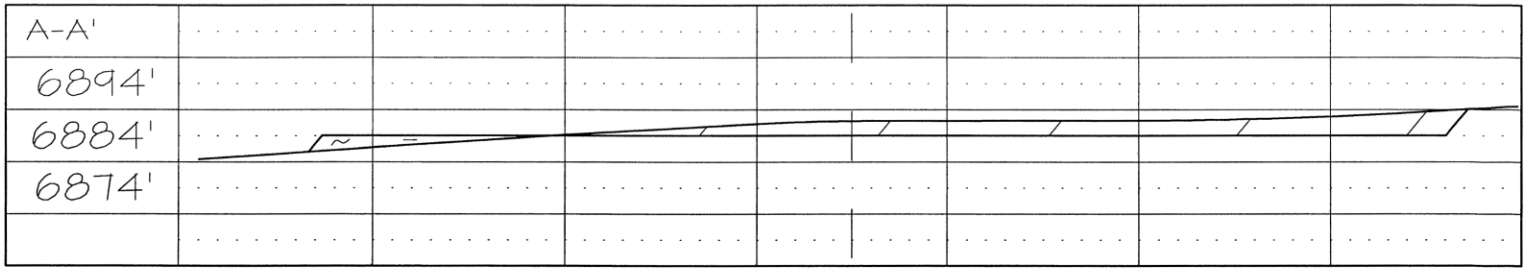
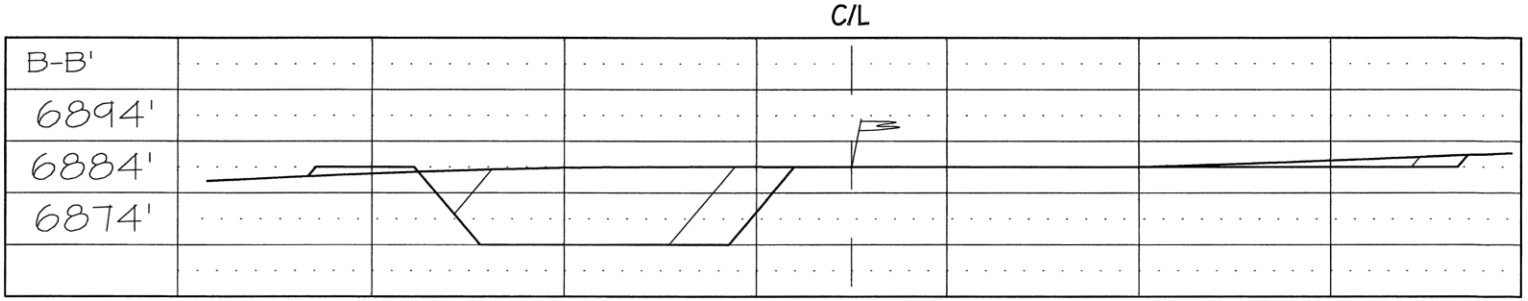
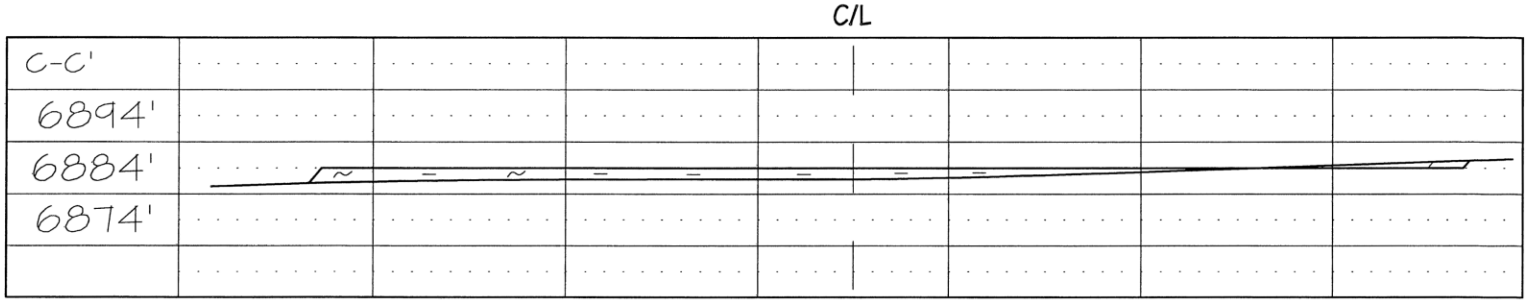
WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
1524' FSL & 255' FEL, SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6884'

HORIZONTAL SCALE
1"=40'

VERTICAL SCALE
1"=30'



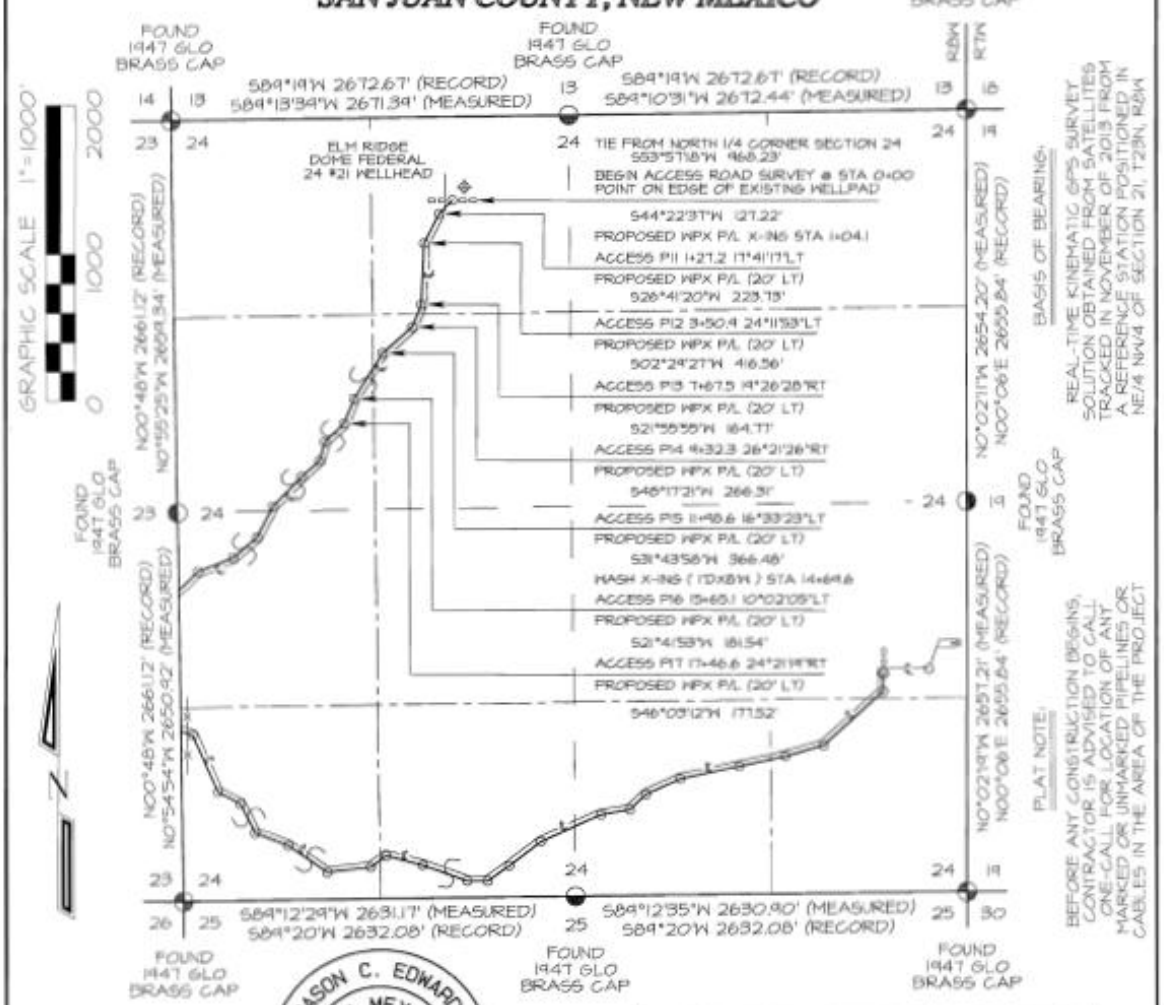




NCE SURVEYS IS NOT LIABLE FOR LOCATION OF UNDERGROUND UTILITIES OR PIPELINES.

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 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 33+81.1	3381.1 FT / 204.9 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: May 7, 2014

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

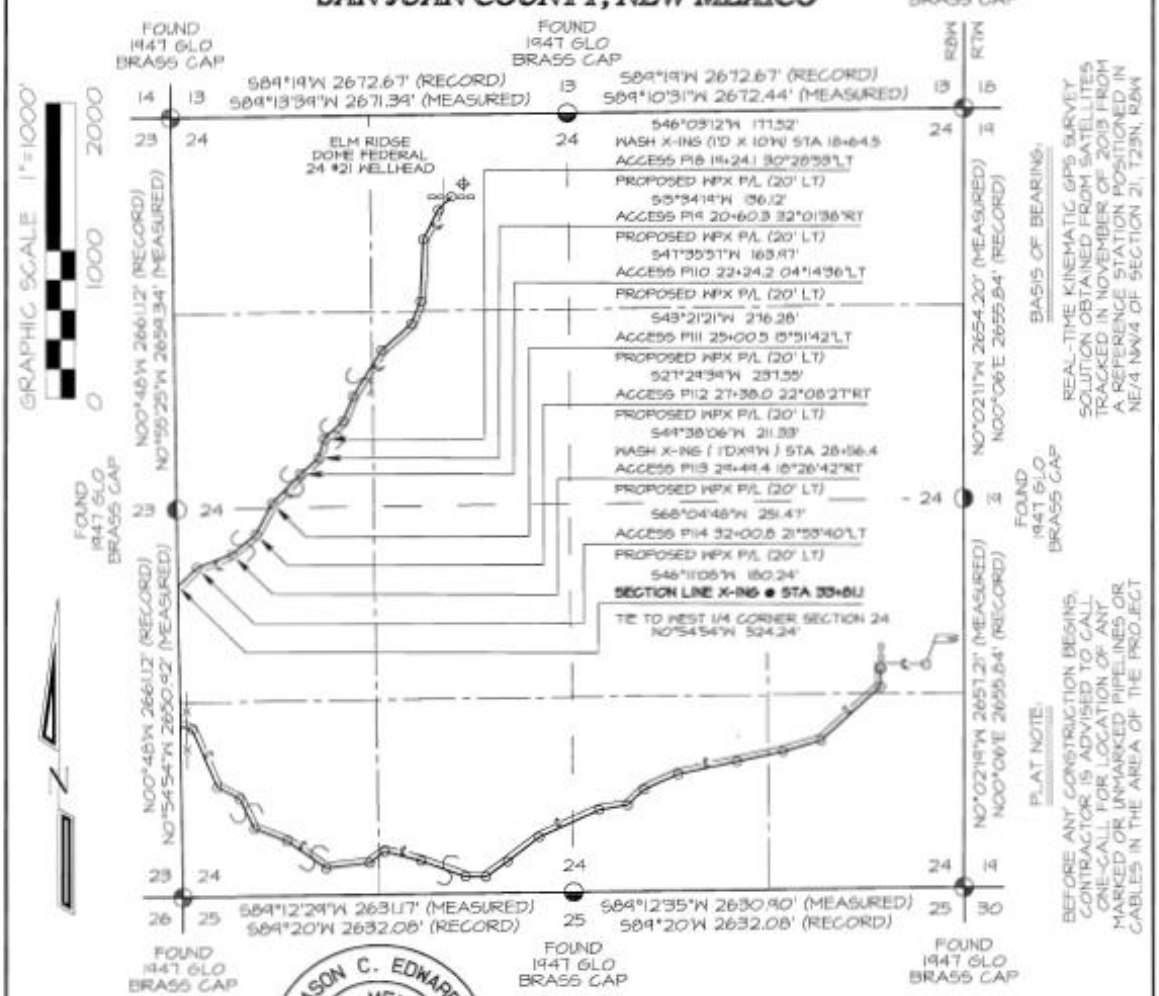
Mailing Address:
Post Office Box 6612
Farmington, NM 87499

Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: GLE
SHEET 1 OF 1
FILENAME: 2382.MAP

WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 33+81.1	3381.1 FT / 204.9 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: May 7, 2014

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:
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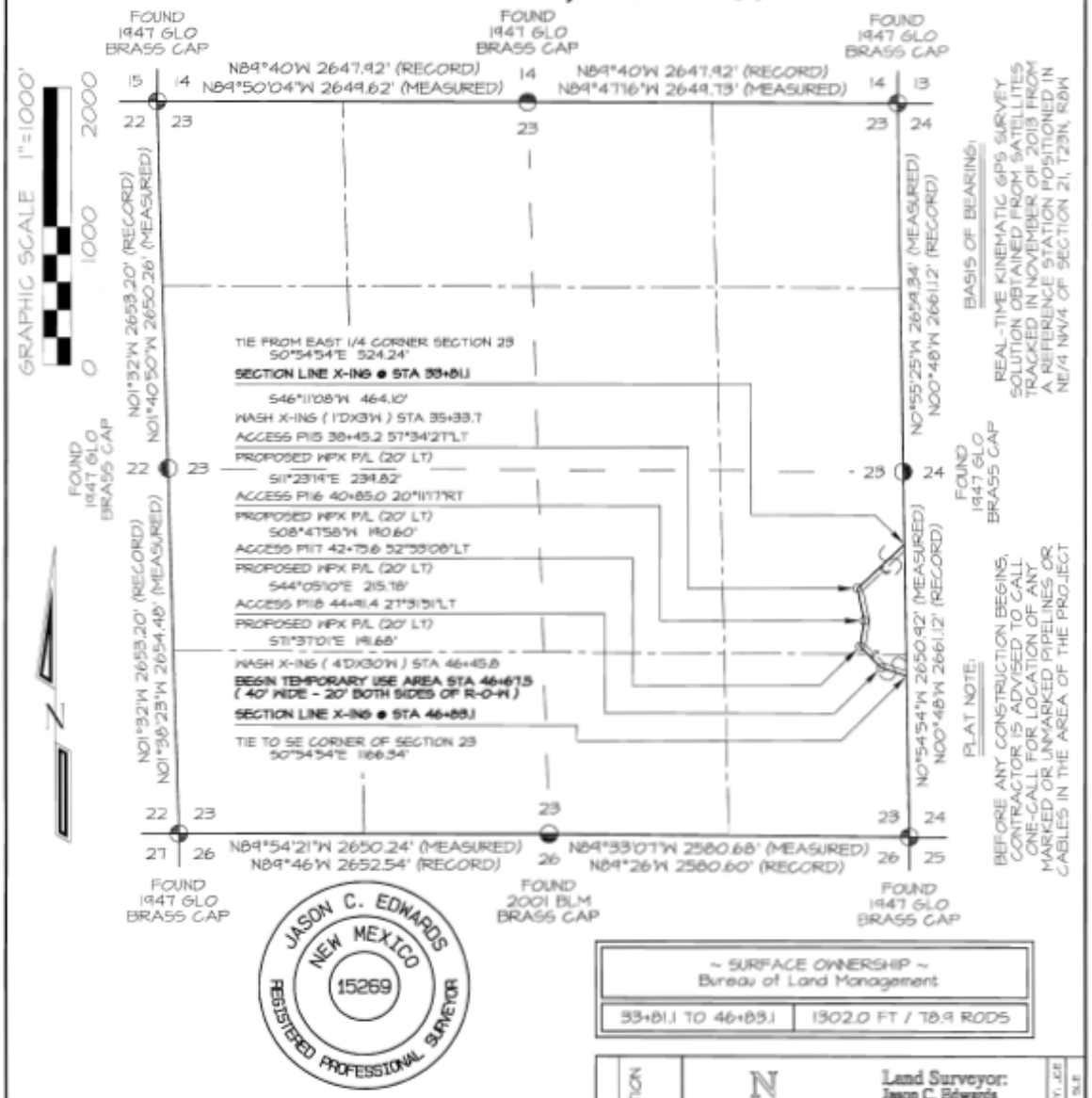
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

