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DRAFT

IC Potash Ochoa Project Geotechnical Testing Program

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Lea County, New Mexico

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Geotechnical Testing Program

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IC Potash Ochoa Project
Geotechnical Testing Program

(DOI-BLM-NM-P020-2012-1405-EA)

1 PURPOSE & NEED

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of a geotechnical testing program for the proposed Intercontinental Potash Corp, USA [ICP (USA)] Ochoa potash mine (Ochoa). The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action. The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Carlsbad Resource Management Plan (BLM 1988) and the Carlsbad Approved Resource Management Plan Amendment and Record of Decision *(*BLM 1997).

1.2 Background

The Carlsbad Field Office (CFO) is considering a request by ICP (USA) to conduct a geotechnical testing program for its proposed Ochoa project. The Ochoa project would comprise three primary infrastructure facilities locations in Lea County, New Mexico. These locations would be the sites for the proposed geotechnical program actions and would include:

- Mine shaft and decline: The mine shaft and decline would be located in Sections 14 and 15 (T24S, R33E).
- Processing facility: The processing facility would be comprised of a decline tunnel, processing plant, surge and evaporation ponds, waste rock and tailings storage, including roads and parking lots. The processing facilities to support the mine would be located in Sections 23, 26, and 35 and parts of Sections 24 and 25 (T24S, R33E).
- Jal Loadout facility: The loadout facility would include a new rail spur and sidings, storage domes and silos, and an evaporation pond. The loadout facility would be constructed on private land approximately four miles north of Jal, in Sections 24, 25, and

36 (T24S, R36E), and Sections 19 and 31 (T24S, R37E). The three locations for the proposed geotechnical testing program are illustrated in Figure 1.

The proposed geotechnical testing program will comprise borehole drilling, excavating test pits for soil sampling and testing, and a seismic refraction survey. The program would occur within a relatively brief timeframe, approximately 30 days, and on a relatively small footprint, thus minimizing impacts to BLM ecosystems.

1.3 Need for the Proposed Action

The Ochoa project geotechnical testing program is required to provide data on subsurface soil, rock, and groundwater conditions for key structure locations of the proposed Ochoa mine facilities. Information gained from the testing program would enable identification of the engineering properties of subsurface borrow and foundation materials.

The testing would also provide data needed for estimating the hydraulic containment characteristics beneath proposed geomembrane-lined structures in the tailings facility and pond areas. The seismic surveys would confirm competent ground near sink depressions; determine the groundwater depth, if any; and assess the rippability of bedrock materials.

1.4 Purpose of the Proposed Action

BLM is considering approval of the proposed geotechnical testing program under a single Mine Plan Modification. Private exploration and production from Federal mineral leases is an integral part of BLM's mineral leasing program under authority of the Mineral Leasing Act of 1920, as amended by the Federal Land Policy and Management Act of 1976.

Additionally, mineral exploration and development is recognized as an appropriate use of public lands in the Carlsbad Resource Management Plan that provides management direction for the leased area. BLM will consider approval of the proposed geotechnical testing program that avoids or reduces impact on cultural, wildlife, soils, and vegetation resources and is consistent with the lease rights granted to the applicant and prevents unnecessary or undue degradation of the public lands.

1.5 Conformance with BLM Land Use Plan

The proposed action and alternatives described below are in conformance with the Carlsbad Resource Management Plan (RMP) (BLM 1998). Guidance cited in the RMP states: "BLM will encourage and faci1itate the development by private industry of public land mineral resources so that national and local needs are met, and environmentally sound exploration, extraction, and reclamation practices are used".

As pertains to solid leasable minerals, the Carlsbad RMP states the Carlsbad Field Office will manage solid leasable minerals under the authority of the Mineral Leasing Act of 1920, as amended, and the Potash Leasing Act of 1927. Regulations that pertain to these minerals are contained in 43 CFR 3500.

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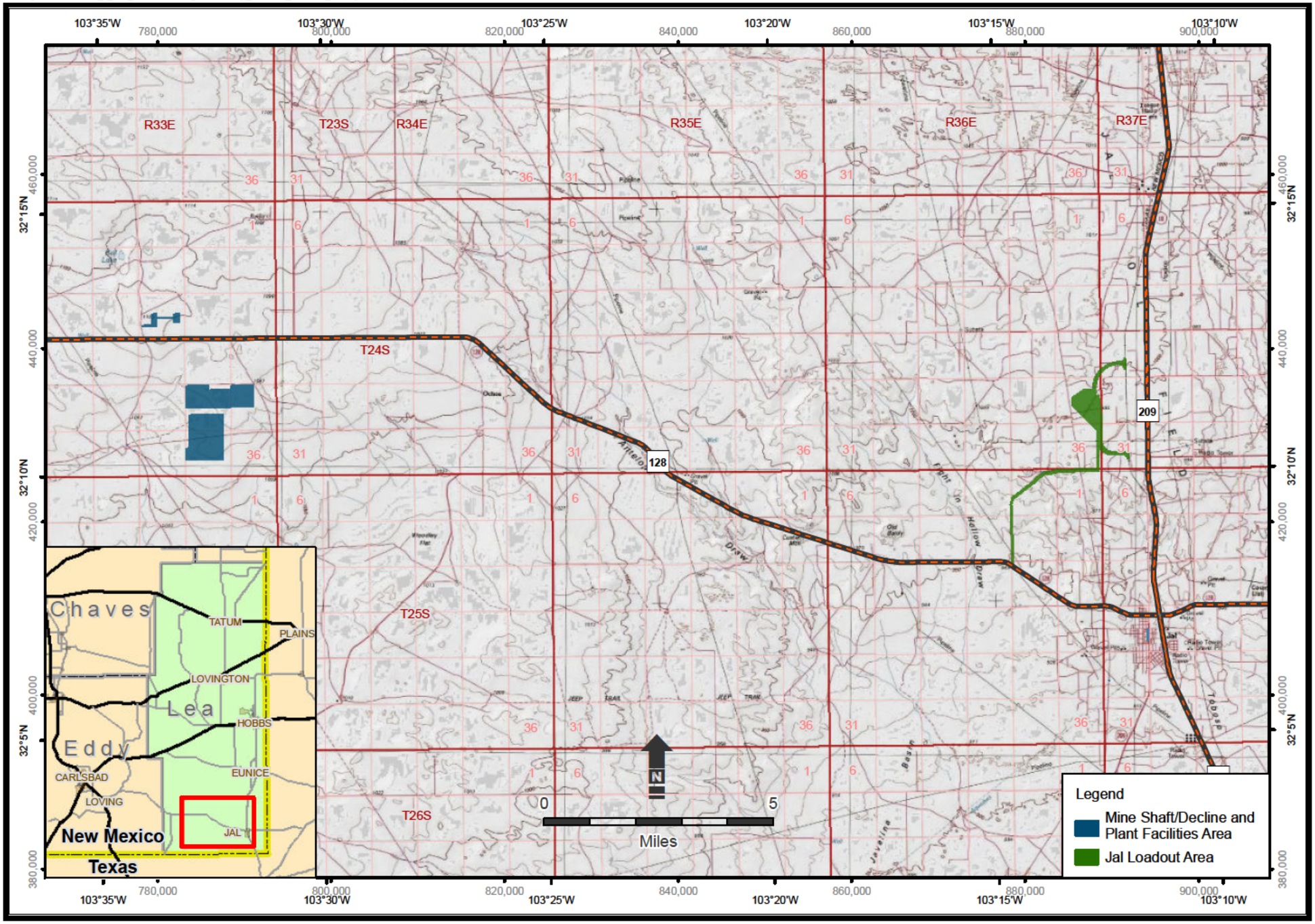

NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
USGS Topographic Base

Figure 1
Vicinity Map
Geotechnical Testing Program EA
Lea County, New Mexico 2012

1.6 Relationship to Statutes, Regulations, or Other Plans

This EA has been prepared in accordance with the National Environmental Policy Act of 1969 and implementing regulations, 40 Code of Federal Regulations (CFR) Parts 1500 – 1508.

