United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-NM-FOl0-2013-0169

Encana Oil & Gas (USA) Inc.

Proposed Good Times Trunk #1 Phase 1 Pipeline

September 2013

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It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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ACRONYMS

ARPA	Archaeological Resources Protection Act
AUM	animal unit month
bcf	billion cubic feet
BIA	Bureau of Indian Affrurs
BLM	Bureau of Land Management
BMP	best management practice
CFR	Code of Federal Regulations
CO	carbon monoxide
EA	Environmental Assessment
Ecosphere	Ecosphere Environmental Services, Inc.
EIS	Environmental Impact Statement
Encana	Encana Oil & Gas (USA) Inc.
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FFO	Farmington Field Office
GHG	greenhouse gases
GIS	geographic information systems
HAPs	hazardous air pollutants

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LAC	La Plata Archaeological Consultants
MAOP	maximum allowable operating pressure
mbo	41 million barrels of oil
Mcfd	cubic feet per day
MLA	Mineral Leasing Act
NAAQS	National Ambient Air Quality Standard
NATA	National Scale Air Toxics Assessments
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NMAAQS	New Mexico Ambient Air Quality Standards
NMOCD	New Mexico Oil Conservation Division
NMPIF	New Mexico Partners in Flight
NMPM	New Mexico Principal Meridian
NO_2	nitrogen dioxide
NRHP	National Register of Historic Places
OHWM	ordinary high water mark
PM	particulate matter
ppb	parts per billion
ppm	parts per million
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
PRMP	Proposed Resource Management Plan
psi	per square inch
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
SO_2	sulfur dioxide
TCPs	Traditional Cultural Properties
TUA	temporary use area
U.S.	United States
$\mu g/m^3$	Micrograms per cubic meter of air
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1. PURPOSE AND NEED FOR ACTION

1.1 Background

Encana Oil & Gas (USA) Inc. (Encana) is proposing to construct the Good Times Trunk #1 Phase I pipeline in San Juan County, New Mexico. Encana has applied for a right-of-way (ROW) grant with the Bureau of Land Management (BLM) Farmington Field Office (FFO) for the proposed action. The proposed pipeline would be approximately 33,302 feet in length (6.3 miles) and constructed within a 40-foot wide ROW. The proposed action would be located approximately 30 miles south of Bloomfield, New Mexico and 4.5 miles west of Nageezi, New Mexico in San Juan County.

Encana has proposed six well pads in the eastern portion of the proposed ROW. Nine wells have been or would be drilled from these six well pads. Encana has proposed four well pads in the western portion of the proposed ROW. Five wells would be drilled from these well pads. In total, 14 wells drilled from 10 wells pads would connect to the proposed Good Time Trunk #I Phase l pipeline. The wells that would connect to the proposed Good Times Trunk #I Phase 1 pipeline are listed in Table 1-l. The proposed pipeline would transport fluid minerals from these wells and possibly future wells that could be drilled in the area. The effects from developing the proposed well pads and the associated infrastructure have been or will be analyzed in separate Environmental Assessments (EAs).

Table 1-1. Status of wells proposed to connect to the Good Times Trunk #1 Phase 1 Pipeline

Well Name	Connects To	Lease Type	Status
Escrito H3l-2409 0lH	East Alignment	Federal	Drilled
Escrito A31-2409 OJH	East Alignment	Federal	Drilled
Good Times D06-2309 OIH	East Alignment	Federal	Dtilled
Escrito M30-2409 0IH	East Alignment	Federal	Pending
Escrito M30-2409-03H	East Alignment	Federal	Pending
Good Times P36-2410 0IH	East Alignment	State of New Mexico	Approved Permit
Good Times P36-2410 03H	East Alignment	State of New Mexico	Approved Permit
Good Times P36A-2410 OIH	East Alignment	Federal	Approved Permit
Good Times P36A-2410 03H	East Alignment	Federal	Approved Permit
Good Times 132-2410 OIH	West Alignment	State of New Mexico	Approved Pemlit
Good Times P34-2410 OlH	West Alignment	Navajo Allotted	Approved Permit
Good Times P34-2410 02H	West Alignment	Navajo Allotted/Federal	Pending_
Good Times P32-2410 0lH	West Alignment	State of New Mexico	Approved Permit
Good times A06-2410 0IH	West Alignment	State of New Mexico	Approved Permit

1.2 Purpose and Need for Action

The purpose of the proposed project is to allow the applicant access to BLM-managed lands for the construction of a pipeline that consists of two separate sections (East and West). Fluid minerals produced from the existing Escrito H31-2409 OJH. Escrito A31-2409 OlH, and Good Times 006-2309 OIH wells. and the approved Good Times P34-2410 01H, P36-2410 01 Hand 03H, P36A-2410 01 Hand 03H would be transported by the pipeline to the recently constructed Dugan Production Company Olympic Torch gathering system. The need for the action is BLM's responsibility under the Mineral Leasing Act (MLA) of 1920, as amended (30 USC 181 et seq.), to respond to Encana's request for a ROW grant. The MLA

authorizes the BLM to issue oil and gas leases for the exploration of mineral resources and permit the development of those leases. The need for the action is also established by the BLM's authority under the Title Y of the Federal Land Policy and Management Act (FLPMA), as amended (43 USC 1761-1771). and Section 28 of the MLA (43 USC 185).

1.3 Decision Framework

Based on the information in this EA. the BLM/FFO will decide whether to issue the ROW grant and, if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA) (Public Law [PL] 91-90, 42 USC 4321 et seq.), the FFO must determine if there are any significant environmental impacts associated with the proposed action warranting further analysis in an Environmental Impact Statement (EIS). The BLMIFFO Field Manager is the responsible officer who will decide one of the following:

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

An approved ROW grant issued by the BLM would authorize the applicant to construct and operate the subsurface pipeline.

Three action alternatives are analyzed in this EA. Alternative A is the proposed action and is located on BLM-managed lands. Alternatives B and Care located on BLM and Navajo Nation land. Should the BLM select Alternative B as the agency preferred alternative, Encana would need to request a ROW grant from the Bureau of Indian Affairs (BIA) for those portions of the alignment located on the Navajo Nation. The BIA would issue a separate decision for the ROW grant proposal on Tribal Trust lands. For the BIA to make an informed decision, Alternative B would also be subject to additional NEPA analysis.

1.4 Conformance with Applicable Land Use Plan(s)

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this EA incorporates the information and analysis contained in the 2003 Farmington Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS) (USDI/BLM 2003a). The proposed action would be in conformance with the oil and gas leasing and development management actions in the Resource Management Plan (RMP)/Record of Decision (ROD) signed December 2003 and updated in December 2003 (USDI/BLM 2003b).

The proposed action would be in conformance with the 2003 RMP/ROD that states, to the extent possible, new ROWs will be located within or parallel to existing ROWs or corridors to minimize resource impacts (USDIIBLM 2003b, page 2-11). The PRMP/FEIS and ROD are available for review at the FFO in Farmington, New Mexico or electronically at http://www.nm.blm.gov/ffo/ffo_home.html. This project EA addresses site-specific resources and/or impacts that are not covered within the PRMP/FEIS, as required by the NEPA.

Oil and gas development is recognized as an appropriate use of public lands in the FFO planning area (USDI/BLM 2003b). The RMP adheres to the federal mandates contained in the Energy Policy and Conservation Action (42 USC 6217) and Executive Order 13212, which direct federal land managing agencies to expedite the production of the federal mineral estate for the development of reliable domestic sources of energy (USDIIBLM 2003b, pages I and 11).

1.5 Relationship to Statutes, Regulations, or Other Plans

Encana would comply with all applicable federal, state, and local laws and regulations as well as obtain the necessary permits for the installation and operation of the pipeline. These laws and regulations include, but are not limited to the following:

- Antiquities Act of 1906. as amended (PL 52-209: 16 USC 431-433)
- American Indian Religious Freedom Act of 1978 (PL 95-431; 92 Stat. 469; 42 USC 1996)
- Archaeological Resources Protection Act of 1979 (PL 96-95; 93 Stat. 721; 16 USC § 470aa et seq.), as amended (PL 100-555; PL 100-588)
- Bald and Golden Eagle Protection Act of 1940, as amended (PL 86-70, PL 87-884, PL 92-535, PL 95-616; USC 668-668d)
- Clean Air Act, as amended (PL 88-206: 42 USC§ 7401 et seq.)
- Clean Water Act, as amended (PL 107-303; 33 USC§ 1251, et seq.)
- Colorado River Salinity Control Act, as amended (PL 93-320; 7 CFR Part 702)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (PL 96-510; 42 USC§ 9601; 40 CFR Part 307)
- Endangered Species Act of 1973 (PL 93-205; 16 USC§ 1531 et seq.)
- Executive Order 11988 Floodplain management
- Executive Order 11990 Protection of Wetlands
- Executive Order 13007 Indian Sacred Sites
- Executive Order 13112 Invasive Species
- Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds
- Migratory Bird Treaty Act of 1918, as amended (16 USC§§ 703-712; 50 CFR Part 21)
- Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3048; 25 USC 300 I; 43 CFR Part 10).
- Paleontological Resources Preservation Act as part of the Omnibus Public Land Management Act (PL 111-011, Title VI. Subtitle D)
- Safe Drinking Water Act, as amended (PL 93-523; 42 USC 300F-300-9), 40 CFR Parts 144 and 147).
- Section I06 of the National Historic Preservation Act of 1966 (PL 89-665; 80 Stat. 915; 16 USC 470 et seq.), as amended (implemented under regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800)

1.6 Scoping, Public Involvement, and Issues

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

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

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

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

- How would the alternatives affect air quality in the area?
- How would the alternatives affect soils?
- How would the alternatives affect water quality and quantity?
- How would the alternatives affect BLM special management species and migratory birds?
- How would the alternatives affect upland vegetation and invasive species?
- How would the alternatives affect cultural resources?
- How would the mineral estate be affected by the alternatives?
- How would the alternatives affect livestock grazing?
- How would social and economic features be affected by the alternatives?
- What would be the affects to public health and safety?

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

2. PROPOSED ACTION AND ALTERNATIVES(S)

2.1 No Action

The BLM NEPA Handbook (USDVBLM 2008) states that for EAson externally initiated proposed actions, the no action alternative is generally to reject the proposal or deny the application. This option is provided in 43 CFR 3162.3-2 (h)(2). This alternative would deny the approval of the ROW grant and the current land and resource uses would continue to occur in the proposed project area. The no action

alternative provides a useful baseline for comparison of environmental effects (including cumulative effects) and demonstrates the consequences of not meeting the need for the action.

2.2 Alternative A (Proposed Action)

Encana is requesting authorization to construct, operate, maintain, and abandon the proposed Good Times Trunk #I Phase I pipeline. A vicinity map is provided as Figure I. The proposed 33,302-foot subsurface pipeline would consist of two separate sections (East and West) that would connect to the recently constructed Dugan Production Company Olympic Torch gathering system. The proposed action is shown on the 2010 digital photo orthoquad in Figures 2 and 3. The proposed pipeline legal description is:

East
N/2 of Section 31, Township 24 North, Range 9 West
S/2 SE/4 of Section 35 and S/2 and SE/4 NE/4 of Section 36, Township 24 North, Range 10 West
New Mexico Principal Meridian (NMPM), San Juan County, New Mexico

West
S/2 SW/4 of Section 27, S/2 of Section 28. SE/4 SE/4 of Section 29, N/2 of Section 33, N/2 of Section 34, SW/4 NW/4 and SW/4 of Section 35, Township 24 North, Range 10 West
NMPM, San Juan County, New Mexico

The proposed pipeline would be approximately 33,302 feet in length (6.3 miles) and constructed within a 40-foot-wide ROW on BLM/FFO-managed land. The permanent ROW would be 40 feet wide. Survey plats of the proposed pipeline are provided in Appendix A. Additionally, two 50-foot-wide temporary use areas (TUAs) are proposed-one for boring under State Highway 57 between station 149+43.1 and 151+93.J on the East pipeline alignment and one for boring under County Road 7635 between station 121+12.3 and 124+12.3 on the West pipeline alignment.

The proposed pipeline would be located adjacent to existing roads and/or pipelines for approximately 22,758 feet (4.3 miles). Based on an approximate 20-foot overlap with existing disturbance, this portion of the alignment would result in approximately 11.4 acres of new disturbance. Approximately 10,544 feet (2.0 miles) of the proposed alignment would be constructed cross-country, resulting in about 9.7 acres of new disturbance. Total new disturbance from the proposed project would be approximately 20.13 acres. The TUAs would add an additional 0.63 acres of disturbance. Total disturbance from the proposed action would be 31.21 acres. Table 2-1 in Section 2.5 provides a comparison of the disturbance per action alternative.

The proposed pipeline would be a 12-inch steel line with a maximum allowable operating pressure (MAOP) of 740 pounds per square inch (psi). During operation and maintenance, Encana would maintain the pipeline ROW according to the environmental protection measures stipulated in the ROW grant. The proposed action would operate according to industry standards. Normal maintenance of the pipeline would be required. When the pipeline is no longer commercially viable, it would be abandoned per BLM stipulations.

The proposed action would be scheduled for construction in the fall of 2013 with construction and reclamation activities expected to last for approximately I0 to 12 weeks. Encana would comply with all

applicable federal, state, and local laws and regulations and obtain the necessary permits for the installation of the pipeline.

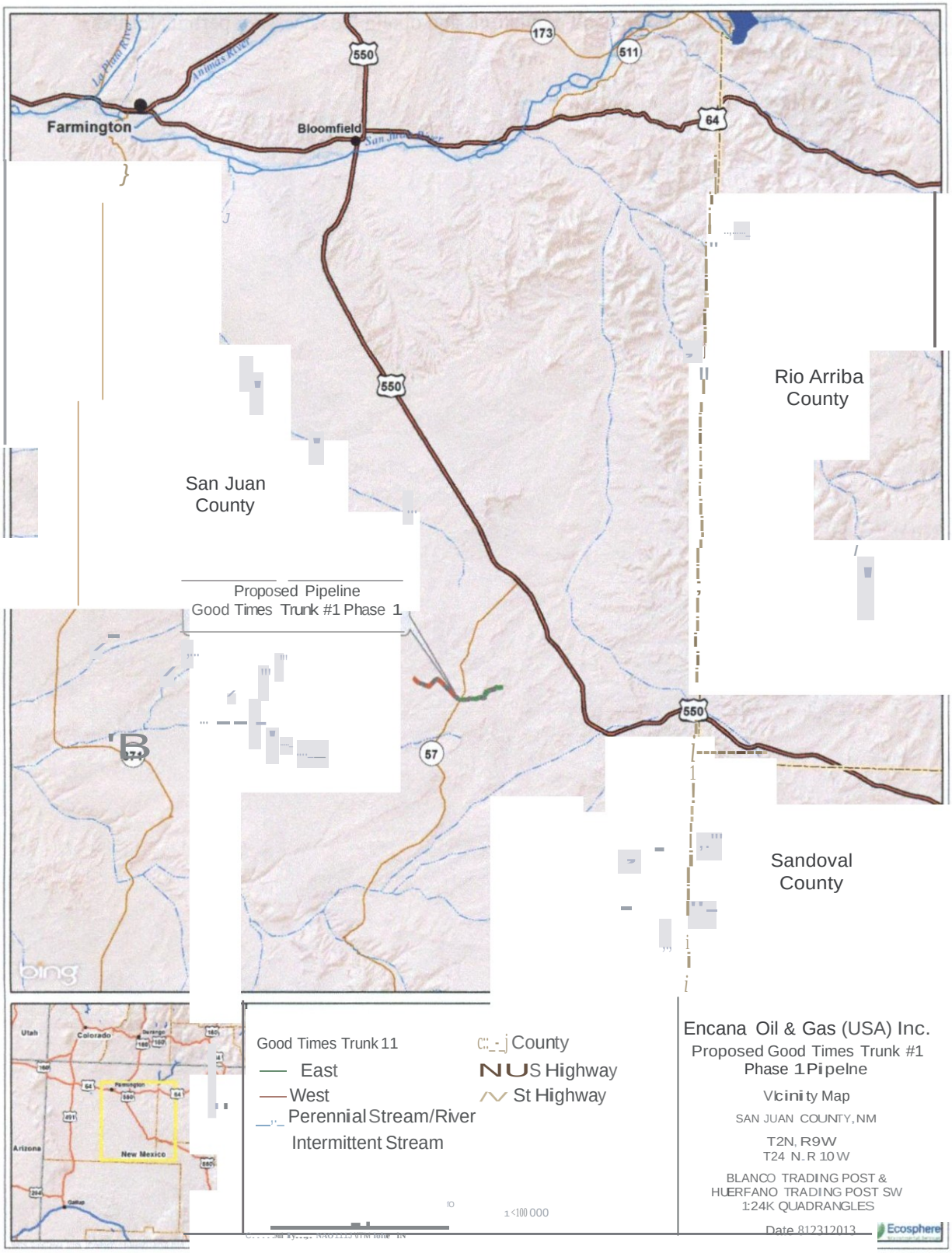

Figure 1: Good Times Trunk #1 Phase 1 and vicinity

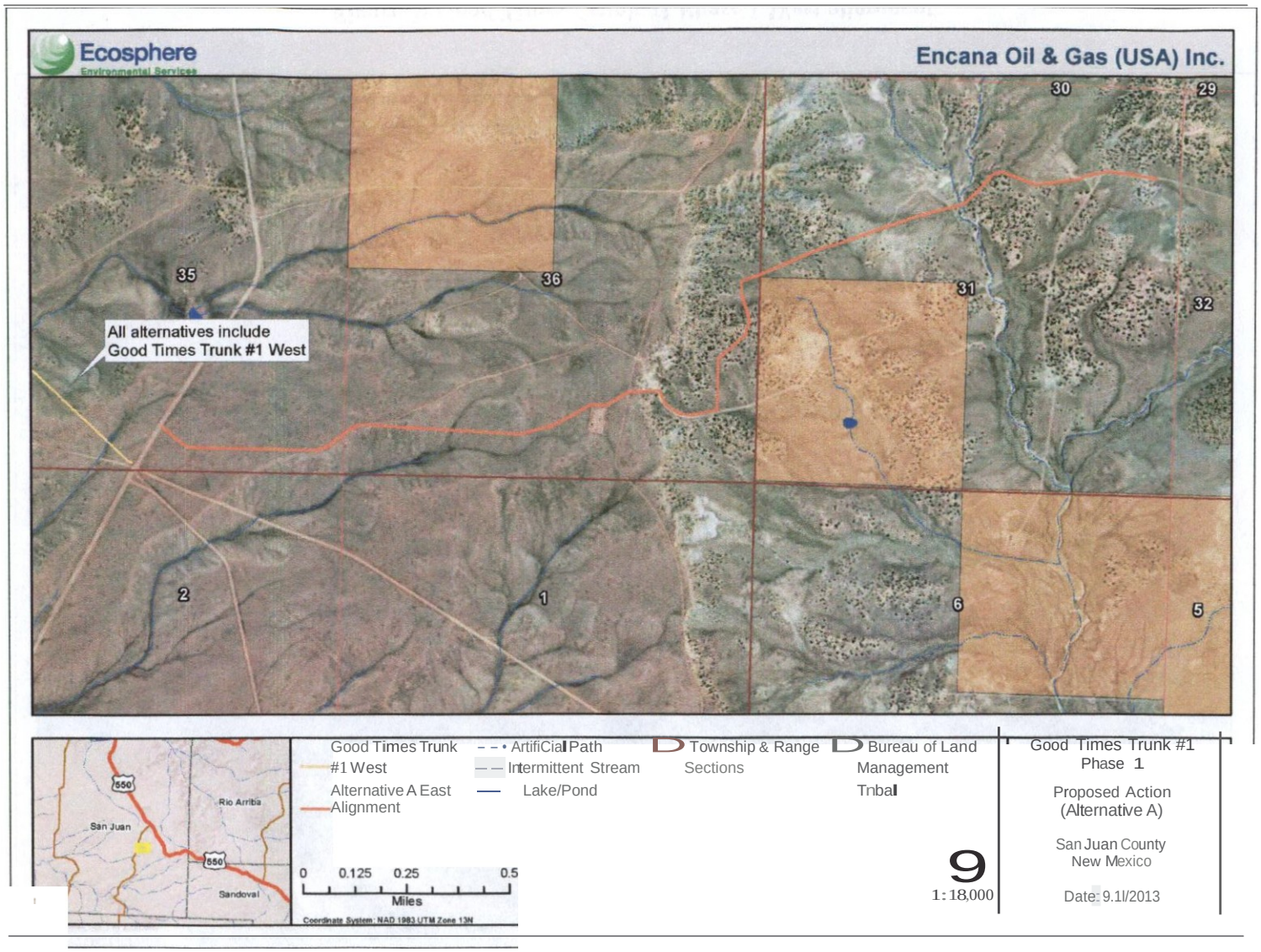

Figure 2: Good Times Trunk #1 Phase 1 proposed action (Alternative A)

