Final

ENVIRONMENTAL ASSESSMENT

Salinas Peak Power Distribution
Line Replacement
White Sands Missile Range, New Mexico

Prepared For:

White Sands Missile Range
Directorate of Public Works
Environmental Division
Building 163 Springfield Avenue
White Sands Missile Range, NM 88002

OPSEC Completed: August 2023
Controlled by: Directorate of Public Works
Distribution Statement A. Approved for public release: distribution unlimited
POC: USARMYGarrisonWSMREnvironmentalAssessments@army.mil

October 2023

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FINDING OF NO SIGNIFICANT IMPACT
White Sands Missile Range, New Mexico

NAME OF THE PROPOSED ACTION: Environmental Assessment – Salinas Peak Power Distribution Line Replacement – White Sands Missile Range, New Mexico

DESCRIPTION OF THE PROPOSED ACTION: White Sands Missile Range (WSMR) proposes to construct (where needed), repair, operate, and maintain a 14.4 kilovolt (kV)/24.9 kV three-phase distribution line connecting facilities at Salinas Peak to a Sierra Electric Cooperative supply line near the base of the mountain.

PURPOSE AND NEED: The purpose of the Proposed Action is to provide stable and reliable power to buildings and equipment critical to military operations, reduce safety risk associated with maintenance of the utility, and improve resiliency to extreme weather events on Salinas Peak. The Proposed Action is needed because the infrastructure is aging, is susceptible to being damaged from extreme weather events, and lacks resiliency.

ENVIRONMENTAL CONSEQUENCES: Cultural and natural resources, soils, human health and safety, socioeconomics, and cumulative effects were evaluated, while evaluation of other valued environmental components was incorporated by reference. The proposed activities would influence soils with a potential increase of erosion. Salinas Peak is a traditional cultural property and has Cold War era significance. Several sensitive biological elements are in the area.

CONCLUSION: Alternative 2 – Western Route is the preferred alternative. This alternative would move the existing distribution line to a western route and would eventually discontinue use and remove associated infrastructure along the eastern route. Based on the analysis in this EA and consideration of the mitigation measures listed in Section 3.6, and in accordance with the guidelines for determining the significance of proposed federal actions (32 CFR §651 [2002]; 40 CFR §1508.27) and Environmental Protection Agency criteria for initiating an Environmental Impact Statement (40 CFR §6.207), WSMR has concluded that the distribution system replacement described in the Preferred Alternative will not result in a significant effect on the environment. Mitigation measures include conducting surveys for bird nests if vegetation removal is to occur during the migratory bird nesting season, following the WSMR Avian Protection Plan, replacement of creosote-treated wood poles with steel poles that contain fewer hazardous components that can leach into soils, use of suspension insulators to increase space between phased conductors to protect raptors that may land on the structures, and placement of poles and guy wire anchors in existing holes or previously disturbed ground to reduce new ground disturbance. Applicable federal, state, and local laws and regulations would be followed. WSMR has determined that an Environmental Impact Statement pursuant to the National Environmental Policy Act is not required, and this Finding of No Significant Impact is hereby submitted.

DRAFT AVAILABILITY AND POINTS OF CONTACT: White Sands Missile Range invites members of the public to comment on the draft EA. The draft EA and FNSI are available digitally at https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/environmental. Hard copies are available to the public by sending a request using the contact information below, or at the following public repositories.

- Thomas Branigan Memorial Library, 200 E. Picacho Ave., Las Cruces, New Mexico 88001
- WSMR Post Library, Building 465, White Sands Missile Range, New Mexico 88002
- Alamogordo Public Library, 920 Oregon Ave., Alamogordo, NM 88310
- Socorro Public Library, 401 Park St., Socorro, NM 87801

Written comments concerning the draft EA should be directed to the White Sands Missile Range Garrison Environmental Division. The publication of this notice serves as the start of the 30-day comment period. All comments must be received no later than 31 September 2023 to the following address, e-mail or fax.

U.S. Army Garrison White Sands
Directorate of Public Works, Environmental Division
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Building 163
White Sands Missile Range, New Mexico 88002
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DCC
for

DAVID MITCHELL
COLONEL, US ARMY
COMMANDING

12-19-2023
Date

U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5048
ENVIRONMENTAL ASSESSMENT

TITLE: Salinas Peak Power Distribution White Sands Missile Range, New Mexico

PROPONENT:

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1 DEC 2023

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ENERGY MANAGER
DIRECTORATE OF PUBLIC WORKS

Date

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Date

CONCURRENCE:

KNIGHT.BRIAN.DANIEL.1271283330 Digitally signed by KNIGHT.BRIAN.DANIEL.1271283330 Date: 2023.12.07 15:09:52 -07'00'

MICHAEL WILLIAMS
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Date

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DGC for

DAVID MITCHELL
COLONEL, US ARMY
COMMANDING

12-19-2023

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DEPARTMENT OF THE ARMY
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WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5000

AMIM-WSG-ZA (800D) 6 Dec 23

MEMORANDUM FOR RECORD

SUBJECT: Delegation of Authority

1. For the period 14-19 Dec 23, Mr. Fred Hankerson is appointed as Acting Garrison Commander, White Sands Missile Range, New Mexico.