In addition to NEPA, a number of supplemental authorities contain procedural requirements that pertain to actions contained in the proposed action. A number of BLM plans, policies, and regulations are applicable to the AFM EA and are incorporated into this EA by reference. All the plans, policies, and regulations will be included in the Administrative Record (AR) for this project and made available upon request. The following comprises applicable regulation, guidance, and supplemental authorities integrated into this EA:

- BLM Plans, Policies, and Regulations
- BLM Planning Regulations, 40 CFR 1600
- BLM National Environmental Policy Act (NEPA) Handbook H-1790-1
- BLM Rangeland Health Standards, BLM Manual 4180
- Special Status Species Management, BLM Manual 6840
- Cultural Resource Management, BLM Manual 8100
- Identifying and Evaluating Cultural Resources, BLM Manual 8110
- Planning for Uses of Cultural Resources, BLM Manual 8130
- Protecting Cultural Resources, BLM Manual Section 8140
- Federal Land Policy and Management Act of 1976 (FLPMA; 43 United States Code [U.S.C.] 1701 et seq.)
- Clean Air Act of 1977 (CAA; 33 U.S.C. 1251 et seq.)
- Clean Water Act of 1977 (CWA; 33 U.S.C. 1251 et seq.), as amended
- Taylor Grazing Act of 1934 (43 U.S.C. 315)
- Federal Noxious Weed Act of 1974 (PL 93-629)
- Endangered Species Act of 1983 (ESA; 16 U.S.C. 1531), as amended
- National Historic Preservation Act (16 U.S.C. 470), as amended
- Archaeological Resources Protection Act (16 U.S.C. 470), as amended
- The Archaeological Resources Protection Act of 1979 (ARPA)
- Archaeological and Historic Preservation Act of 1974 (AHPA)
- 36 CFR 68 Secretary of the Interior’s Standards for the Treatment of Historic Properties
- Migratory Bird Treaty Act of 1918 (16 U.S.C. 703),as amended
- Control of Invasive Species, EO 13112:
- Final EIS: Vegetation Treatment on BLM Lands in the 13 Western States
- 40 CFR 2740, 2912, 2911, and 2920, Land Use Authorizations

1.7 Identification of Issues

As required by NEPA, the BLM CFO completed a process to determine the relevant issues that would guide the scope of the environmental analysis and alternatives to be analyzed in this EA. A CFO interdisciplinary team (ID Team), which included resource and planning specialists, identified potential issues and concerns related to the proposed action. These were refined into impact topics. Impact topics facilitate the analysis of environmental consequences and provide

for a standardized comparison of alternatives, based on the most relevant information available. The impact topics were identified based on Federal laws, regulations, and orders, BLM Management Policies, and BLM resource specialists' knowledge of limited or vulnerable-to-impact resources.

The following list provides an outline of resources or issues that must be carried through analysis in the EA.

1.7.1 Vegetation Resources/Invasive Species/Noxious Weeds

- *Would the proposed project result in impacts to native vegetation?*
- *Would the proposed project result in impacts to federally listed Threatened & Endangered (T&E) (Candidate) or special status plant species?*
- *Would ground disturbance result in the establishment and spread of invasive/noxious plants, particularly African rue?*

1.7.2 Wildlife Resources

- *Would the proposed project result in impacts to active raptor nests?*
- *Would the proposed project result in impacts to lesser prairie chicken habitat?*
- *Would the proposed project result in impacts to waters used by wildlife?*
- *Would the proposed project result in impacts to T & E (Candidate) or special status wildlife species?*

1.7.3 Soil Resources

- *Would the proposed project result in impacts to soil, such as compaction or soil loss?*

1.7.4 Cultural Resources

- *Are there cultural sites in or in close proximity to the project area?*
- *Would the proposed project result in impacts on prehistoric sites eligible for the National Register?*

1.8 Issues Considered but Eliminated from Further Analysis

During internal scoping, the BLM ID Team conducted a preliminary analysis of resources to determine the context, duration, and intensity of effects that the proposed action may have on those resources. If the magnitude of effects was determined by the resource specialists to be at the negligible or minor level with mitigation, there is no potential for significant impact and further impact analysis is unnecessary. The following list provides an outline of resources or issues that have been eliminated from further analysis in the EA.

- Air Quality
- ACECs
- Greenhouse Gas Emissions
- Environmental Justice

- Farmlands – Prime or Unique
- Fish Habitat
- Floodplains
- Fuels/Fire Management
- Wetlands/Riparian Zones
- Lands/Access
- Lands with Wilderness Characteristics
- Livestock Grazing
- Native American Religious Concerns
- Paleontology
- Rangeland Health Standards
- Recreation
- Socio-Economics
- Visual Resources
- Waste Material (hazardous or solid)
- Water Resources/Quality
- Wilderness/WSA
- Woodland/Forestry
- Wild Horses and Burros

1.9 Summary

This chapter has presented the purpose and need of the proposed project, as well as the relevant issues; those elements of the human environment that could be affected by the implementation of the proposed project. In order to meet the purpose and need of the proposed project, the proposed action and no-action alternative are presented in Chapter 2. The potential affected environment is described in terms of resources in Chapter 3. The potential environmental impacts or consequences resulting from the implementation of alternatives considered in detail are analyzed in Chapter 4 for each of the identified issues.

2 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Introduction

For an alternative to be considered reasonable under NEPA, it should meet the purpose and need statement (as outlined in Chapter 1). For this EA, one action alternative, the Proposed Action, was identified in addition to the No Action Alternative.

2.2 Proposed Action Alternative

The geotechnical testing program would be conducted within a 30-day period. A detailed work plan to integrate all the following Best Management Practices (BMPs) and proponent-proposed mitigation actions would be prepared prior to the commencement of activities. The program includes borehole drilling, excavating test pits for soil sampling and testing, and a seismic refraction survey. The three individual testing programs are described in the following sections.

Overland access to individual test locations (Figure 2) would be selected at the discretion of truck operators. When possible, existing two-track routes will be used. ICP (USA) estimates that a total of approximately one linear mile of off-route access will be required. Drivers will choose access routes that avoid cultural resources, known raptor nests, fences, and other structure.

2.2.1 Geotechnical Boreholes

Twenty-five (25) boreholes would be drilled to a maximum depth of 75 feet or to auger refusal, whichever occurs first. If auger refusal occurs, rotary coring methods would be used to obtain a minimum 20 feet of core or sufficient depths for obtaining adequate feasibility-level design data for borrow development, foundation design, and construction. Boreholes would extend to a maximum depth of 75 feet in soils or weathered bedrock in most areas. Three boreholes (BH-4, BH-6, and BH-8 on Figure 2) would be drilled to a maximum depth of 100 feet. Core samples would be logged during boring and transported to a local geotechnical laboratory for testing of material characteristics.

Boreholes would be drilled using a small, truck (rig)-mounted CME-75 hollow-stem auger, or equivalent, for standard penetration tests, blow count, and sampling. The rig would weigh approximately 9 to 10 tons. This type of rig would not require a pad for auger or rotary drilling. The hollow-stem auger would have an outside diameter of 7.5 inches and the rotary core would have an outside diameter of 4 inches. The boreholes would not be lined.

At least two vehicles would be involved for each borehole drilling location: one to convey the rig, and one or more additional pick-up truck(s) to transport other geotechnical engineers to sample sub-surface material. The sampling would be conducted using the pick-up truck bed or by setting up a small folding table. No designated parking areas or staging areas would be required. Geotechnical engineers would be at each site for approximately two to five hours.

A water truck or self-contained water tank on the drill rig would be used for drilling activities. If drilling mud is required, a portable trough and tank for hydration and recirculation of bentonite mud would be brought to the site. However, it is not anticipated that drilling mud would be needed.

Standard penetration tests and split-spoon samples would be collected at minimum 5-foot depth intervals to evaluate material strength and to collect material samples for select laboratory tests.

Boreholes in the proposed tailings facility and pond areas would include field permeability tests for estimating the hydraulic containment characteristics beneath the proposed geomembrane-lined structures. Field permeability testing would possibly include shallow boreholes at 5-foot and 10-foot depths. These secondary boreholes would be approximately 15 feet removed from the main borehole. Field percolation tests and pressure packer tests would also be conducted at the tailings storage and pond areas.