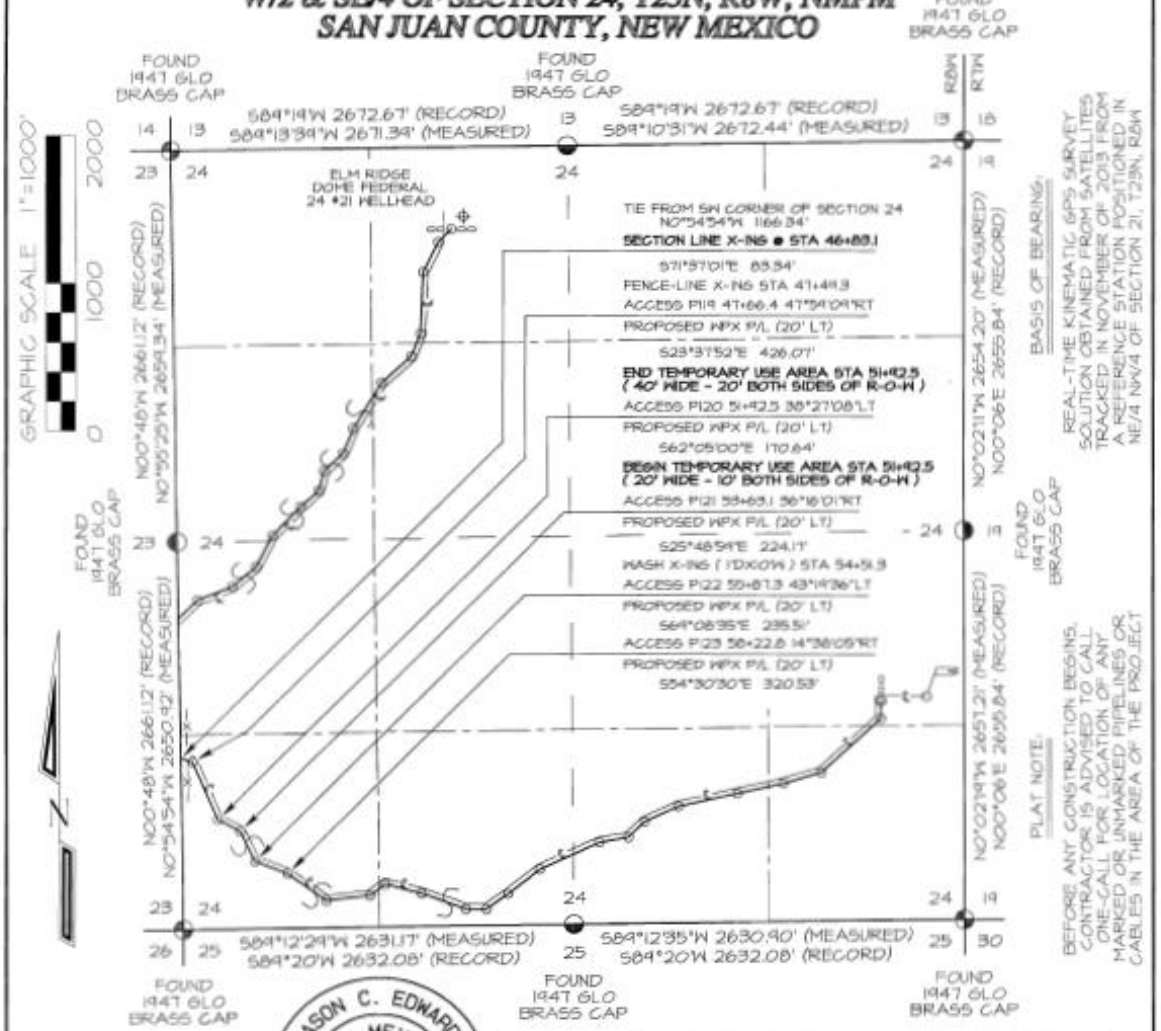
SURVEYS, INC.

SHEET 2 OF 4 | CHECKED BY: JCE
FILENAME: 2362-4APD | DRAWN BY: SJE

WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE E/2 SE/4 OF SECTION 23, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
46+83.1 TO 74+74.1	3246.6 FT / 196.8 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: May 7, 2014

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:
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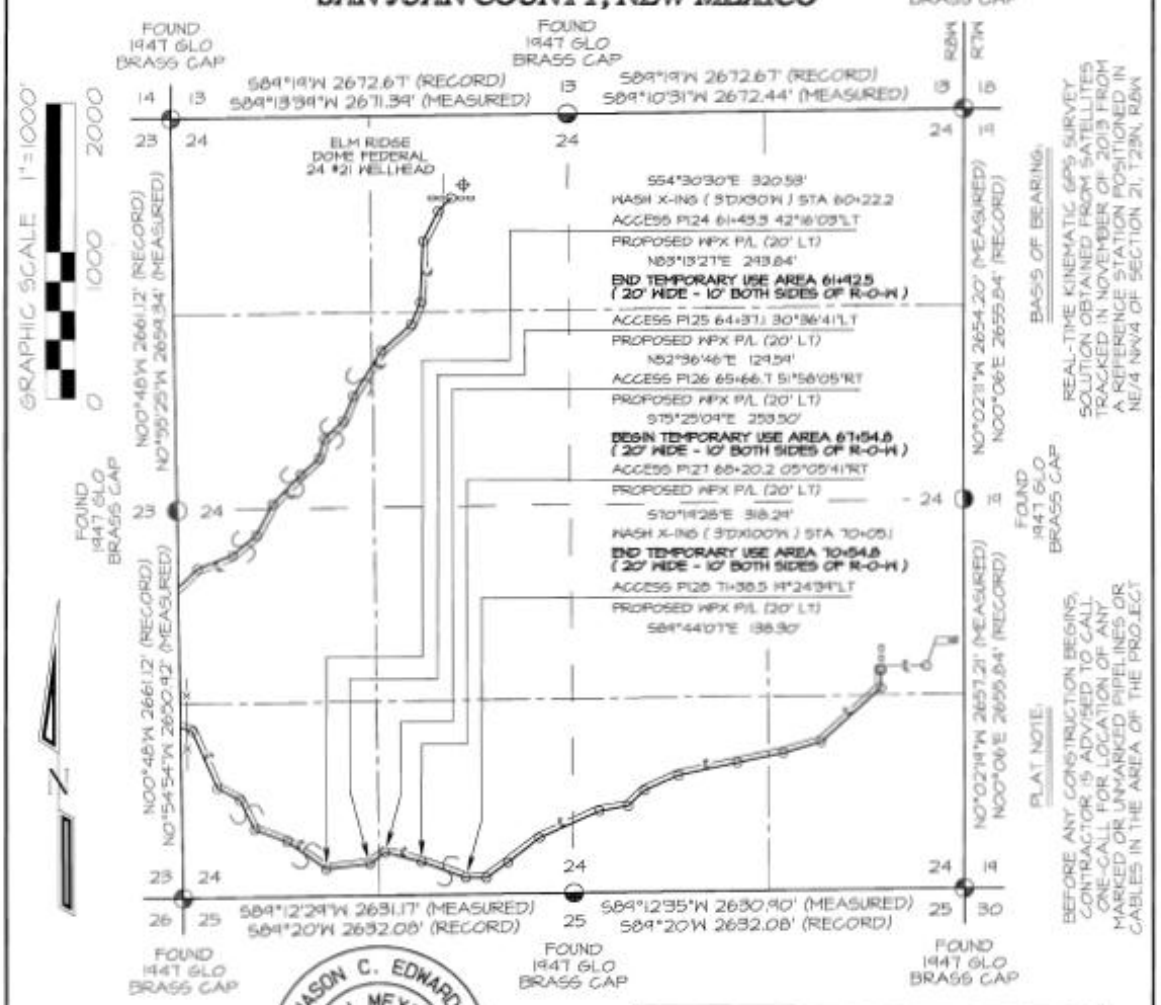
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5630 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 4 OF 4
FILENAME: 2308CHAPA

WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
46+83.1 TO 79+79.7	3246.6 FT / 199.6 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: May 7, 2014

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:
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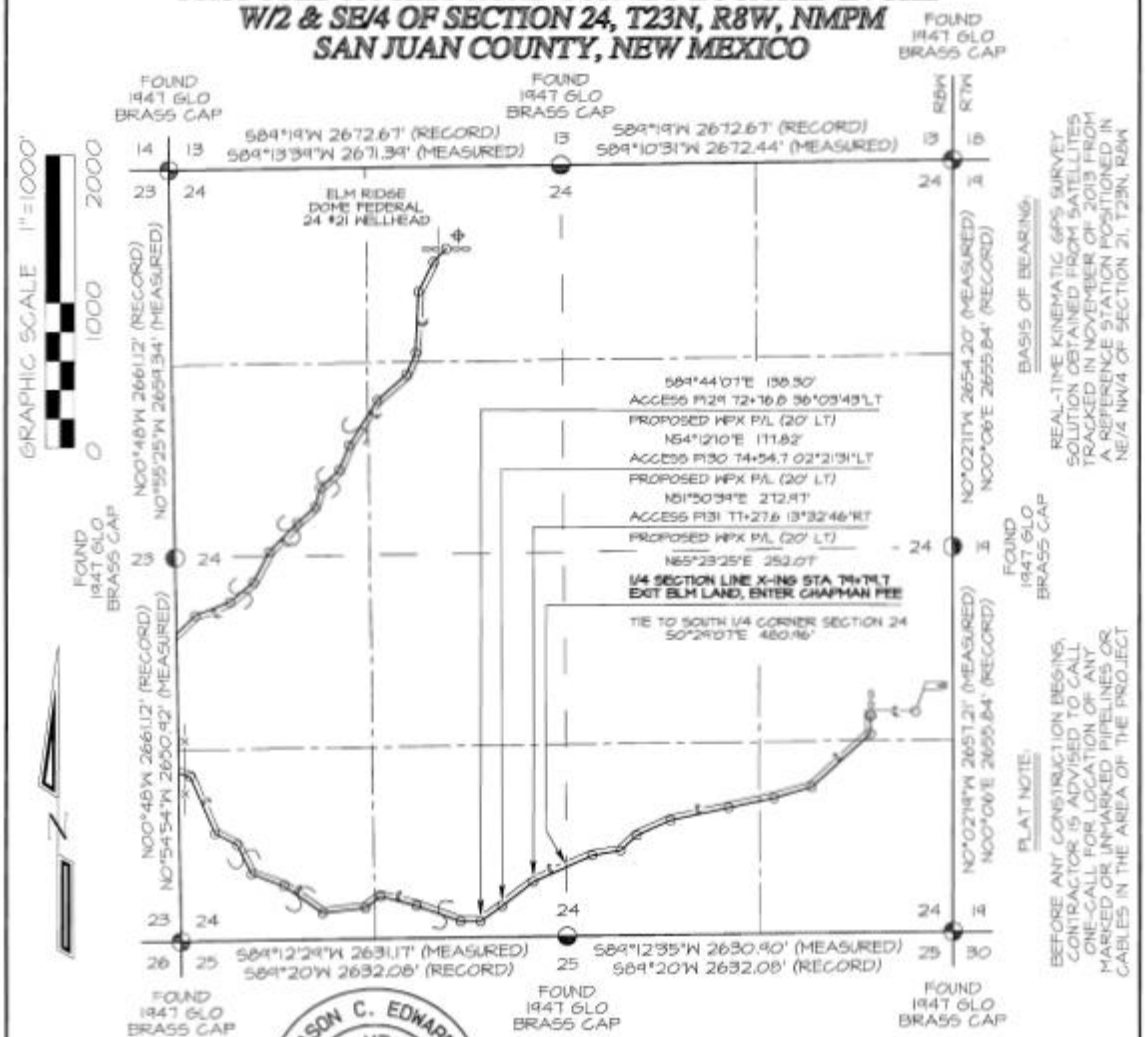
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 5 OF 9
FILENAME: 23N24AP5

WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
46+88.1 TO 79+79.7	3296.6 FT / 199.8 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: May 7, 2014

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

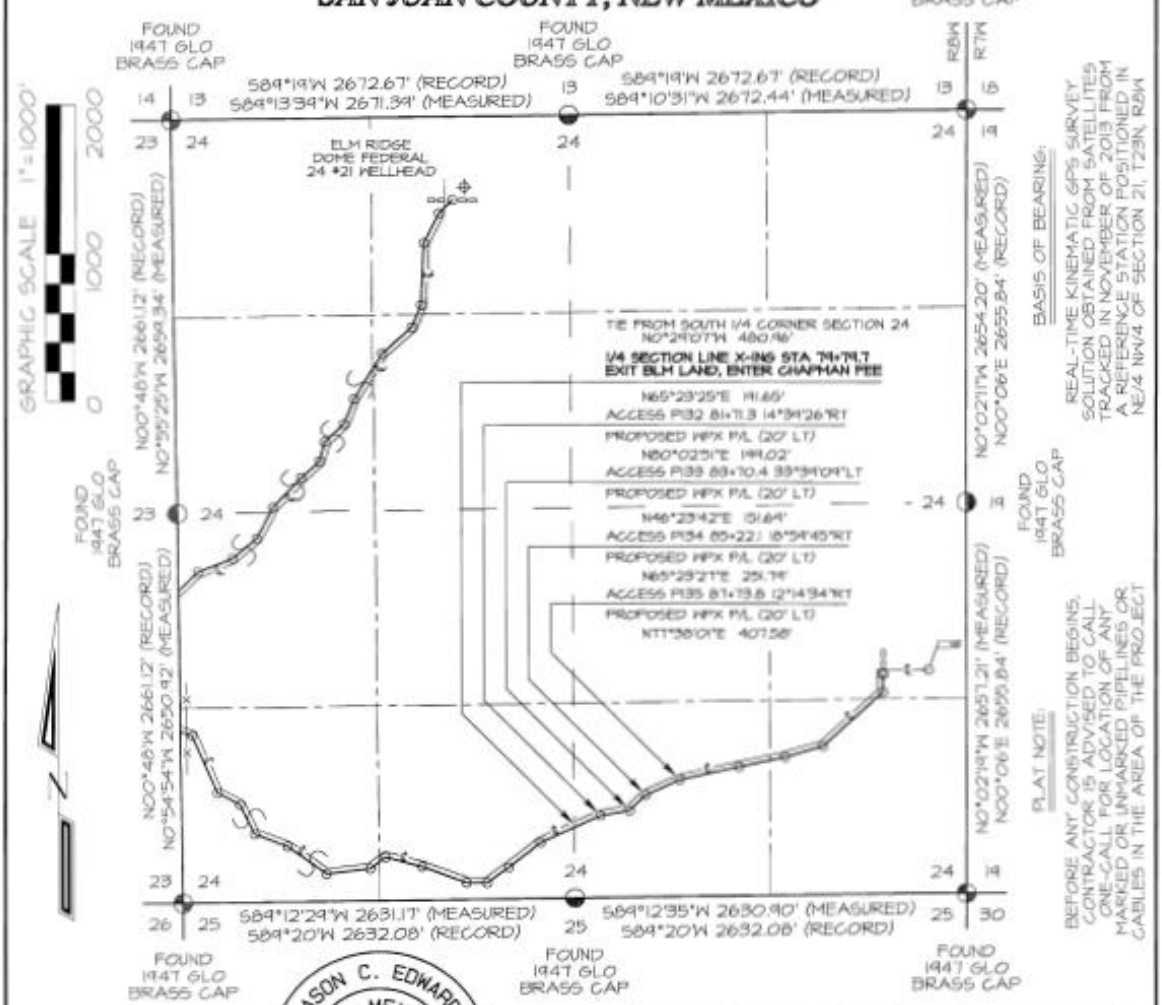
Mailing Address: Post Office Box 5612 Farmington, NM 87499

Business Address: 111 East Pinon Street Farmington, NM 87402 (505) 325-2654 (Office) (505) 326-5650 (Fax)

SURVEYS, INC.