2. Mr. Hankerson is delegated full authority and responsibility to make decisions and act on all Garrison Commander matters.

3. For continuity, a reading file of all documents signed by Mr. Hankerson, as Acting Garrison Commander, will be maintained.

4. To ensure proper accountability, matters requiring the Garrison Commander's involvement will be personally managed by Mr. Hankerson.

DAVID A. MITCHELL
COL, LG
Commanding

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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White Sands Missile Range, New Mexico

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Epsilon Systems Solutions, Inc.

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U.S. Army Garrison White Sands Missile Range, 100 Headquarters Avenue,
White Sands Missile Range, New Mexico 88002

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14. ABSTRACT
This environmental assessment evaluates possible environmental effects on the human and natural environment associated with repairs, replacement (full or partial), and maintenance of an electrical supply line providing power and communications to facilities on Salinas Peak in Sierra County, New Mexico.

Impacts on the affected environment (including air quality, natural resources, cultural resources, infrastructure, and human health and safety were investigated. No significant impacts to the environment have been identified for implementation of the preferred alternative, Alternative 2.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF: a. REPORT	b. ABSTRACT	c. THIS PAGE	**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON** / **19b. TELEPHONE NUMBER** *(Include area code)*
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Acronyms and Abbreviations

AAQS	Ambient Air Quality Standards
ACHP	Advisory Council on Historic Preservation
ANSI	American National Standards Institute
APE	Area of potential effects
ARPA	Archaeological Resources Protection Act
ATV	All-terrain vehicle
BMP	Best management practice
C	Candidate
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
cm	Centimeter
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CRM	Cultural resources manager
E	Endangered
EA	Environmental assessment
EIS	Environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Expn	Experimental
FEIS	Final environmental impact statement
ft	Feet
GHG	Greenhouse gas
H_2S	Hydrogen sulfide
ha	Hectare
HPD	Historic Preservation Division
in	Inch
INCRMP	Integrated Natural and Cultural Resources Management Plan
IO	Isolated Occurrence
IWG	Interagency Working Group
JDETC	Joint Directed Energy Test Center
km	Kilometer
kV	Kilovolt
LA	Laboratory of Anthropology
lb	Pound
m	Meter
MBTA	Migratory Bird Treaty Act
mph	Miles per hour
N	Newton

N_2O	Nitrous oxide
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NHPA	National Historic Preservation Act
NMAC	New Mexico Administrative Code
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
No.	Number
NO_2	Nitrogen dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCP	Pentachlorophenol
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or less
ppt	Parts per thousand
RDT&E	Research, development, testing, and evaluation
ROI	Region of Influence
ROW	Right-of-way
SCEC	Sierra County Electric Cooperative
SGCN	Species of greatest conservation need
SHPO	State Historic Preservation Officer
SO_2	Sulfur dioxide
SOC	Species of concern
SWPPP	Stormwater pollution prevention plan
T	Threatened
T&E	Threatened and endangered
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UV	Ultraviolet
UXO	Unexploded ordnance
WSMR	White Sands Missile Range

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CHAPTER 1 INTRODUCTION

This environmental assessment (EA) evaluates possible environmental effects on the human and natural environment associated with repairs, replacement (full or partial), and maintenance of an electrical supply line providing power and communications to facilities on Salinas Peak in Sierra County, New Mexico. This EA has been prepared to fulfill the requirements of the National Environmental Policy Act (NEPA, 429 United States Code [USC] §§4321-4370d) in accordance with regulations of the Council on Environmental Quality (CEQ; 40 Code of Federal Regulations [CFR] Parts 1500-1508, 20 May 2022) and the U.S. Army (32 CFR Part 651, 29 March 2002).

1.1 BACKGROUND

White Sands Missile Range (WSMR) is located in south-central New Mexico, encompassing over 2,000,000 acres (809,000 hectares [ha]) in the five counties of Doña Ana, Socorro, Lincoln, Otero, and Sierra. The Main Post area is approximately 45 miles (72 kilometers [km]) north of El Paso, Texas, and 20 miles east-northeast of Las Cruces, New Mexico. U.S. Highway 70 crosses WSMR from east to west and serves as the main access route to the Main Post area. Figure 1-1 provides the location of WSMR in blue within the state of New Mexico shaded tan.

The Proposed Action would involve construction and repair activities associated with the rehabilitation of an approximately 2.5 mile-long (4 km-long) WSMR-maintained power distribution line connecting facilities on Salinas Peak, New Mexico within Sierra County, with electrical supply lines near the base of the mountain, owned and maintained by Sierra County Electric Cooperative (SCEC). All land within the project vicinity is WSMR-owned. No additional right-of-way (ROW) or easements will be needed to implement the Proposed Action.