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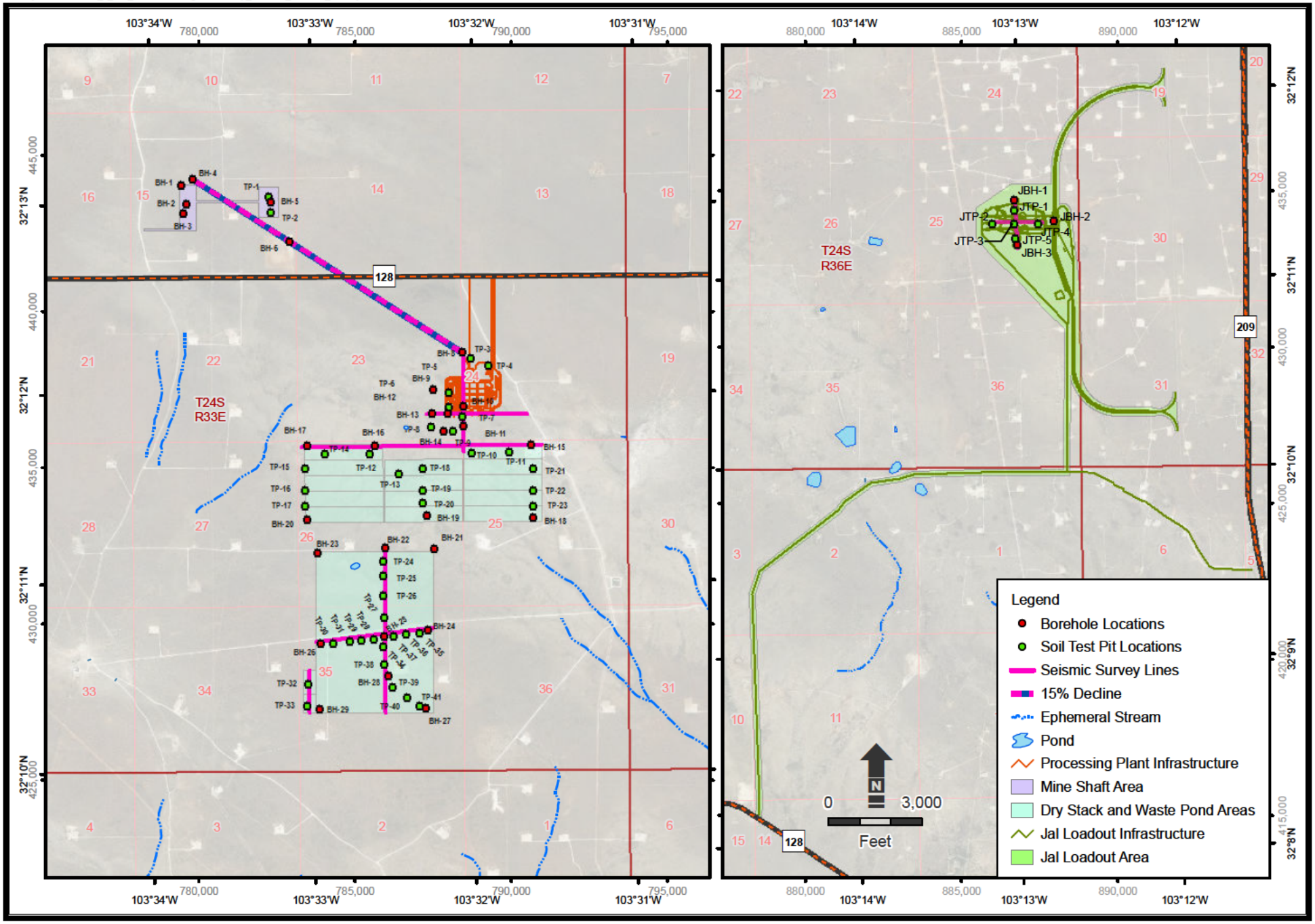

NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
New Mexico NAIP 2011 Aerial Base
Source:
Mine areas and infrastructure: IC Potash, 2012

Figure 2
Site Layout
Geotechnical Testing Program EA
Lea County, New Mexico 2012

Upon completion of all testing activities, boreholes will be backfilled with cuttings and bentonite. No additional mineral material would be required for reclamation of boreholes. Any reserved topsoil would be spread on top of the borehole, and the area would be seeded and mulched.

2.2.2 Test Pits

Forty-one (41) test pits will be excavated in the shaft and processing area, and five test pits are planned for the Jal Loadout area (Figure 2). Proposed test pit locations may be moved up to 50 feet in any direction, in response to field conditions. The total area of temporary surface disturbance from each test pit excavation would be approximately 600 square feet. Approximately 400 square feet of surface would be temporarily covered with excavated soil. The pits would be excavated to a maximum depth of 20 feet.

Test pits will be excavated with a rubber-tired backhoe. Topsoil, as well as existing vegetation and other organic matter, will be bladed off and placed in windrows prior to excavation. Soil in the test pits will be logged and sampled. Where sampling is necessary in test pits deeper than 4 feet, the back side wall will be laid back to a slope of 1H: 1V.

At completion of sampling, all test pits will be immediately backfilled with excavated soil so that excavations do not present a safety concern. No excavated pits will be left open overnight. No additional mineral material will be required for reclamation of soil pits. The windrowed topsoil will be spread on top of the backfilled test pit and the area will be seeded and mulched, as described above.

2.2.3 Seismic Survey

Seven (7) seismic surveys would be conducted in the processing and decline areas and two would be conducted in the Jal Loadout area (Figure 2). The surveys would be conducted entirely by a seismic crew on foot. No large seismic vehicles would be required. Wire lines and attached geophones would be set into the ground surface at measured spacing intervals across a straight line alignment. Wire lines would be removed as soon as possible upon completion of the survey. None would be left laid-out overnight. An 8-inch square plate would be set 1 to 2 inches into the ground at both ends of a line and struck by a sledge hammer to send sound waves into the subsurface. The geophones will record sound wave arrival time. The sound waves would later be analyzed to determine different soil and rock formation surfaces and the relative density of the subsurface materials. Topographic surveys would be conducted at the start and end point of each line.

2.2.4 Standard Operating Procedures, Best Management Practices, and Mitigation

All geotechnical testing program actions would integrate the following BLM Standard Operating Procedures (SOPs) and BMPs. A number of mitigation measures would be implemented during performance of the proposed action. These measures are all intended to avoid and minimize impacts to the surrounding natural environment and are described below.

Vegetation, Wildlife, and Soils Resources

- A field worker orientation program would include training to understand and implement the SOPs, BMPs, and mitigation measures integrated into the project design.
- No roads would be constructed as part of the geotechnical testing program, and every effort would be taken to use existing two-track trails and oil and gas and ranch roads to minimize overland travel. Any discernible trails left by drilling vehicles and backhoes would be raked and seeded after completion of the testing program.
- Surface disturbance would not be allowed within up to 200 meters of the outer edge of 100-year floodplains to protect the integrity of those floodplains. Exceptions would be requested with an approved plan of operations.
- Depth to groundwater would be measured in a temporary open-well-slotted PVC pipe. After measurement, the pipe would be removed and the hole backfilled with cuttings and bentonite.
- Field workers would be briefed as part of the orientation regarding how to recognize the noxious weed African rue (*Peganum harmala*) and where the known population of this plant occurs (Figure 3). All truck traffic and ground-disturbing activities would avoid entry into this location, to prevent spread of this weed to new locations.
- Temporary surface disturbances would be seeded with a BLM-approved seed mixture and seeding rate.
- Commercial seed used in the reclamation seed mix would be certified weed-free and registered in accordance with State of New Mexico regulation.
- Certified weed-free mulch and tackifier would be applied immediately, as necessary, to seeded areas to prevent soil loss from wind erosion.
- Off-road travel routes will be designated if the proposed action activities occur during nesting season (February through September). A survey for nesting birds would be conducted along these routes and within the estimated project footprint areas by a qualified biologist. If songbird nests are located, construction activities would not be initiated until any identified nests have fledged based on the biology of the affected species and a recheck of the nest and the area of consideration.
- Active raptor nests would be avoided for a distance of 200 meters during nest occupancy, or by delaying activities for 90 days, or both. Exceptions to this requirement might be requested if a nest was inactive, the proposed activity were of short duration, and/or if the proposed activity would not be continuous.
- No PVC piping or reflective markers that could attract songbirds or raptors would be used to mark survey locations.
- Surface disturbance would not be allowed within 200 meters of known lesser prairie-chicken leks.

- Noise levels will not exceed 75 decibels (dB) at 30 feet in lesser prairie-chicken habitat; likewise, surface disturbance in lesser prairie-chicken habitat would not be allowed between 3:00 a.m. and 9:00 a.m. from March 15 through June 15. Exceptions to these requirements would be requested for areas of unoccupied habitat.
- To protect big game, construction activity would be halted if animals are present prior to daily construction activity.
- To protect reptiles, open bore holes will be capped daily to prevent any reptiles from exploring holes.
- Any wildlife watering stations (guzzlers) encountered will be avoided to prevent accidental impacts or destruction.

Cultural

- Field workers would be briefed as part of the orientation regarding the general location of eligible cultural resource sites in the vicinity of the project area. All sites will be mapped to include a 100-foot buffer. Precise locations will not be made available. All truck traffic and ground-disturbing activities would avoid entry into these buffer areas to prevent any negative impacts to these locations.
- Any unrecorded cultural resource sites encountered during implementation of the geotechnical program would be left intact and immediately brought to the attention of the BLM Authorized Officer.
- If paleontological resources of potential scientific interest would be encountered (including all vertebrate fossils and deposits of petrified wood), they would be left intact and immediately brought to the attention of the BLM Authorized Officer.

Hunting and Grazing Leases

- It is unlikely that the geotechnical testing program would be implemented during any hunting seasons. However, hunting opportunities would be preserved by allowing access within the project area, with hunters adhering to hunter safety rules around field workers and infrastructure. Field operations will occur during off-times for hunting daily and seasonally to the extent possible
- ICP (USA) would discuss the proposed geotechnical program work plan with grazing leasees prior to the start of work.