SHEET 6 OF 4 | CHECKED BY: JCE
FILENAME: 23B3.4APN | DRAWN BY: ILE

WPX ENERGY PRODUCTION, LLC CHACO 2308-24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ FEE SURFACE OWNERSHIP ~ Al & Sandra Chapman	
79+79.7 TO 102+40.2	2260.5 FT / 137.0 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: May 7, 2014

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

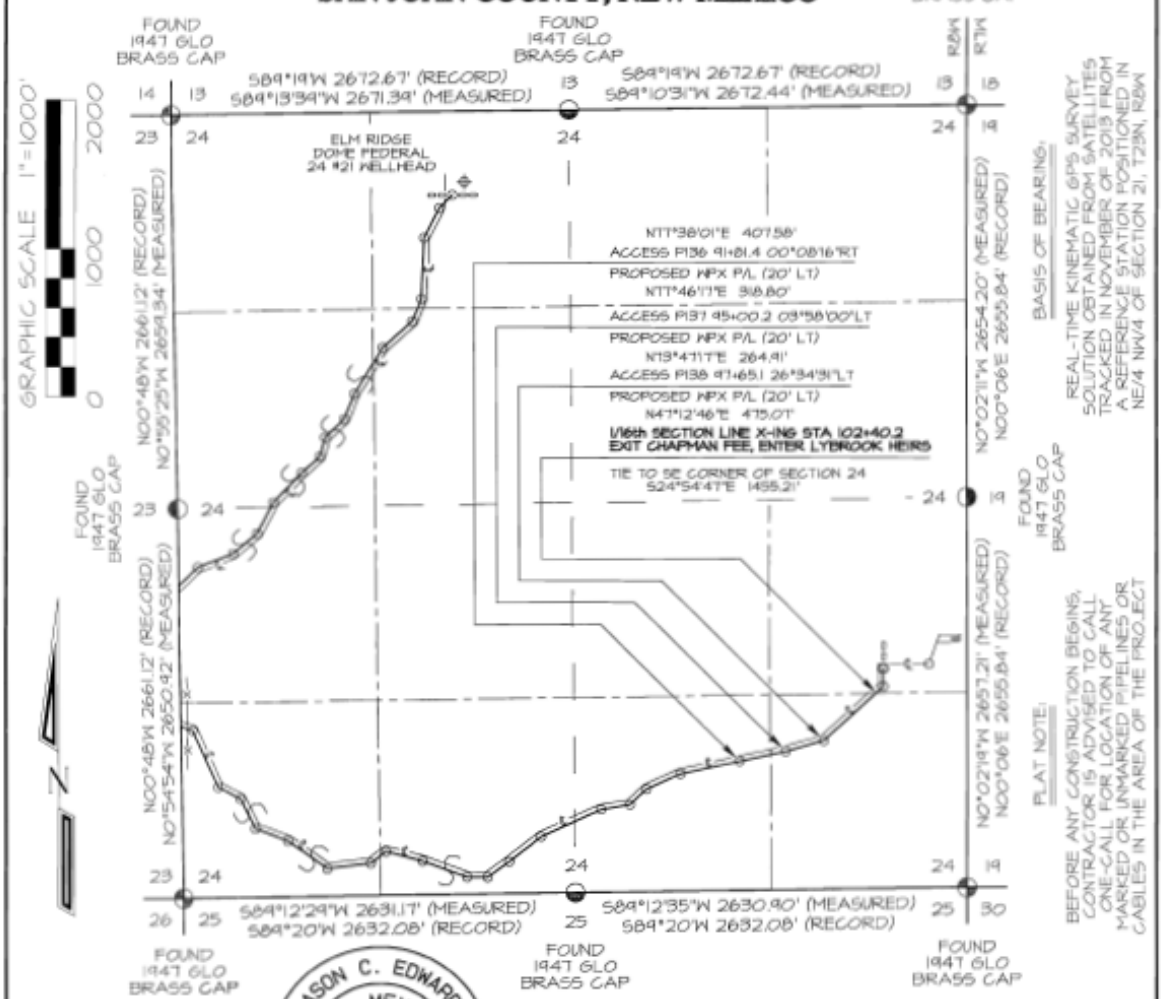
Mailing Address:
Post Office Box 6612
Farmington, NM 87499

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 1 OF 1
FILENAME: 2302AAPT

WPX ENERGY PRODUCTION, LLC CHACO 2308-24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ FEE SURFACE OWNERSHIP ~ Al & Sandra Chapman	
74+79.7 TO 102+40.2	2260.5 FT / 137.0 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: May 7, 2014

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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Jason C. Edwards
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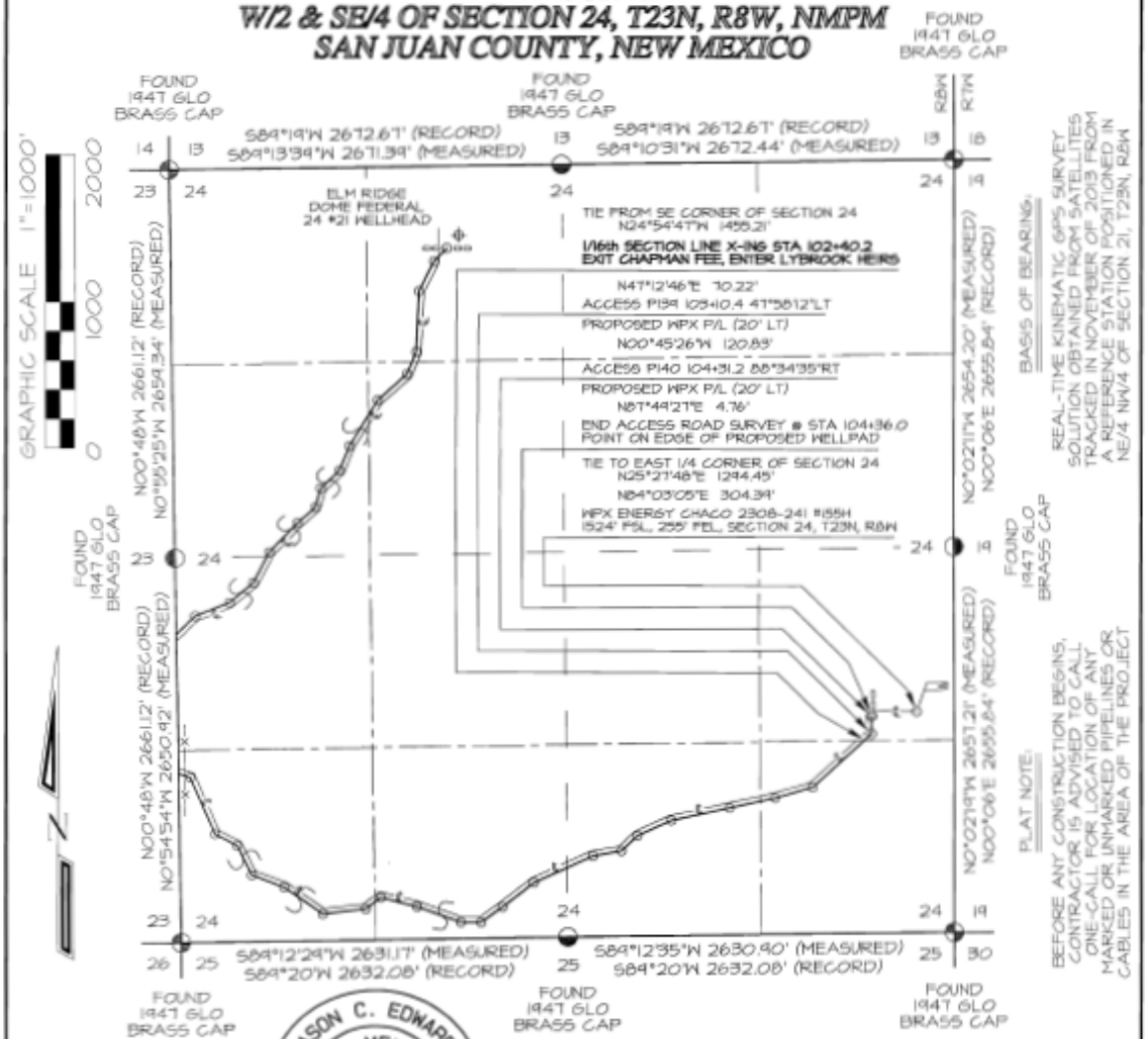
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: GLE
SHEET 8 OF 9
FILENAME: 2308240PD

WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H
PROPOSED ACCESS ROAD SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ FEE SURFACE OWNERSHIP ~ N.A. Lybrook Heirs	
102+40.2 TO 104+36.0	195.8 FT / 11.9 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: May 7, 2014

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

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

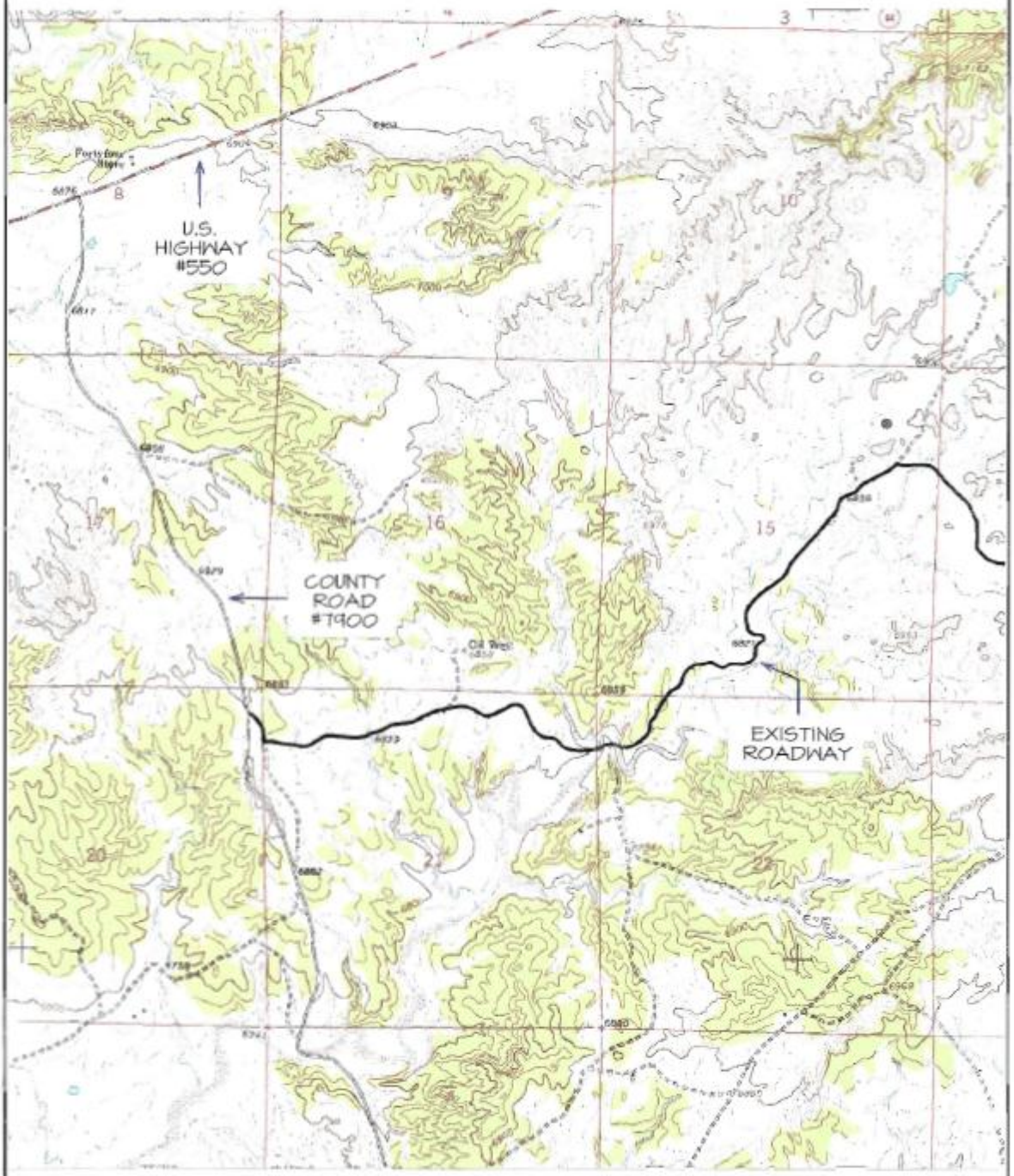
N C E

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 4 OF 4 | CHECKED BY: JCE | DRAWN BY: SLE | FILENAME: 23S24W1

WPX ENERGY PRODUCTION, LLC CHACO 2308-24I #155H

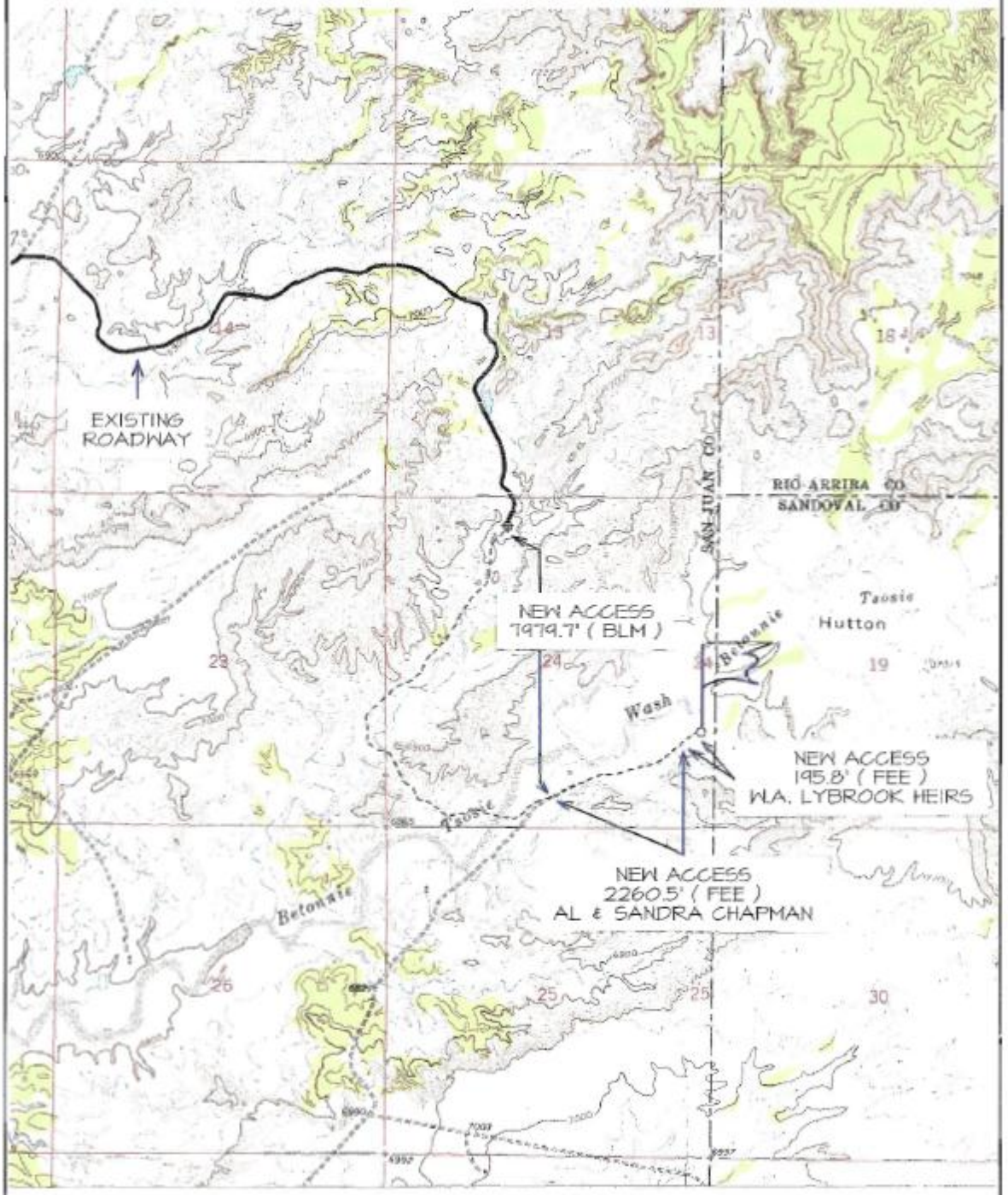
1524' FSL & 255' FEL, SECTION 24, T23N, R8W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