1.1.1 Salinas Peak

Salinas Peak is the highest point in the San Andres Mountains and is often subject to inclement weather conditions, including temperature extremes, snow, rain, and winds often exceeding 100 miles per hour (mph). The WSMR facilities on Salinas Peak are located approximately 9,000 feet (ft) (2,740 meters [m]) above sea level on a ridgeline overlooking the Tularosa Basin, making it an ideal site for military operations. Salinas Peak is accessible by ground vehicles and helicopters.

The military has constructed several facilities on Salinas Peak over time. There are plans for expansion of research, development, training, and evaluation (RDT&E) activities at Salinas Peak, increasing the demand for a reliable uninterruptible power supply to the facilities.

1.1.2 Current Salinas Peak Power Distribution

The Salinas Peak utility line was constructed in the 1950s and is comprised of creosote-treated wood poles. Currently, WSMR maintains 77 poles along this utility line. Large sections of the utility line follow steep slopes inaccessible to most ground vehicles (Figure 1-2). It is assumed that the steep stretches of the utility line were installed using heavy equipment. In some areas with heavy pinyon pine and juniper cover, poles are located near slopes exceeding 70 degrees.

Past failures of the Salinas Peak utility line have occurred during intense storm events such as wind and snow. Snow, ice, and rain complicate access on the steep slopes and switchback roads. Working conditions for maintenance and operations can be hazardous.

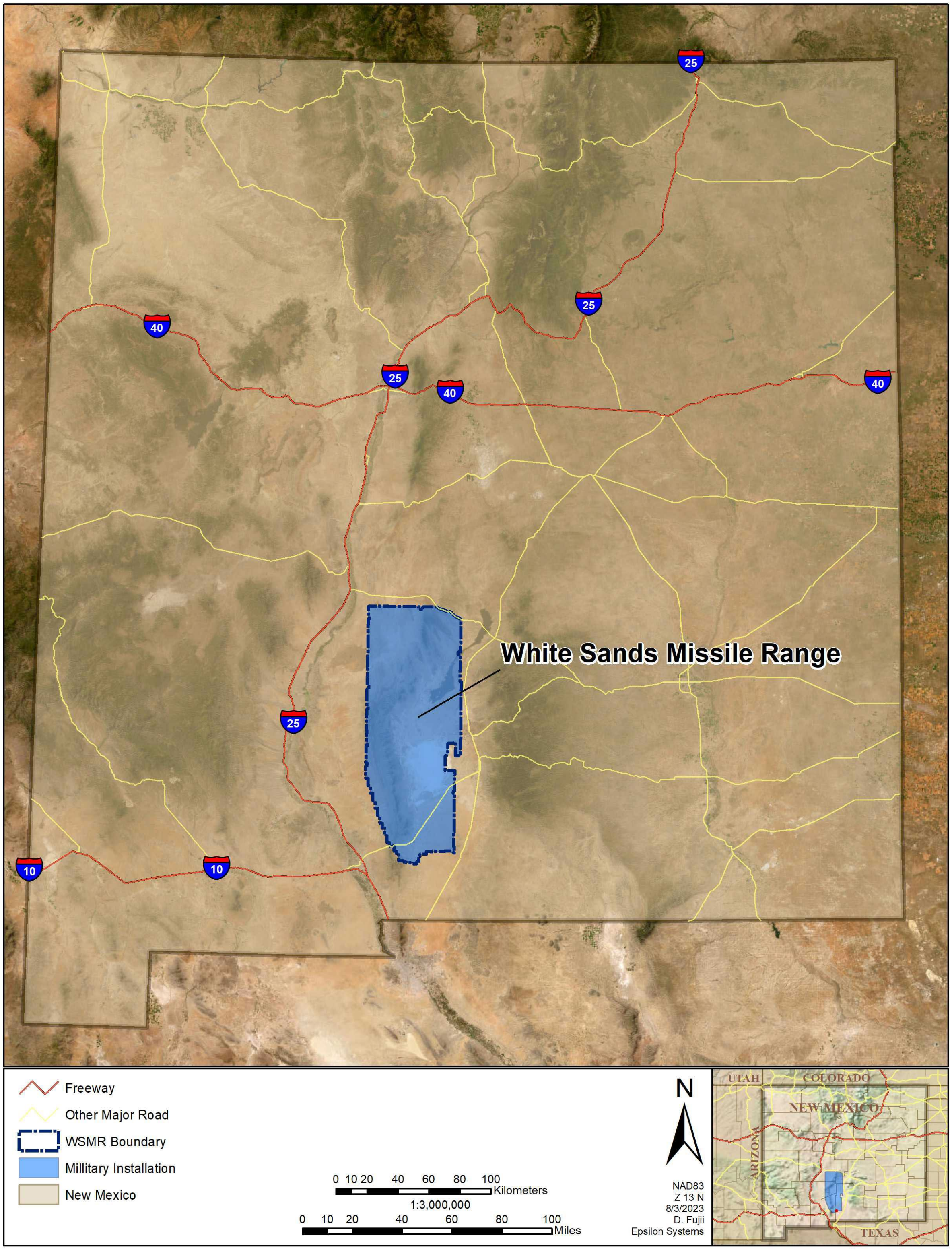

Figure 1-1 WSMR Location within New Mexico

In 2003, roughly half of the existing 77 poles were replaced with new wood poles (Koch 2015). Many poles were not replaced during this repair effort due to the inaccessibility of these steep slopes.