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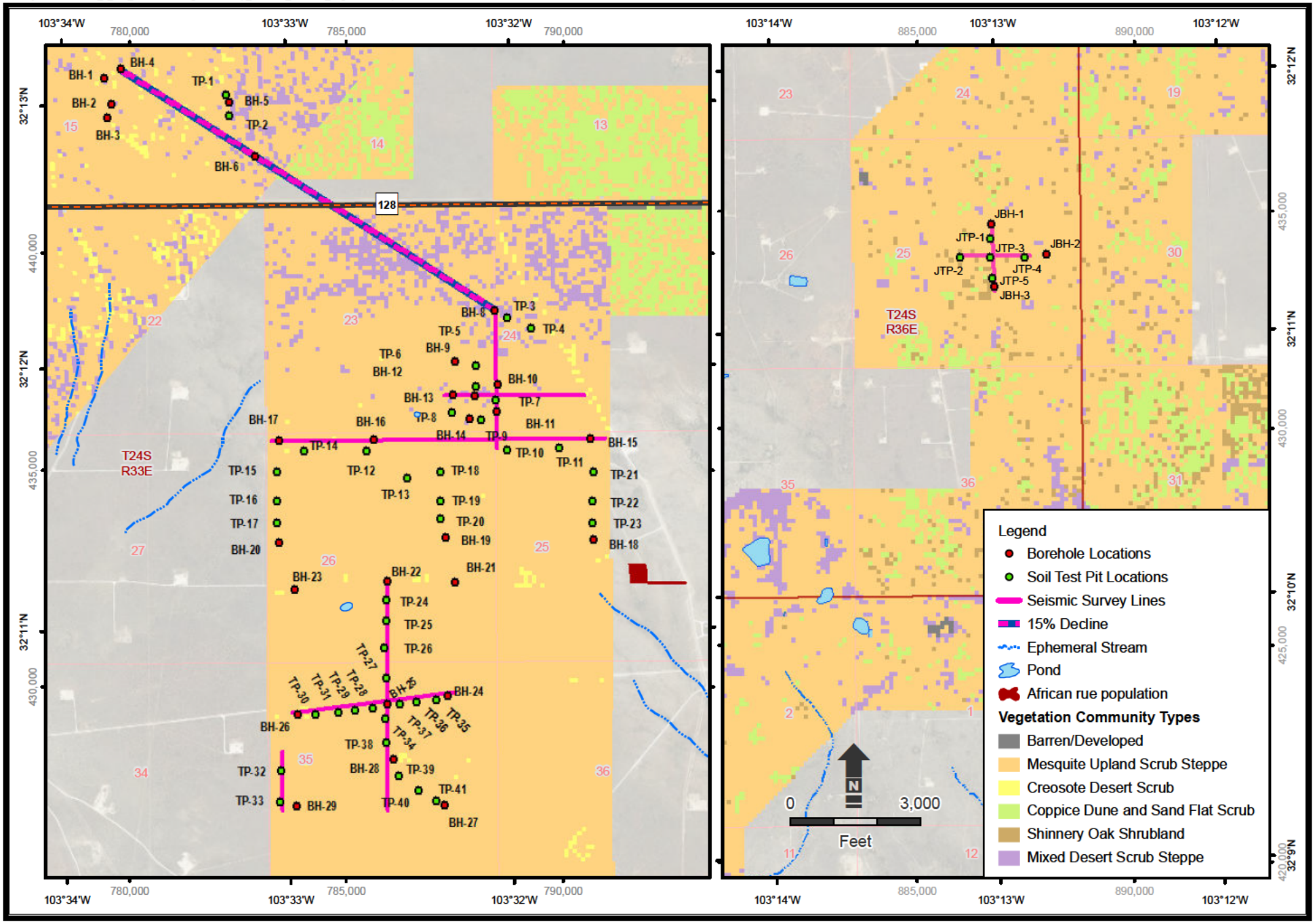

NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
Source:
Vegetation-Walsh, 2012 (Modified Landfire, USGS, 2008)
Weeds-BLM, 2011
Wetlands-US Fish & Wildlife Service, 2011

Figure 3
Vegetation Resources
Geotechnical Testing Program EA
Lea County, New Mexico 2012

2.3 No Action Alternative

The No Action alternative provides a basis for comparing the environmental consequences of the proposed action. In this case, the No Action Alternative represents ongoing current management practices, and the proposed geotechnical testing program would not be conducted. If the No Action alternative is selected, the data to be collected by the geotechnical testing program would not be available for the design of the Ochoa project infrastructure facilities, and the Ochoa project could not be safely designed or built.

3 AFFECTED ENVIRONMENT

3.1 Introduction

This section describes the existing environmental resources within the Ochoa project geotechnical testing program site and in the immediately surrounding area—vegetation, wildlife, soils, and cultural resources—that could be affected by the alternative actions.

3.2 General Setting

The Ochoa project geotechnical testing program site is located in the southeastern corner of New Mexico, and comprises two level IV ecoregions (Griffith et al. 2006). The processing area is in the Chihuahuan Desert Grasslands Ecoregion, which consists of plateaus, high intermountain basins, alluvial fans, and bajadas. Streams are ephemeral, flowering only after storm events. Land uses include livestock grazing, ranching, recreation, and wildlife habitat.

The Jal Loadout Facility occurs within the Shinnery Sands ecoregion. Topography is generally smooth plains, sand hills, and dunes. Ephemeral or spring-fed streams are rare, and there is little or no stream network. Land uses include livestock grazing, ranching, wildlife habitat, and oil and gas production.

Elevations in the project site range from approximately 3,000 to 3,600 feet. The proposed processing plant and facilities are at 3,500 feet and the Jal Loadout facility is at 3,300 feet. The climate is characterized by light precipitation totals, abundant sunshine, low relative humidity, and a relatively large annual and diurnal temperature range. June and July are the warmest months with average daytime highs averaging in the upper 90s and occasionally exceeding 100°F. In January, the coldest month, average daytime high temperatures are in the mid to upper 50s (°F). While minimum temperatures below freezing are common, it is rare that temperatures fall below 0°F.

Average annual precipitation is 10- to-15 inches, with wide annual variation. Summer rains fall almost entirely during brief, but frequently intense thunderstorms. About 80 percent of the annual total precipitation is received during May through October, with July and August being the rainiest months. On average, only about 0.5 inch of precipitation occurs each month during the period of November through April.

3.3 Resources/Issues Brought Forward for Analysis

3.3.1 Vegetation Resources, Noxious Weeds, and Special Status Species

Five vegetation community types occur within the project vicinity: mesquite upland scrub steppe, creosote desert scrub, coppice dune and sand flat scrub, shinnery oak shrubland, and mixed desert scrub steppe (Figure 3).

By far the most common vegetation community within the geotechnical program project area is mesquite upland scrub steppe. This community is thought to represent the native shrub steppe that has been invaded in historic time by honey mesquite (*Prosopis glandulosa*). This community supports a diverse, if scattered, native shrub component with common species such as desert buckthorn *(Ceanothus greggii*), rabbitbrush (*Chrysothamnus* sp.*),* javelina bush (*Condalia ericoides*), and broom snakeweed (*Gutierrezia sarothrae*). This community is often adjacent to the mixed desert scrub steppe, a similarly structured community, except lacking honey mesquite. Incursion by honey mesquite, a non-native shrub, could have been brought on by drought, grazing and seed dispersal by livestock, and/or a decrease in natural fire frequency (Natureserve 2011).

Within the project area, the creosote desert scrub community is uncommon and only occurs along the top and upper slopes of rocky hills. Soils are generally coarse-textured loams and are usually non-saline and often calcareous (Natureserve 2011). In contrast to the mixed desert scrub steppe, shrub diversity is generally low in this community. Shrub cover is sparse and is dominated by creosote bush (*Larrea tridentata*). A large amount of bare ground occurs between creosote shrubs, with little other vegetation except broom snakeweed.

In the project area, mixed desert scrub steppe is dominated by many of the native shrub species found in the mesquite upland scrub steppe, as well as shinnery oak (*Quercus havardii)*, sand sagebrush (*Artemisia filifolia*), whitethorn and catclaw acacia (*Acacia constricta, A. greggii),* and creosote bush. In apparently disturbed locations within this community, the non-native Lehmann lovegrass (*Eragrostis lehmanniana*) dominates the understory. However, in less-disturbed areas, a more native grass complex dominates, including sand dropseed (*Sporobolus cryptandrus*), three awn (*Aristida purpurea*), and bush muhly (*Muhlenbergia porteri*).

The coppice dune and sand flat scrub community occurs on low, sandy flats. These areas are dominated by sand sagebrush (*Artemisia filfolia*), with some scattered shinnery oak (*Quercus havardii*). Coppice dune and sand flat areas often occur adjacent to areas where the shinnery oak completely dominates (shinnery oak shrubland) and may represent an intermediate condition following surface disturbance, as the areas stabilize and mature to the point where the shinnery oak again predominates. Other common species on these sandy flats include soaptree yucca (*Yucca elata*), giant dropseed (*Sporobolus giganteus*), little bluestem (*Schizachyrium scoparium*), blazingstar (*Mentzelia* sp.), and Torrey's jointfir (*Ephedra torreyana*). Scattered honey mesquite individuals (*Prosopis glandulosa*) are the only trees of note in this community.