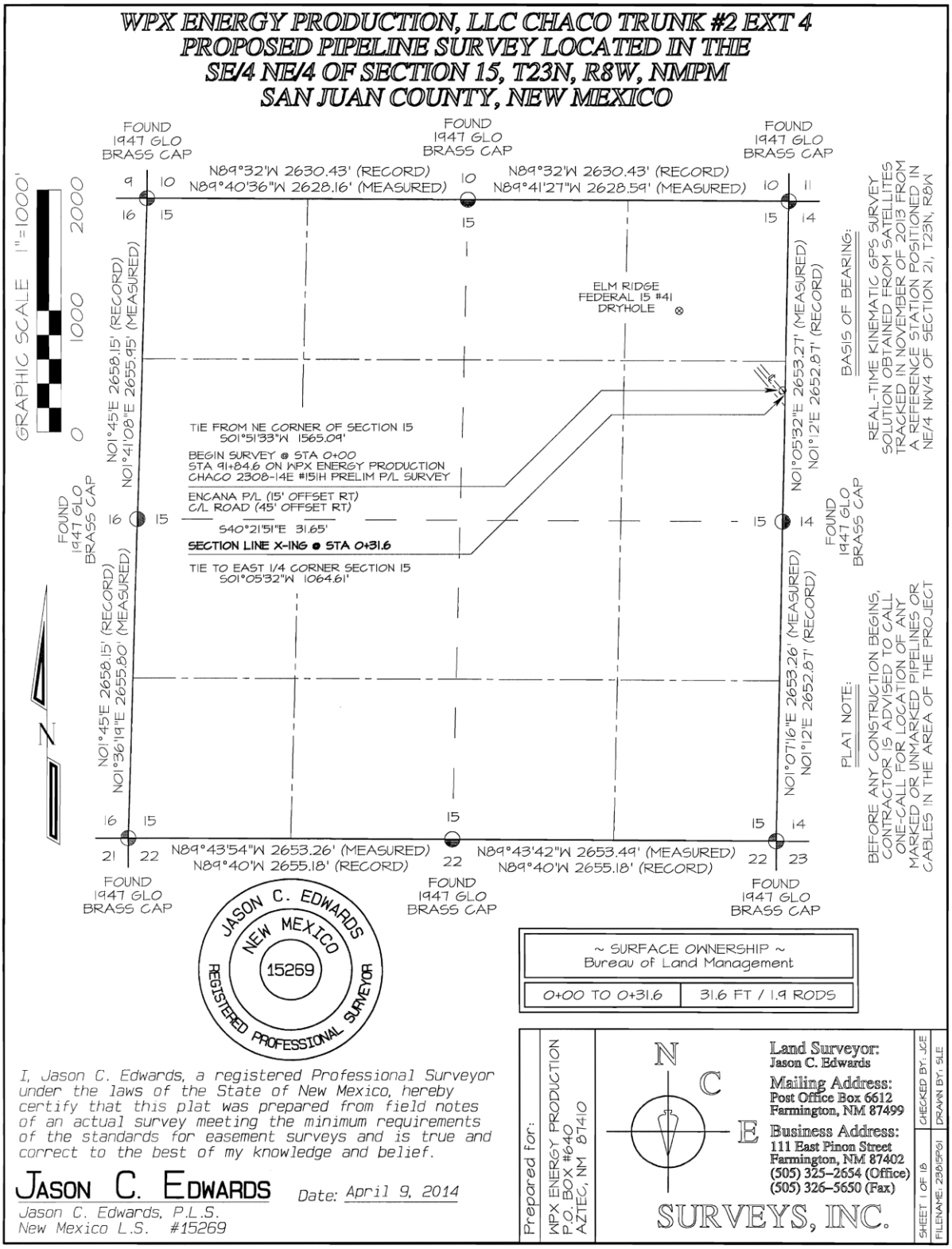
TOPO MAP NAMES : LYBROOK & LYBROOK NW ⌖ PRODUCING WELL ⊗ PLUGGED & ABANDONED WELL

WPX ENERGY PRODUCTION, LLC CHACO 2308–24I #155H

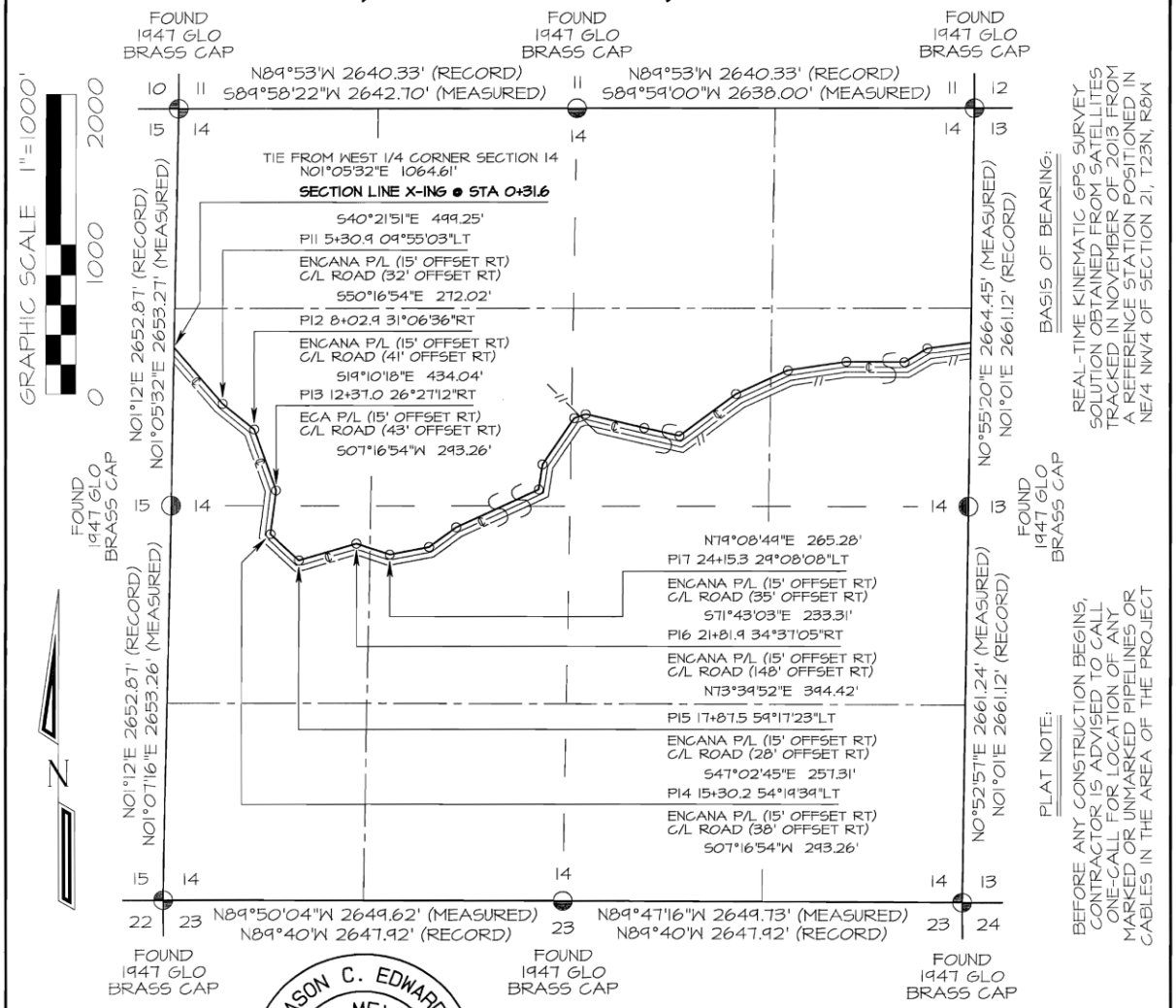
1524' FSL & 255' FEL, SECTION 24, T23N, R8W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



C.3. Chaco Trunk No. 2 Extension No. 4 Pipeline



WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE S/2 N/2 & N/2 SW/4 OF SECTION 14, T23N, R8W NMPM, SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+31.6 TO 68+70.1	6838.5 FT / 414.5 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: April 9, 2014

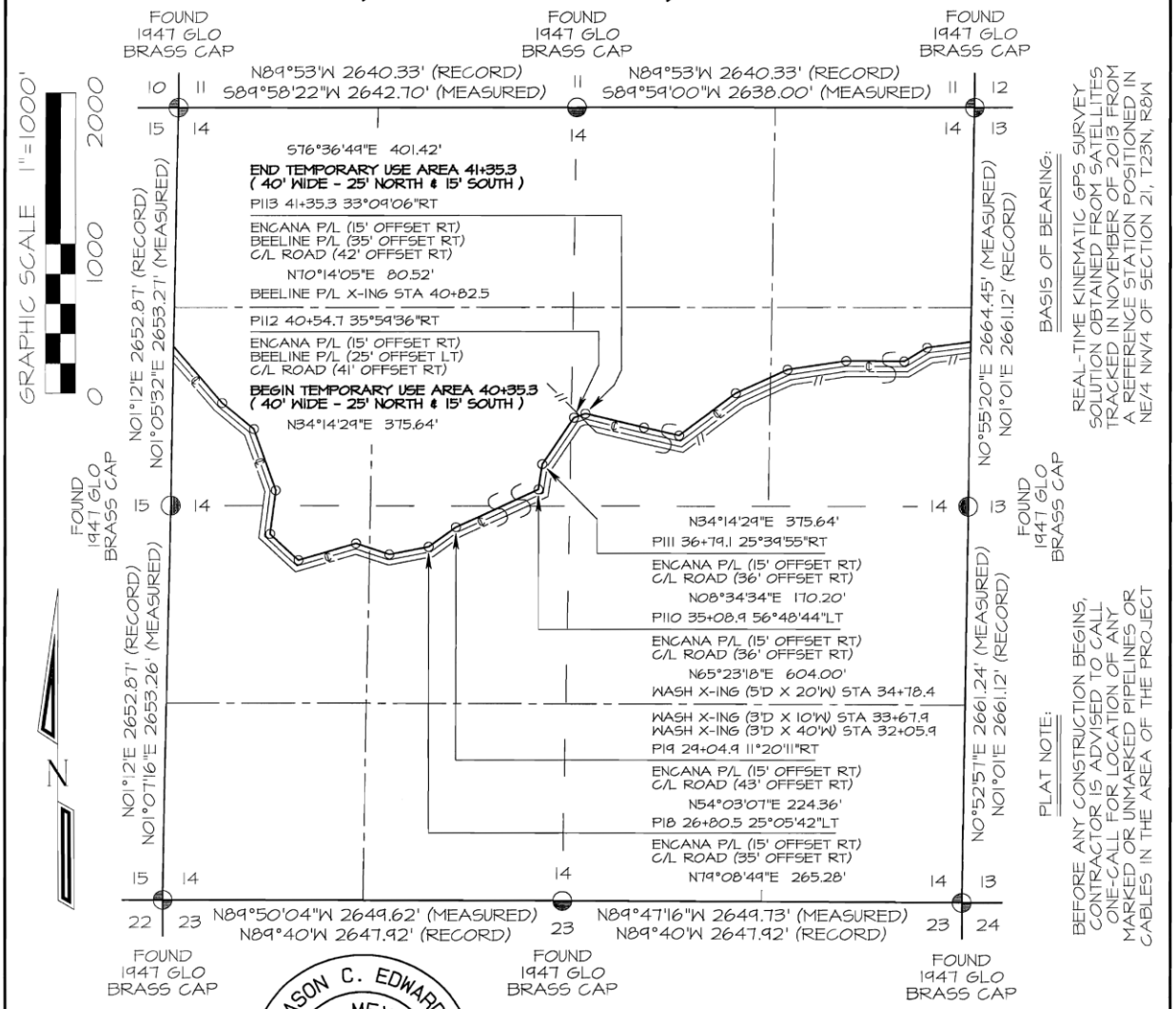
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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

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)
NCE SURVEYS, INC.

SHEET 2 OF 18 | CHECKED BY: JCE
FILENAME: 238HPS2 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE S/2 N/2 & N/2 SW/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	
0+31.6 TO 68+70.1	6838.5 FT / 414.5 RODS

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JASON C. EDWARDS Date: April 9, 2014
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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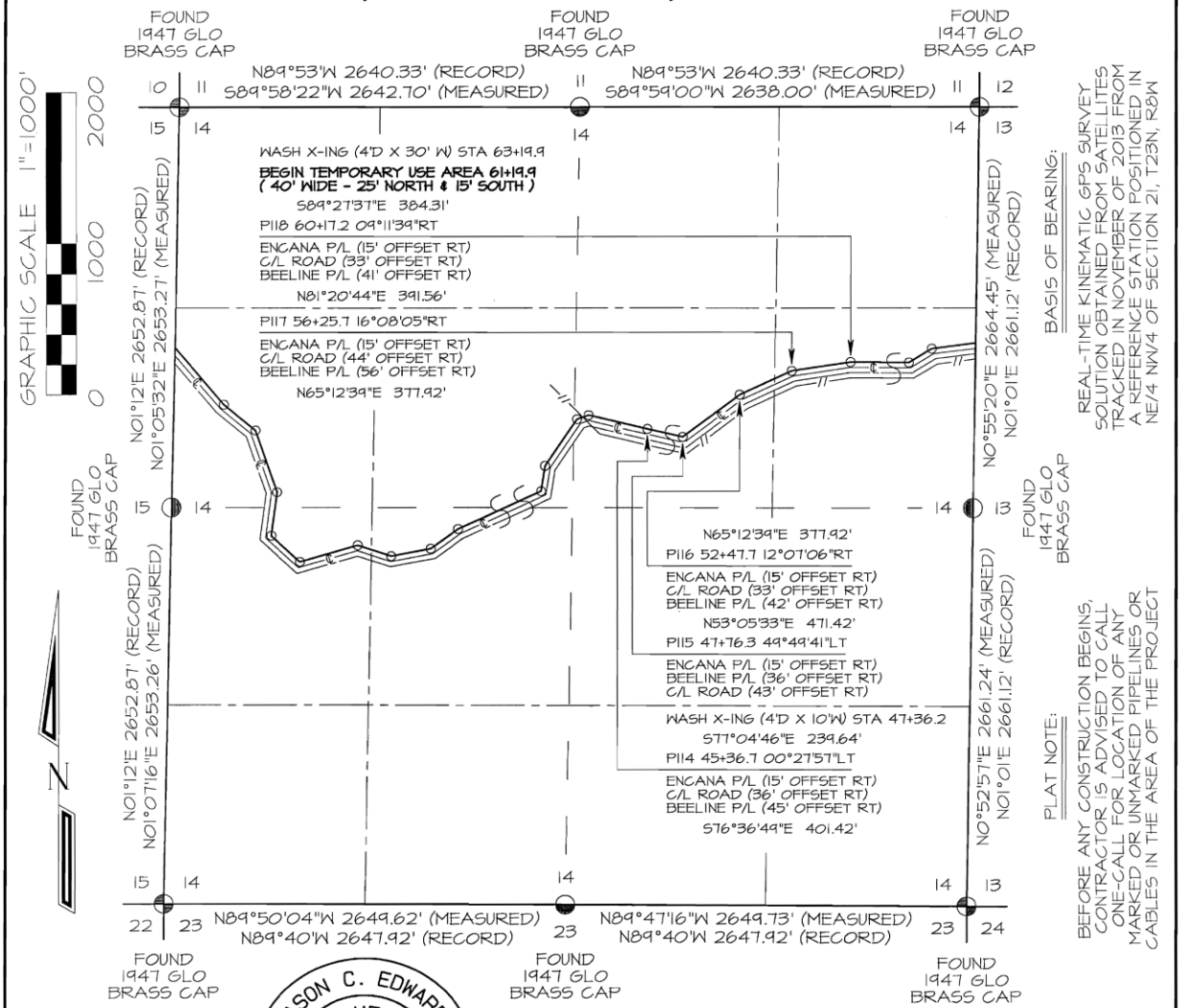
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 3 OF 18
FILENAME: 23614P63

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE S/2 N/2 & N/2 SW/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	
0+31.6 TO 68+70.1	6838.5 FT / 414.5 RODS