Figure 1-2 is a photo of a steep slope traversed by the current distribution line. Figure 1-3 is a photo of an existing pole along this steep slope with a vertical red line inserted to demonstrate the extent to which the pole is warped. The last known pole failure requiring repairs occurred in 2020 or 2021. In addition to the deteriorating poles, the conductors (wires conveying electricity) are past their 30-year service life and are in need of replacement, as well.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.2.1 Purpose of the Proposed Action

The purpose of the Proposed Action is to provide stable and reliable power to buildings and equipment critical to military operations, reduce safety risk associated with maintenance of the utility, and improve resiliency to extreme weather events on Salinas Peak.

1.2.2 Need for the Proposed Action

The Proposed Action is needed because the infrastructure is aging, is susceptible to being damaged from extreme weather events, and lacks resiliency.

1.3 DECISION TO BE MADE

The decision to be made by WSMR, based on analysis within this EA, is whether the Proposed Action would result in significant impacts on the environment. If significant impacts are anticipated, WSMR would evaluate mitigations or best management practices (BMPs) to determine if impacts would be reduced below levels of significance. If these measures would not reduce impacts to a satisfactory level, WSMR would undertake the preparation of an environmental impact statement (EIS) addressing the Proposed Action, or it would abandon the Proposed Action.

1.4 RELATED ENVIRONMENTAL DOCUMENTATION

Existing and relevant environmental documents have been reviewed. As permitted through Army policy and CEQ guidelines (40 CFR 1501.11 and 1501.12 [2022]), the analysis completed has been incorporated to keep the document brief. Incorporation of previous analysis eliminates repetitive discussions of the same issues while focusing on the key issues of this action. Documents that have been reviewed and incorporated by references include:

- Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities at White Sands Missile Range, New Mexico (WSMR FEIS; WSMR 2010).

  This FEIS examines the environmental effects of developing new test and training capabilities to meet current and future mission requirements. The FEIS was examined for material relevant to the description and analysis of resource areas considered in this EA. From a military operations standpoint, Salinas Peak is a dedicated site and specialized area providing a location for instrumentation and communication equipment as well as directed energy weapon testing. Salinas Peak is one of five potentially eligible Traditional Cultural Properties (TCP) on WSMR. This area is within a ponderosa pine woodland plant community with barren rock outcrops and talus slopes. Natural and cultural resources and military operation description on Salinas Peak was incorporated into the analysis. Older EIS references were reviewed and updated.

- Environmental Assessment for the Joint Directed Energy Test Center (JDETC) White Sands Missile Range, New Mexico (WSMR 2022)

  This document expands directed energy weapon capabilities at WSMR, with operations occurring at Salinas Peak. Information about the affected environment was reviewed and incorporated into this analysis.

- White Sands Missile Range Integrated Natural and Cultural Resources Management Plan and Environmental Assessment 2015-2019 (INCRMP; WSMR 2015).

  This plan is a guide for how WSMR will manage natural and cultural resources in a way that supports and sustains the operational military mission. The plan was reviewed for information relevant to the description of existing conditions of resource areas addressed in the EA. This plan is currently being updated.