This community type appears to be limited to sandy soils with approximately 30 to 45 percent bare ground. These conditions allow for wind scouring and erosion of the surface, creating vegetation microclimates by forming a series of shifting sand dunes and depressions (Natureserve 2011).

The shinnery oak shrubland grades into coppice dune and sand flat scrub and mesquite upland scrub steppe communities throughout the geotechnical program project area. For the most part, shinnery oak shrubland appears to be a stable community, occupying and stabilizing sand dunes. The dominant species is the low-growing shinnery oak shrub that grows slowly, lives for hundreds of years, and forms extensive underground root systems (Peterson and Boyd 1998).

Disturbance including drought, fire, grazing, and brush treatment can modify the community by changing plant composition and dune stabilization (Peterson and Boyd 1998, Natureserve 2011). More stable dunes are the preferred habitat for shinnery oak establishment. Areas with more shifting dunes promote establishment of the coppice dune sand flat and the mesquite upland scrub steppe communities.

African rue is an invasive plant that was introduced into the U.S. in the 1920's and was first observed near Deming, New Mexico. It has spread and now occurs throughout southern New Mexico and is classified as a noxious weed. The plant invades disturbed and barren areas and has expanded into rangeland. Its deep root system makes it drought tolerant and difficult to control. Recent BLM mapping indicates that there is a population of African rue approximately 1,000 feet southeast of proposed borehole BH-18 (Figure 3).

Plant Special Status Species (SSS) information from the United States Fish and Wildlife Service (USFWS), the State of New Mexico, and the BLM are compiled by the New Mexico Rare Plants Technical Council (NMRP 1999). The NMRP website was consulted to identify known locations of plant SSS in Lea County, as identified under the Endangered Species Act (ESA), designated by the State of New Mexico, and BLM Sensitive Species lists. No plant SSS are known to occur in Lea County.

3.3.2 Wildlife Resources and Special Status Species

General wildlife resources are discussed by taxonomic group, below. Special status wildlife species are discussed as a distinct category.

Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918, and EO 13186 addresses the responsibilities of Federal agencies to protect migratory birds by taking actions to implement the MBTA. BLM management for migratory bird species on BLM-administered lands is based on Instruction Memorandum (IM) No. 2008-050 (BLM 2008a).

A number of migratory bird species breed within the habitats within the project site including mourning dove (*Zenaida macroura*), ladder-backed woodpecker (*Picoides scalaris*), Chihuahuan raven (*Corvus cryptoleucus*), verdin (*Auriparus flaviceps*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus verticalis*), scissor-tailed flycatcher (*Tyrannus forficatus*), loggerhead shrike (*Lanius ludovicianus*), northern mockingbird (*Mimus polyglottos*), curve-billed thrasher (*Toxostoma curvirostre*), pyrrhuloxia (*Cardinalis sinuatus*), and western meadowlark (*Sturnella neglecta*).

Raptors

Swainson's hawk (*Buteo swansoni*) is the only nesting raptor observed within the project area. Other raptor species that could potentially occur in the area include red-tailed hawk *(Buteo*

jamaicensis) and American kestrel *(Falco sparverius).* Swainson's hawk is also protected under the MBTA. Arriving in late March and early April, it builds a flimsy nest in the only available large trees in area, honey mesquite. Food items include lizards, small mammals, and invertebrates. Nesting is generally completed between April and the end of July, and the hawks depart for Argentina in September. Two active nests were located within the Project area during baseline surveys in 2012 (Walsh 2012) (Figure 4).

Mule Deer

The desert subspecies of mule deer (*Odocoileus hemionus crooki*) occur in a variety of shrublands within arid deserts. They are a year-round resident in southern New Mexico. Mule deer have been observed sporadically in the project area during surveys in 2011 and 2012 (Walsh 2012). Pellet surveys within the general project area in 2012 detected pellets at one transect out of eight distributed throughout the study area (Walsh 2012). Mule deer in Lea County are a hunted big game species with no restrictions specific to the region (NMGF 2012).

Pronghorn

Pronghorn (*Antilocapra americana*) are widespread across New Mexico. After market hunting reduced populations to a low in the early 1900s, protection measures have steadily rebounded pronghorn numbers. They occur typically in desert grasslands and shrub in the project area. Pellet surveys in 2012 detected pellets at one transect out of eight distributed throughout the study area (Walsh 2012). Pronghorn in Lea County are a hunted big game species with no restrictions specific to the region (NMGF 2012).

Bats

Distribution of bat species in southeast New Mexico is poorly understood, especially in Lea County. Few studies have been initiated to determine species occurrence and habitats. Lack of water and rocky outcrops in the general project area limits resident bat activity to human-made ponds and dwellings. Some species may be detected as they are in transition from other regions. A baseline survey of bats is currently being conducted just north of the project area (Walsh 2012).

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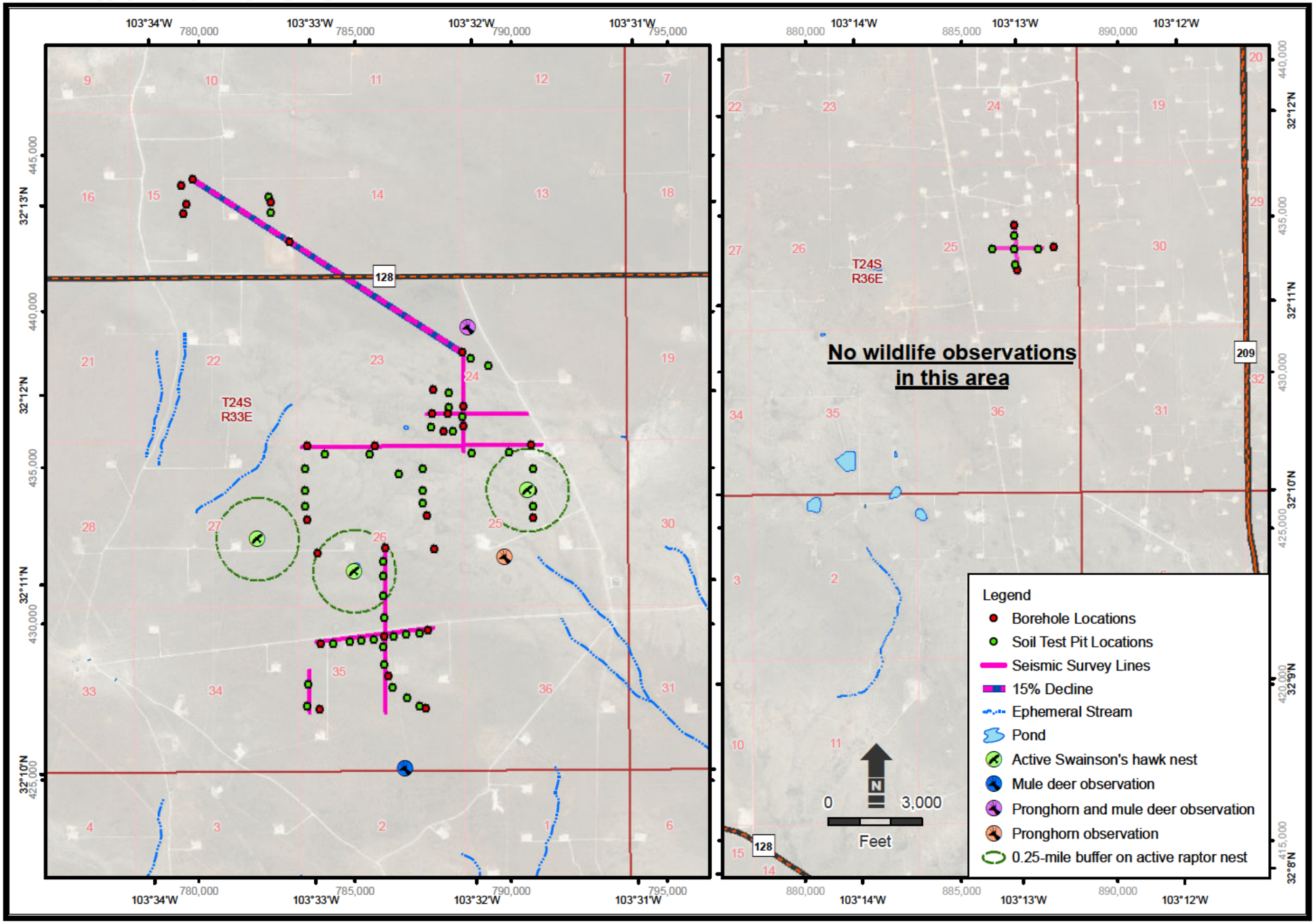

NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
Source:
Wildlife Observations: Walsh, May 2012

Figure 4
Wildlife Resources
Geotechnical Testing Program EA
Lea County, New Mexico 2012

Reptiles

The Chihuahuan desert habitats support a variety of snakes and lizards. Western rattlesnake (*Crotalus viridis*) are noted in the project area. Commonly observed lizard species include whiptails (*Aspidoscelis* spp.) and side-blotched lizard (*Uta stansburiana*).