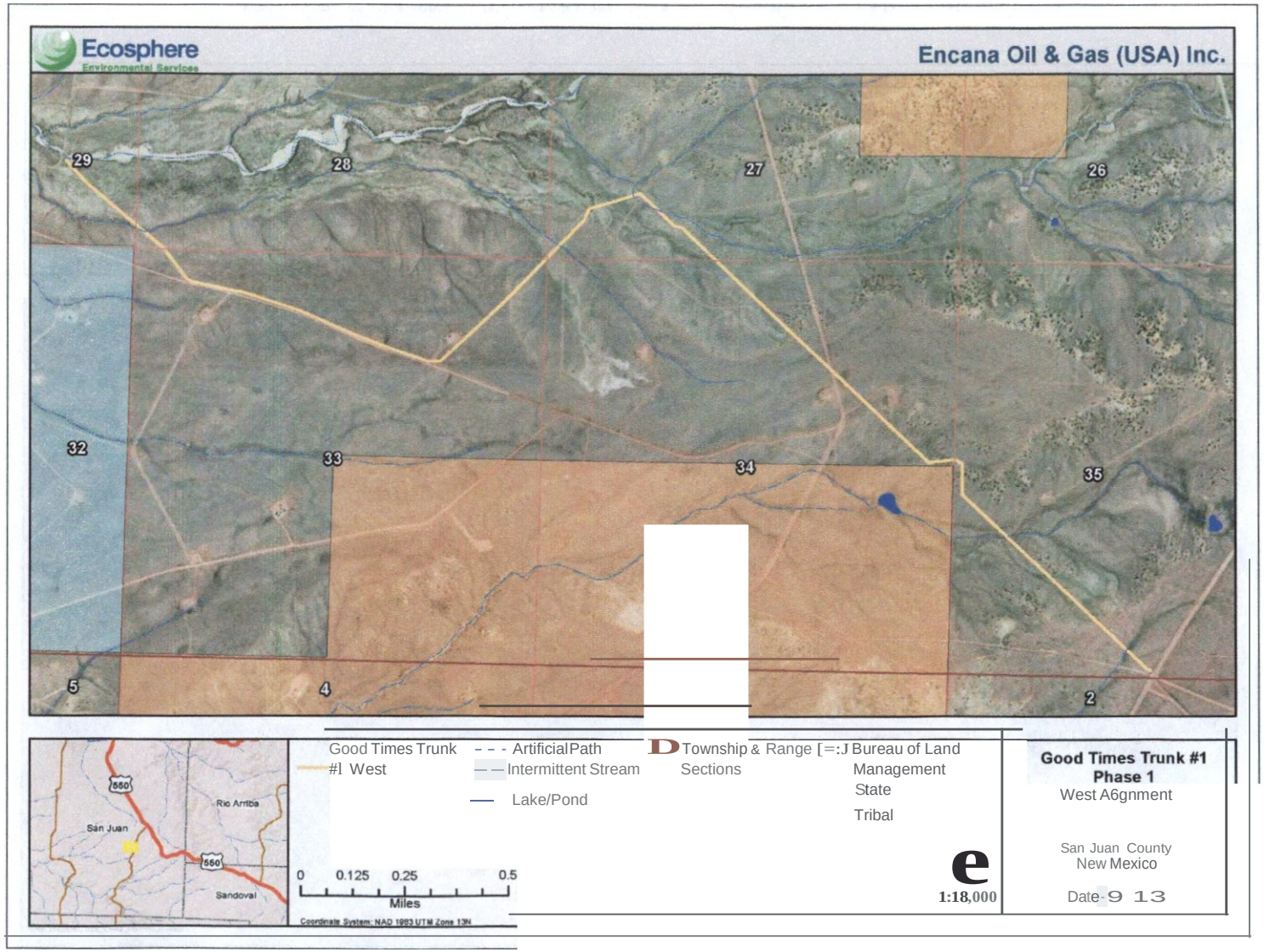

Figure 3: Good Times Trunk #1 Phase 1 West alignment

2.2.1 Construction

New Mexico State Highway 57, County Road 7515, County Road 7635, Indian Route 458, and other existing roads would provide access to construct the pipeline. In those areas where the proposed ROW would not be adjacent to an existing road, the pipeline would be accessed along the proposed ROW.

Clearing, grading, and other disturbance of soil and vegetation would be limited to the minimum areas required for safe construction operation within the approved work areas. Shrubs and trees would be cut to near ground level and cleared. The upper 6 inches of topsoil (or all available) would be stripped off the trench or any areas to be cut. The salvaged topsoil would be windrowed on the non-working side of the construction corridor, where possible, or stockpiled and protected in designated TUAs.

Once the working area is prepared, the trenching operation would begin. The pipeline would be installed to a minimum of a 3-foot depth, except in drainages where depth would range from 4 to 6 feet. The trench would be excavated using a backhoe or excavator to remove subsoil. The trench would be excavated and sloped in accordance with Occupational Safety and Health Administration specifications. The trenching operation would be followed by pipe installation that would include stringing, bending for horizontal or vertical angles in the alignment, welding pipe segments together, inspecting, coating joint areas to prevent corrosion, and lowering into the trench. The joints of pipe would be trucked to the corridor and strung end-to-end in the construction corridor in preparation for bending and welding. After final inspection of the welded and coated pipe, the assembled pipe would be lowered into position in the open trench.

Spoil material excavated from the trench would be used to cover the pipe and backfill the trench, and then compacted. After backfilling has been completed, the pipeline will be hydrostatically tested to ensure pipeline integrity. Following construction, topsoil would be re-spread and the ROW would be re-contoured and reseeded.

2.2.2 Design Features

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

- A migratory bird nest survey will be conducted if any vegetation disturbing activities occur between May 15 and July 31. The survey must be conducted by a BLM-approved biologist using

- Trees and brush less than 6 inches in diameter will be chipped or shredded: this material will be salvaged and stored with topsoil.
- Trees greater than 6 inches in diameter will be cut, de-limbed, and bucked into 4-foot lengths. Trunks will be stacked to the side of the pipeline workspace and/or access road for wood gatherers and the limbs will be stockpiled for reclamation. Stumps will be cut no higher than 6 inches from the ground and stumps and root balls will be buried onsite.
- Topsoil will be segregated from the trench line, except for areas that require grading. In areas requiring grading, the top 6 inches of soil will be stripped from the entire portion of the workspace.
- Topsoil will be segregated and stockpiled at the edge of the workspace. Topsoil will not be used for padding or mixed with excavated subsoil.
- Excavated material will be stockpiled at the edge of the workspace.
- The amount of open trench will be minimized ahead of pipe laying and backfilling. No more than Y2 mile of trench or the amount of trench that can be worked in a day will be open at any given time. Backfilling operations would be performed within a reasonable amount of time of the lowering operation to ensure the trench is not left open for more than 24 hours. Trenches left open overnight will be fenced with a temporary fence or other methods approved by the Authorized Officer. The ends of the trench will be sloped (3:1) to allow animals to escape.
- Escape ramps/crossovers will be constructed every I,320 feet. In areas where active grazing is taking place or in Wildlife Specially Designated Areas (SDA's) escape ramps/crossovers will be placed every 500 feet. The ends of the open trench will be sloped each night with a 3:I slope.
- Established livestock and wildlife trails will be left in place as a crossover. Escape ramps/crossovers will be constructed with a minimum 3:I slope at each end of the crossover. Crossovers will be a minimum of lO feet wide and not fenced.
- The end of the pipe will be plugged to prevent animals from crawling in.
- Before the trench is closed. it will be inspected for animal. Any trapped wildlife or livestock will be promptly removed and released at least 150 yards from the trench.
- The pipeline will bore beneath County Road 7635 and State Highway 57.
- Cover from top of pipe to ground level will be a minimum of 36 inches through typical soil and rock and a minimum of 48 inches at road crossing. Inspection will be conducted to verify that minimum cover is provided, the trench bottom is free of rocks and debris, external pipe coating is not damaged, and the pipe is properly fitted and installed into the ditch.
- Backfilling will begin after a section of the pipe has been placed in the ditch and final inspection has been completed.
- After backfilling has been completed. cleanup activities will be initiated as soon as practicable. All construction-related debris will be removed and disposed at an approved disposal area. The workspace will be graded as near as possible to the pre-construction contours and natural runoff and drainage patterns will be restored.
- Rocks and limbs removed during clearing will be scattered across the workspace in a random arrangement using rubber-tired equipment.

- All existing improvements (such as fences, gates. and bar ditches) will be repaired to previous or better than pre-construction conditions.
- Permanent erosion control measures will be installed after the workspace has been re-contoured. The disturbed areas will then be reseeded with a BLM/FFO-approved seed mix. Seeding will be accomplished within 120 days of construction completion, weather perrrutting. Upon evaluation after the second growing season, seeding will be repeated if a satisfactory stand is not obtained. Cut and fill slopes would be hand seeded with hydro-mulch excelsior netting and/or mulch with netting.
- Where the ROW is not adjacent to the road, berms or other controls will be placed to restrict access to the ROW.
- It will be the operator's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the proposed project. The operator will contact the BLM/FFO regarding acceptable weed-control methods. If the operator does not hold a current Pesticide Use Permit, a Pesticide Use Perrrut will be subrrutted prior to pesticide application. Only pesticides authorized for use on BLM lands will be used. The use of pesticides will comply with federal and state laws. Pesticides will be used only in accordance with their registered use and limitations. The operator will contact the BLM/FFO prior to using these chemicals.
- All FFO cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review, attached to the COA in the APD/ROW as the case may be. These stipulations may include, but are not limited to temporary or permanent fencing or other physical baniers. monitoring of ea1th disturbing construction. project area reduction and/or specific construction avoidance zones. and employee education. All employees, contractors. and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles. and company equipment. All employees, contractors, and sub-contractors of the project will also be informed that it is illegal to collect. damage, or disturb cultural resources and that such activities are punishable by crirrunal and/or adrrunistrative penalties under the provisions of the Archaeological Resources Protection Act (16 United States Code [U.S.C.] 470aa-mm). In the event of a discovery during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery and 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.. National Register, Native American Graves Protection and Repat1iation Act , Archaeological Resources Protection Act (ARPA), it will be protected in place until mitigating measures can be developed and implemented according to guidelines set by the BLM.

2.3 Alternative B

Under Alternative B, Encana would construct an approximately 32.990-foot subsurface pipeline consisting of two separate sections (East and West) that would connect to a recently constructed Dugan Production Company Olympic Torch gathering system. The West section of the pipeline would be the same as the proposed action (Figure 3), while the East section would follow the general alignment shown Figure 4. The proposed pipeline would be located on BLM-managed lands and Navajo Nation Tribal Trust lands. The East section Alternative B has not been land surveyed and the alignment was developed

using geographic information systems (GIS) software, aerial images, and other digital data. The Alternative B legal description is:

East

NW/4 and S/2 of Section 31, Township 24 North, Range 9 West
S/2 SE/4 of Section 35 and S/2 of Section 36, Township 24 North, Range 10 West
NMPM. San Juan County. New Mexico

West

S/2 SW/4 of Section 27, S/2 of Section 28, SE/4 SE/4 of Section 29, N/2 of Section 33, N/2 of Section 34, SW/4 NW/4 and SW/4 of Section 35, Township 24 North, Range 10 West
NMPM. San Juan County, New Mexico

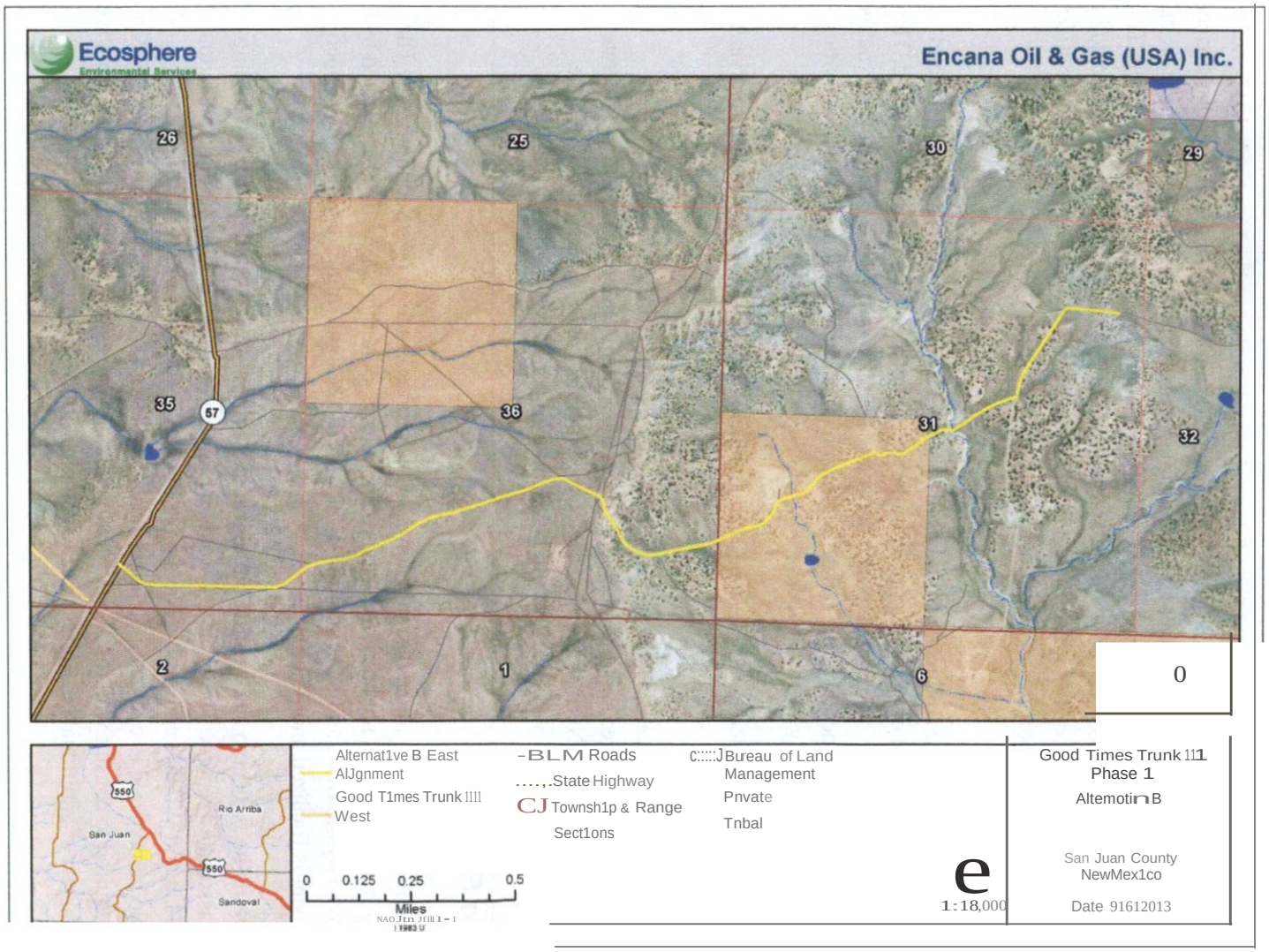

Figure 4: Good Times Trunk #1 Phase 1 Alternative B (East alignment)

Additionally, two 50-foot-wide TUAs would be needed-one for boring under State Highway 57 between station 149+43.1 and 151+93.1 on the East pipeline alignment and one for boring under County Road 7635 on the West pipeline alignment. Figure 5 shows Alternative A in relation to Alternative B.

The proposed pipeline would be located adjacent to existing roads and/or pipelines for approximately 32,156 feet (6.1 mHes). Approximately 3.400 feet of this existing disturbance is a two-track that is not a ELM-authorized or maintained road. Based on an approximate 20-foot overlap with existing disturbance. Alternative B would result in approximately 14.77 acres of new disturbance. Approximately 834 feet of Alternative B would be constructed cross-country, resulting in about 0.76 acres of new disturbance. Total new disturbance from the proposed project would be approximately 15.53 acres. The TUAs would add an additional 0.63 acre of disturbance. Total disturbance from Alternative B would be approximately 30.93 acres. Refer to Table 2-1 in Section 2.5 for a summary comparison of disturbance of the action alternatives.

In order to implement Alternative B, Encana would need to apply for a ROW grant with the BIA and receive approval to construct and operate the portion of the alignment located on Tribal Trust land. The BIA permitting process would be anticipated to take between 12 and 24 months to complete. Alternative B would be scheduled for construction in the fall of 2015, with construction and reclamation activities expected to last for approximately 10 to 12 weeks.

Alternative B would be constructed using the same accepted techniques and practices as Alternative A (refer to Section 2.2.1).

During operation and maintenance, Encana would maintain the pipeline ROW according to the environmental protection measures stipulated in the ROW grants. The proposed action would operate according to industry standards. Normal maintenance of the pipeline would be required. When the pipeline is no longer commercially viable, it would be abandoned per BLM and BIA stipulations.

2.3.1 Design Features

Alternative B would incorporate all the design features of the proposed action (see Section 2.2.2). The East portion of Alternative B has not been inspected in the field. Should this alternative be selected by the BLM and approved by the BLM and BIA. additional site-specific design features could be developed when the alignment is finalized and field inspected.

Alternative B would be subject to site-specific biological and cultural surveys and the survey findings documented in associated reports. The applicant would be required to consult with the Navajo Nation Department of Fish and Wildlife concerning Navajo Nation species of concern and a Biological Evaluation would be prepared to evaluate potential impacts to Navajo species of concern. The applicant would also be required to consult with the Navajo Nation Historic Preservation Department. Alternative B would also be subject to additional NEPA analysis to comply with BIA requirements.

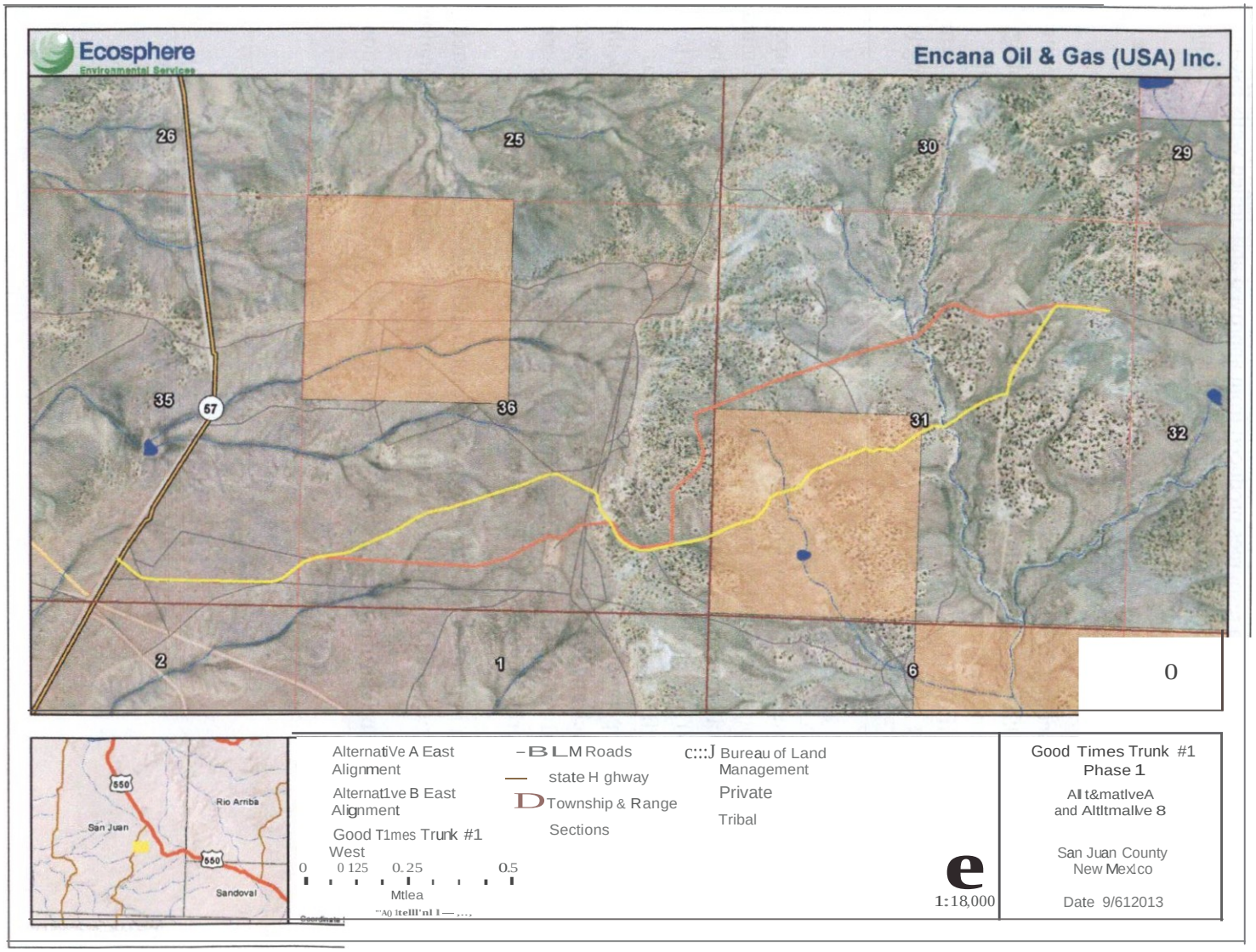

Figure 5: Comparison of Good Times Trunk #1 Phase 1 Alternatives A and B East alignments

2.4 Alternative C

Alternative C would consist of the subsurface pipeline alignment described under Alternative B. Additionally. under Alternative C, Encana would apply for a ROW grant to construct and operate two temporary surface lines to allow access to resources produced from approved and drilled wells Escrito H31-2409 OIH and Escrito A31-2409 01 H wells (which have already been drilled) and the Good Times 006-2309 01H well (which has also been drilled and will be completed and producing in less than 4 months). The surface lines would be permitted for a 2-year period. Figure 6 shows the location of the proposed Alternative C subsurface and surface lines.