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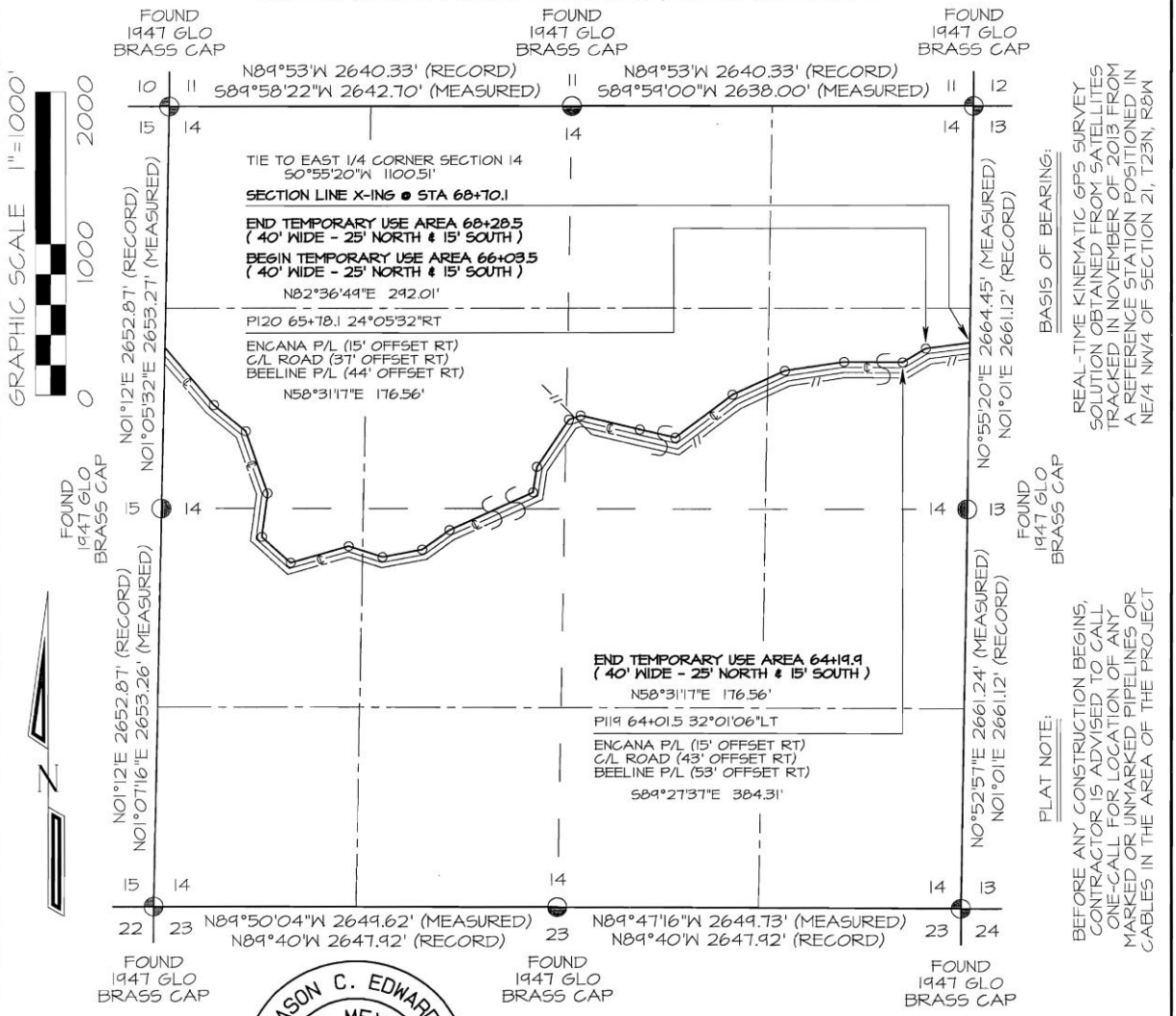
JASON C. EDWARDS Date: April 9, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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)

SHEET 4 OF 18 | CHECKED BY: JCE
FILENAME: 23B4P64 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE S/2 N/2 & N/2 SW/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	
0+31.6 TO 68+70.1	6838.5 FT / 414.5 RODS

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JASON C. EDWARDS Date: April 9, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

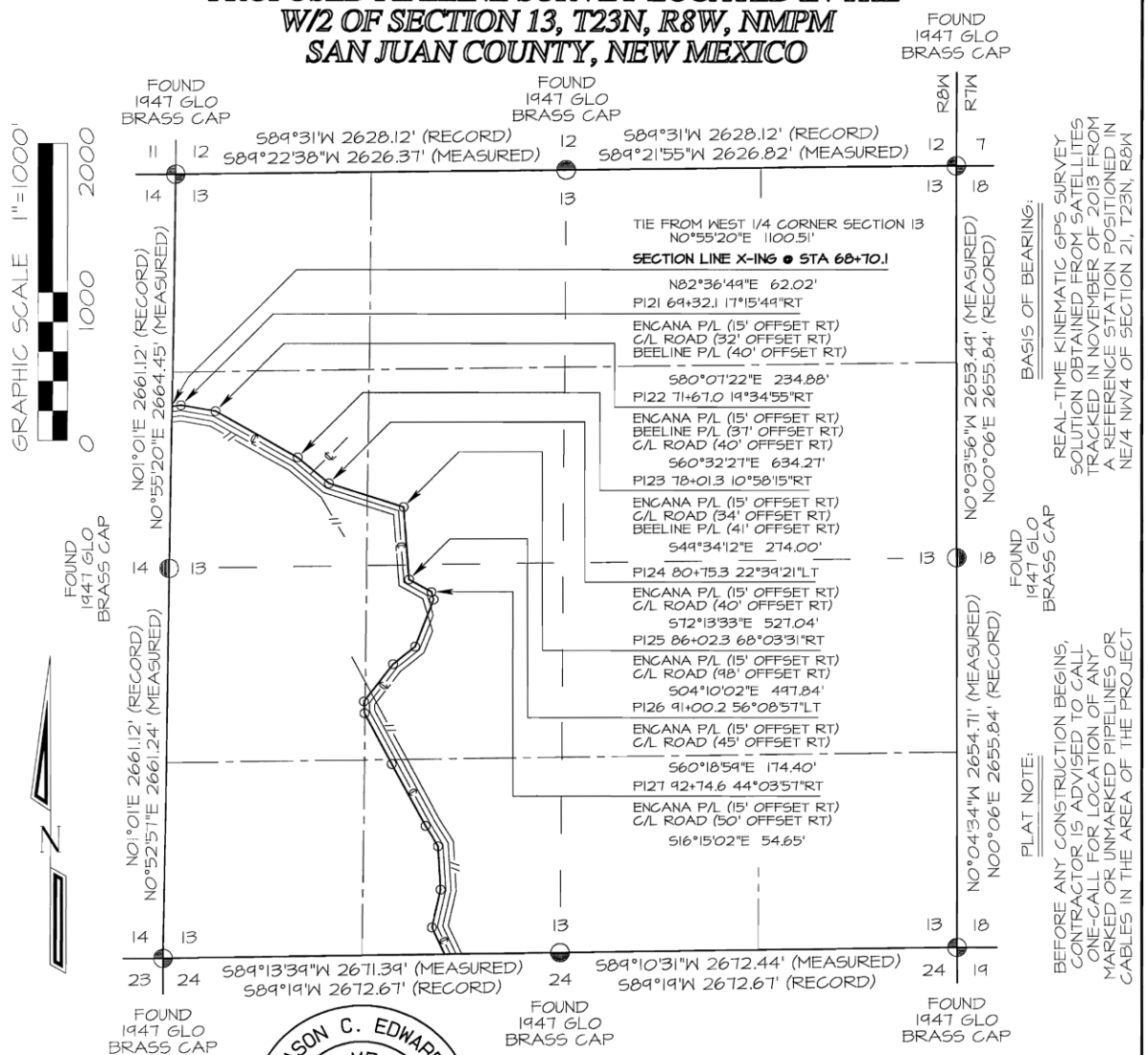
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

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 18
FILENAME: 23614P05

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 OF SECTION 13, 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	
68+70.1 TO 120+61.3	5191.2 FT / 314.6 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: April 9, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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

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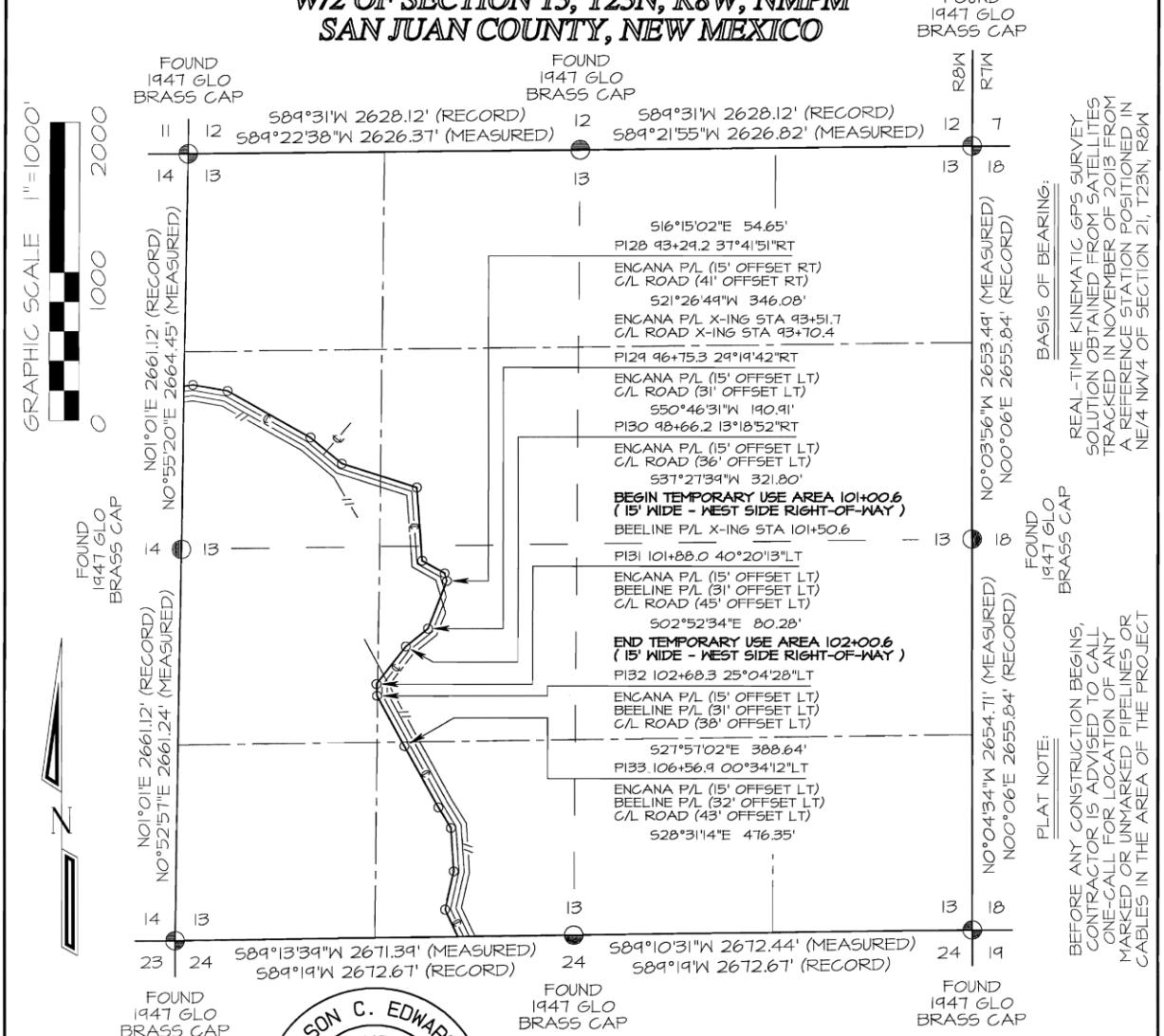
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

SHEET 6 OF 18 | CHECKED BY: JCE
FILENAME: 23913F06 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 OF SECTION 13, 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	
68+70.1 TO 120+61.3	5191.2 FT / 314.6 RODS

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JASON C. EDWARDS Date: April 9, 2014
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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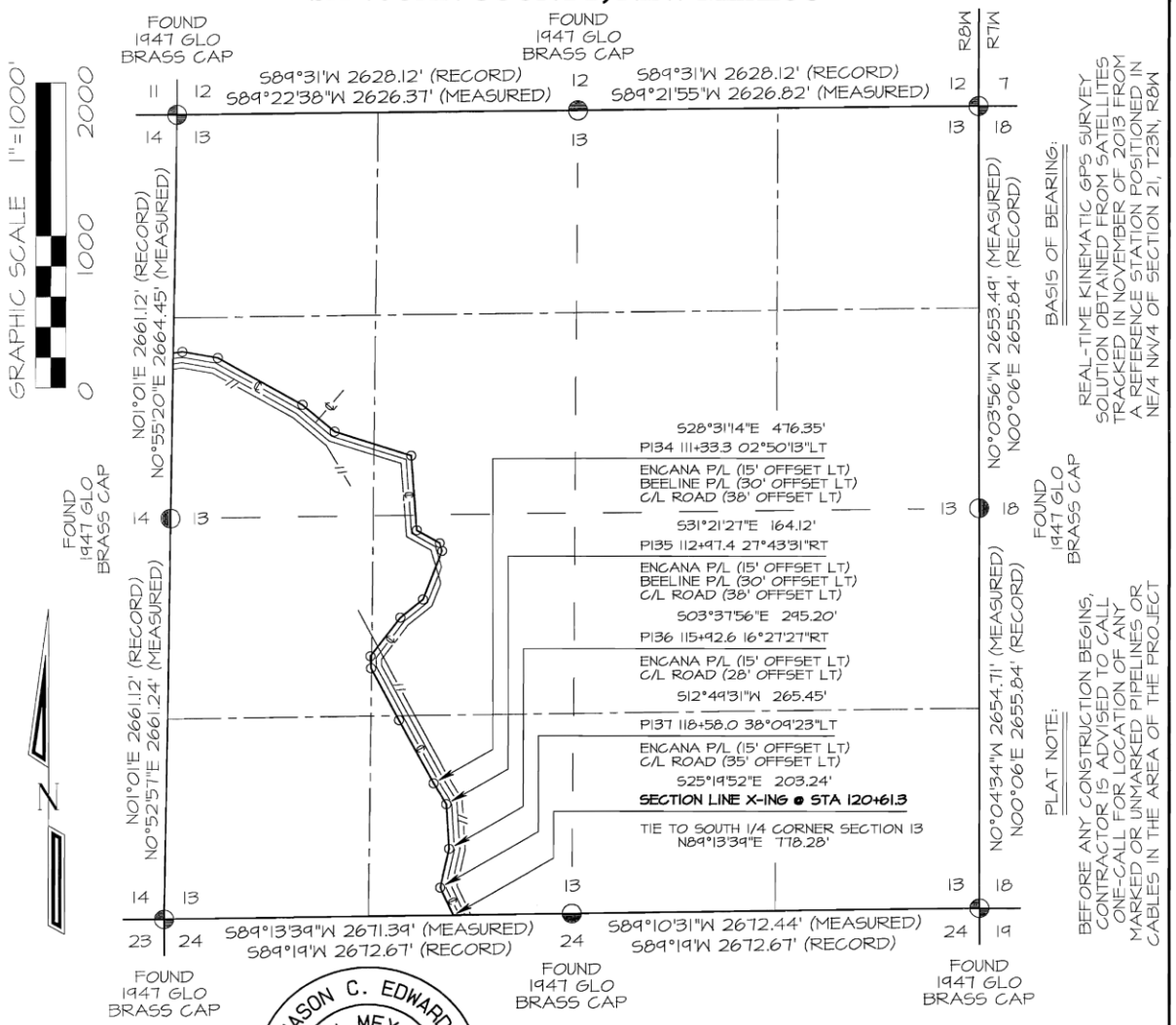
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 1 OF 18
FILENAME: 2381PR7

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 OF SECTION 13, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
68+70.1 TO 120+61.3	5191.2 FT / 314.6 RODS

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

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JASON C. EDWARDS Date: April 9, 2014