The dunes sagebrush lizard (*Sceloporus arenicolus*) was a Candidate for listing under ESA. In June 2012 the USFWS withdrew the proposed listing of this species. The published range of the dunes sagebrush lizard is north of the geotechnical survey area (Painter 2004; Johnny Chopp personal communication). This species was not captured or sighted during the pitfall trap surveys conducted in the project area (Walsh 2012).

Special Status Species

The USFWS, the New Mexico Natural Heritage Program (NMNHP), and the New Mexico Department of Game and Fish (NMGF) websites were consulted to identify known locations of species listed as Threatened, Endangered, or Candidate for listing under the ESA, and other special status species including BLM Sensitive Species and state-listed species. Two bird species, managed as SSS in the CFO, have the potential to occur within the geotechnical testing program project area; the lesser prairie-chicken (*Tympanuchus pallidicinctus*) and the burrowing owl (*Athene cunicularia*).

The lesser prairie-chicken has been a Candidate species for listing by the ESA since 1998. In New Mexico this species especially favors areas of shinnery oak interspersed with native grasslands, more specifically the High Plains Bluestem Subtype, a type determined not to be present during vegetation characterization of the general project areas. Recent data suggests that the birds are nearly extirpated south of Highway 380 (Best et al 2003). The most current detections near the site by researchers occurred in 2005; a single lek of two birds (BLM 2007). The lesser prairie-chicken in this region are considered to be an isolated population, outside the primary range of the species. Two years of lek surveys in 2011 and 2012 in the general project area have not detected any lesser prairie-chicken (Walsh 2012).

Burrowing owls are listed as a BLM Sensitive Species in New Mexico. Burrowing owls inhabit open dry treeless habitats in the southwest, usually in association with ground squirrels or other fossorial mammals. They will also use areas with low-growing shrubs such as mesquite and creosote, as long as good visibility exists. These owls rarely dig their own holes and are dependent upon burrows created by other species. This species of burrowing owl occurs year-round in southern New Mexico. The abundance of taller shrubs and mesquite trees within the project area limits visibility and thus ability of burrowing owls to exist within the general project area. No burrowing owls have been observed during two years of baseline surveys in 2011 and 2012 in the general project area (Walsh 2012).

3.3.3 Soil Resources

Soils within the Ochoa project geotechnical testing program area generally consist of Sharvana loamy fine sand, Simona-Upton association, and Berino-Cacique loamy fine sands association (Figure 5). The Sharvana loamy fine sand soils consist of alluvium and/or eolian deposits derived from sedimentary rock, while the Simona-Upton and Berino-Cacique loamy fine sands associations consist of calcareous eolian deposits.

These soils are typically well drained, and organic matter content in the surface horizon is one percent or less. The surface texture is loamy to sandy, and water capacity is very low, between 0.03- and 0.15-inch (USDA 2008).

3.3.4 Cultural Resources

Cultural resource records review and Class III surveys of the respective project areas were conducted by Marron and Associates from December 13, 2011 through January 15, 2012. These surveys were performed under BLM Permit No. 199-2920-10-F and New Mexico Permit 12-160-S. The surveys were conducted for three distinct Areas of Potential Effects (APEs), listed below.

- the proposed site for the mine shaft area, including access corridors, comprising 152 acres located on the north side of NM 128, near Mile Post 28 (Marron and Associates 2012a);
- the proposed processing facility, comprising 1,845 acres located on the south side of NM 128, near Mile Post 30.25 (Marron and Associates 2012b);
- the proposed Jal Loadout facility, comprising 2,240 acres located north of NM 128 and west of NM 18, northwest of Jal (Marron and Associates 2012c).

The locations and extent of the three APEs addressed in these surveys is illustrated in Figure 6. The results of the surveys are summarized below, by APE.

Proposed Mine Shaft Area

One newly recorded archaeological site and three isolated occurrences were recorded in this APE. The single recorded site is a small, sparse artifact scatter located around and between several dunes in a relatively level plain, on State of New Mexico land surface. The site is centered on a mesquite-stabilized sand dune. The site measures approximately 111 feet (34 meters) by 128 feet (39 meters). It has been affected by wind erosion and grazing, but there is no extensive human disturbance. Integrity is estimated to be about 80 percent.

This site is recommended not eligible by BLM for nomination to the NRHP. However, given the location on State Land, the final decision for eligibility rests with the State of New Mexico archeologist.

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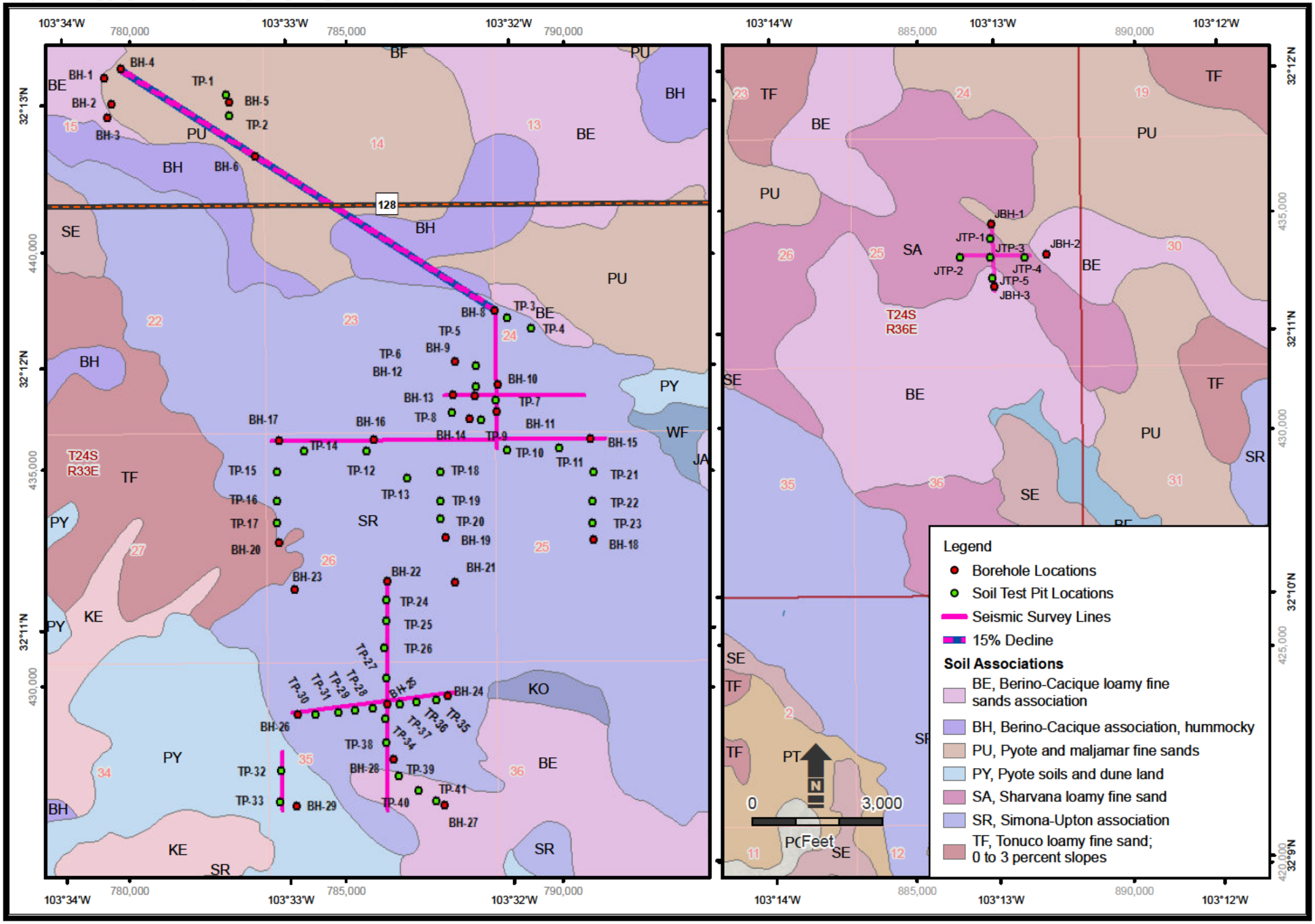

NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
Source:
Soils: NRCS, 2008

Figure 5
Soil Resources
Geotechnical Testing Program EA
Lea County, New Mexico 2012

Proposed Processing Facility

Four newly recorded archaeological sites, one previously recorded archaeological site, and 72 isolated manifestations were recorded in this APE. BLM considers two of the four newly recorded sites eligible for nomination to the NRHP under Criterion D. The single previously recorded site is also considered eligible for nomination to the NRHP under Criterion D.