The proposed surface line connecting the Good Times 006-2309 01 H to the Olympic Torch gathering line would be approximately 10,700 feet in length. The swface line would be laid adjacent to existing disturbance and there would be no subsurface disturbance. The proposed surface line connecting the Escrito H31-2409 0 IH and Escrito A31-2409 0 lH to an existing Enterprise Products gathering system would be approximately 23,347 feet in length and adjacent to existing disturbance for its entire length.

2.4.1 Construction

The surface lines would be constructed of up to 6-inch diameter fiberspar or flex steel composite pipe with a MAOP of 740 psi. The pipeline would be in constructed and operated in accordance with United States Department of Transportation regulations and industrial standards. The surface lines would be offset from existing roads by I 0 to 20 feet. The ROW vegetation would be mowed (brush-hogged) to allow the line to lay evenly on the ground surface. Mowing would be limited to the minimum areas required for safe construction operation within the approved work areas. Once the ROW is cleared. the pipe would be spooled off a truck and the fittings crimped on. The line would be hydrostatically tested and inspected. The line would then be stabilized on the ground to minimize movement due to pressure changes. Construction of the surface lines would take approximately 12 weeks.

The surface lines would remain in place until a subsurface alignment could be designed and permitted. Once a subsurface line is constructed and operating, the sutface lines would be removed from operation.

The subsurface pipeline would be constructed as desctibed under the proposed action (refer to Section 2.2.1).

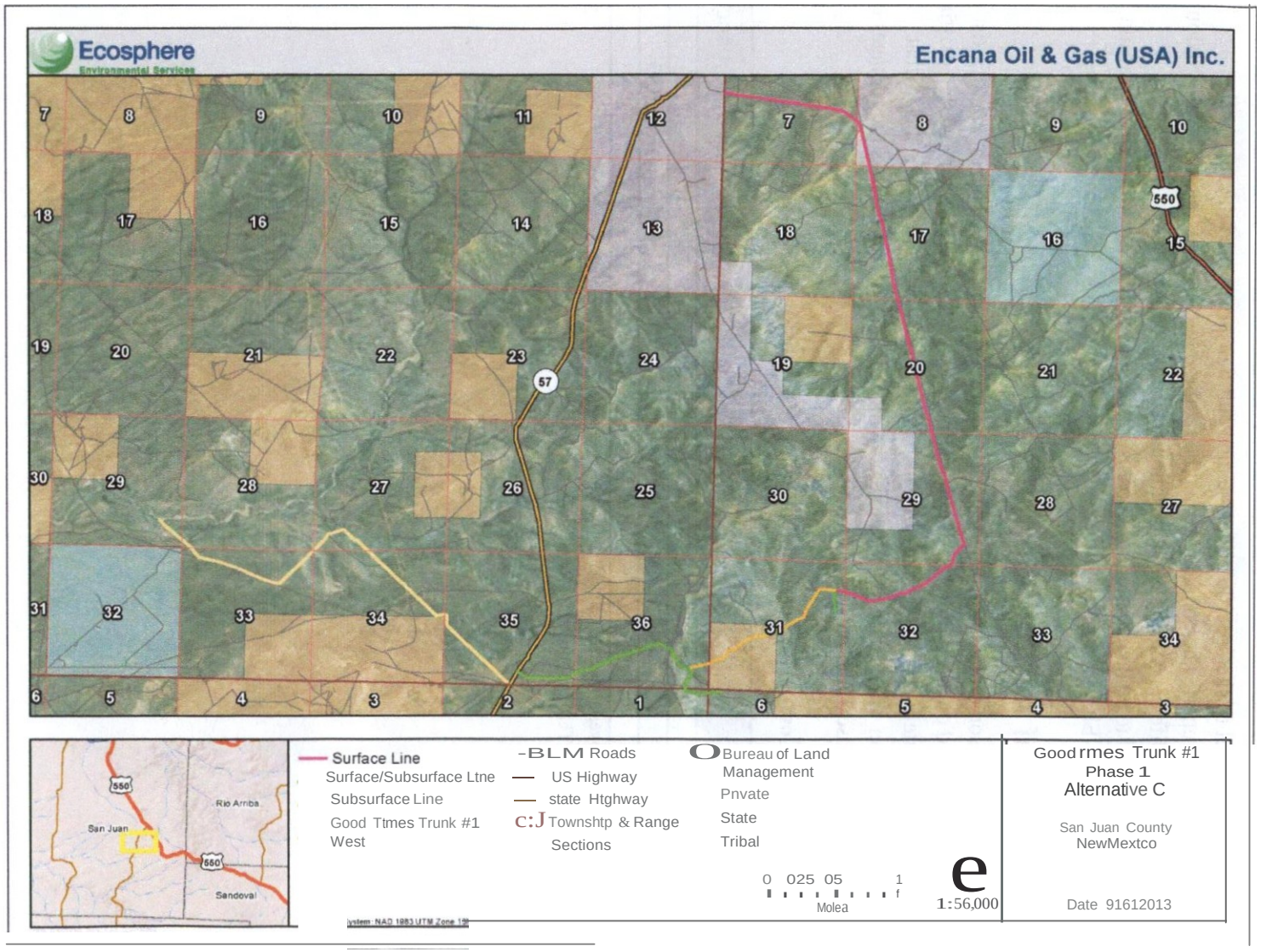

Figure 6: Good Times Trunk #1 Phase 1 Alternative C

2.4.2 Design Features

Alternative C would incorporate all the design features of the proposed action (Section 2.2.2). The East portion of Alternative C has not been inspected in the field. Should this alternative be selected by the BLM and approved by the BLM and BIA, additional site-specific design features could be developed when the alignment is finalized and field inspected.

Alternative C would be subject to site-specific biological and cultural surveys and the survey findings documented in an associated report. The applicant would be required to consult with the Navajo Nation Department of Fish and Wildlife concerning Navajo Nation species of concern and a Biological Evaluation would be prepared to evaluate potential impacts to species of concern. Alternative C would also be subject to additional NEPA analysis.

2.5 Comparison of Action Alternatives

Table 2-1 provides a comparison of the disturbance acreage per action alternative. The amount of existing disturbance is calculated based on an assumption that the proposed pipeline ROW would overlap existing roads or ROWs by approximately 20 feet. Total disturbance includes the 0.63 acre for the TUAs that would be used for boring under State Highway 57 and County Road 7635. Table 2-2 lists the footages of the Good Times Trunk #1 Phase 1 alternatives disturbance.

Table 2-1: Comparison of action alternatives of disturbance acreage

Alternative	New Disturbance (acres)	Existing Disturbance (acres)[1, 2]	Total Disturbance [2]
Alternative A	20.13	11.08	31.21
Alternative B	15.53	15.40	30.93
Alternative C	15.53	15.40	30.93

[1] Based on an approximate 20-foot overlap with existing disturbance.

[2] Includes disturbance acreage from TUAs proposed under all action alternatives.

Table 2-2: Comparison of Alternative Components

Route	Type	Alternative A	Alternative 8	Alternative C
		Length (feet)		
Good Times Trunk #1 Phase 1 (West)	Cross-country	833.9	833.9	833.9
	Parallel to Existing	17,334.2	17334.2	17334.2
	Sub Total	18,168.1	18.168.1	18,168.1
Good Times Trunk #1 Phase 1 (East)	Cross-country	9,710.1	0.0	0.0
	Parallel to Existing	5,423.4	14,821.4	14,821.4
	Sub Total	15,133.5	14,821.4	14,821.4
Escrito 831/A/31-2409 Surface Line	Cross-country	0.0	0.0	10,700
Good Times D06-2309 Surface Line	Parallel to Existing	0.0	0.0	23,347
	Subtotal			34,047
	Total Cross-country	10,544.0	833.9	833.9
	Total Parallel to Existin	22,757.6	32,155.6	32,155.6
	Total Subsurface	33,301.6	32,989.5	32,989.5
	Total Surface	0.0	0.0	34047
	Grand Total	33,301.6	32,989.5	67 036.5

Lengths are approximate and calculated using geographic information systems. Actual length may vary.

Encana has proposed four well pads in the West section of the proposed Good Time Trunk #I Phase I. The West portion of the proposed trunk line would be the same under all the action alternatives.

Encana has proposed six well pads in the East section of the proposed Good Times Trunk #1 Phase I; Escrito H31-2409 and Escrito A31-2409 (EA# DOI-BLM-NM-FOl0-2013-0391), Good Times D06-2309 (EA #FOI 0-2013-0096), Escrito M30-2409, Good Times P36-2410 (EA# DOI-BLM-NM-FOl0-2013-0169), and the Good Times P36A-2410 (EA #FOOI0-2013-0081). Nine wells would be driUed from these six well pads. The proposed pipeline would transport fluid minerals from these wells and possibly future wells that could be drilled in the area. Figure 7 shows the location of the drilled. approved, and pending well pads. In the future, additional wells may be identified for lease development.

The effects from developing the proposed six well pads and the associated infrastructure have been or will be analyzed in separate EAs. The lengths and locations of the associated well-tie pipelines connecting to the East alignment would be different under the action alternatives. These wells, lease type, and status are listed in Table 1-1. For wells listed in Table 1-1 that are pending, the site-specific well pad locations have not been identified.

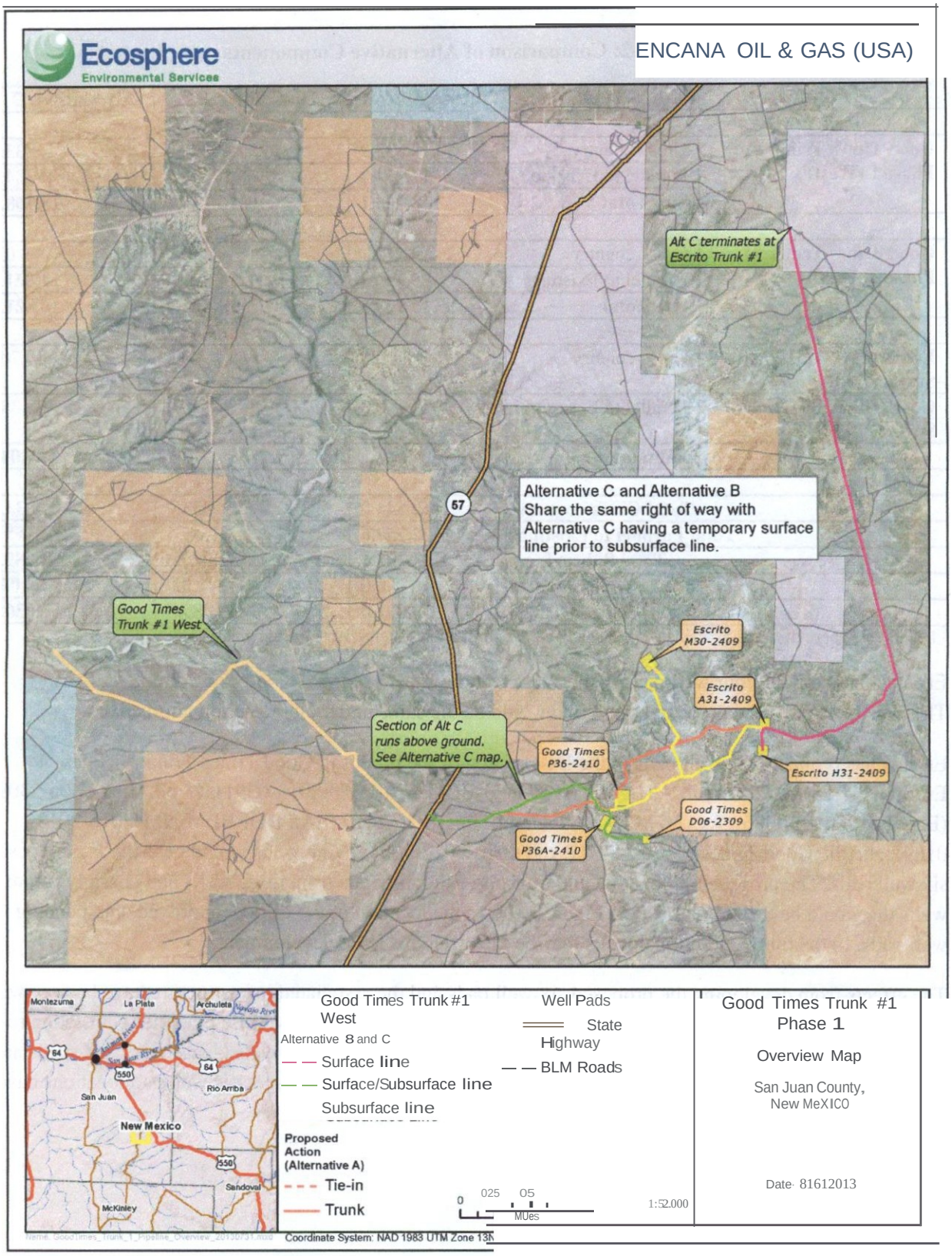

Figure 7: Good Times Trunk #1 Phase 1 Overview

2.6 Alternatives Considered but Eliminated from Further Analysis

One alternative was considered but eliminated from further analysis. Encana considered tying into the existing Dugan Production Corporation Good Times gathering line. There are two reasons why this alternative has been eliminated.

The system capacity is inadequate. This alternative would restrict production given the systems operating pressure limits. Dugan's Good Times System is a mix of steel tubing, fiberglass, and polyethylene pipe. The system's normal operating pressure is 30 psi or less and has never been operated at pressures greater than 150 psi, according to Dugan Production Corporation. There is no record of a hydrostatic test on the system and there is no way to establish an acceptable MAOP without one. However, the limiting factor on the system is the inclusion of SDR 11 polyethylene pipe that has a MAOP of 160 psi. but would be de-rated to 80 psi in the presence of hydrocarbons. At 80 psi, the Good Times 006-2309 01H well would only be able to flow a maximum of 200 to 260 thousand cubic feet per day (Mcfd), willie the Escrito A31 and H31 wells combined would only be able to flow 175 to 225 Mcfd.

Considering that the Dugan Good Times system is currently operating at about 20 psi, if Encana were to tie in the three wells, and future wells, the line pressure would almost certainly curtail existing wells on the system. This would require Encana to decrease production on its wells to meet an 80 psi MAOP and negatively impact other rruneral owners currently tied into the system.

Human health and safety risks would also be greater. There is the potential to overpressure the Good Times, which could lead to line failure. Given the line is constructed of different materials, line failure would likely be a rupture rather than a leak. Pipeline ruptures carry a higher risk of explosion and fire. Therefore, this alternative has been eliminated from detailed considerati on since it cannot be implemented without significant technical challenges and this alternative would result in greater environmental impacts than the proposed action alternatives.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environment that would be affected by implementation of the alternatives described in Chapter 2. Aspects of the affected environment desctibed in this section focus on the relevant major resources or issues. Only the aspects of the affected environment that are potentially impacted are described. None of the proposed action alternatives is located within an Area of Critical Environmental Concern or Specially Designated Area.

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

Cultural resource surveys were conducted by La Plata Archaeological Consultants (LAC) between May I and May 31, 2012 and on December 13, 2012. An onsite meeting with representatives from Encana, the BLM, Ecosphere Environmental Services (Ecosphere), and LAC was held on November 20, 2012. Field resource investigations of the Alternative A alignment were conducted on November 28 and 29,2012 by biologists from Ecosphere.

Pottions of Alternatives B and C have not been surveyed for biological or cultural resources. The affected environment descriptions for these alternatives are based on desktop review of available GIS or other data. Should either of these alternatives be implemented. field surveys and consultation with land and resource managers and agencies would be conducted.

Impacts in this section are analyzed by quantitatively estimating impacts without regard to site-specific information for those portions of Alternatives Band C that have not been surveyed. When necessary, impacts are analyzed qualitatively.

3.1 Air Resources

3.1.1 Affected Environment

The proposed action alternatives would be located in San Juan County, New Mexico. Additional general information on air quality in the project area is contained in Chapter 3 of the Farmington PRMP/FEIS. In addition, new information about greenhouse gases (GHG) and their effects on national and global climate conditions has emerged since this document was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide. methane, 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 into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably and may contribute to overall climatic changes, typically referred to as global warming.

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

The United States Environmental Protection Agency (USEPA) has the primary responsibility for regulating air quality. including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO); nitrogen dioxide ($N0_2$); ozone: patticulate matter (PM), specifically particulate matter Jess than I0 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$); sulfur dioxide ($S0_2$); and lead. The USEPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment.

The USEPA has proposed or completed actions recently to implement Clean Air Act requirements for GHG emissions and the USEPA has approved New Mexico's State Implementation Plan. 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 air quality 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 seties of years. Climate has the potential to influence renewable and non-renewable resource management.

Criteria Air Pollutants

The Air Quality Technical Report describes the types of data used for the description of 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 (USDI/BLM 2013). The USEPA Green Book web page reports that all counties in the analysis area (San Juan, McKinley, Rio Arriba, and Sandoval Counties in New Mexico) and La Plata County, Colorado are in attainment of all NAAQS, as defined by the Clean Air Act. The area also does not violate any New Mexico Ambient Air Quality Standards (NMAAQS). The current criteria pollutant "design concentrations" in the analysis area are desctibed below. Design Concentrations are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. Table 3-1 shows monitored design values for ozone in recent years for each of the three San Juan County ozone-monitoting stations.

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

State Air Monitoring Station	8-hour Ozone Design Value (ppm[1])				NAAQS
	2007-2009	2008-2010	2009-2011	2010-2012	2008
Substation	0.067	0.063	0.063	0.067	0.075
Bloomfield	0.061	0.060	0.061	0.067	0.075
Navajo Lake	0.069	0.066	0.068	0.071	0.075

[1] parts per nulhon
Source: USEPA 2013

Table 3-2 summarizes monitored design values for other critetia pollutants in San Juan County.

Table 3-2: Criteria pollutant design value concentrations monitored in San Juan County (USEPA 2012)

Pollutant	Design Value	Averaging Time	NAAQS	NMAAQS
NO_2	13 parts per billion (ppb)	Annual	53 ppb	50 ppb
NO_2	39 ppb	1-hour	100 ppb[3]	0.10 ppm (24-hour)
PM_{10}	Data incomplete	24-hour	150 micrograms per cubic meter of air (!Ig/m[3] b	150 J.tg/mJc
$PM_{2.5}$	4.5 J.tg/mj	Annual	12 J.tg/mJ0	60 -tg/mb
$PM_{2.S}$	14 IJ.g/mj	24-hour	35 J.tg/m[3]	
SO_2	0.001 ppm	Annual	None	0.02 ppm
SO_2	20 ppb	1-hour	75 ppbe	None
SO_2	0.008 ppm	24-hour	None	O.IO ppm

[a] 98[lh] percentile, averaged over 3 years.

bNot to be exceeded more than once per year, on average, over 3 years.