Figure 1-2 Steep Slope along Route

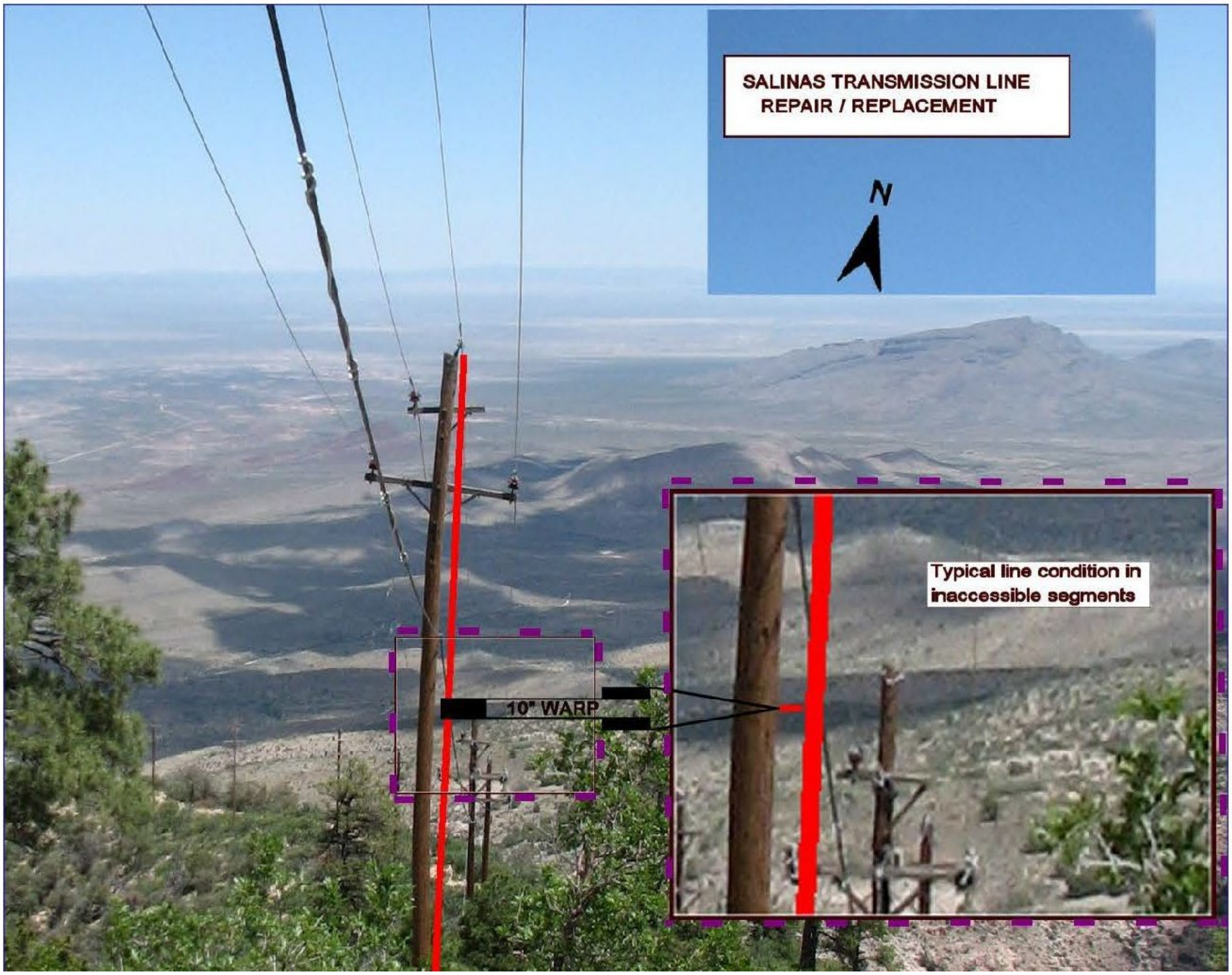

Figure 1-3 Example of Warped Pole

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

2.1 THE NO-ACTION ALTERNATIVE

Under the No-Action Alternative, WSMR would continue making repairs to the Salinas Peak distribution line, but only on an emergency basis. This would fail to meet WSMR mission requirements and the purpose and need to provide reliable power and reduce the hazards of maintenance of the line would not be met.

2.2 ACTION ALTERNATIVES

Each of the action alternatives considered in this EA include the following phases:

1. Surveillance, inspection, and prioritization;
2. Construction; and
3. Maintenance and repair.

This section provides background information regarding components common to all action alternatives considered in this EA, as well as details specific to each alternative considered.

2.2.1 Components Common to All Action Alternatives

WSMR proposes to construct (where needed), repair, operate, and maintain a 14.4 kilovolt (kV)/24.9 kV three-phase distribution line connecting facilities at Salinas Peak to a SCEC supply line near the base of the mountain. The new and upgraded distribution infrastructure is common to all of the action alternatives. Also common to all action alternatives is the use of service road upgrades/construction and temporary work areas.

2.2.1.1 Service Roads

Service roads would be needed to facilitate regular inspection, construction, and maintenance activities associated with the proposed distribution line. Access to the distribution line corridor would be done via existing roads to the maximum extent possible. These roads would be maintained both during and after construction for operation, maintenance, and inspection of the distribution line once the proposed construction activities are complete. New service roads may be needed and would be located within the proposed distribution line corridor. All service roads would be constructed or maintained no wider than 16 ft (4.9 m) and would receive basic maintenance for long-term operation. Figure 2-1 provides an overview of the existing Salinas Peak service roads and proposed new service roads considered in this EA. The existing distribution line is in red, with the existing service road indicated as a yellow line segment. The proposed western alignment is provided in blue, with the new service road colored beige.