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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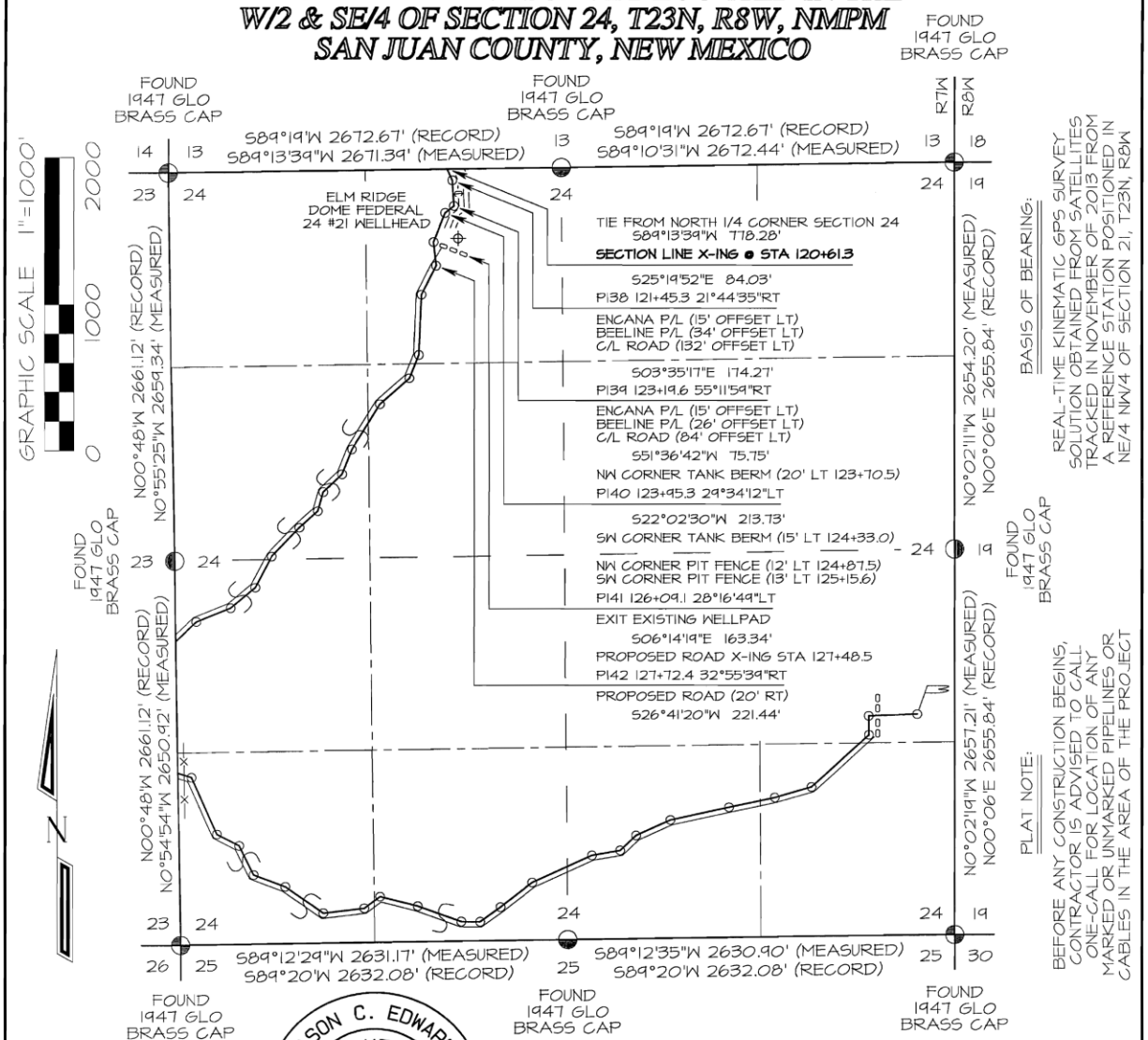
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 8 OF 18
FILENAME: 23613PG8

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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	
120+61.3 TO 160+53.9	3992.6 FT / 242.0 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: April 9, 2014
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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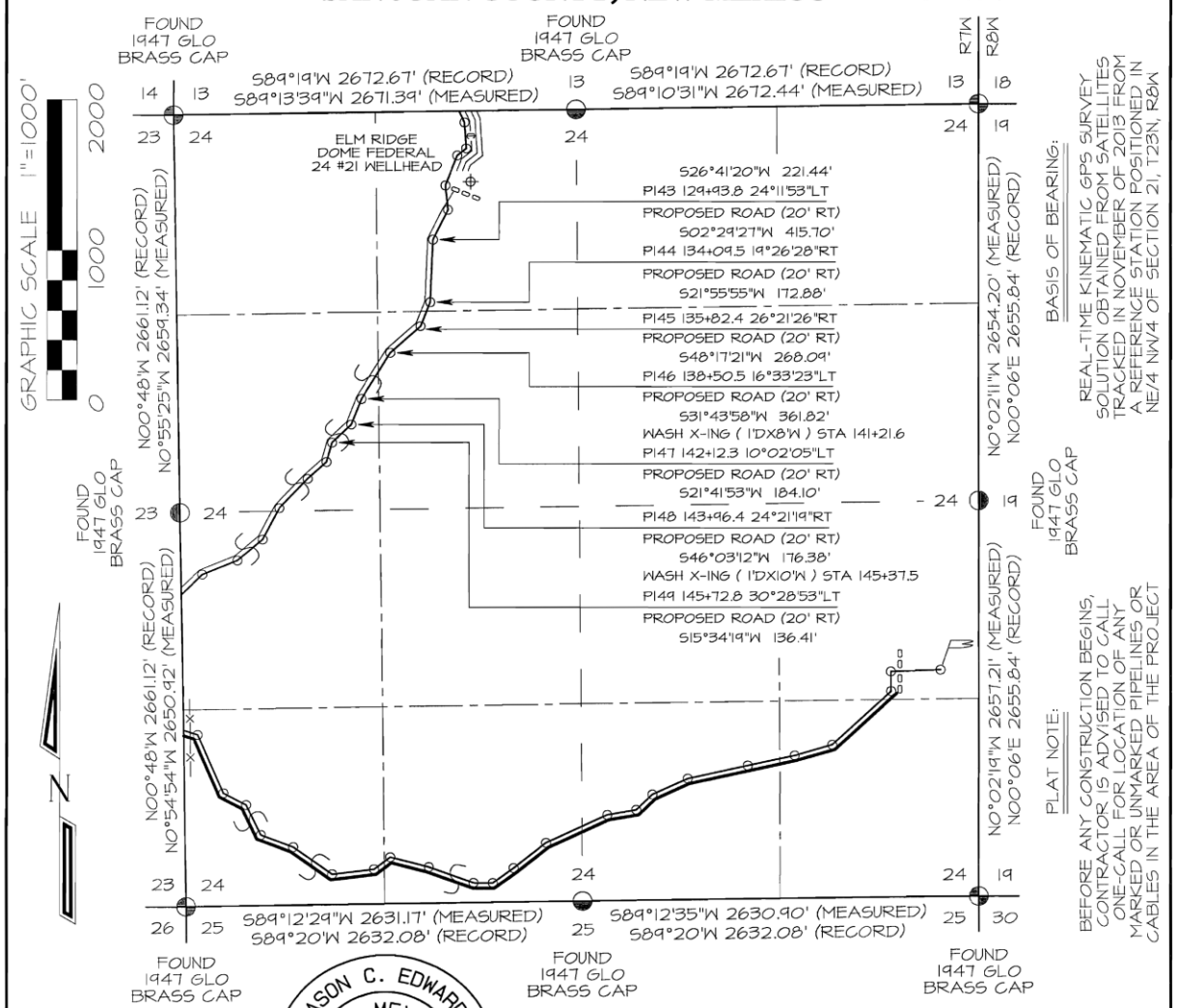
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 4 OF 18
FILENAME: 23624P04

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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	
120+61.3 TO 160+53.9	3992.6 FT / 242.0 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: April 9, 2014

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
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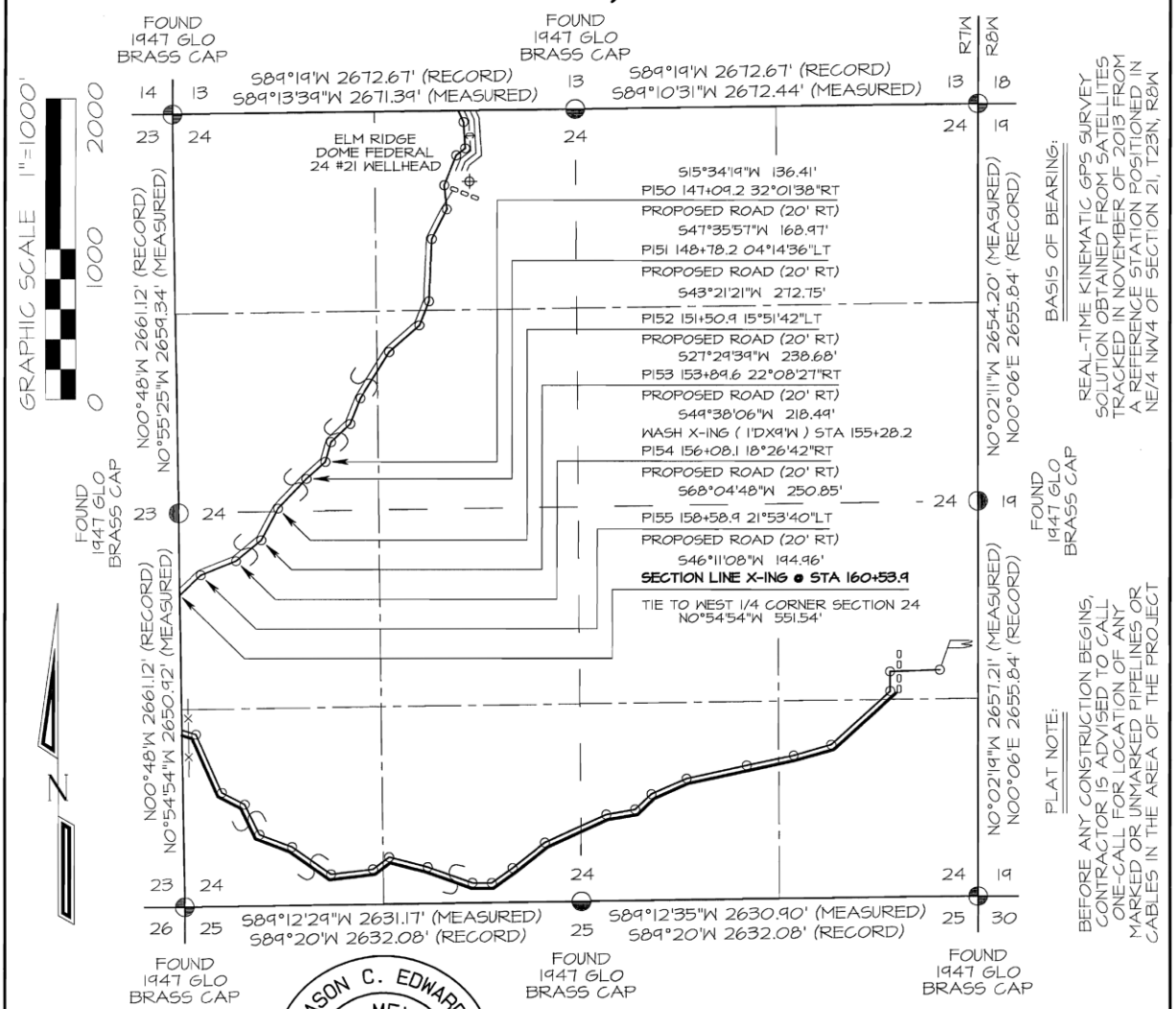
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLF
SHEET 10 OF 18
FILENAME: 23624P10

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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	
120+61.3 TO 160+53.9	3992.6 FT / 242.0 RODS

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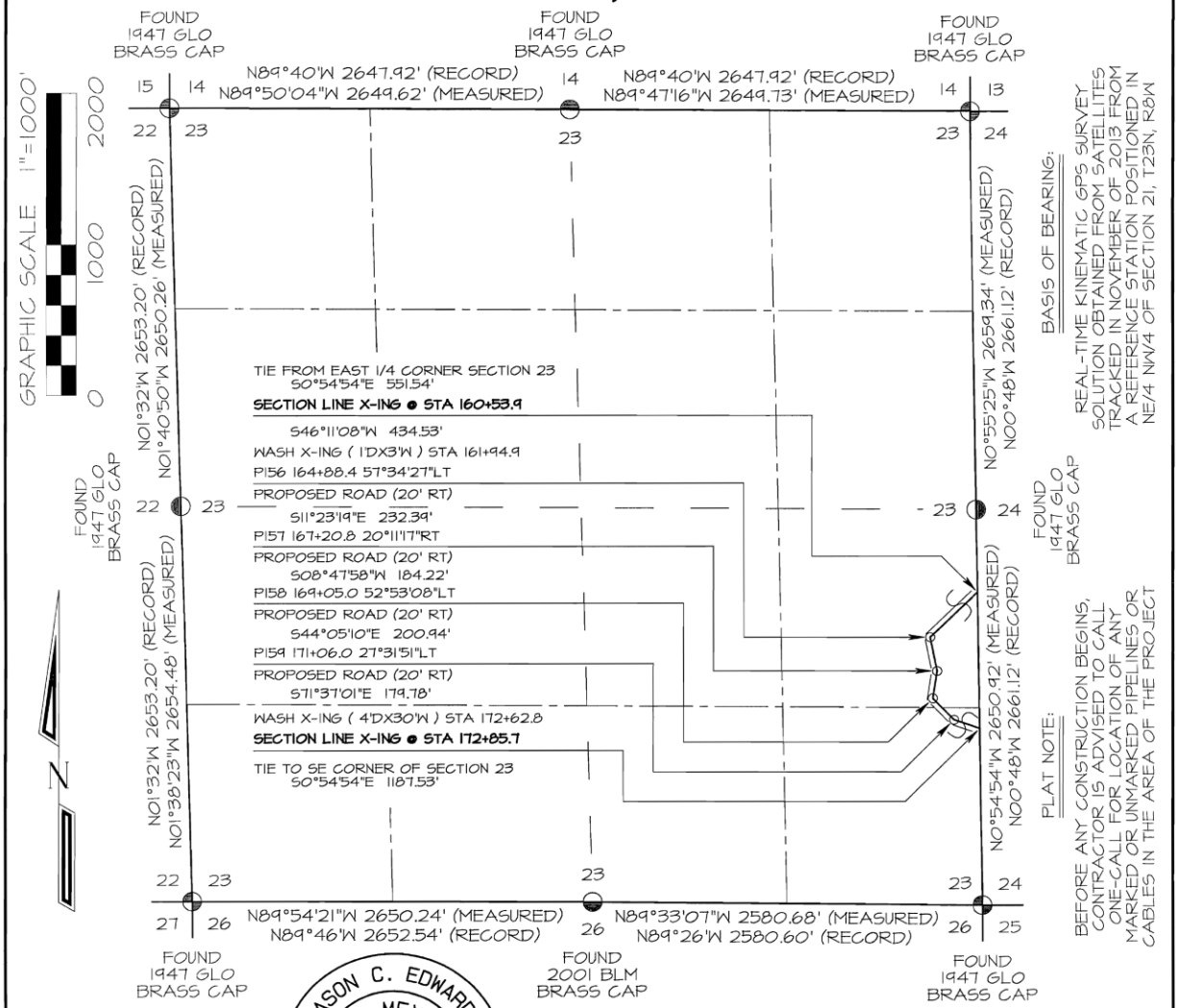
JASON C. EDWARDS Date: April 9, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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

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 11 OF 18 | CHECKED BY: JCE
FILENAME: 23524P11 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE
E/2 SE/4 OF SECTION 23, 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	
160+53.9 TO 172+85.7	1231.8 FT / 74.7 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.