< The NMAAQS is a standard for totalsuspended PM.

d Annualmean, averaged over 3 years.

•99•h percentile of 1-hour-daily maximum concentrations, averaged over 3 years.

In 2005, the USEPA estimated that there was less than 0.01 ton per square mile of lead emitted in the analysis area, which is less than 2 tons total (USDVBLM 2013). There is no monitoring conducted for lead and CO in no1thwestern New Mexico: however, concentrations of these pollutants are expected to be low in rural areas and therefore not monitored.

Hazardous Air Pollutants

The Air Quality Technical Report discusses the relevance of hazardous rur pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (USDUBLM 2013). The USEPA has identified 187 toxic rur pollutants as HAPs. In March 2011, the USEPA published the fourth in a series of National Scale Air Toxics Assessments (NATAs) that quantifies HAP emissions for 2005 by United States (U.S.) counties. The purpose of the NATA is to identify areas where HAP emissions result in high health risk. Computer models are used to develop estimates of risk of cancer or other health impacts. NATA presents risk hazard indexes for cancer, neurological, and respiratory problems for each county and census tract.

Because techniques have changed over the years, each NATA is not comparable to those previously issued. The USEPA also cautions that because data availability varies from state to state, the results are not necessarily comparable from one geographic area to another. The 2005, NATA analysis estimated tract level total cancer risk for the analysis area as 25 to 50 per one million and the estimated tract level total respiratory hazard index was 0 to 1. The USEPA estimates the average national cancer risk for 2005 was 50 per one million, meaning one person out of every 20,000 had an increased likelihood of contracting cancer from breathing air toxics from outdoor sources if exposed to 2005 emission levels over his or her lifetime. A respiratory hazard index below I indicates that exposures in the area do not exceed reference levels that would have adverse effects for human health.

Climate

The analysis area is located in a semi-arid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F), and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above lOOoF 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 3-3 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 3-3: Climate normals for the Farmington area, 1981 to 2010

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

Source: USDUBLM 2013; data collected at New Mex1co State Agricultural Science Center- Farm1ngton

3.1.2 Impacts from Alternative A

Direct and Indirect Impacts

Air Quality

Air quality would be temporarily impacted with pollution from exhaust emissions and dust during construction. Air pollution from the motorized equipment and dust dissemination would discontinue at the completion of the project. Other factors that currently affect air quality in the area include dust from livestock herrung activities. dust from recreational use, dust from use of roads for vehicular traffic, and emissions from oil and gas production activities. Impacts to air quality attributable to this project would be temporary and minor.

Cumulative Impacts

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

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (USDIIBLM 2013). The Air Quality Technical Report 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 GHG 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 (USD1JBLM 2013) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with cettainty the net impacts from patticular emissions associated with activities on public lands.

3.1.3 Impacts from Alternative 8

Direct and Indirect Impacts

Given the minimal difference in pipeline footages, impacts under Alternative B would be similar to Alternative A.

Cumulative Impacts

Impacts under Alternative B would be similar to Alternative A.

3.1.4 Impacts from Alternative C

Direct and Indirect Impacts

Impacts under Alternative C would be similar to Alternatives A and B. However, the construction of two surface pipelines in addition to the subsurface pipeline would result in an increase in emissions and fugitive dust. These impacts would be temporary for the duration of construction. These impacts would not be measurably greater than those resulting from Alternatives A or B.

Cumulative Impacts

Impacts under Alternative C would be similar to Alternative A and B.

3.2 Soils

3.2.1 Affected Environment

Soils in the San Juan Basin were formed primarily in two kinds of parent material-alluvial sediment and sedimentary rock. Alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terrnces. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

Three major soil types occur within the proposed pipeline alternatives. The Doak-Sheppard-Shiprock association, rolling comprises approximately 50 percent of the area; the Blancot-Notal association gently sloping and the Fruitland-Persayo-Sheppard complex, hilly each comprise approximately 25 percent of the area (NRCS 2011). Each of the three soil types is well drained. highly erodible, and has not been classified as prime farmland.

The texture of the soil throughout the area was found to be fine to medium sandy clay loam. All soils within the alternative alignments are considered highly erodible and signs of erosion were present near ephemeral drainages in the Alternative A alignment. Cryptobiotic soils and foliose lichen were observed scattered throughout the undisturbed portions of the proposed Alternative A alignment, with an average cover up to 10 percent.

3.2.2 Impacts from Alternative A

Direct and Indirect Impacts

Construction would result in temporary displacement, compaction, and mixing of soils. The proposed project would affect approximately 31.2 acres of soils that have been classified as having slow to rapid surface runoff and low to severe water and wind erosion potential. Compaction of the soils during construction of the Alternative A, coupled with the implementation of stipulations and construction general practices, would limit soil impacts from erosion. The most susceptible period for soil erosion impacts is during construction, when strong winds or precipitation could mobilize soils. Those areas not already in use for access would be reclaimed following construction. The impact on soil resources as a result of the proposed project would be localized and short to long term.

Cumulative Impacts

The PRMP/FEIS determined that "cumulative impacts on soils in the San Juan Basin would comprise the total amount of short-term and long-term surface disturbance due to all new oil and gas development and other activities" (USDI/BLM 2003a, page 4-123). The PRMP/FEIS projected that 264 acres of initial surface disturbance would occur in the Chaco sub-watershed (USDIIBLM 2003a, page 4-7). The proposed action would cumulatively contribute 31.2 acres of short-term disturbance to soils in the watershed; all of the proposed ROW would be reclaimed, with the exception of existing roads.

3.2.3 Impacts from Alternative B

Direct and Indirect Impacts

Impacts resulting from Alternative B would be similar to those described for Alternative A. Approximately 30.9 acres of soils would be temporarily displaced and subject to mixing and erosion during construction. As with Alternative A. implementation of best management practices (BMPs) would reduce erosion during construction. Impacts are expected to be localized and short to long term.

Cumulative Impacts

Impacts under Alternative B would be similar to Alternative A.

3.2.4 Impacts from Alternative C

Direct and Indirect Impacts

Impacts resulting from the subsurface pipeline proposed under Alternative B would be the same as those described for Alternative B. Additionally, installing temporary surface pipelines could result in mowing portions of the ROW. It is expected that the entire ROW would not need to be mowed to install the line. To conservatively estimate potential impacts. however, approximately 16 acres would be affected if 50 percent of the ROW were mowed. Mowing vegetation could expose soils to potential erosion. particularly during intense storm events. Under Alternative C, there would be a greater short-term potential for accidental spills and releases from the surface line. Since the surface lines would be adjacent to roads for the majority of their length. there is potential for off-road traffic or vandalism to damage or rupture the line. This impact would be short-term for a 2-year period. Impacts to soils are expected to be localized and short to long term.

Cumulative Impacts

Impacts under Alternative C would be similar to Alternatives A and B.

3.3 Water Resources/Quality- Surface and Groundwater

3.3.1 Affected Environment

The proposed action and alternatives are located in the Upper Colorado River Hydrologic Region that is part of the Chaco sub-watershed. The nearest perennial water source is the San Juan River, which is located approximately 30 miles north of the proposed action and alternatives.

The proposed Alternative A alignment would cross multiple shallow, ephemeral drainages that flow south toward Kimbeto Wash in the East alignment and southwest toward Split Lip Flats and De-na-zin Wash in the West alignment. Seven intermittent "blue lines"–as shown on the USGS National Hydrography Dataset (NHD)-would be crossed by the proposed ROW, though not all are considered jurisdictional waters of the U.S. The field evaluations conducted by Ecosphere biologists determined that four of the seven washes may be considered jurisdictional based on the presence of a defined bed and bank features, scour, and deposition processes. Four of the blue lines that the proposed project crosses are comprised of

two of the same drainages. The proposed project crosses over several other drainages created by erosion not identified by the USGS NHD.

Existing pipelines are exposed in many of these eroding drainages. The proposed West pipeline alignment begins approximately 30 feet south of a large, ephemeral wash. This wash has a sandy bottom and evidence of water scouring the bottom. The ordinary high water mark (OHWM) is approximately 50 feet wide by 1 foot deep. Another unnamed, deep, eroded drainage that flows into De-na-zin Wash occurs approximately 15 feet north of the proposed project area. The drainage is located north of the existing Dugan Silver Medal #001 well pad. This drainage has a sandy bottom and evidence of recent scour and deposition with banks approximately 30 feet wide and 15 feet deep. The largest, ephemeral wash crossed by the proposed ROW is an unnamed tributary to Kimbeto Wash that occurs in the proposed East alignment. This wash has a sandy bed and an OHWM of approximately 25 feet wide by 6 inches deep. No water was present in any of the ephemeral drainages during the surveys. Surface runoff from the proposed Alternative A alignment flows southwest. There are no perennial water resources, springs, seeps. or wetlands within the proposed Alternative A alignment.

Alternatives B and C would cross all the drainages described under Alignment A plus one additional drainage identified by the USGS NHD during a desktop review. This tributary flows southeast into Kimbeto Wash.

The primary aquifers in the BLM/FFO area are the sandstone-based Uinta-Animas and the Mesaverde. Groundwater is readily available in most of the BLM/FFO area and is of fair to poor quality. A search was performed of the New Mexico State Engineers Office-Water Administration and Technical Engineering Resource System database for the proposed project area and vicinity (1-mne radius). The database has no records of water wells located within a 1-mile radius of the proposed Alternative A or 8 alignments (NMOSE 2012).

3.3.2 Impacts from Alternative A

Direct and Indirect Impacts

The proposed project would temporarily expose approximately 31.2 acres of soil as a sediment source. Exposures of soils. par1icularly on slopes, could lead to an increase in an undetermined but likely small amount of sediment transport, particularly during and following storm events. Slight alterations in project area drainage patterns may also lead to an increase in sediment transport. These increases in sediment transport would persist for 1 to 2 years until the disturbed areas are stabilized. The potential for sediment transport into the drainages would be minimized through the implementation of BMPs and other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions. The total disturbance created by Alternative A within the OHWM would be less than 0.5 acre and would be covered under a U.S. Army Corps of Engineers Nationwide Permit #12 (utility line crossings).

There would be the potential for accidental spills or release of materials that could impact local water quality. Potential for surface water quality impacts from accidental spills or releases of hazardous materials would be short term during construction. Encana maintains a hazardous material response contingency plan to cover an accidental release of hazardous materials. During operation, the proposed pipeline could potentially leak or rupture, which could impact groundwater quality. The proposed pipeline

would be tested to ensure integrity prior to operation. A cathodk protection system would be installed to protect the pipeline from corrosion, which could affect the integrity of the pipe. Potential impacts to groundwater quality from the proposed action would be long term.

Cumulative Impacts

Cumulative impacts to surface waters would be related to short-term sedimentation or flow changes. Surface-disturbing activities other than the proposed action that may cause accelerated erosion include, but are not limited to, construction of roads, other facilities, and installation of trenches for utilities; road maintenance such as grading or ditch cleaning: public recreational activities; vegetation manipulation and management activities; prescribed and natural fires; and livestock grazing. Because the proposed action would have a negligible impact to downstream surface water quality, the cumulative impact also would be negligible when added to other past, present, and reasonably foreseeable activities.

3.3.3 Impacts from Alternative B

Direct and Indirect Impacts

Alternative B would expose approximately 30.9 acres of soils as a sediment source. Impacts to surface water quality from sediment transfer and drainage patterns would be similar to those described under Alternative A. The potential for sediment transport into the drainages would be minimized through the implementation of BMPs and other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions. Prior to construction. drainages crossed by Alternative B would be evaluated to determine whether they would require permitting by the U.S. Army Corps of Engineers under the Clean Water Act.

Alternative B would have potential impacts to groundwater quality from spills or releases. These impacts would be similar in scope and intensity to those of Alternative A. Encana maintains a hazardous material response contingency plan to cover an accidental release of hazardous materials. During operation, the proposed pipeline could potentially leak or rupture, which could impact groundwater quality. The proposed pipeline would be tested to ensure integrity prior to operation. A cathodic protection system would be installed to protect the pipeline from corrosion, which could affect the integrity of the pipe. Potential impacts to groundwater quality from the proposed action would be long term.

Cumulative Impacts

Cumulative impacts would be the same as those described under Alternative A.

3.3.4 Impacts from Alternative C

Direct and Indirect Impacts

Alternative C would expose approximately 30.9 acres of soils as a sediment source from construction of the subsurface pipeline. Impacts to surface water quality would be similar to those described under Alternative A.

The proposed surface lines would not result in any soil disturbance, but portions of the ROW could be mowed. Removal of overstory vegetation could increase the potential for sediment transfer during storm

events. though this effect would be short term and immeasurable. The potential for sediment transport into the drainages would be minimized through the implementation of BMPs and other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions. Prior to construction, drainages crossed by Alternative C would be evaluated to determine whether they would require permitting by the U.S. Army Corps of Engineers under the Clean Water Act.

Under Alternative C, there would be a greater short-term potential for accidental spills and releases from the surface line. Since the surface lines would be adjacent to roads for the majority of their length, there is potential for off-road traffic or vandalism to damage or rupture the line. This impact would be short term for a 2-year period.

Once the subsurface Hne is installed and the temporary surface line removed. Alternative C would have potential impacts to groundwater quality similar in scope and intensity to those of Alternative A. Encana maintruns a hazardous material response contingency plan to cover an accidental release of hazardous materials. During operation, the proposed pipeline could potentially leak or rupture, which could impact groundwater quality. The proposed pipeline would be tested to ensure integrity prior to operation. A cathodic protection system would be installed to protect the pipeline from corrosion, which could affect the integrity of the pipe. Potential impacts to groundwater quality from the proposed action would be long term.

Cumulative Impacts

Cumulative impacts from Alternative C would be the same as those described under Alternative A.

3.4 Upland Vegetation and Invasive Species

3.4.1 Affected Environment

The proposed action alternatives are located in a Great Basin desert scrub community interspersed with patches of pinon pine *(Pinus edulis)* and juniper *(Juniperus osteosperma)* trees. The majority of the proposed alignment is located within sagebrush grassland. Dominant species observed included big sagebrush *(Artemisia tridentata)*, James' galleta *(Pleuraphis jamesii)*, Indian ricegrass *(Achnatherum hymenoides)*, and broom snakeweed *(Gutierrezia sarothrae)*. Pinon and juniper are scattered along ridge tops and slopes in the East pipeline project area. Greasewood *(Sarcobatus vermiculatus)* flats occur in the proposed West alignment and are intermixed with big sagebrush and blue grama *(Bouteloua gracilis)*. Rubber rabbitbrush *(Ericameria nnuseosa)* and greasewood occur within the larger washes in the project area. Ground cover was visually estimated at 25 to 70 percent and highly variable.

Alternative A follows existing pipeline ROWs and/or roads for approximately 70 percent of its length. The existing pipeline ROWs have been reclaimed, but are in varying stages of regrowth. Big sagebrush has densely re-established in many places, while batTen ground and Russian thistle *(Sa/sola tragus)* occur in other previously disturbed areas. The remaining approximately 30 percent of the proposed alignment travels through undisturbed pinon-juniper woodlands and Great Basin desert scrub communities. Approximately 200 to 250 pinon and juniper trees of varying ages and sizes occur within the proposed Alternative A alignment.

On the East alignment, Alternative Band C would diverge from the Alternative A alignment and extend south approximately 1.300 feet before turning east and paralleling a two-track road for approximately 3.400 feet. Vegetation communities and disttibution in this divergence are similar to Alternative A. Further west, the Alternative B and C alignments diverge from alternative A again and parallel existing roads before tying into the Olympic Torch gathering system. The vegetation community in this area is sagebrush grassland. similar to the Alternative A alignment (refer to Figure 5). Based on a review of aerial photography, approximately 150 pinon and juniper trees could be located within the proposed Alternative B. Approximately 450 to 500 trees could be located within the proposed Alternative C alignment: approximately 150 within the proposed subsurface pipeline alignment and approximately 300 to 350 within the sutface line alignment.

No BLM-Iisted noxious weed species were observed within the proposed Alternative A alignment. A list of plants and wildlife observed during the field surveys conducted for the proposed action is included in the Biological Survey Report in Appendix C.

Those portions of the Alternative Band C alignment that diverge from Alternative A were not surveyed for the presence of BLM-listed noxious weed species.

3.4.2 Impacts from Alternative A

Direct and Indirect Impacts

The proposed action would remove approximately 20.1 acres of previously undisturbed desert scrub and pinon-juniper woodland vegetation. Approximately 200 to 250 pinon and juniper trees could be removed by the proposed action. Following installation of the proposed pipeline, the entire proposed ROW. with the exception of where it overlaps existing roadways, would be reseeded with a BLM/FFO seed mix. Berms or other controls would be installed to restrict vehicle traffic along the cross-country portions of the proposed ROW. Following reclamation, there would be long-term changes in the density and composition of project area vegetation communities. Wooded areas would be converted to shrub- and grass-dominated areas. Trees may not re-establish in the area for several decades. Reseeded areas would be expected to be fully reclaimed within 1 to 2 years.

Cumulative Impacts

Within the FFO planning area, there are approximately 633,400 acres of pinon-juniper and approximately 435,500 acres of Great Basin desert shrub habitat types (USDIJBLM 2003a, page 3-31). Based on the acres of plant community types within the planning area and the estimated total disturbance of future activities. approximately 2.7 percent of the desert grassland and Great Basin desert scrub communities and less than 1 percent of the pinon-juniper and juniper savannah communities would be disturbed within the planning area over 20 years from reasonably foreseeable future actions (USDIJBLM 2003a, page 3-31 and 4-7). The proposed action would not contribute to a loss of vegetation communities in the planning area, as all areas would be reclaimed with the exception of existing roads. Changes in vegetation composition and the potential for invasive, non-native species to establish would cumulatively impact vegetation in the project area. These impacts would affect approximately 20.13 acres of vegetation.

3.4.3 Impacts from Alternative B

Direct and Indirect Impacts

Alternative B would remove approximately 15.5 acres of previously undisturbed desert scrub and pinon-juniper woodland vegetation. Approximately 150 pinon and juniper trees could be removed for pipeline construction. Following installation of the proposed pipeline, the entire proposed ROW. with the exception of where it overlaps existing roadways, would be reseeded with a BLM/FFO or BIA seed mix. There would be long-term changes in the density and composition of project area vegetation communities following construction. Wooded areas would be converted to shrub- and grass-dominated areas. Trees may not re-establish in the area for several decades. Reseeded areas would be expected to be fully reclaimed within 1 to 2 years.

Cumulative Impacts

Cumulative impacts would be similar to those described under Alternative A. Alternative B would not contribute to a loss of vegetation communities in the planning area, as all areas would be reclaimed with the exception of existing roads. Changes in vegetation composition and the potential for invasive, non-native species to establish would cumulatively impact vegetation in the project area. These impacts would affect approximately 15.5 acres of vegetation.

3.4.4 Impacts from Alternative C

Direct and Indirect Impacts

Alternative C would remove approximately 15.5 acres of previously undisturbed desert scrub and pinon-juniper woodland vegetation. Approximately 150 pinon and juniper trees could be removed for pipeline construction where the subsurface line would be located. An estimated 300 to 350 trees occur within the surface pipeline alignment proposed under Alternative C. Tree removal could occur within the surface pipeline alignment: however, the number of the trees cannot be quantified at this time. Following installation of the proposed pipeline, the entire proposed ROW, with the exception of where it overlaps existing roadways, would be reseeded with a BLM/FFO or BIA seed mix. Following construction, there would be long-term changes in the density and composition of project area vegetation communities. Wooded areas would be converted to shrub- and grass-dominated areas. Trees may not re-establish in the area for several decades. Reseeded areas would be expected to be fully reclaimed within 1 to 2 years. Under Alternative C, there would be a greater short-te1m potential for accidental spills and releases from the surface line, which could affect vegetation. Since the surface lines would be adjacent to roads for the majority of their length, there is potential for off-road traffic or vandalism to damage or rupture the line. This impact would be short-term for a 2-year period.

Cumulative Impacts

Cumulative impacts would be similar to those described under Alternative B.