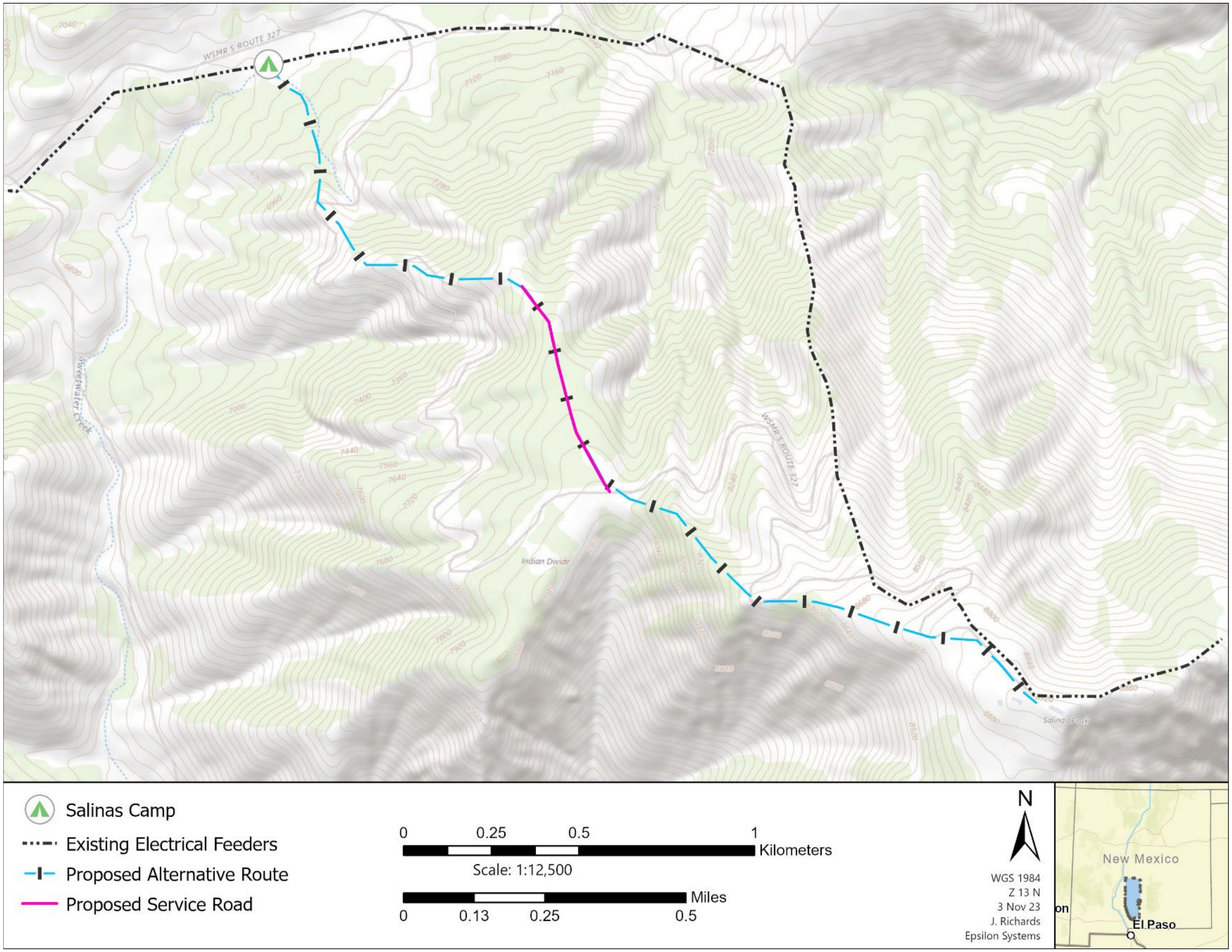

Figure 2-1 Existing Conditions and Potential Alternatives

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2.2.1.2 Temporary Work Areas

Temporary work areas would consist of wire pulling/tensioning sites located at the beginning and end of the distribution line, and at turns or directional changes in both directions of the angled alignment. These areas would be approximately 100 × 150 ft (30 × 46 m) in size, or roughly 0.34 acres (0.14 ha). Temporary work areas would be selected based on the phase of construction and progress of work. Previously disturbed areas would be utilized to the greatest extent possible. Alternatively, sites that are relatively level within the existing ROW would be selected and utilized. These temporary work areas would be the width of the permanent ROW, relatively flat, and cleared of vegetation to accommodate equipment and supplies. Figure 2-2 provides a schematic representation of a wire-pulling operation, with a puller drawing line from right to left from a tensioner and reel system to the right. Figure 2-3 is a photo of the equipment that could be utilized during wire pulling and tensioning.