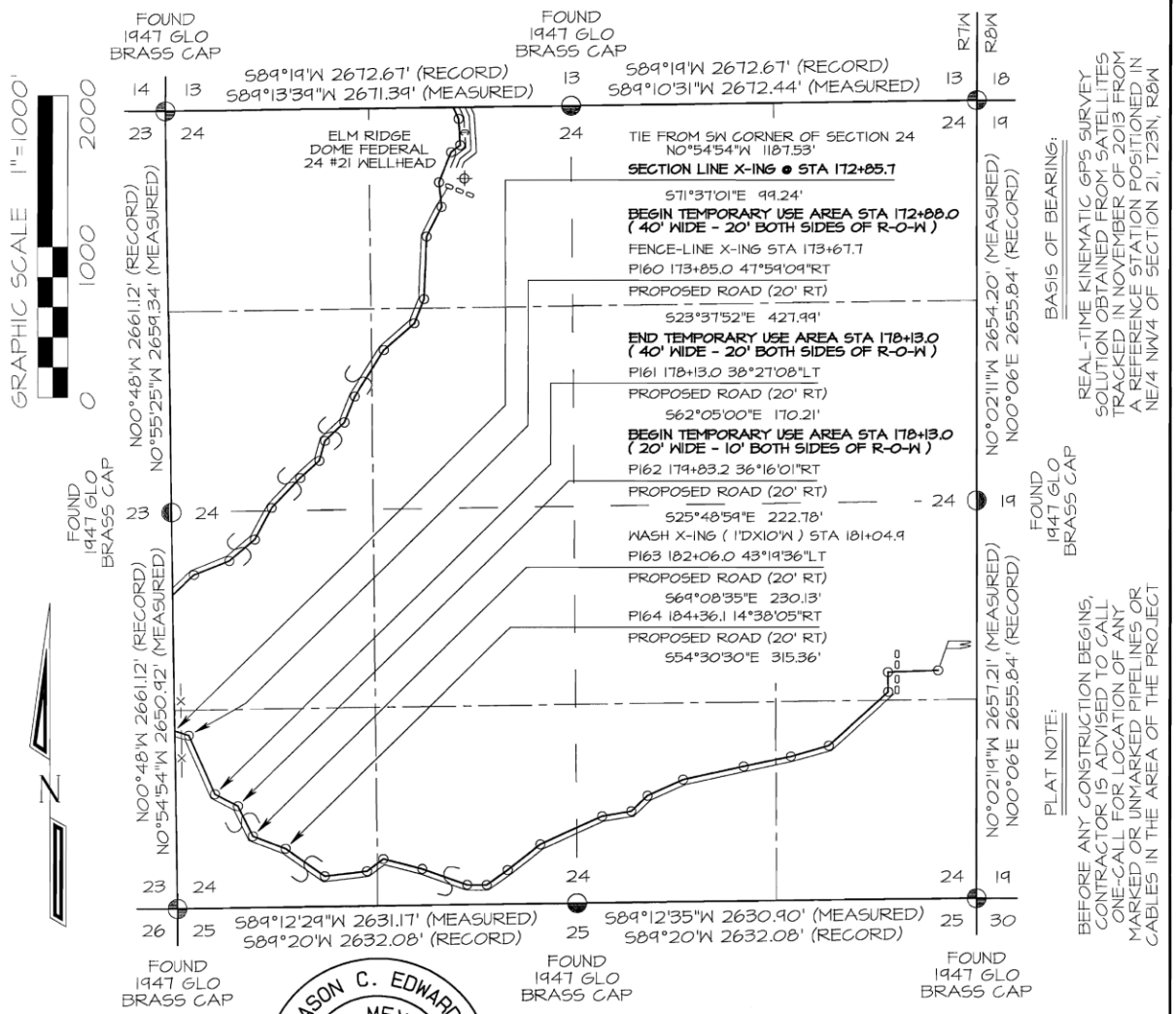
JASON C. EDWARDS Date: April 9, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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 12 OF 18 | CHECKED BY: JCE
FILENAME: 23b23P12 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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	
172+85.7 TO 205+83.5	3297.8 FT / 199.9 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: April 9, 2014

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

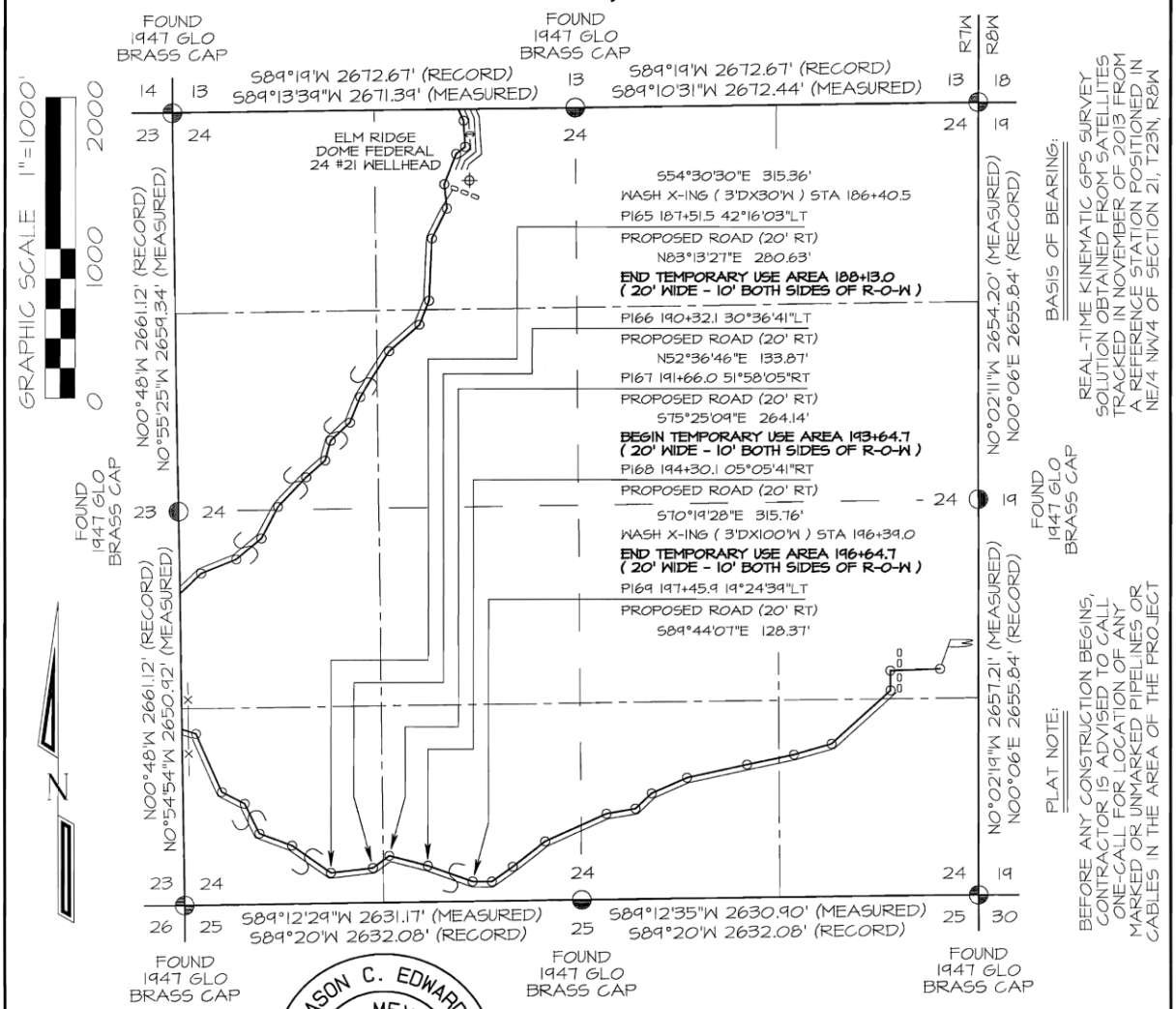
Prepared for:
WPX ENERGY PRODUCTION
P.O. BOX #640
AZTEC, NM 87410

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 13 OF 18
FILENAME: 23624P13

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE
W/2 & SE/4 OF SECTION 24, 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	
172+85.7 TO 205+83.5	3297.8 FT / 199.9 RODS

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JASON C. EDWARDS Date: April 9, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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

Land Surveyor:
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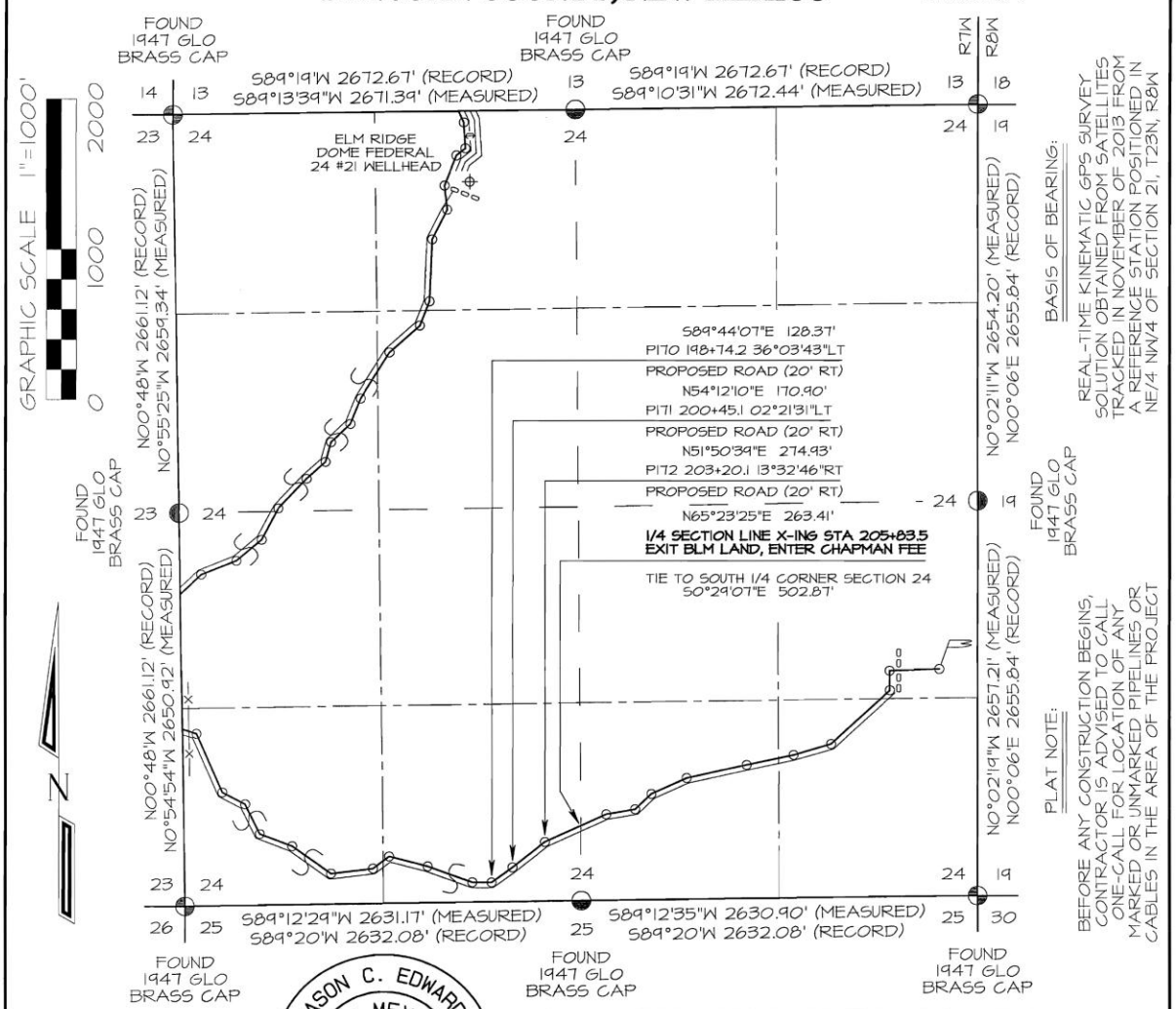
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

CHECKED BY: JCE
DRAWN BY: SLE
SHEET 14 OF 18
FILENAME: 23624P14

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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	
172+85.7 TO 205+83.5	3297.8 FT / 199.9 RODS

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JASON C. EDWARDS Date: April 9, 2014
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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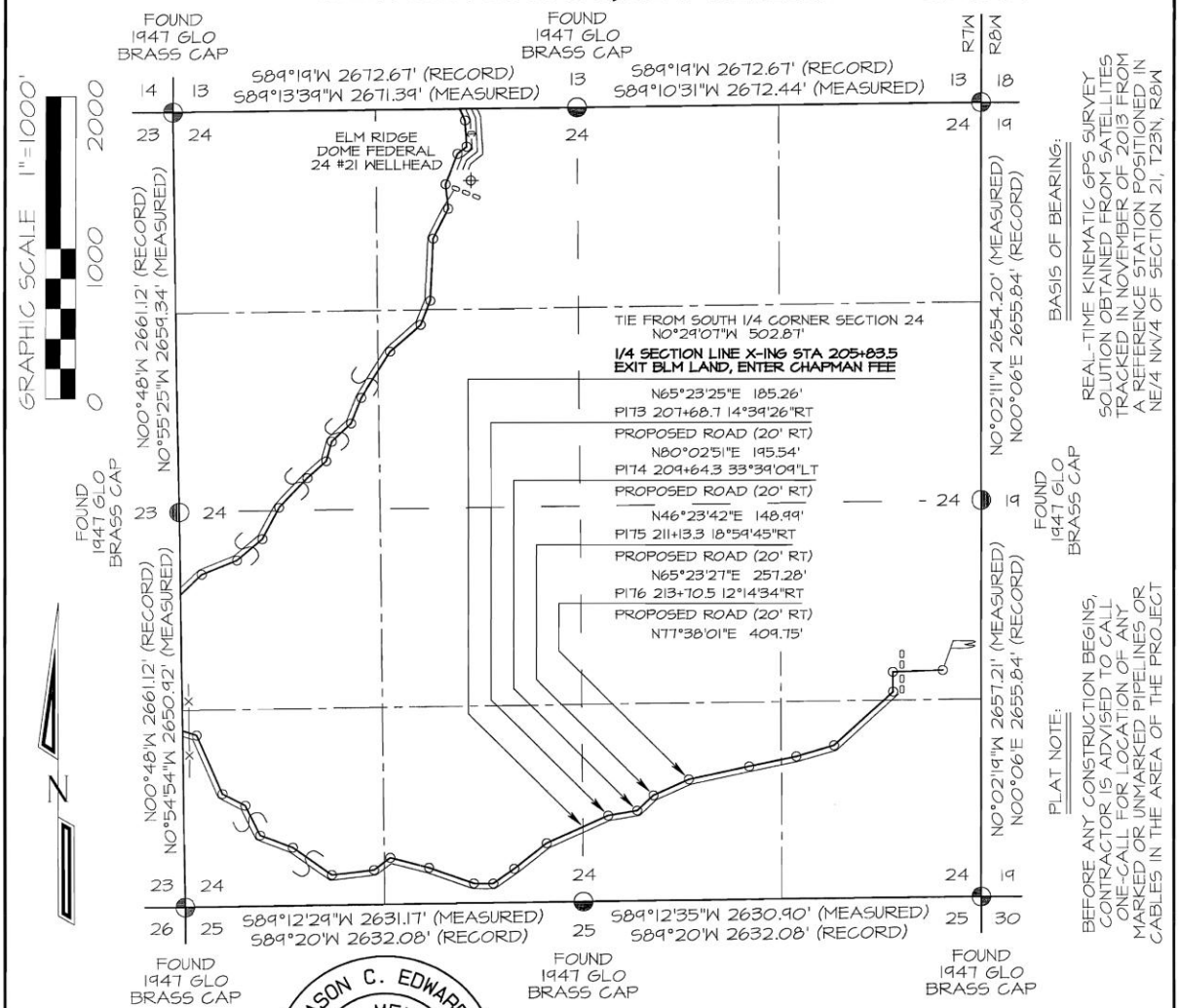
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

SHEET 15 OF 18 | CHECKED BY: JCE
FILENAME: 23524P15 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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