3.5 Special Status Species

3.5.1 Affected Environment

Field surveys for United States Fish and Wildlife Service (USFWS)-listed threatened and endangered species and BLM sensitive species were conducted along the pipeline alignment proposed as Alternative A. The findings of these surveys are documented in the Biological Survey Report (Appendix C). Neither the East alignment of Alternatives B or C, nor the routes of the surface lines that are proposed under Alternative C have been biologically surveyed. If one of these Alternatives were selected, surveys and reporting would be required in compliance with BLM and BIA guidelines.

According to the USFWS, 11 federally listed threatened, endangered, or candidate species have the potential to occur in San Juan County, New Mexico. No federally listed species, or habitats thereof, were identified during the field survey within the proposed Alternative A alignment. For details on federally listed species, refer to the Biological Survey Report in Appendix C. The Biological Survey Report delineates the action area as a 1/3-mile radius around the proposed action where direct, indirect, and cumulative effects would occur.

In accordance with BLM Manual 6840, the BLM manages certain sensitive species not federaJly listed as threatened or endangered in order to prevent or reduce the need to list the species as threatened or endangered in the future. Table 3-4 lists the special management species and their potential to occur in the proposed Alternative A alignment.

Alternative A includes potential foraging habitat for burrowing owls *(Athene cunicularia)*, ferruginous hawks *(Buteo regalis)*, golden eagles *(Aquila cht)'Saetos)*, and prairie falcons *(Falco mexicanus)*. During the Alternative A biological investigations in November 2012, no raptors or sign of consistent use (such as whitewash or nests) were observed or recorded in the proposed project area. Since the majority of Alternative B and much of Alternative C overlap the proposed Alternative A alignment, it can be assumed that Alternatives B and C also provide suitable foraging habitat for the species listed above.

A small Gunnison's prairie dog *(Cynomys gunnisont)* colony with 35 active burrows occurs in the proposed West portion of the Good Times Trunk #1 Phase I and fox *(Vulpes* sp.). coyote *(Canis latrans)*, and badger *(Taxidea taxus)* dens were observed within the proposed ROW. The burrows created by these species provide potential nesting and foraging habitat for the burrowing owl. No sign of burrowing owl occupancy such as whitewash. feathers, or cast pellets (NMDGF 2007) was observed at the entrance of burrows in the proposed Alternative A alignment during the biological surveys in November 2012. However. burrowing owls typically migrate south during the winter (BNA 2005) and the survey was conducted during a time when this species would not be present.

The Alternative A alignment *also* provides nesting habitat for Bendire's thrasher. No birds were observed, but the field surveys were not conducted dw·ing the breeding season. It is assumed that Alternatives B and C also provide nesting habitat.

Potential habitat for Aztec gilia and Brack's hardwall cactus occurs in the action area (as described in the Biological Survey Report), but the project area does not support habitat for these species. The Alternative

A project and action areas provide habitat for San Juan milkweed though no individuals were observed. It is assumed that the Alternatives B and C alignments may also provide potential habitat for these species.

Table 3-4: Bureau of Land Management Special Status Species and their Potential to Occur in the Alternative A Alignment

Species	Conservation Status	Habitat Associations	Potential to occur in the Project or Action Area
Mammals			
Gunnison's prairie dog (*Cynomys gwznisoni)*	Federal Candidate; BLM Sensitive	Primarily inhabits grass/forb/shrub habitats on abandoned land, valley floors, stream valleys, mountain meadows, high-elevation plateaus and benches, and intermountain valleys.	Prairie dog burrows were observed within the project and action areas.
Birds			
Bendire's thrasher *(Toxostoma bendirei)*	BLM Sensitive	Typically inhabits sparse desert shrubland and open woodland with scattered shrubs.	Suitable habitat occurs in the project and action areas.
Burrowing owl *(Athene cunicularia)*	BLM Sensitive	Rarely digs its own burrows and is typically associated with prairie dog colonies. Found in dry, open, short-grass, and in treeless plains; uses areas that include shrubs, such as four-wing saltbush and rabbit-brush.	The project and action areas contain prairie dog burrows that provide potential nesting habitat for burrowing owls.
Ferruginous hawk *(Buteo regalis)*	BLM Sensitive	Flat or rolling terrain in grasslands, shrub-steppes, deserts, and badlands; prefers elevated nest sites (e.g., buttes, utility poles, trees, and on the ground.)	The project and action areas provide potential foraging and nesting habitat.
Golden eagle *(Aquila chrysaetos)*	BLM Sensitive	In the West, mostly open habitats in mountainous, canyon terrain; nests primarily on cliffs and in trees.	The project and action areas provide potential foraging and nesting habitat.
Prairie falcon *(Falco mexicanus)*	BLM Sensitive	Arid, open regions of grassland or scrub vegetation with cliff formations that are at least 30 feet high. Breeding cliffs are sometimes in semi-open regions with scattered conifer trees and occasionally dense woodlands.	Potential foraging habitat occurs in the project and action areas.
Plants			
Aztec gilia *(Aliciella formosa)*	State Endangered; BLM Sensitive	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 feet).	Nacimiento Formation soils within the action area.
Brack's hardwall cactus *(Sclerocactus cloveriae* ssp. *brackit)*	State Endangered; BLM Sensitive	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 feet).	Nacimiento Formation soils within the action area.
San Juan milkweed *(Asclepias sanjuanensis)*	BLM Sensitive	Sandy loam soils in juniper savanna and Great Basin desert scrub (5,000-5,500 feet).	Not observed within the project area; suitable habitat occurs within the project and action areas.

3.5.2 Impacts from Alternative A

Direct and Indirect Impacts

No federally listed species with the potential to occur in San Juan County or potential habitats for federally listed species were observed within the proposed project area. No designated critical habitat for any federally listed species occurs within the proposed project area. The FFO reviewed and determined that the proposed action is in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. No. 2-22-01-I-389) (USDIIBLM 2002). No fUlther consultation with the USFWS is required.

The project area contains open desert scrub that provides potential foraging habitat for golden eagle, ferruginous hawk, and prairie falcon. No potential nesting habitat for these species would be removed or modified by the proposed action. It is possible that these raptor species could forage in the vicinity or fly through the proposed action area. Direct impacts would include the modification of a maximum of 31.2 acres of foraging habitat for these raptor species. There would be no long-term loss of foraging habitat.

Potential nesting habitat for Bendire's thrasher would be lost under Alternative A. Approximately 200-250 trees could be removed by the construction of the pipeline. Potential for disturbance and nest destruction would be greatest during the breeding season, March through August. Pre-construction surveys would be conducted to identify any active nests within the proposed project area should construction occur between May 15 and July 31. This design feature would avoid impacts to nesting sensitive avian species.

The small prairie dog colony with approximately 35 active butTows occurs in the proposed West alignment. Construction of Alternative A would result in the destruction of these burrows. Some prairie dogs could be killed by equipment and other vehicles working in the area. Prairie dogs would temporarily migrate from the construction area into suitable adjacent habit. The prairie dog colony also provides potential nesting and foraging habitat for burrowing owl. The potential for disturbance and nest destruction would be greatest during the breeding and nesting season, between the months of March and August. If construction were scheduled during the nesting period between April I and July 31, surveys for active burrowing owl burrows would be required. Should active nests be identified, no disturbance within a 50-meter radius would be allowed from April L to August 15.

No impacts to Aztec gilia and Brack's hardwall cactus are expected, as there is no habitat in the project area. The project and action areas do suppott habitat for San Juan milkweed. However, the species was not observed during field surveys and no impacts are expected to occur.

The pipeline ROW, with the exception of where it overlaps existing roads, would be reclaimed following construction. After reclamation, there would be a long-term change in vegetation density and composition. Until the area is reclaimed, the prey base for raptors could be affected for the shmt term. Additional impacts may include avoidance of the project area by raptors during construction due to disturbance and activity from human and vehicle presence and associated noise. Impacts from avoidance would be short term.

Cumulative Impacts

The FFO would continue to manage non-federally listed species according to BLM policies and guidelines, with the goal of contributing to the conservation of these species to reduce the potential for being listed under the ESA of 1973, as amended (USDUBLM 2003a, 4-111). For reasonably foreseeable actions on federal lands, direct impacts to nesting special status raptor species would be avoided through the BLM's siting criteria. Development on federal and private land would result in the removal or modification of potential foraging habitat. These effects would be related to availability of undisturbed habitat and the amount of disturbance that would occur within the area. The PRMP/FEIS determined that cumulatively up to 5.5 percent (128.000 acres) of vegetation in the planning area could be impacted by oil and gas development (USDUBLM 2003a, page 4-125). Other reasonably foreseeable actions within the planning area that could impact special status species would include livestock grazing. agriculture, commercial and residential development, mining, wildfire, and vegetation management. The proposed action would not contribute to a cumulative habitat loss for BLM special management species within the planning area.

3.5.3 Impacts from Alternative 8

Direct and Indirect Impacts

Based on an assessment of habitat requirements and desktop review of available datasets, no impacts to USFWS threatened and endangered species are expected because no suitable habitat occurs within the project or action area. However. a biological survey would be required along those portions of the alignment that have not been surveyed to evaluate in the field the suitability of habitat for federally listed species.

Impacts to BLM sensitive species that would result from implementing Alternative B are expected to be similar as those described for Alternative A. Approximately 30.9 acres of foraging habitat for ferruginous hawk, golden eagle and prairie falcon would be modified. There would be no long-term loss of foraging habitat. Approximately *ISO* trees that these species could use as perches or which could be used by breeding Bendire's thrashers would be removed.

Similar to Alternative A, a small prairie dog colony with approximately 35 active burrows occurs in the proposed West alignment. Construction of Alternative B would result in the destruction of these burrows. Some prairie dogs could be killed by equipment and other vehicles working in the area. Prairie dogs would temporarily migrate from the construction area into suitable adjacent habit. Additional prairie dog colonies might be located along the un-surveyed p01tion of the Alternative B alignment. Therefore, impacts to prairie dogs cannot be completely quantified at this time.

Prairie dog colonies also provide potential nesting and foraging habitat for burrowing owl. The potential for disturbance and nest destruction would be greatest during the breeding and nesting season. between the months of March and August. If construction were scheduled during the nesting period between April I and July 31, surveys for active burrowing owl burrows would be required. Should active nests be identified, no disturbance within a 50-meter radius would be allowed from April I to August 15.

Potential habitat for Aztec gilia, Brack's hardwall cactus, and San Juan mnkweed does occur along this pipeline alignment in those sections that overlap Alternative A and might occur in those sections that have

not been surveyed. Surveys would be conducted to determine whether these species are present and appropriate design features or mitigation measures would be implemented to ensure these species are not adversely impacted. Surveys for Navajo Nation listed species would be conducted on Tribal Trust lands and a Biological Evaluation would be prepared to meet consultation requirements of the Navajo Nation.

Cumulative Impacts

Cumulative impacts would be similar to those described for Alternative A.

3.5.4 Impacts from Alternative C

Direct and Indirect Impacts

Based on an assessment of habitat requirements and desktop review of available datasets, no impacts to USFWS threatened and endangered species are expected because no suitable habitat occurs within the project or action areas. However, a biological survey would be required along those portions of the alignment that have not been surveyed to evaluate in the field the suitability of habitat for federally listed species.

Impacts resulting from constructing and maintaining the proposed subsurface pipeline would be the same as those described for Alternative B. Additional impacts would result from construction and maintenance of the proposed temporary surface lines. Clearing vegetation along the surface pipeline alignments could result in modification of an additional 16 acres of habitat (based on a conservative estimate of mowing 50 percent of the proposed ROW). The total amount of habitat that could be affected would be approximately 31.5 acres. The loss of approximately 300 to 350 pinon trees would primarily affect potential nesting habitat for Bendire's thrasher.

Under Alternative C, there would be a greater short-term potential for accidental spills and releases that could impact the quality of habitat for protected species. This impact would be short-term for a 2-year period. Neither the eastern portion of the subsurface pipeline nor the proposed temporary surface pipeline alignments have been surveyed for sensitive species. Surveys would be conducted to determine whether these species are present and appropriate design features or mitigation measures would be implemented to avoid or minimize impacting these species. Additionally, surveys for Navajo Nation listed species would be conducted on Tribal Trust lands and a Biological Evaluation would be prepared to meet consultation requirements of the Navajo Nation.

Cumulative Impacts

Cumulative impacts would be similar to those described for Alternative A.

3.6 Migratory Birds

3.6.1 Affected Environment

While all migratory songbirds are protected by law, certain species have been determined to be at greater risk than others. More than 350 avian species occur in San Juan County and the surrounding area administered by the BLM/FFO, which includes portions of Sandoval County. Data collected through

breeding bird surveys coordinated by the USFWS and private sector efforts have provided the basis for the New Mexico Partners in Flight (NMPIF) organization to develop bird "watch lists" and the USFWS list of Birds of Conservation Concern. The NMPIF has identified priority species of birds by habitat type for the state of New Mexico. The FFO area lies within the Colorado Plateau physiographic region, as identified by the NMPIF. The proposed project area contains two of the habitat types—Great Basin desert shrub (sage-grass) and pinon-juniper woodland. Some of the birds listed as "highest priority" by the NMPIF and the USFWS list of Birds of Conservation Concern include the ferruginous hawk, gray vireo *(Vireo vicinior),* pinon jay, and juniper titmouse *(Baeolophus ridgwayi).*

The Bird Conservation Plan developed by NMPIF for the State of New Mexico lists the sage thrasher *(Oreoscoptes montanus)* and sage sparrow *(Amphispiza belli)* within the Great Basin desert shrub habitat type as "highest priority" species for conservation. Priority species in pinon–juniper woodland habitat include the gray vireo. pinon jay, and juniper titmouse. Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management list of "Birds of Conservation Concern 2008" within Bird Conservation Region 16: Southern Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions. are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).

The pinon-juniper woodland habitat surrounding the proposed project area provides foraging and roosting habitat for large raptors including golden eagles, prairie falcons, and red-tailed hawks *(Buteo jamaicensis).* Certain birds nest almost exclusively in pinon-juniper habitats including the juniper titmouse. western scrub jay *(Aphelocoma californica),* and bushtit *(Psaltriparus minimus).* Mountain chickadees *(Parus gambeli),* black-throated gray warblers *(Dendroica nigrescens) ,* and blue-gray gnatcatchers *(Polioptila caerulea)* also occur in this community (NMPIF 2007).

The open grassland habitat surrounding the proposed project area provides foraging habitat for large raptors. A variety of bird species may be found in the proposed project area such as Bendire's thrasher *(Toxostoma bendirei).* loggerhead shrike *(Lanius Ludovicianus).* and vesper sparrow *(Pooecetes gramineus).* Certain birds nest almost exclusively in this habitat including the vesper sparrow, sage sparrow. and sage thrasher (NMPIF 2007).

3.6.2 Impacts from Alternative A

Direct and Indirect Impacts

Executive Order 13186, dated January 17, 2001 calls for increased efforts to fully implement the Migratory Bird Treaty Act. In keeping with this mandate, the BLM/FFO has consulted the NMPIF Bird Conservation Plan for the State of New Mexico and the USFWS list of Birds of Conservation Concern. A review of these documents—specifically as they pertain to the Colorado Plateau physiographic area—indicates there are eight priority species that utilize the sage-grass habitat within the Great Basin Desert Shrub habitat. Various types of perturbations and or anthropogenic activity may affect these species. These species and a brief assessment of the effects of the proposed action on their habitat are provided in Table 3-5.

Table 3-5. Migratory bird species of concern occurring within the BLMIFFO and potential impacts from the proposed action

Species	Habitat Type	Effects
Grasshopper sparrow *(Ammodramus savannarum)*	Sage-grass	May be positively affected due to conversion to grassland.
Sage sparrow' *(Amphispiza belli)*	Sage-grass	Short-term loss of nesting and brood rearing habitat.
Burrowing owl *(Athene cunicularia)*	Sage-grass	Short-term loss of nesting and foraging habitat; nests in abandoned prairie dog burrows.
Ferruginous hawk *(Buteo regalis)*	Sage-grass/pinon-juniper interface	Short-term loss of foraging habitat; decrease in prey (small mammals) abundance likely.
Mountain plover *(Charadrius montanus)*	Sage-grass	May be positively affected due to conversion to grassland; may produce more prey (i.e., arthropods).
Long-billed curlew *(Numenius americanus)*	Sage-grass	May be positively affected due to conversion to grassland.
Sage thrasher' (*Oreoscoptes montanus)*	Sage-grass	Short-term loss of sage/nesting habitat.
Bendire's thrasher *(Toxostoma bendirei)*	Sage-grass	Short-term loss of nesting habitat; increase in prey (i.e., arthropods) likely.

[1] "High Priority" bird species that are on the NMPIF Priority Species List, but not on the USFWS "Birds of Conservation Concern 2008" list.

Alternative A would result in the removal of approximately 31.2 acres of vegetation, of which 20.1 acres are undisturbed. Impacts would occur from the removal of approximately 200 to 250 pinon and juniper trees, resulting in a loss of nesting and foraging habitat for migratory birds that utilize this habitat type. Impacts to migratory birds would be greater should construction occur during the breeding season of May 15 through July 31. Construction during this period could result in nest destruction or cause some nest abandonment in adjacent areas. Pre-construction surveys would be conducted to identify any active nests within the proposed project area should construction be scheduled during this time. Any active nests identified would be avoided or appropriate mitigation measures would be implemented in coordination with the BLM/FFO biologist. Although individual migratory birds may be impacted, given the amount of habitat modification and fragmentation, no population level effects are anticipated from the proposed action.

Cumulative Impacts

Within the FFO planning area there are approximately 633,400 acres of pinon-juniper and approximately 435,500 acres of Great Basin desett shrub habitat types (USDVBLM 2003a, page 3-31). Based on the acres of plant community types within the planning area and the estimated total disturbance of future activities, approximately 2.7 percent of the desert grassland and Great Basin desert scrub communities and less than 1 percent of the pinon-juniper and juniper savannah communities would be disturbed within the planning area over 20 years from reasonably foreseeable future actions (USDVBLM 2003a, page 3-31 and 4-7). Cumulative impacts to migratory birds would result from the long-term changes in density and composition of approximately 31.2 acres of vegetation, as well as the removal of approximately 200-250 pinon and juniper trees. There would be no long-term loss of migratory bird habitat from the proposed action.

3.6.3 Impacts from Alternative B

Direct and Indirect Impacts

Implementing Alternative B would result in impacts similar to those described for Alternative A. The proposed project would result in the removal of approximately 30.9 acres of habitat, of which 15.5 acres are undisturbed. Impacts would occur from the removal of approximately 150 pinon and juniper trees, resulting in a loss of nesting and foraging habitat for migratory birds that utilize this habitat type. Impacts to migratory birds would be greater should construction occur during the breeding season of May 15 through July 31. Construction during this period could result in nest destruction or may cause some nest abandonment in adjacent areas. Pre-construction surveys would be conducted to identify any active nests within the proposed project area should construction be scheduled during this time. Any active nests identified would be avoided or appropriate mitigation measures would be implemented in coordination with the BLM/FFO biologist.

Cumulative Impacts

Cumulative impacts would be similar to those described for Alternative A.

3.6.4 Impacts from Alternative C

Direct and Indirect Impacts

Implementing Alternative C would result in impacts similar to those described for Alternative A. The proposed project would result in the removal of approximately 30.9 acres of habitat, of which 15.5 acres are undisturbed. Approximately 150 pinon and juniper trees could be removed for pipeline construction where the subsurface line would be located.

The entire ROW would not need to be mowed for the surface line installation; however, to conservatively estimate potential impacts, approximately 16 acres would be affected if 50 percent of the ROW were mowed. An estimated 300 to 350 trees occur within the surface pipeline alignment proposed under Alternative C. Tree removal could occur within the swface pipeline alignment, but the number of the trees cannot be quantified at this time. Impacts would occur from the removal of pinon and juniper trees, resulting in a loss of nesting and foraging habitat for migratory birds that utilize this habitat type. Impacts to migratory birds would be greater should construction occur during the breeding season of May 15 through July 31. Construction during this period could result in nest destruction or may cause some nest abandonment in adjacent areas. Pre-construction surveys would be conducted to identify any active nests within the proposed project area should construction be scheduled during this time. Any active nests identified would be avoided or appropriate mitigation measures would be implemented in coordination with the BLM/FFO biologist. Under Alternative C, there would be a greater short-term potential for accidental spills and releases that could impact the quality of habitat for migratory bird species. This impact would be for a 2-year period.

Cumulative Impacts

Cumulative impacts would be similar to those described for Alternative A.