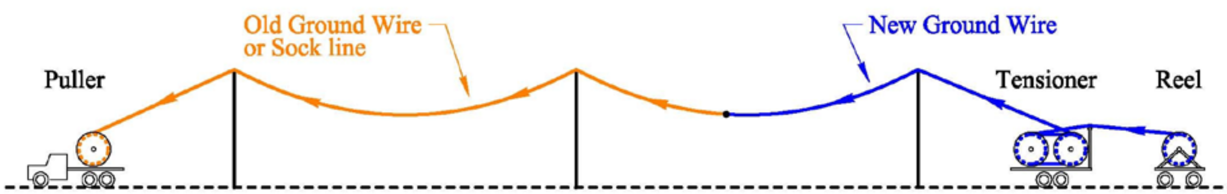

Figure 2-2 Schematic Representation of Wire Pulling Operation

Figure 2-3 Tensioner Equipment within Temporary Work Area

2.2.1.3 Utility Poles and Associated Structures

The majority of utility poles used in the United States are made of wood, treated with preservatives to protect against biological degradation. Once harvested, treatment for the poles to dry and impregnate with preservatives can take up to two years. With preservatives, the standard life of a wood pole is 25 to 50 years, depending upon climate. Natural wood decomposes and cannot be used in the construction of utility structures without the aid of a chemical preservative. Most of these preservatives are harmful to the environment. When the wood pole falls into disrepair and is discarded in a landfill, the chemicals will seep into the ground (ORNL 2021).

The American National Standards Institute (ANSI) sets the standards by which single-pole wood utility structures are classified based on size. The greatest variations in these classifications are in length and tip circumference. But the classifications also incorporate information about load-bearing capability, which is related to size and other factors regarding the integrity of the material from which the poles are made.

Alternative utility pole materials include, but are not limited to, steel, concrete, and fiber-reinforced composites. Each of these materials has its own strengths, shortcomings, and environmental impacts to produce and use. Appendix A provides a deeper look into four material types (wood, steel, concrete, and composite). Table 2-1 summarizes some of the information provided in the appendix.

2.2.1.4 Distribution Pole Types

There are numerous structure types and configurations of utility poles. However, there are three general categories of utility pole types: tangent, angle, and dead end. Tangent poles carry the conductor wire with no angle between poles (i.e., the distribution line is straight or is within 5 degrees of straight).

Angle poles accommodate turns greater than 5 degrees. These poles often have two set insulators: one on either side of the angle.

A dead-end structure is where conductors and ground wires are pulled only on one side, unless it is a double dead-end structure. These structures are where the line ends, where turns are at a large angle, at major crossings like highways or rivers, and where the line branches into two or more segments.

All of these structures can be guyed or unguyed. A guyed structure provides extra support by fastening a wire from the structure to the ground or another structure, whereas an unguyed structure is self-supporting. One side of a guy wire is connected to a point high on the structure, with the other anchored to a safe point on solid ground, creating a diagonal line. An anchor concreted into the solid ground is used to hold one or more guy wires steady.

2.2.1.5 Insulators

A material that does not let electricity and heat travel through it is known as an insulator. The electrical insulator is a protector or protective device that finds a use for connecting many electrical components. It plays a notable role in the making of various electrical and electronic circuits and overhead power systems. The most commonly used material for overhead line insulators is porcelain; however, glass, steatite, and other special composite materials may also be used. There are four types of overhead line insulators that are commonly used: strain, pin, shackle, and suspension type insulators.

Strain structures are configured so that conductors are directly attached through in-line insulators through or around the tower.

Pin type insulators or pin insulators are popularly used in electric distribution systems with strain structures. Voltage can be as high as 33 kV with pin insulators, which are secured on the cross arms of the pole. There is a groove on the upper end of a pin insulator for housing the conductor. Conductor wire is passed through this groove and secured by binding with the same wire as the conductor.

A pin insulator is usually made from porcelain, but glass or plastic may also be used. As pin insulators are almost always employed in open air, proper insulation while raining is also an important consideration. A wet pin insulator may provide a path for current to flow towards the pole. To overcome this problem, pin insulators are designed with rain sheds or petticoats.

Table 2-1 Comparison of Utility Pole Materials

Attribute	Wood	Steel	Concrete	Composite
Readily available	✓			
Relative strength of material		✓	✓	✓
Engineered material (uniform size, taper, and repetitive pole design)		✓	✓	✓
Weight of Class 2 pole (40-ft) in pounds	1,476	587	3,411	376
Weight of Class 1 pole (60 ft) in pounds	3,013	1,589	9,177	903
Weight of Class H1 pole (60 ft) in pounds	3,530	1,658	9,227	941
Insulator (would not conduct during line failure)	✓		✓	✓
Termite resistant		✓	✓	✓
Rot proof		✓	✓	✓
Ultraviolet (UV) protection			✓	✓
Corrosion resistant		✓		✓
Fire resistant		✓		
Relative low cost	✓			
Ease of transport	✓	✓		✓
Ease of installation		✓		✓
Ease of maintenance	✓	✓		✓
Number of Class 1 poles (60 ft) per shipment [1]	15	27	6	53
Environmentally friendly to manufacture	✓			
Recyclable after use		✓		
Service life (years)[2]	45	60	60	70-100

Notes: 1. Source: RST 2022.
2. Source: ORNL 2021.

Shackle insulators are also known as spool insulators. This type of insulator has a tapered hole that distributes the load force consistently over the structure, which decreases the chance of fracture when given a heavy mass load. The shackle insulator holds a conductor within a groove while it is fixed using a soft binding wire. This type of insulator is used for lower voltage distribution lines.