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JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ FEE SURFACE OWNERSHIP ~ Al & Sandra Chapman	
205+83.5 TO 228+06.0	2222.5 FT / 134.7 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: April 9, 2014
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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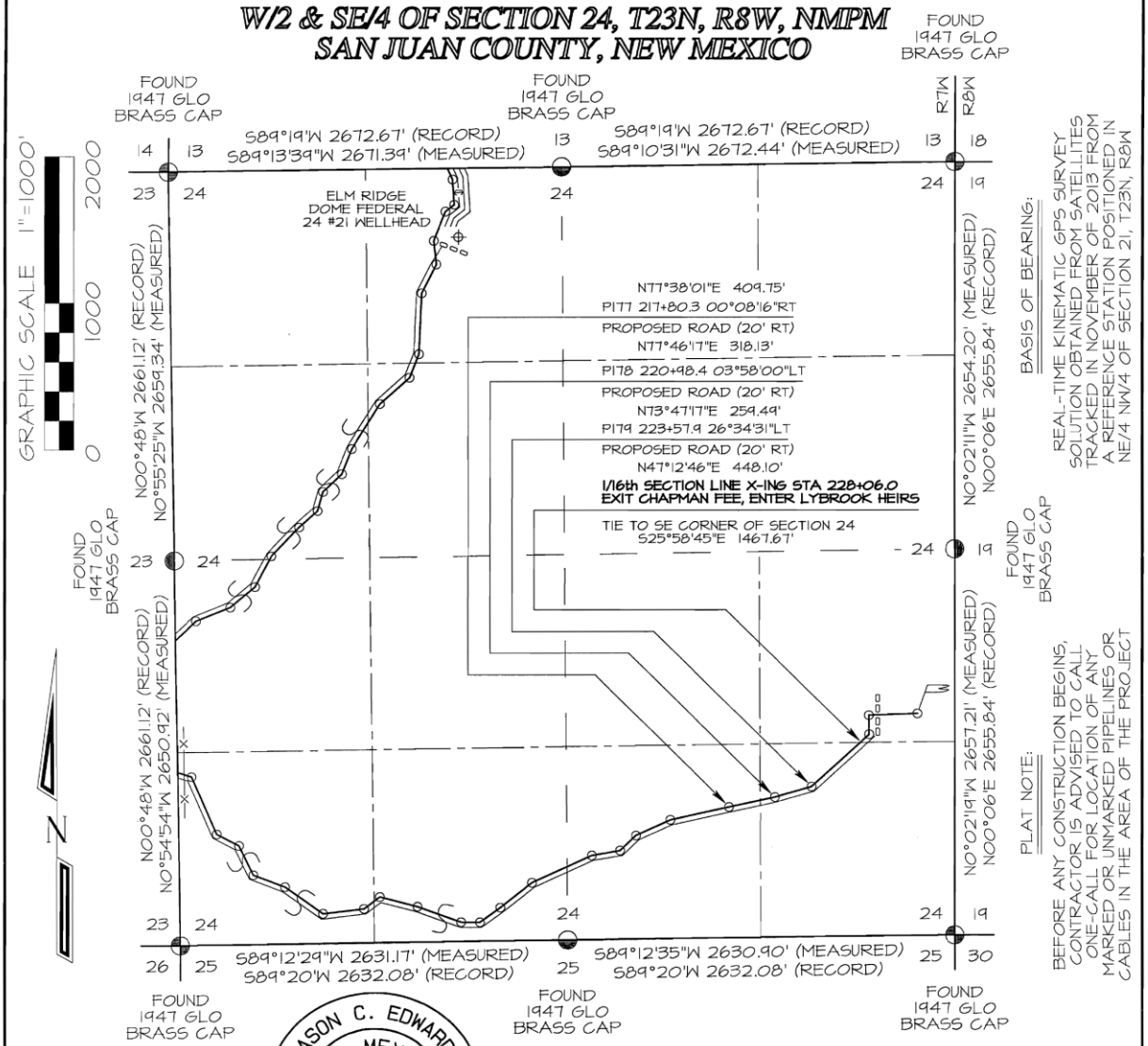
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

SURVEYS, INC.

SHEET 16 OF 18 | CHECKED BY: JCE
FILENAME: 23824P16 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, 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

~ FEE SURFACE OWNERSHIP ~ Al & Sandra Chapman	
205+83.5 TO 228+06.0	2222.5 FT / 134.7 RODS

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JASON C. EDWARDS Date: April 9, 2014

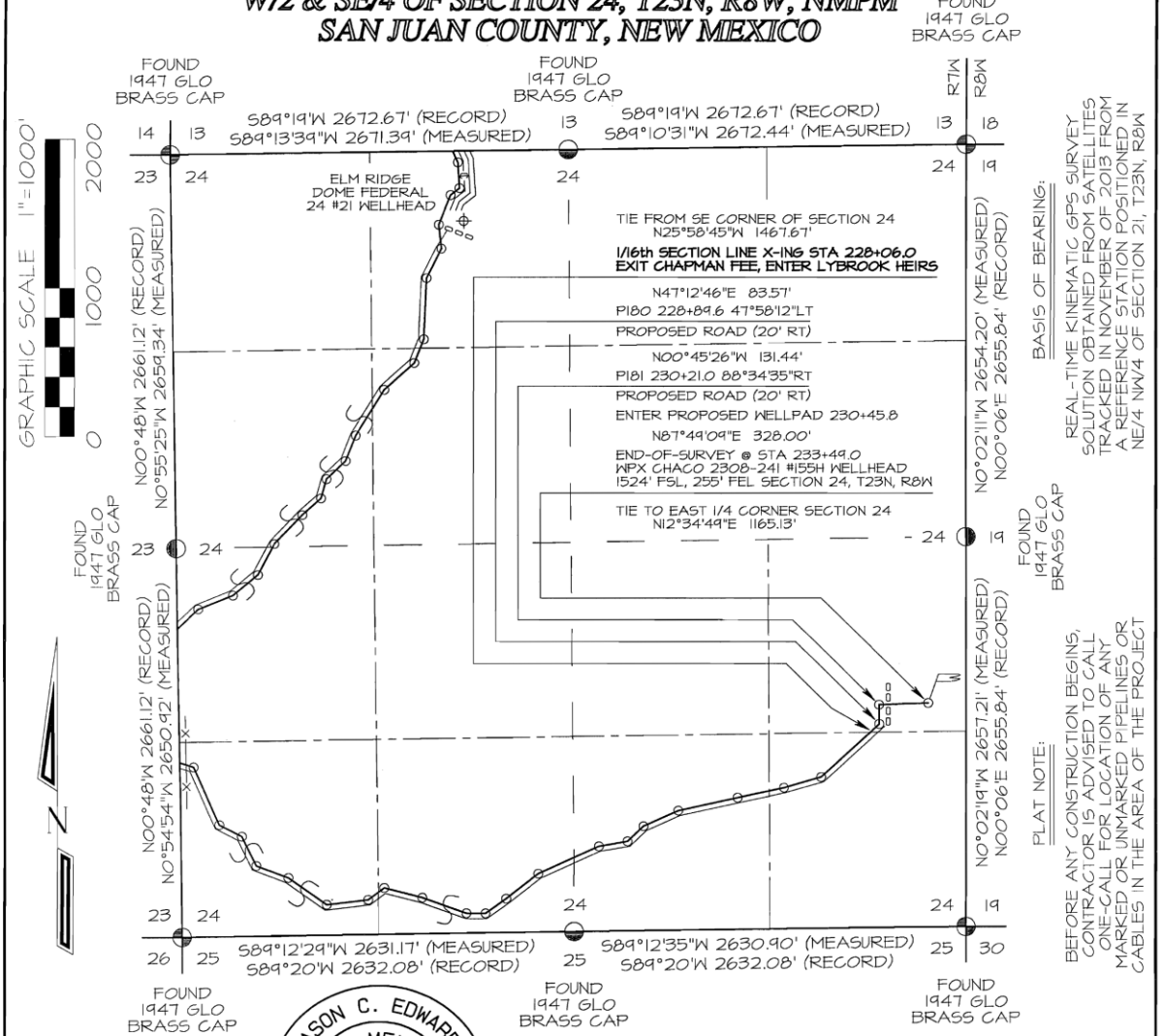
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

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

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 17 OF 18 | CHECKED BY: JCE
FILENAME: 23B24P17 | DRAWN BY: SLE

WPX ENERGY PRODUCTION, LLC CHACO TRUNK #2 EXT 4
PROPOSED PIPELINE SURVEY LOCATED IN THE W/2 & SE/4 OF SECTION 24, T23N, R8W, NMPM
SAN JUAN COUNTY, NEW MEXICO



JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

~ FEE SURFACE OWNERSHIP ~ W.A. Lybrook Heirs	
228+06.0 TO 233+49.0	543.0 FT / 32.9 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: April 9, 2014

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

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

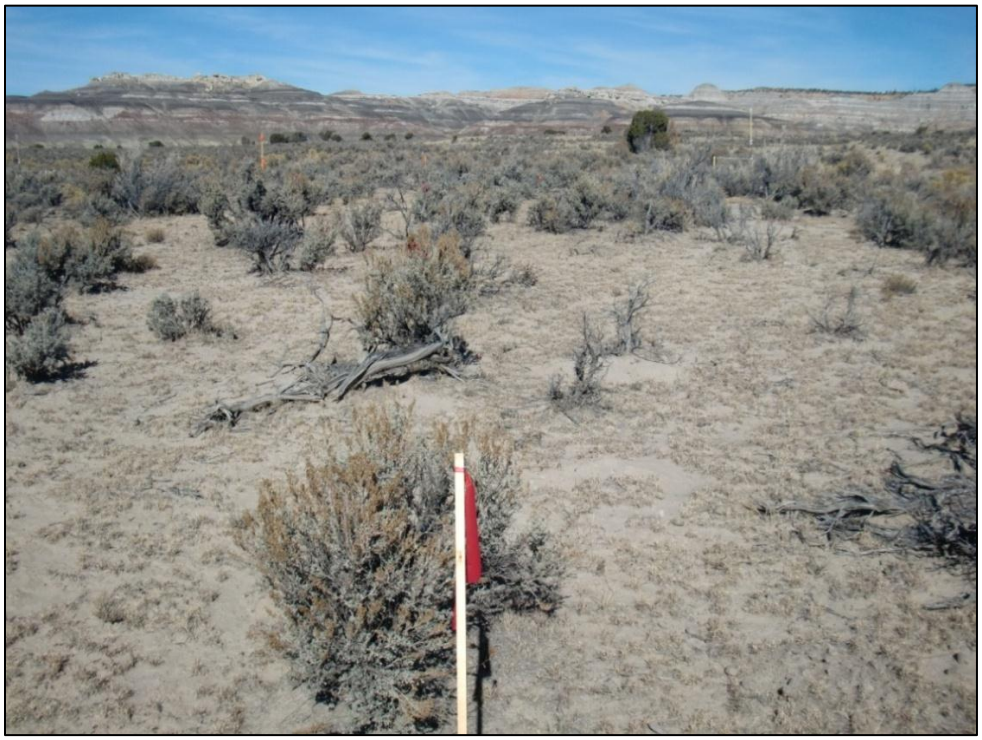
N C E

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.

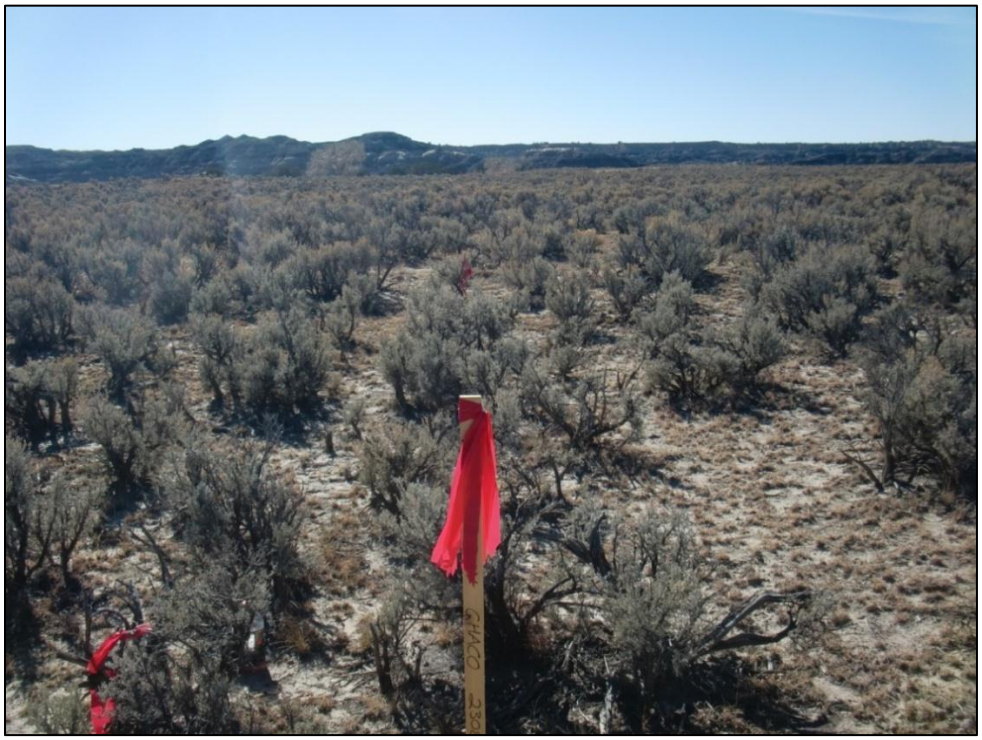
CHECKED BY: JCE
DRAWN BY: SLE
SHEET 18 OF 18
FILENAME: 23624P18

APPENDIX D. PHOTOGRAPHS

D.1. 153H/154H



View from the beginning of the proposed access road/well-connect pipeline corridor (southern terminus), facing the alignment (northward).



View from the end of the proposed access road/well-connect pipeline corridor (northern terminus), facing the alignment (southward).

View from the proposed wellheads facing eastward.

View from the proposed wellheads, facing northward.

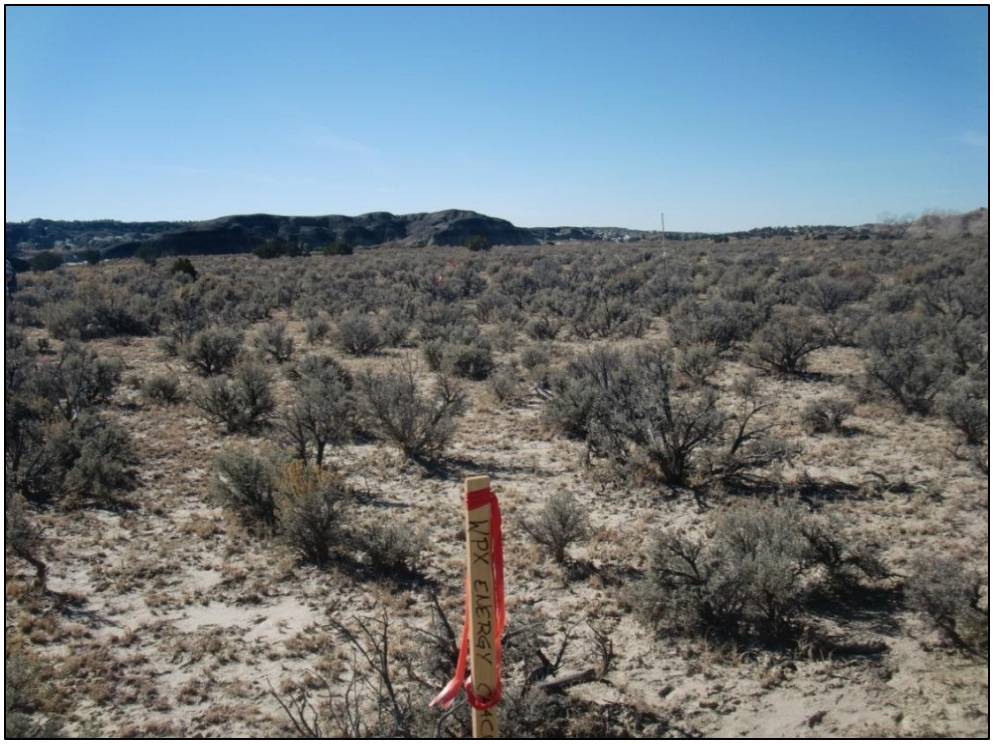
View from the proposed wellheads, facing southward.

View from the proposed wellheads, facing westward.

D.2. 155H/156H and Chaco Trunk No. 2 Extension No. 4

Proposed access road and pipeline corridor, from start of proposed access road (northwestern terminus) facing toward road alignment.

Proposed access road and pipeline corridor, at approximate pipeline stationing 198+74.2 facing westward along alignment.



Proposed access road and pipeline corridor, end of proposed access road (at edge of 155H/156H well pad) facing southwestward along alignment.

Proposed well pad, facing northward from wellheads.

Proposed well pad, facing eastward from wellheads.

Proposed well pad, facing southward from wellheads.

Proposed well pad, facing westward from wellheads.

Proposed pipeline corridor, facing northward from along alignment from approximate stationing 18+58.0.

Proposed pipeline corridor, facing southward from along alignment from approximate stationing 18+58.0.

Proposed pipeline corridor, facing southwestward from approximate stationing 26+80.5.

Proposed pipeline corridor, facing northeastward from approximate stationing 26+80.5.

Proposed pipeline corridor, facing northward from approximate stationing 91+00.2.

Proposed pipeline and access road, from TUA 5 (see Figure A.3; approximate stationing 172+88.0) facing southeastward along alignment.

APPENDIX E. SURFACE RECLAMATION PLANS

E.1. 153H/154H Surface Reclamation Plan

E.2. 155H/156H and Chaco Trunk No. 2 Extension No. 4 Surface Reclamation Plan