3.7 Cultural Resources

3.7.1 Affected Environment

The proposed project area is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: Paleolndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 B.C. to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (A.D. l to 1540), and the historic (A.D. 1540 to present) that includes Native American as well as later Hispanic and Euro-American settlers. A detailed description of these various periods and select phases within each period is provided in the Farmington PRMP/FEIS (USDIIBLM 2003a). Additional information can also be found in the Cultural Resources Technical Report (CRTR; SAIC 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 for Alternative A was archaeologically surveyed at a BLM Class III level (100 percent) by LAC and a report 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* (USDIIBLM 2005).

The Class Ill inventory identified 13 cultural sites within the Area of Potential Effect (LAC 2012-23a; BLM Report 2013(I)074F) including seven new sites (LA173839, LA173840, LA173841, LAI73842, LA173843, LA173844, and LA173845), six previously identified sites (LA49482, LA59815, LA69488, LA137436, LA137437, and LA173838), and 12 isolated occurrences. Of the 13 sites visited. six were determined to be eligible for inclusion in the National Register of Historic Places (NRHP) and three sites need additional data for inclusion in the NRHP. Four sites were determined to be ineligible for the NRHP. The western portion of the pipeline route, which Alternatives A, B, and C have in common, has two eligible sites (LA59815 and LA173844) and one that needs additional data for inclusion in the NRHP. Archaeological surveys have not been conducted on the eastern portion of the proposed pipeline alignments for Alternatives B and C, which differ from Alternative A. Cultural surveys according to BLM and/or BIA requirements would be required should one of these alternatives be selected. Those surveys, if conducted, could be expected to have similar cultural resources results as Alternative A.

3.7.2 Impacts from the Proposed Action

Direct and Indirect Impacts

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

Significant cultural sites (i.e.. NRHP eligible/listed) are being avoided with the implementation of design features such as (but not limited to) reduction of construction areas, temporary barriers, and site

monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the stipulations in the ROW grant.

Cumulative Impacts

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

3.7.3 Impacts from Alternative B

Direct and Indirect Impacts

As with Alternative A, impacts to known cultural resources would be avoided by implementation of design features. Archaeological surveys, reporting, and coordination with the BLM and BIA would be required for the eastern portion of the proposed pipeline. Any potential impacts to significant cultural sites would be avoided by adherence to design features.

Cumulative Impacts

Cumulative impacts would be similar to those described for Alternative A.

3.7.4 Impacts from Alternative C

Direct and Indirect Impacts

Impacts to known cultural resources resulting from the proposed subsurface pipeline would be the same as those described for Alternative B. The eastern portion of the proposed subsurface pipeline and the proposed temporary pipeline routes of would require archaeological surveys. reporting, and coordination with the BLM and BIA. Impacts to significant cultural sites would be avoided by implementation of design features.

Cumulative Impacts

Cumulative impacts would be similar to those described for Alternative A.

3.8 Native American Religious Concerns

3.8.1 Affected Environment

Native American Religious Concerns were not identified as a potentially impacted resource for Alternative A. Identification efforts were limited to reviewing existing published and unpublished literature (e.g. Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), the site-specific Class III survey report prepared for the proposed action, and a review by the BLM's cultural resources program regarding the presence of traditional cultural properties (TCPs) identified through ongoing BLM tribal consultation efforts. There are currently no known TCPs or remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) or the ARPA (16 USC 470) within the Alternative A alignment.

Alternatives Band C share the same alignment of the West portion of the pipeline with Alternative A and no known TCPs occur along this route. The East Section of Alternatives Band C alignments differ and these have not been culturally surveyed and a review has not been conducted to identify the presence of TCPs.

3.8.2 Impacts from Alternative A

Direct and Indirect Impacts

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 (42 USC 1996) or Executive Order (EO) 13007. No impacts to TCPs would result from Alternative A, as no TCPs are known to occur along the proposed pipeline alignment.

Cumulative Impacts

No impacts are anticipated, as any TCPs identified would be avoided as required by the BLM and BIA.

3.8.3 Impacts from Alternative B

Direct and Indirect Impacts

It is not known whether TCPs occur along the eastern portion of the pipeline alignment proposed as Alternative B. Any TCPs identified during literature reviews or in consultation with the BLM and BIA would be avoided and no impacts would be expected to occur.

Cumulative Impacts

No impacts are anticipated, as any TCPs identified would be avoided as required by the BLM and BIA.

3.8.4 Impacts from Alternative C

Direct and Indirect Impacts

It is not known whether any TCPs occur along the eastern portion of the pipeline alignment proposed as Alternative C. Any TCPs identified during literature reviews or in consultation with the BLM and BlA would be avoided and no impacts would be expected to occur.

Cumulative Impacts

No impacts are anticipated, as any TCPs identified would be avoided as required by the BLM and BIA.

3.9 Minerals

3.9.1 Affected Environment

Fourteen wells drilled from 10 wells pads would connect to the proposed Good Time Trunk #I Phase I pipeline. Additional wells might be drilled in the future. Two wells, the Escrito H31-2409 01H and

Esclito A31-2409 OlH wells, have already been drilled in the area. The Good Times 006-2309 OIH well has also been drilled and will be completed and producing in by January 2014. Fluid minerals produced from these wells require transportation to a gathering system. Modeled production volumes during one year for these three wells are 41 million barrels of oil (mbo) and 0.1 billion cubic feet (bet) of natural gas; over two years, 62 mbo and 0.2 bcf (volumes are not additive) are projected.

The fluid mineral production that would be serviced by the proposed pipeline project is overseen through regulations by federal and state agencies. The New Mexico Oil Conservation Division (NMOCD) requires that oil and gas wells drilled in New Mexico must show significant progress toward production within 12 to 14 months (New Mexico Administrative Code Title 19 Chapter 15 Section 5.9-Compliance). Wells that are drilled but do not have production or injection for 12 months are classified by NMOCD as "inactive wells" and operators are subject to fines and sanctions if a portion of their wells fall into this category.

3.9.2 Impacts from Alternative A

Direct and Indirect Impacts

The proposed action would be in compliance with federal and state mineral production regulations. The timely completion of the Alternative A pipeline would ensure that Encana would be in compliance with state and federal mineral production regulations. Also, the renewal of ROW leases by the BLM to *allow* continued operation of the pipeline over its planned useful life would best meet the purpose and need of the proposed action and support efficient development of the fluid mineral estate.

Cumulative Impacts

Development of fluid minerals would continue in the FFO planning area. There are approximately 23,522 wells in the San Juan Basin and about 16,435 of the wells are federal wells. Analysis of cumulative impacts for reasonable development scenarios of oil and gas wells on public lands in the FFO was presented in the 2003 PRMP (USDIIBLM 2003a). Other reasonably foreseeable activities in the proposed project area that could affect the mineral estate are the use of the proposed pipeline to deliver fluid minerals from at least II proposed wells. Additional wells may also be drilled and connected to the proposed pipeline.

3.9.3 Impacts from Alternative B

Direct and Indirect Impacts

Should Alternative B be selected as the agency prefen·ed alternative, the alignment would need to be designed, land surveyed, surveyed for cultural and biological resources, an EA and Biological Evaluation prepared, and the BIA decision on the ROW alignment made. It could take 1 to 2 years for BIA approval of the pipeline ROW alignment across tribal lands. The potential delay in producing the three wells already drilled (Escrito H31-2409 OlH, Escrito A31-2409 OlH, Good Times 006-2309 OlH) could cause the operator to be in violation with NMOCD rules. The penalties would depend on the number of active and inactive wells that Encana has at the time of the shut-in. There would be a delay in producing an estimated 62 mbo and 0.2 bcf while undergoing the BIA permitting process.

Furthermore, if the BIA were to deny the ROW request required for Alternative B, then the producer would not be able to deliver fluid mineral production to market and could be in violation of NMOCD rules.

Other wells reasonably foreseeable for drilling in the next 2 to 3 years would be postponed or would not be drilled.

Cumulative Impacts

Development of fluid minerals would continue in the FFO planning area. There are approximately 23,522 wells in the San Juan Basin. About 16,435 of the wells are federal wells. Analysis of cumulative impacts for reasonable development scenarios of oil and gas wells on public lands in the FFO was presented in the 2003 PRMP (USDI/BLM 2003a). Other reasonably foreseeable activities in the proposed project area that could affect the mineral estate are the use of the proposed pipeline to deliver fluid minerals from at least 11 proposed wells. Additional wells may also be drilled and connected to the proposed pipeline.

The useful life of the pipeline is estimated to be 50 years. The pipeline alignment proposed for Alternative B would require that the BLM and BIA renew their respective ROW grants every 30 years. If the BIA were to deny a future ROW renewal, even if the BLM were to renew its ROW grant, the section of pipeline in the BIA ROW would have to be abandoned in place by the applicant before its useful life was realized. At that time to deliver the fluid minerals to market, Encana would need to develop an alternative pipeline corridor around tribal lands. This scenario would result in additional surface disturbance and impacts to natural resources.

3.9.4 Impacts from Alternative C

Direct and Indirect Impacts

Alternative C was developed to minimize the reduction in federal and tribal mineral production that would result from timing constraints associated with the BIA ROW application process. If Alternative C were selected by the BLM as the preferred alternative, Encana would need to shut the three drilled wells in and stop production for an estimated 12 and 24 months to complete the BIA permitting process.

Alternative C would avoid the delay in fluid mineral production that would occur under Alternative B by installing a temporary surface line to move the fluid minerals to market while the BlA decision on the ROW grant is being made. However, if the BIA were to deny the ROW grant, then the Alternative B route would become infeasible. Furthermore. a two-year approval for the sutface line may not be enough time to design, permit, and construct a permanent pipeline alternative and the operator would be facing the same risks and consequences of being in violation of NMOCD rules as in Alternative B.

Cumulative Impacts

Cumulative impacts would be the same as those described under Alternative B.

3.10 Livestock Grazing

3.10.1 Affected Environment

The BLM/FFO manages 167 grazing allotments with 351 grazing authorizations that permit cattle, sheep, and horse grazing within the planning area. Of the 351 grazing authorizations, 317 are permitted under Section 3 of the Taylor Grazing Act. Additional authorizations under Section 15 permit grazing on 30 allotments in the Lindrith, New Mexico area.

Alternatives A and B would be located within the boundaries of two BLM/FFO grazing allotments-Otis Community (6011) in the West alignment and Kimbeto Community (6013) in the East alignment. Alternative C would also be located within the Otis and Kimbeto Community allotments as well as the Blanco Trading Post allotment (5081). Table 3-4 lists the details of these allotments.

Table 3-6. Details of grazing allotments in the Alternative A project area

Allotment Number	Livestock Number	Livestock Type	Period Begin Date	Period End Date	AUMs[1]
6011	1,178	Sheep	1-Mar.	28-Feb.	2,827
6013	34	Cattle	1-May	31-0ct.	206
6013	38	Cattle	15-Nov.	28-Feb.	132
6013	16	Cattle	16-Apr.	15-Nov.	113
6013	5	Cattle	1-Apr.	9-Sept.	30
6013	167	Cattle	1-Mar.	28-Feb.	2000
6013	38	Cattle	1-Mar.	15-Jun.	134
6013	18	Cattle	27-Mar.	28-Feb.	201
6013	4	Goat	1-Mar.	28-Feb.	10
6013	17	Horse	1-Mar.	28-Feb.	173
6013	1	Horse	27-Mar.	28-Feb.	11
6013	3	Sheep	1-May	31-0ct.	4
6013	55	Sheep	15-Mar.	15-Nov.	89
6013	45	Sheep	!-Aug.	31-0ct.	27
6013	173	Sheep	1-Jun.	28-Feb.	240
6013	672	Sheep	!-Mar.	28-Feb.	1509
6013	10	Sheep	1-Mar.	15-0ct.	15
6013	637	Sheep	!-Mar.	28-Feb.	1442
6013	20	Sheep	1-0ct.	28-Feb.	20
5081	177	Cattle	!-Nov.	30-June	72

[1]Ammalumt months.

3.10.2 Impacts from Alternative A

Direct and Indirect Impacts

Surface disturbance associated with construction of the proposed action would remove approximately 31.2 acres of vegetation (of which 20.1 acres are undisturbed), resulting in a reduction in forage and a change in vegetative species composition. Impacts to grazing resources would occur from the direct short-term loss of 20.1 acres of forage, which equates to approximately 0.8 Animal Unit Months (AUMs) at an estimated 25 acres per AUM. The reclaimed area along the proposed pipeline ROW would be expected to re-vegetate within 1 to 2 years following reclamation. There would be no long-term loss of grazing resources. Effects from construction of the proposed project would result from an increase in human activity that may disturb livestock occurring within or near the project area.

Pipeline trenches can pose hazards to livestock. Livestock grazing occurs in the project area year round, so it is likely *that* livestock would be in the project area during construction. Design features include escape ramps in open trenches, barriers, or not leaving open trenches during extended periods (i.e., more than 24 hours). The proposed action would be located on two grazing allotments. Boundary or pasture fences would be properly braced and temporarily gated during construction. After construction, all crossed fences would be repaired to BLM specifications. Livestock grazing permittees in the area would be contacted prior to construction activities.

Cumulative Impacts

Other reasonably foreseeable activities within the planning area that would impact forage resources include off-highway vehicle traffic and grazing. The PRMP determined that total surface disturbance from oil and gas development in the planning area would affect about 1.6 percent of the San Juan Basin. Added to other sutface disturbance from urban development, the overall effect of removing rangeland acreage from production would still be minimal when compared to the acreage of available forage (USDI/BLM 2003a, pages 4-126 to 4-127). When added to past, present. and reasonable foreseeable activities within the grazing allotments. the proposed action would not result in changes to the allotments' carrying capacity or to available AUMs. Reseeding of disturbed areas with the BLM-approved seed mix, which is composed of grasses and palatable shrubs, may result in an increase in available forage within the affected allotments. This increase is not expected to be measurable.

3.10.3 Impacts from Alternative 8

Direct and Indirect Impacts

Surface disturbance associated with construction of Alternative B would remove approximately 30.9 acres of vegetation, of which 15.5 acres are undisturbed, resulting in a reduction in forage and a change in vegetative species composition. Impacts to grazing resources would occur from the direct short-term loss of 15.5 acres of forage. which equates to approximately 0.6 AUMs at an estimated 25 acres per AUM. The reclaimed area along the proposed pipeline ROW would be expected tore-vegetate within I to 2 years following reclamation. There would be no long-term loss of grazing resources. Effects from construction of Alternative B would result from an increase in human activity that may disturb livestock occurring within or near the project area.

Design features would include escape ramps in open trenches, baniers, or not leaving open trenches during extended periods. Boundary or pasture fences would be properly braced and temporarily gated during construction. After construction, all crossed fences would be repaired to BLM specifications. Livestock grazing permittees in the area would be contacted prior to construction activities.

Cumulative Impacts

Cumulative impacts would be the same as those described under Alternative A.

3.10.4 Impacts from Alternative C

Direct and Indirect Impacts

Alternative C would result in the disturbance of approximately 15.5 acres for subsurface pipeline construction. Additionally, portions of the ROW might need to be mowed under this alternative for the surface line installation. To estimate potential impacts conservatively, approximately 16 acres would be affected if 50 percent of the ROW were mowed; therefore, approximately 31 acres of vegetation could be impacted. Impacts to grazing resources would occur from the direct short-term loss of 31 acres of forage, which equates to approximately 1.2 AUMs at an estimated 25 acres per AUM. An increase in human activity during construction may cause livestock to avoid the area.

Under Alternative C, there would be a greater short-term potential for accidental spills and releases that could impact forage resources. This potential impact would be short-term for a 2-year period.

Design features would include escape ramps in open trenches, barriers, or not leaving open trenches during extended periods. Boundary or pasture fences would be properly braced and temporarily gated during construction. After construction, all crossed fences would be repaired to BLM specifications. Livestock grazing permittees in the area would be contacted prior to construction activities.

Cumulative Impacts

Cumulative impacts would be similar to those described under Alternative A.

3.11 Public Health and Safety

3.11.1 Affected Environment

Public health and safety concerns are related to vehicle travel on area roads and to public and worker safety around natural gas wells, pipelines, or other production facilities. Other health and safety concerns identified include the risk of pipeline rupture, leaks, or explosion. There is a risk of accidental spills and illegal dumping of non-hazardous and hazardous materials. Contamination of surface waters, near-surface drinking water aquifers, and soil resources caused by surface degradation due to accidental spills and leaks of chemicals and waste products are also of concern.

3.11.2 Impacts from Alternative A

Direct and Indirect Impacts

Impacts to the general public would be minimized by controlling access to all work and operation areas. All road crossings would be manned with flaggers and spotters during heavy construction close to the area and during mobilization and demobilization. Orange flagging and barriers would be put in place to restrict public access to the work site. All roadway speed limits would be observed to reduce potential for traffic accidents. Additionally, hauling of materials or equipment would follow NMDOT regulations. Water would be applied to roads, if needed, to minimize fugitive dust. No chemicals would be applied to roads accessing the proposed pipeline ROW. Following construction, existing roads would be rehabilitated, if needed.

Disposal of any liquid and solid waste generated during construction, operation, and maintenance activities would be done at permitted facilities. Encana would implement measures for safe handling and storage of materials. In the event of a hazardous material spill, releases would be contained and disposed in accordance with federal and state regulations. The proposed pipeline would be constructed and operated to meet all industry standards and applicable federal and state requirements.

The proposed pipeline would be tested to ensure integrity prior to operation. A cathodic protection system would be installed to protect the pipeline from conosion, which could affect the integrity of the pipe. Encana would perform regular maintenance on the pipeline.

Cumulative Impacts

Other reasonably foreseeable activities in the proposed project area that could affect public health and safety include construction and operation of pipelines, well pads, and associated facilities; prescribed fire; and vehicular travel on unimproved dirt roads. The construction and operation of the proposed pipeline would contribute negligibly to public health and safety concerns when considered with past, present and reasonably foreseeable actions in the FFO planning area.

3.11.3 Impacts from Alternative B

Direct and Indirect Impacts

Direct and indirect impacts resulting from Alternative B would be similar to those described for Alternative A.

Cumulative Impacts

Cumulative impacts would be the same as those described under Alternative A.

3.11.4 Impacts from Alternative C

Direct and Indirect Impacts

Direct and indirect impacts to public health resulting from the construction and operation of the proposed subsurface pipeline would be the same as Alternatives A and B. However, there would be a greater short-term potential for accidental spills and releases from the surface line under Alternative C. Since the

surface lines would be adjacent to roads for the majority of their length, there is potential for off road traffic or vandalism to damage or rupture the line. This impact would be short-term for a 2-year period.

Cumulative Impacts

Cumulative impacts would be the same as those described under Alternative A.