Proposed Jal Loadout Facility

Twenty-one newly recorded archaeological sites, one historic railroad, and 144 isolated manifestations were recorded. BLM has determined that seven sites are recommended eligible for nomination to the NRHP under Criterion D. Ten sites are not eligible for nomination to the NRHP and two sites undetermined. Two sites on New Mexico State Lands have an undetermined eligibility until the New Mexico State Land Office provides recommendations for these sites.

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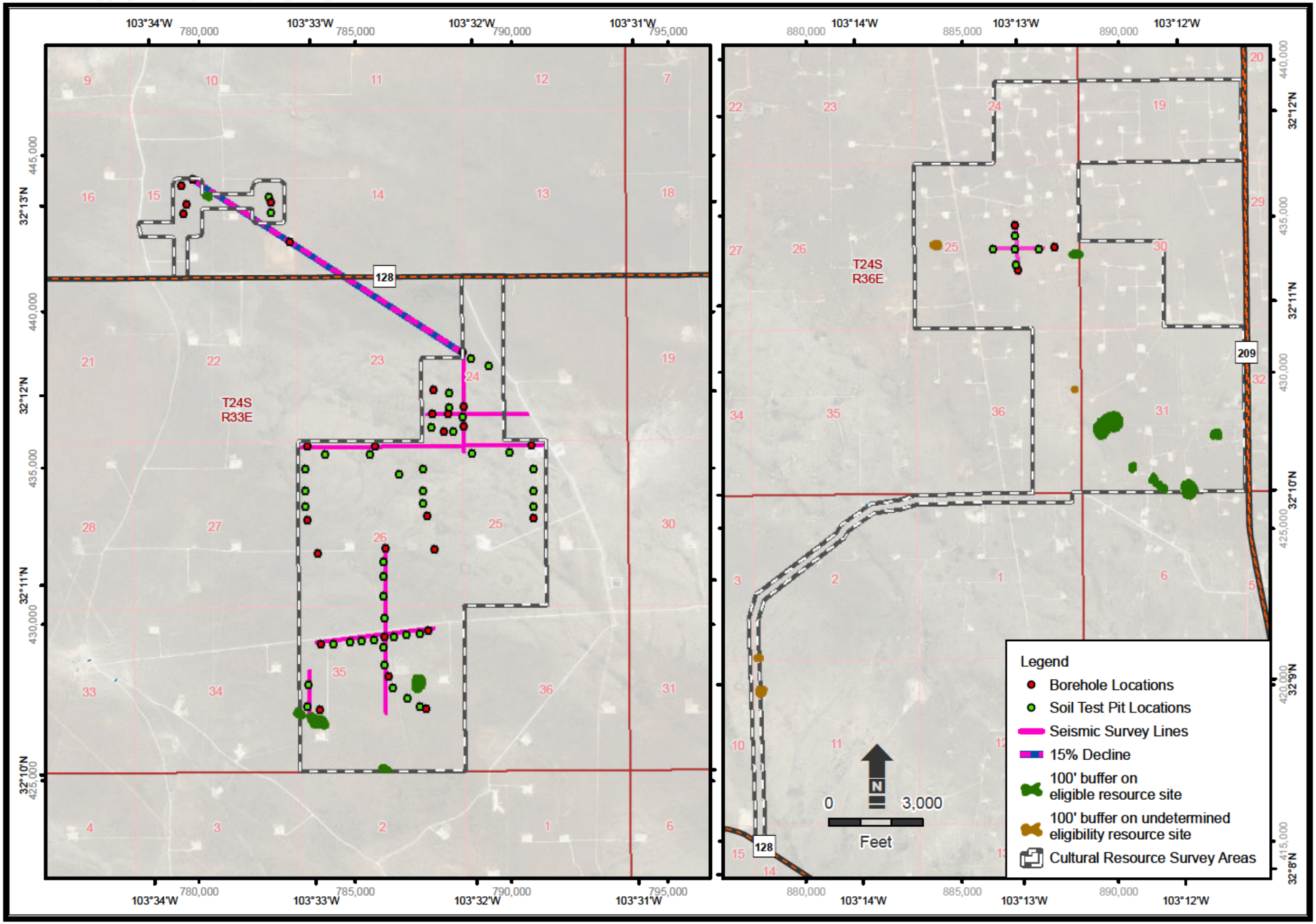

NAD 1983 StatePlane New Mexico East FIPS 3001 Feet
Source:
Cultural Resource Sites: Marron and Associates, 2012

Figure 6
Cultural Resources
Geotechnical Testing Program EA
Lea County, New Mexico 2012

4 ENVIRONMENTAL IMPACTS

4.1 Introduction

This chapter describes and compares the environmental consequences predicted to result from implementing the two alternatives presented in Chapter 2. The purpose of this chapter is to present the impact analyses of the alternatives and to disclose the potential impacts of the actions on affected resources at the Ochoa project geotechnical testing program sites and surrounding areas.

The potential consequences or impacts of each alternative are addressed in the same order of resource topics as in Chapter 3. This parallel organization will allow readers to compare existing resource conditions (Chapter 3) with potential impacts (Chapter 4) for the same resource(s).

Potential impacts for a particular resource or resource use are discussed primarily in terms of the direct physical change and the indirect consequences of change resulting from the specific management of that resource or resource use under a particular alternative.

4.2 General Analysis Assumptions and Guidelines

The alternative analysis describes how each alternative could affect baseline conditions of individual resources at the Ochoa project geotechnical testing program sites. Impacts are described by topic, such as surface disturbance, and impact on other resources or resource uses. If no impacts are expected or the anticipated impact is considered extremely small or highly unlikely to occur, the impacts to the resource are not discussed.

The amount of disturbance from potential actions is used to quantify impacts where possible. For this EA, disturbance from boreholes, soil test pits, and seismic refraction survey activities was calculated for the proposed action (Table 4-1).

Table 4.1. Estimated Temporary Disturbance Areas, by Geotechnical Test and Area

Location and Disturbance Type	Area per Pit or Hole (ft^2)	Number of Locations	Total Disturbance in acres (ft^2)
Mine Shaft, Decline, and Processing Facility			
Test Pits	600	41	0.56 (24,600)
Bore Holes	1	28	<0.01 (28)
Total	-	69	0.57 (24,628)
Jal Loadout Facility			
Test Pits	600	5	0.07 (3,000)
Bore Holes	1	3	<0.01 (3)
Total	-	8	0.07 (3,003)

4.3 Direct and Indirect Impacts

Direct impacts result from activities authorized by the BLM and generally occur at the same time and place as the activity or action causing the impact. For example, for the action of building a road, a direct adverse impact is surface disturbance. Surface disturbance is the impact (the effect) of heavy equipment removing existing vegetation (the cause) as it grades the proposed road location. Indirect impacts often occur at some distance or time from the action. In the example just given, an indirect impact could occur days after the surface is disturbed, as well as some distance from the disturbance. Heavy precipitation following the removal of vegetation and/or disturbance of the ground surface could erode soil and transport sediment into ephemeral streams. This impact on surface water quality is considered an indirect and adverse.

4.3.1 Proposed Action Alternative

Vegetation Resources

Direct adverse impacts to vegetation from borehole drilling and soil test pits would include temporary disruption or removal of rooted vegetation on approximately 0.64 acres. This is based on the estimated extent of ground-disturbance for the proposed action, as summarized in Table 4-1. The majority of this temporary direct impact would be to the most common vegetation community type; mesquite upland scrub steppe. In addition, approximately one linear mile of overland truck travel would result in temporary compression of rooted vegetation. These direct impacts would result in a temporary reduction in areas of native vegetation, reduction of total numbers of plant species (species richness) within the area, and/or temporary reduction or loss of total area, diversity, structure, or function of wildlife habitat. As noted above, all these impacts would be temporary, as the borehole areas and soil test pits will be revegetated per specific actions described in Section 2.2.4.

Implementation of the refractive seismic survey would be expected to result in no measurable direct impacts to vegetation.

Direct beneficial impacts would result if some portion of the estimated disturbance area is currently not supporting vegetation and would be revegetated, increasing the area of native vegetation.

Most indirect impacts to vegetation resources are assumed to result from direct impacts in proportion to the relative amount of surface disturbance. These would potentially include a disruption or reduction of an extremely small component of pollinator populations, potential introduction or spread of noxious weeds. It is expected this impact will be completely eliminated by specific actions described in Section 2.2.4.

Estimated impacts to vegetation resulting from implementing the proposed alternative are integrated in the following assumptions:

- Project actions would be planned to meet overall resource management objectives for upland and riparian vegetation, including Resource Advisory Council (RAC) Standards and Guidelines for Rangeland Health (BLM 2007). This would include application of all appropriate BMPs for prevention of spread of noxious weeds and revegetation with species native to the local region.

- Natural revegetation would occur over time, increasing the diversity of any revegetated area.
- Because of integration of the BMPs listed in Section 2.2.4, no direct or indirect impacts would occur to riparian or wetland vegetation.
- Because of integration of the BMPs listed above, no noxious weeds would be introduced to the project site, nor would these plant species be spread throughout the site.
- There will be no impacts to plant Special Status Species, because none are known to occur in Lea County.