4. SUPPORTING INFORMATION

4.1 Tribes, Individuals, Organizations, or Agencies Consulted

Jason Eckman-Encana

Brenda Linster—

Encana Holly Hill—

Encana

Katie Wegener–Encana

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Jacob Brown-NCE Surveying

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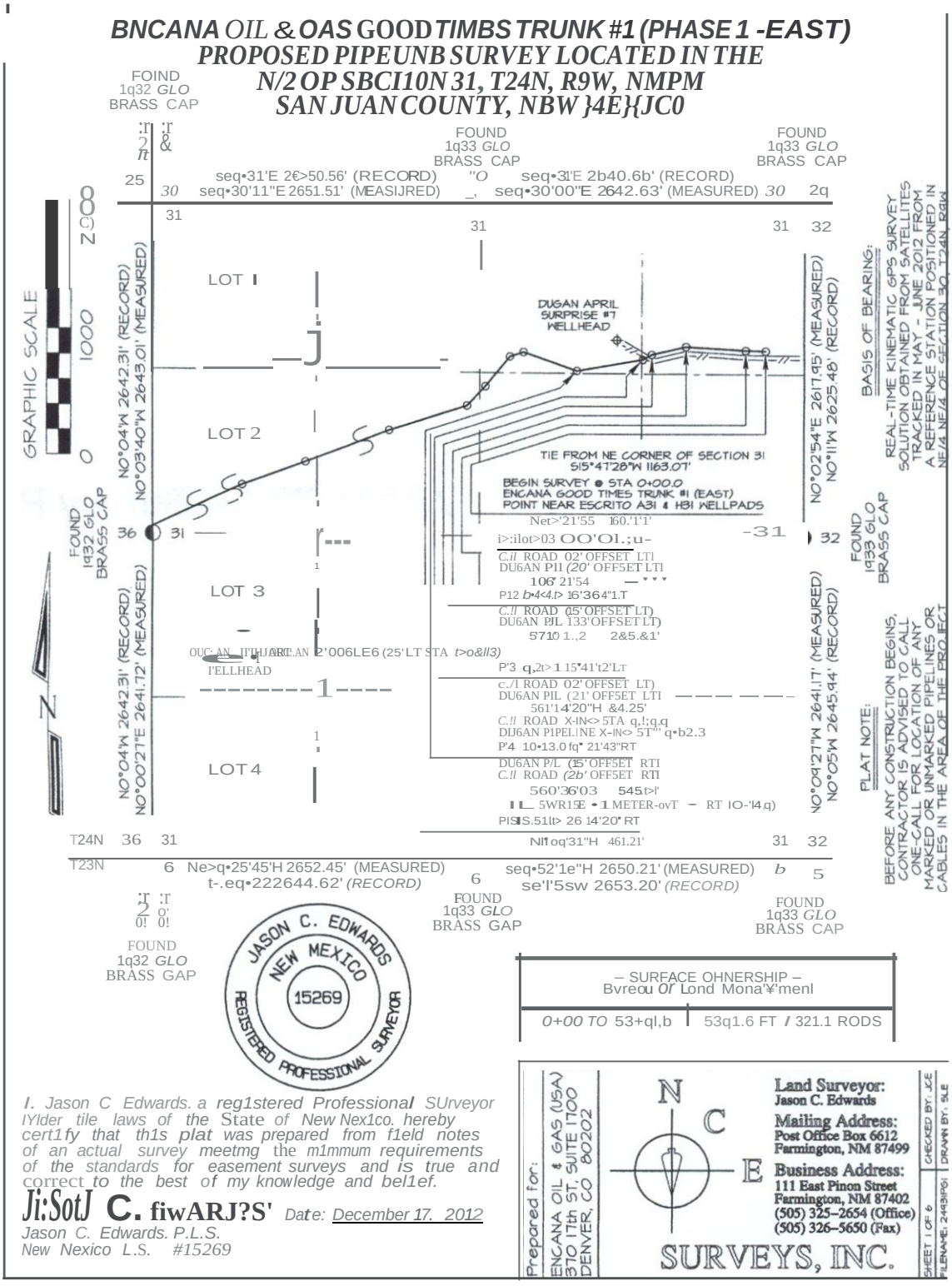
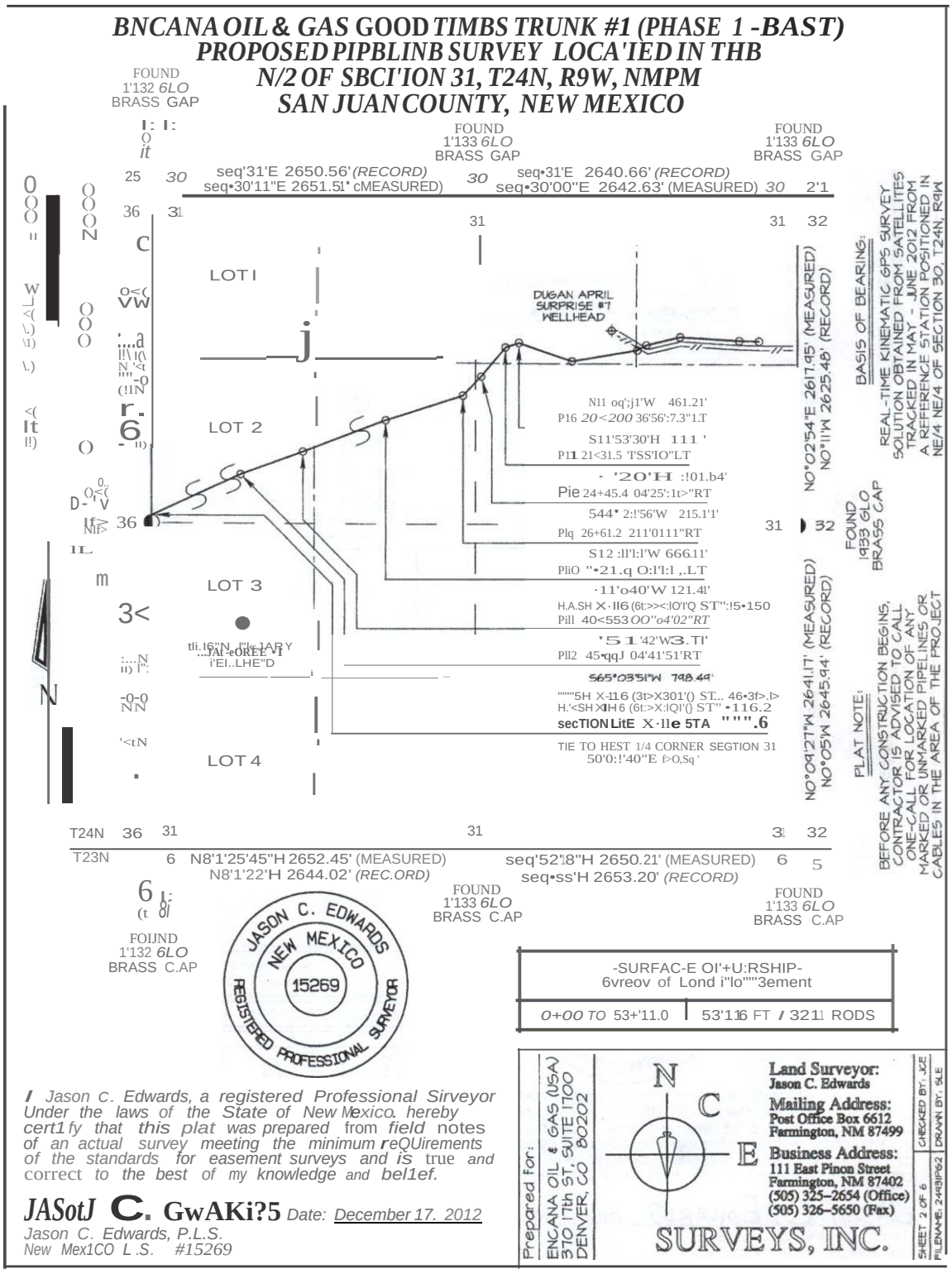
Appendix A-Survey Plats


BNCANA OIL & OAS GOOD TIMBS TRUNK #1 (PHASE 1 -EAST)
PROPOSED PIPEUNB SURVEY LOCATED IN THE
N/2 OP SBCI10N 31, T24N, R9W, NMPM
SAN JUAN COUNTY, NBW }4E}{JC0
FOIND 1q32 GLO BRASS CAP
FOUND 1q33 GLO BRASS CAP
FOUND 1q33 GLO BRASS CAP
seq•31'E 2€>50.56' (RECORD)
seq•30'11"E 2651.51' (MEASIJRED)
seq•31'E 2b40.6b' (RECORD)
seq•30'00"E 2642.63' (MEASURED)
GRAPHIC SCALE
LOT 1
LOT 2
LOT 3
LOT 4
DUGAN APRIL SURPRISE #7 WELLHEAD
TIE FROM NE CORNER OF SECTION 31
BEGIN SURVEY @ STA 0+00.0
ENCANA GOOD TIMES TRUNK #1 (EAST)
POINT NEAR ESCRITO A31 & HB1 WELLPADS
NO°04'W 2642.31' (RECORD)
NO°03'40"W 2643.01' (MEASURED)
NO°02'54"E 2617.95' (MEASURED)
NO°11'W 2625.48' (RECORD)
NO°04'W 2642.31' (RECORD)
NO°00'27"E 2641.72' (MEASURED)
NO°09'27"W 2641.17' (MEASURED)
NO°05'W 2645.94' (RECORD)
FOUND 1932 GLO BRASS CAP
FOUND 1933 GLO BRASS CAP
BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN MAY - JUNE 2012 FROM A REFERENCE STATION POSITIONED IN NE/4 NE/4 OF SECTION 30, T24N, R9W
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
T24N
T23N
Ne>q•25'45'H 2652.45' (MEASURED)
t-.eq•222644.62' (RECORD)
seq•52'1e"H 2650.21' (MEASURED)
se'l'5sw 2653.20' (RECORD)
FOUND 1q32 GLO BRASS GAP
FOUND 1q33 GLO BRASS GAP
FOUND 1q33 GLO BRASS CAP
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
– SURFACE OHNERSHIP –
Bvreou Of Lond Mona'¥'menl
0+00 TO 53+ql,b
53q1.6 FT / 321.1 RODS
I. Jason C Edwards. a reg1stered Professional SUrveyor IYlder tile laws of the State of New Nex1co. hereby cert1fy that th1s plat was prepared from f1eld notes of an actual survey meetmg the m1mmum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and bel1ef.
Ji:SotJ C. fiwARJ?S' Date: December 17. 2012
Jason C. Edwards. P.L.S.
New Nexico L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1700
DENVER, CO 80202
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 6
FILENAME: 2443P61
CHECKED BY: JCE
DRAWN BY: SLE


BNCANA OIL & GAS GOOD TIMBS TRUNK #1 (PHASE 1 -BAST)
PROPOSED PIPBLINB SURVEY LOCA'IED IN THB
N/2 OF SBCI'ION 31, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO
FOUND 1'132 6LO BRASS GAP
FOUND 1'133 6LO BRASS GAP
FOUND 1'133 6LO BRASS GAP
seq'31'E 2650.56' (RECORD)
seq•30'11"E 2651.51' cMEASURED)
seq•31'E 2640.66' (RECORD)
seq•30'00"E 2642.63' (MEASURED)
LOT I
LOT 2
LOT 3
LOT 4
DUGAN APRIL SURPRISE #7 WELLHEAD
N11 oq';j1'W 461.21'
P16 20<200 36'56':7.3"1.T
S11'53'30'H 111 '
P11 21<31.5 'TSS'IO"LT
- '20'H :!01.b4'
Pie 24+45.4 04'25':1t>"RT
544' 2:!'56'W 215.1'1'
Plq 26+61.2 211'0111"RT
S12 :ll'l:l'W 666.11'
PliO "•21.q O:l'l:l ,.LT
·11'o40'W 121.4l'
H.A.SH X·ll6 (6t:>><:lO'l'Q ST":!5•150
Pill 40<553 OO"o4'02"RT
'51'42'W3.TI'
Pll2 45•qqJ 04'41'51'RT
565°03'51"W 798.49'
5H X-116 (3t>X301'() ST... 46•3f>.l>
H.'<SH X1H 6 (6t:>X:lQl'() ST" •116.2
secTION LitE X·lle 5TA ".6
TIE TO HEST 1/4 CORNER SEGTION 31
50'0:!'40"E f>O,Sq'
N0°02'54"E 2617.45' (MEASURED)
N0°11'W 2625.48' (RECORD)
N0°09'27"W 2641.17' (MEASURED)
N0°05'W 2645.94' (RECORD)
FOUND 1933 GLO BRASS CAP
BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN MAY - JUNE 2012 FROM A REFERENCE STATION POSITIONED IN NE/4 NE/4 OF SECTION 30, T24N, R9W
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
T24N 36 31 31 31 32
T23N 6 N8'1'25'45"H 2652.45' (MEASURED)
N8'1'22'H 2644.02' (REC.ORD)
seq'52'18"H 2650.21' (MEASURED)
seq•ss'H 2653.20' (RECORD)
6 5
FOIJND 1'132 6LO BRASS C.AP
FOUND 1'133 6LO BRASS C.AP
FOUND 1'133 6LO BRASS C.AP
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
-SURFAC-E OI'+U:RSHIP-
6vreov of Lond i"lo""3ement
0+00 TO 53+'11.0
53'116 FT / 3211 RODS
I Jason C. Edwards, a registered Professional Sirveyor Under the laws of the State of New Mexico. hereby cert1fy 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 bel1ef.
JASotJ C. GwAKi?5 Date: December 17. 2012
Jason C. Edwards, P.L.S.
New Mex1CO L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1700
DENVER, CO 80202
N
C
E
Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
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Business Address:
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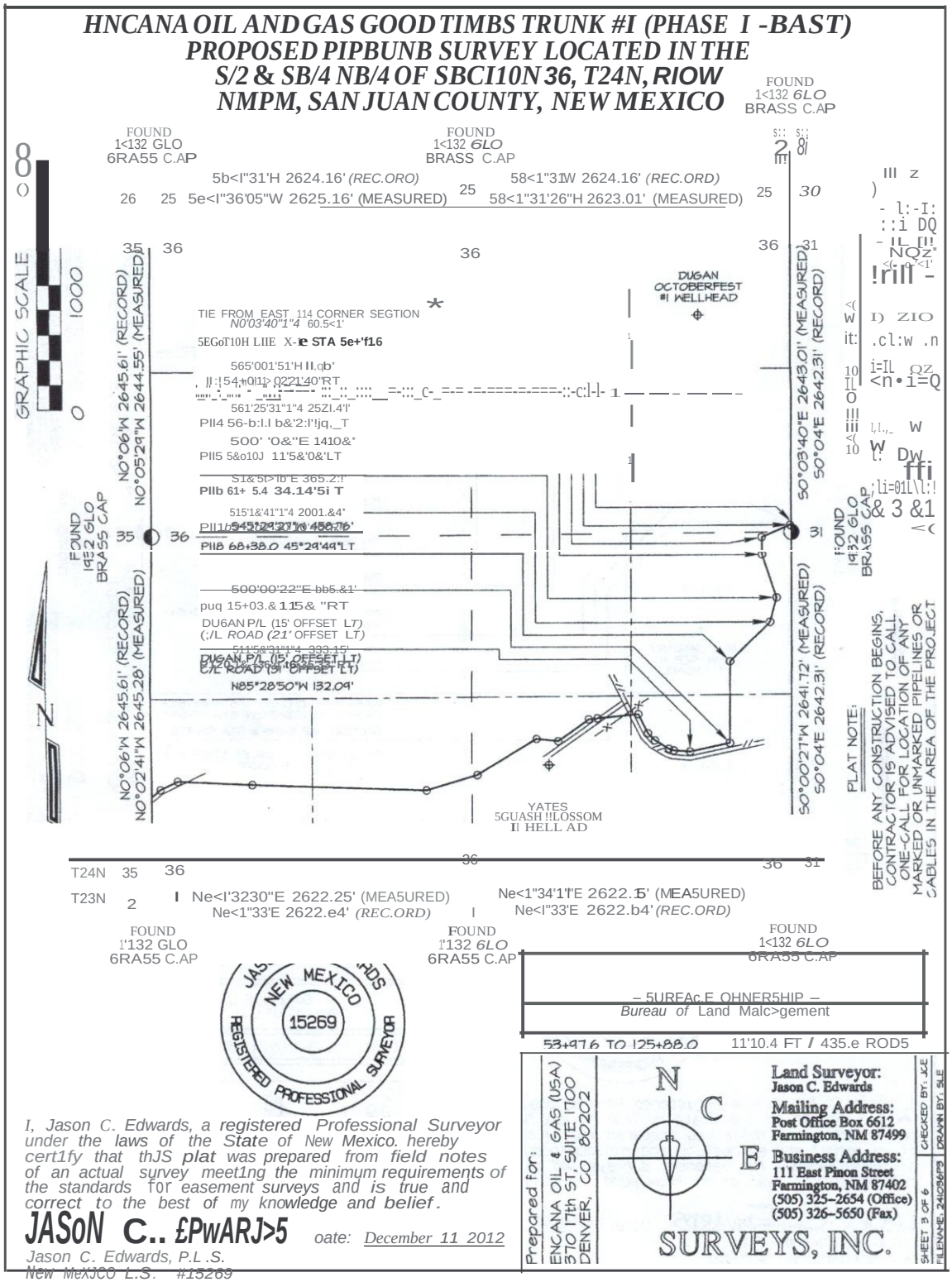
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.
CHECKED BY: JCE
DRAWN BY: SLE
SHEET 2 OF 6
FILENAME: 2413JP62


HNCANA OIL AND GAS GOOD TIMBS TRUNK #I (PHASE I -BAST)
PROPOSED PIPBUNB SURVEY LOCATED IN THE
S/2 & SB/4 NB/4 OF SBCI10N 36, T24N, RIOW
NMPM, SAN JUAN COUNTY, NEW MEXICO
GRAPHIC SCALE
1000
FOUND 1<132 GLO 6RA55 C.AP
FOUND 1<132 6LO BRASS C.AP
5b<I"31'H 2624.16' (REC.ORO)
5e<I"36'05"W 2625.16' (MEASURED)
58<1"31W 2624.16' (REC.ORD)
58<1"31'26"H 2623.01' (MEASURED)
DUGAN OCTOBERFEST #I WELLHEAD
TIE FROM EAST 114 CORNER SEGTION
5EG6T10H LIIE X-STA 5e+'f16
561'25'31"1"4 25ZI.4'I'
500' 'O&"E 1410&'
PIIb 61+ 5.4 34.14'5i T
PIIB 68+38.0 45°29'44"LT
puq 15+03.&115& "RT
DU6AN P/L (15' OFFSET LT)
C/L ROAD (21' OFFSET LT)
N85°28'50"W 132.04'
NO°06'W 2645.61' (RECORD)
NO°05'29"W 2644.55' (MEASURED)
NO°02'41"W 2645.28' (MEASURED)
50°03'40"E 2643.01' (MEASURED)
50°04'E 2642.31' (RECORD)
50°00'21"W 2641.72' (MEASURED)
FOUND 1932 GLO BRASS CAP
YATES 5GUASH !!LOSSOM II HELL AD
T24N
T23N
Ne<I'3230"E 2622.25' (MEA5URED)
Ne<1"33'E 2622.e4' (REC.ORD)
Ne<1"34'1'I'E 2622.15' (MEA5URED)
Ne<I"33'E 2622.b4' (REC.ORD)
– 5UREAc.E OHNER5HIP –
Bureau of Land Malc>gement
53+97.6 TO 125+88.0
11'10.4 FT / 435.e ROD5
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
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
I, Jason C. Edwards, a registered Professional Surveyor under the laws of the State of New Mexico. hereby cert1fy that thJS plat was prepared from field notes of an actual survey meet1ng the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JASoN C.. £PwARJ>5
oate: December 11 2012
Jason C. Edwards, P.L .S.
New MeXJCO L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1700
DENVER, CO 80202
Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
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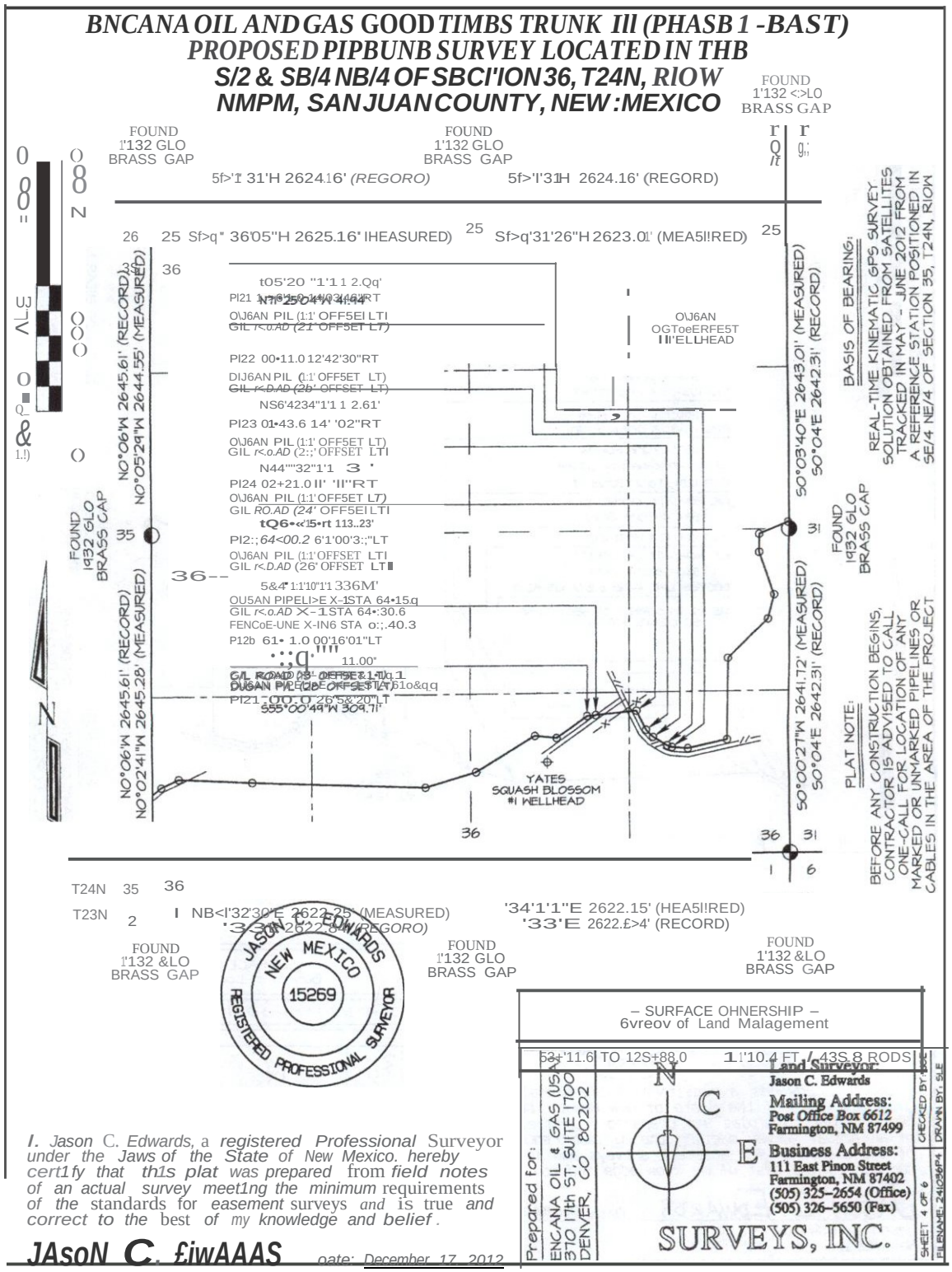
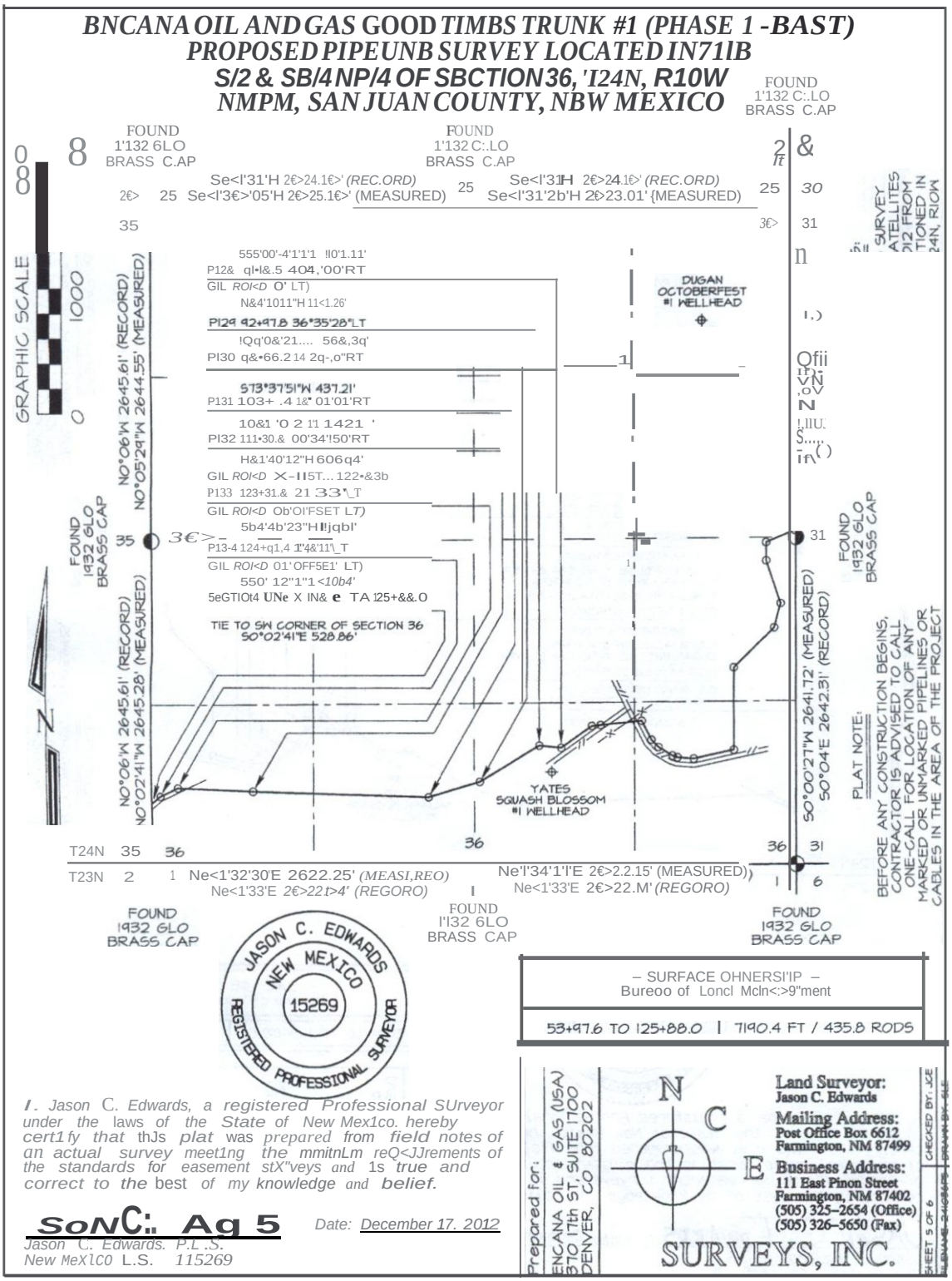
(505) 326-5650 (Fax)
SURVEYS, INC.
CHECKED BY: JCE
DRAWN BY: SLE
SHEET 3 OF 6
FILENAME: 2410361P3


BNCANA OIL AND GAS GOOD TIMBS TRUNK Ill (PHASB 1 -BAST)
PROPOSED PIPBUNB SURVEY LOCATED IN THB
S/2 & SB/4 NB/4 OF SBCI'ION 36, T24N, RIOW
NMPM, SAN JUAN COUNTY, NEW :MEXICO
FOUND 1'132 GLO BRASS GAP
FOUND 1'132 GLO BRASS GAP
FOUND 1'132 <>LO BRASS GAP
5f>'I 31'H 2624.16' (REGORO)
5f>'I'31H 2624.16' (REGORD)
25 Sf>q" 36'05"H 2625.16" IHEASURED)
25 Sf>q'31'26"H 2623.01' (MEA5I!RED)
NO°06'W 2645.61' (RECORD)
NO°05'29"W 2644.55' (MEASURED)
NO°06'W 2645.61' (RECORD)
NO°02'4"W 2645.28' (MEASURED)
50°03'40"E 2643.01' (MEASURED)
50°04'E 2642.31' (RECORD)
50°00'27"N 2641.72' (MEASURED)
50°04'E 2642.31' (RECORD)
FOUND 1432 GLO BRASS CAP
FOUND 1432 GLO BRASS CAP
BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN MAY - JUNE 2012 FROM A REFERENCE STATION POSITIONED IN SE/4 NE/4 OF SECTION 35, T24N, RIOW
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
YATES SQUASH BLOSSOM #1 WELLHEAD
T24N 35 36
T23N 2 1 NB<I'32'30"E 2622.25' (MEASURED)
'34'1'1"E 2622.15' (HEA5I!RED)
'33'E 2622.£>4' (RECORD)
FOUND 1'132 &LO BRASS GAP
FOUND 1'132 GLO BRASS GAP
FOUND 1'132 &LO BRASS GAP
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
– SURFACE OHNERSHIP –
6vreov of Land Malagement
53+'11.6 TO 12S+88.0
1!'10.4 FT / 43S.8 RODS
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1700
DENVER, CO 80202
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 6
FILENAME: 241036P4
CHECKED BY: JCE
DRAWN BY: SLE
I. Jason C. Edwards, a registered Professional Surveyor under the Jaws of the State of New Mexico. hereby cert1fy that th1s plat was prepared from field notes of an actual survey meet1ng the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JAsoN C. £iwAAAS
oate: December 17, 2012
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269


BNCANA OIL AND GAS GOOD TIMBS TRUNK #1 (PHASE 1 -BAST)
PROPOSED PIPEUNB SURVEY LOCATED IN71lB
S/2 & SB/4NP/4 OF SBCTION36, 'I24N, R10W
NMPM, SAN JUAN COUNTY, NBW MEXICO
FOUND 1'132 6LO BRASS C.AP
FOUND 1'132 C:.LO BRASS C.AP
GRAPHIC SCALE
1000
DUGAN OCTOBERFEST #I WELLHEAD
YATES SQUASH BLOSSOM #I WELLHEAD
TIE TO SW CORNER OF SECTION 36 50°02'41"E 528.86'
FOUND 1932 6LO BRASS CAP
T24N
T23N
Ne<1'32'30'E 2622.25' (MEASI,REO)
Ne<1'33'E 2€>22.t>4' (REGORO)
Ne'l'34'1'l'E 2€>2.2.15' (MEASURED))
Ne<1'33'E 2€>22.M' (REGORO)
FOUND l'I32 6LO BRASS CAP
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 OHNERSI'IP –
Bureoo of Loncl Mcln<:>9"ment
53+97.6 TO 125+88.0 | 7190.4 FT / 435.8 RODS
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
I. Jason C. Edwards, a registered Professional SUrveyor under the laws of the State of New Mex1co. hereby cert1fy that thJs plat was prepared from field notes of an actual survey meet1ng the mmitnLm reQ<JJrements of the standards for easement stX"veys and 1s true and correct to the best of my knowledge and belief.
Date: December 17. 2012
Jason C. Edwards. P.L.S.
New MeXlCO L.S. 115269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST. SUITE 1700
DENVER, CO 80202
N
C
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Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
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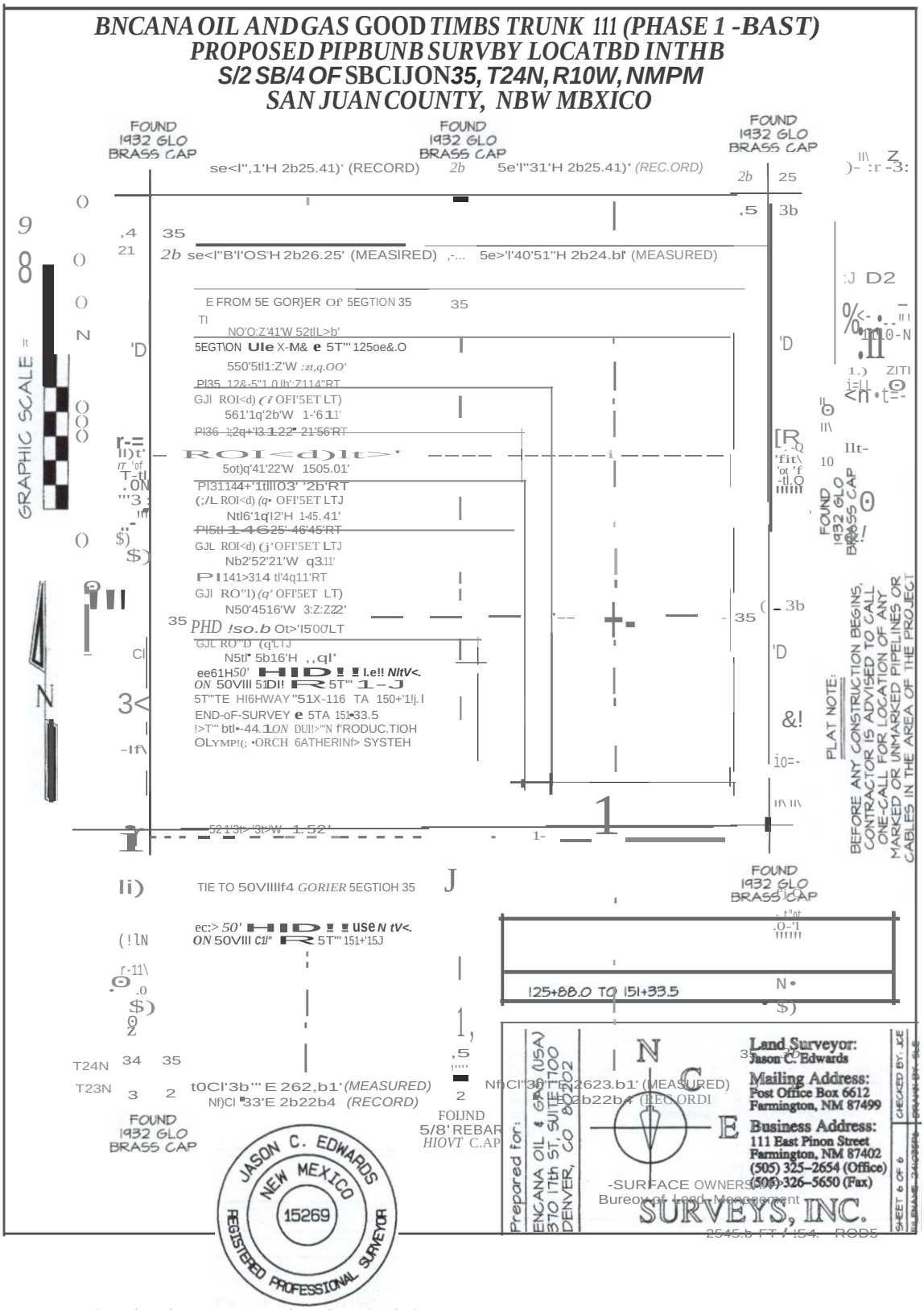
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.
SHEET 5 OF 6
CHECKED BY: JCE

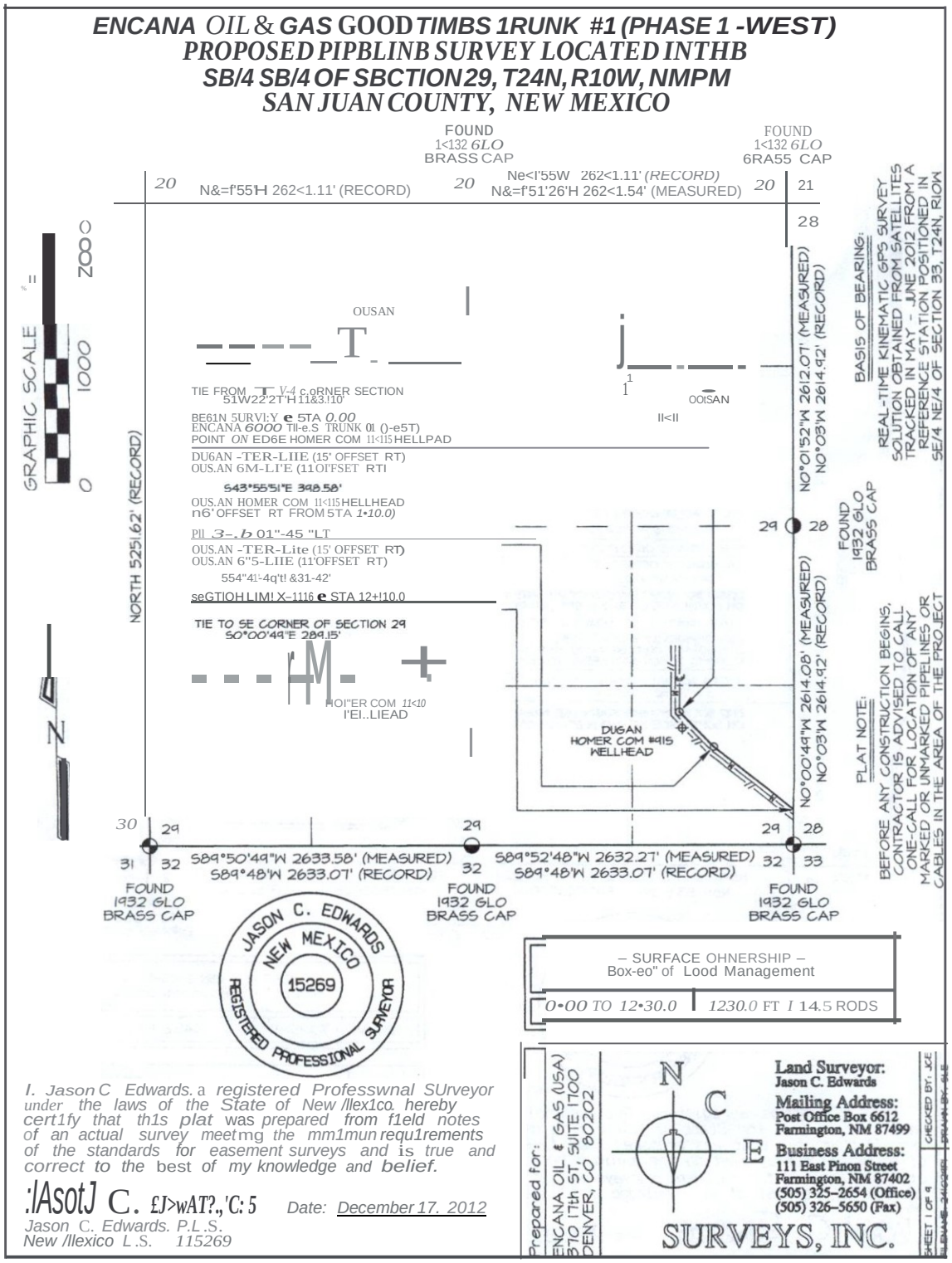


I. Jason C. Edwards. a reg1stered ProfessJOnal SUrveyor under the laws of the State of New Mexico. hereby certJ fy that thJS plat was prepared from f1eld notes of an actual st.rvey meetmg the mm1mun reQtnrements

of the standards for easement swveys and is true and correct to the best of my knowledge and belief.

JAsoN C. fPwAF'J25 Date: December 11, 2012

Jason C. Edwards
New *f.tex1co* LS *#15269*


ENCANA OIL & GAS GOOD TIMBS 1RUNK #1 (PHASE 1 -WEST)
PROPOSED PIPBLINB SURVEY LOCATED INTHB
SB/4 SB/4 OF SBCTION 29, T24N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO
FOUND 1<132 6LO BRASS CAP
FOUND 1<132 6LO 6RA55 CAP
N&=f'55'H 262<1.11' (RECORD)
Ne<I'55W 262<1.11' (RECORD)
N&=f'51'26'H 262<1.54' (MEASURED)
GRAPHIC SCALE
NORTH 5251.62' (RECORD)
N
TIE FROM T V-4 c.oRNER SECTION 51W22'2T'H 11&3.!10
BE61N 5URVl:Y e 5TA 0.00
ENCANA 6000 Tll-e.S TRUNK 01 ()-e5T)
POINT ON ED6E HOMER COM 11<115 HELLPAD
DU6AN -TER-LIIE (15' OFFSET RT)
OUS.AN 6M-LI'E (11OIFSET RTI
S43°55'51"E 348.58'
OUS.AN HOMER COM 11<115 HELLHEAD
n6' OFFSET RT FROM 5TA 1•10.0)
Pll 3-.b 01"-45 "LT
OUS.AN -TER-Lite (15' OFFSET RT)
OUS.AN 6"5-LIIE (11'OFFSET RT)
554"41-4q't! &31-42'
seGTIOH LIM! X-1116 e STA 12+!10.0
TIE TO SE CORNER OF SECTION 29
S0°00'49"E 284.15'
DUGAN HOMER COM #415 WELLHEAD
N0°01'52"W 2612.07' (MEASURED)
N0°03'W 2614.92' (RECORD)
N0°00'49"W 2614.08' (MEASURED)
N0°03'W 2614.92' (RECORD)
S89°50'49"W 2633.58' (MEASURED)
S89°48'W 2633.07' (RECORD)
S89°52'48"W 2632.2T' (MEASURED)
S89°48'W 2633.07' (RECORD)
FOUND 1932 GLO BRASS CAP
FOUND 1932 GLO BRASS CAP
FOUND 1932 GLO BRASS CAP
FOUND 1932 GLO BRASS CAP
BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED IN MAY - JUNE 2012 FROM A REFERENCE STATION POSITIONED IN SE/4 NE/4 OF SECTION 33, T24N, R10W
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 OHNERSHIP –
Box-eo" of Lood Management
0•00 TO 12•30.0 1230.0 FT I 14.5 RODS
I. Jason C Edwards. a registered Professwnal SUrveyor under the laws of the State of New /llex1co. hereby cert1fy that th1s plat was prepared from f1eld notes of an actual survey meetmg the mm1mun requ1rements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
:lAsotJ C. £J>wAT?.,'C: 5
Date: December 17. 2012
Jason C. Edwards. P.L.S.
New /llexico L.S. 115269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1700
DENVER, CO 80202
Land Surveyor:
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(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

Appendix B-Right-of-Way Stipulations

Appendix C-Biological Survey Report