Wildlife Resources

Direct adverse impacts to wildlife would include any potential injury or death of individual animals and loss of nesting habitat, during nesting season (i.e., destruction of nests, or vegetation that provides roosts and/or nest sites) that result from activities associated with implementing the proposed action alternative. Many wildlife species will avoid direct impacts to individuals by moving away from vehicle traffic and surface-disturbing activities. Small, less visible and less mobile wildlife species, such as reptiles, would be those most likely to be directly negatively impacted by vehicle movement.

Indirect temporary impacts to wildlife could include disruption to nest or roosting sites from noise or other physical disturbance, if conducted during nesting season, and degradation of habitat through introduction of noxious weeds, surface compaction, or trampling. Indirect impacts are assumed to result from direct impacts in proportion to the relative amount of surface disturbance.

Wildlife would be expected to receive indirect impacts from noise and disturbance from construction activities and exhibit short-term behavioral avoidance of the area. Some animals may relocate permanently in surrounding habitat. Most individuals would not be expected to move far and would occupy similar habitat nearby. The Chihuahua desert vegetation communities present on the project area are common throughout the region. The amount of wildlife habitat that would be impacted by any alternative is a small component of the habitat available in the area. Most impacts to habitat would be expected to be short-term because all disturbed ground would be reclaimed (Section 4, Vegetation Resources). Adverse indirect impacts to wildlife could occur from the introduction or expansion of noxious weeds. The potential for this would be mitigated by actions discussed in above (Section 4, Vegetation Resources).

Any direct or indirect impacts to wildlife that would result from implementation of the proposed action would involve individual animals at the local level, and would not affect regional wildlife species populations.

Because no known populations of lesser prairie-chicken or burrowing owls occur in the geotechnical testing program project area, no impacts to these special status wildlife species are expected to occur.

Soil Resources

Direct adverse impacts to soils from borehole drilling and soil test pits would include temporary disruption on approximately 0.64 acres. This is based on the estimated extent of ground-disturbance for the proposed action, as summarized in Table 4-1. In addition, approximately one linear mile of overland truck travel and foot traffic (seismic survey) would result in temporary compaction and redistribution of soils. This could be exacerbated during particularly wet or dry conditions.

Indirect impacts to soils could occur if revegetation of boreholes and soil test pits does not occur in a timely manner, making these areas of disrupted and loosened soils particularly susceptible to water and wind erosion.

Cultural Resources

Protective mitigation actions on all eligible, or eligibility undetermined, archeological sites within the project area will include sensitivity training for all geotechnical action field personnel as well as a supervised and enforced avoidance of all eligible and undetermined (for eligibility) sites, each centered within a 100-foot buffer. Implementation of the mitigation actions will result in no direct impacts to eligible sites.

Temporary indirect impacts to these resources would include sediment deposition if surface soil loosened during geotechnical actions would be carried aloft by local wind currents. However, given the very small amount of soil this would involve, and the protective buffers on the eligible sites, this would result in negligible indirect impacts to these resources.

4.3.2 No Action Alternative

Under the No Action Alternative the Ochoa project geotechnical testing program would not be implemented. None of the potential direct or indirect impacts to vegetation, wildlife, soils, or cultural resources described above would occur.

4.4 Cumulative Impacts Analysis

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions. For all resources discussed above, the Cumulative Impact Area (CIA) would be considered the CFO.

4.4.1 Vegetation Resources

Ongoing land use throughout the CFO will include ranching and oil and gas development (roads, pads and pipelines), both of which may result in temporary and permanent impacts to vegetation resources. Ongoing environmental trends that impact regional vegetation include drought and potential for influx and expansion of Lehmann lovegrass and African rue. Chemical management of honey mesquite is also expected to continue throughout the CFO. A reasonably foreseeable action would be the implementation of the Ochoa Mine project. This would result in a permanent impact to acres of vegetation. The small area of temporary disturbance to vegetation resources under the proposed action would be cumulative to all of these described actions and trends.

4.4.2 Wildlife Resources

Ongoing land use throughout the CFO will include ranching and oil and gas development (roads, pads and pipelines), both of which may result in temporary and permanent impacts to wildlife habitat resources. Ongoing environmental trends that impact wildlife include drought as well as regional vegetation trends for influx and expansion of Lehmann lovegrass and African rue. Chemical management of honey mesquite is also expected to continue throughout the CFO. This may have indirect impacts to wildlife and direct impacts to wildlife habitat. A reasonably foreseeable action would be the implementation of the Ochoa Mine project. This would result in a permanent impact to acres of wildlife habitat. The small area of temporary disturbance to wildlife habitat, and even smaller possibility of direct impacts to wildlife under the proposed action, would be cumulative to all of these described regional actions and trends.

4.4.3 Soils Resources

Ongoing land use throughout the CFO that may cause temporary and permanent impacts to soils will include ranching and oil and gas development (roads, pads and pipelines). A reasonably foreseeable action would be the implementation of the Ochoa Mine project. This would result in a permanent impact to acres of soil resources. The small area of temporary disturbance to vegetation resources under the proposed action would be cumulative to all of these described actions and trends.

4.4.4 Cultural Resources

Ongoing land use throughout the CFO that may cause impacts to soil resources will include ranching and oil and gas development (roads, pads and pipelines). It is assumed that such development on BLM surface will be conducted in compliance with the National Historic Preservation Act (NHPA) and there would be negligible-to-minor residual impacts to these resources, following appropriate avoidance or other mitigation.

A reasonably foreseeable action would be the implementation of the Ochoa Mine project, which would have the potential for major impacts to cultural resources in the project area. However, BLM will require appropriate mitigation measures, in some cases including complete excavation and recordation that would be expected to reduce this risk to negligible-to-minor residual impacts to cultural resources from this project.

5 CONSULTATION AND COORDINATION

5.1 Introduction

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. The issues were identified through the agency involvement process described in Section 5.2 and 5.6 below.

5.2 Summary of Agency Participation

An EA kick-off meeting and internal scoping was conducted on August 15, 2012. The BLM ID Team in attendance is listed below. Record of meeting attendance is included in Appendix A. A description of the proposed action was distributed to the ID Team for review prior to the

meeting. Potential impacts issues were discussed and recorded, as well as application BMPs, SOPs, and mitigation actions, all integrated into this analysis.

5.3 List of Preparers

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Jennifer Jackson	Environmental Science	BS, 10 years	Deputy Project Manager, Soils
Chris Jessen, P.G.	Geology, GIS	MS, 17 years	GIS

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List of Acronyms

AHPA	Archeological and Historic Preservation Act
APE	Areas of Potential Effect
ARPA	Archaeological Resources Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practices
CIA	Cumulative Impact Area
CFO	Carlsbad Field Office
CFR	Code of Federal Regulations
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
HMTA	Hazardous Materials Transportation Act
ID Team	Interdisciplinary Team
ICP [USA]	Intercontinental Potash Corp, USA
IM	Instruction Memorandum
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NMGF	New Mexico Department of Game and Fish
NMNHP	New Mexico Natural Heritage Program
NMRP	New Mexico Rare Plant Technical Council
PL	Public Law
RFAS	Reasonably Foreseeable Action Scenario
SSS	Special Status Species
SOP	Standard Operating Procedures
T&E	Threatened & Endangered
USFWS	U.S. Fish and Wildlife Service

Appendix A

ID Team Internal Scoping Sign-in Sheet

Sign-in

BLM Carlsbad Field Office Environmental Assessment Kick-off Meeting 8/15/2012:

Intercontinental Potash, Ochoa Mine Geotechnical Testing Program

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Sign-in

BLM Carlsbad Field Office Environmental Assessment Kick-off Meeting 8/15/2012:

Intercontinental Potash, Ochoa Mine Geotechnical Testing Program

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DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

Project: IC Potash Ochoa Project Geotechnical Testing Program
EA Log Number: DOI-BLM-NM-P020-2012-1405-EA
Location: Lea County, New Mexico.

Finding of No Significant Impact

Based on the analysis of potential environmental impacts contained in the attached Environmental Assessment (EA), I have determined the Proposed Action is not expected to have significant impacts on the environment. The impacts of performing geotechnical bore holes, test pits and seismic survey in the areas described within this EA have been adequately analyzed and are in conformance with the 1988 Carlsbad Resource Management Plan, the 1997 RMP Amendment and the 2008 Special Status Species RMPA. Therefore, preparation of an Environmental Impact Statement is not warranted.

Prepared by:

David M. Herrell Date 10-4-2012
Dave Herrell, Hydrologist

Reviewed By:

Owen W. Lofton Date 10-4-2012
Owen W. Lofton, Planning and Environmental Coordinator

Approved by:

George MacDonell Date 10-4-2012
for Jim Stovall, Field Manager