In suspension transmission structures, the conductor phases pass through the structure and are suspended from the insulator. A suspension insulator consists of a number of porcelain discs connected with metal links in the form of a string. Line conductor is suspended at the bottom end of the suspension string which is secured to the cross-arm of the pole or tower. Each disc in a suspension insulator string is designed for a low voltage, roughly 11 kV per disc. The number of discs in a string depends on the working voltage.

Advantages of suspension insulators:

- Each unit of a suspension insulator (insulator disc) is designed for comparatively low voltage (11 kV) and can increase the insulation strength by connecting these insulator disc modules in series. The number of insulator discs required depends on the operating voltage;
- Suspension type insulators give more flexibility to the line and mechanical stresses due to wind and other factors are reduced in this suspension type insulator arrangement. The connection at the cross arm is such that the insulator string is free to swing in any direction and thus takes up a position where it experiences only a pure tensile stress;
- The suspension type insulators, when used in conjunction with steel supporting structure, are well insulated from the live conductor, allowing the tower to function as a lightning rod;
- In case of a rapid increase in the load on the transmission line, the increased demand can be met by raising the line voltage than providing another set of conductors. With suspension type insulators additional line insulation requirements can be obtained by simply adding one or more discs to the string; and
- In case of long spans (river or valley crossings) where heavy conductor load is to be sustained, two-disc insulators can be yoked. Such an arrangement is not possible in pin type insulators.

The only disadvantage of suspension type insulators is that larger spacing between the conductors is required than with the pin type insulators, due to the large amplitude of the swing of the conductors during wind events.

2.2.1.6 Avian Protection Measures

Avian protection devices are designed to protect birds that may roost or loiter on utility pole crossarms, insulators, conductors, or other structures of the distribution system. These devices fall into six major groups: insulation covers, line markers, pole wraps, perching deterrents, streamer shields, and nesting deterrents.

Insulation refers to covering phase and ground conductors where adequate spatial separation is not feasible. Examples of insulation covers include phase covers, bushing covers, arrester covers, cutout covers, jumper wire hoses, and covered conductors. WSMR currently uses a variety of these devices on the Salinas Peak distribution system. However, nearly all insulation covers have blown off the equipment, increasing the need for maintenance and repair.

Line markers are used to make distribution system components more visible to birds so that they avoid collisions with distribution system equipment during flight. Line marker devices include bird flight diverters, guy wire markers, and phase markers. Often, the line markers are painted to be visible in low-light situations. Use of fluorescent and photoluminescent materials is common, reflecting light and making the structures more visible.

Perching deterrents keep birds (especially large birds of prey) away from energized portions of the distribution system. The deterrents include spikes, cones, triangles, and other features that make it difficult for a bird to land and perch near energized components.

Though typically used to provide a barrier to block raccoons, squirrels, and other animals from climbing poles or to prevent woodpeckers from damaging wooden structures, pole wraps can also be an insulating barrier to help prevent phase to ground electrocutions. When installed adjacent to a crossarm, this provides an added layer of electrocution protection for birds, squirrels, or other animals.

Streamer shields sit atop insulators and provide protection from being contaminated with bird fecal matter and reduce the chance of flashover. They are adjustable for various sized insulators and are secure in high winds for sustained periods. Most streamer shields provide an added level of UV protection to the insulators below.

Nesting deterrents are designed to keep raptors, ravens, and other birds from building nests on distribution systems. One example is an inverted "V" designed bar that sits across the crossarm, leaving no horizontal surface on which to build a nest. Additionally, artificial perches or nests could be constructed at a distance from the distribution line to attract birds away from the infrastructure.

2.2.1.7 Conductors

An electrical conductor provides the medium for the flow of electrical energy. The conductor consists of strands of reinforced steel cable encased by aluminum strands. The steel cable provides the tensile strength to support the conductor; the aluminum conducts the electrical current. This project uses conductor sized 4/0 by the American Wire Gauge. This conductor has an uninsulated diameter of 0.4600 in (1.17 centimeters [cm]). Conductors passing over roads with commercial traffic must have at least 15.5 ft (4.72 m) of clearance from its lowest point to the ground surface.

2.2.1.8 Fiber Optic Cable

A fiber optic cable for communications will be installed on the distribution line. The fiber optic cable will not be electrified and will be installed in accordance with applicable regulations and BMPs per WSMR Environmental Division and Test Center requirements. To meet WSMR Test Center practices, the fiber optic cable would be installed at least 40 in (102 cm) below the lowest phase conductor. Previous fiber optic installation of this section was achieved with zero splices between Salinas Base Camp and Salinas Peak. The proposed fiber optic installation shall achieve the same result unless otherwise noted by the WSMR Test Center Range Operations Directorate Information Management Office.

2.2.2 Screening Criteria for Action Alternatives

This section provides descriptions of screening criteria developed to identify potential action alternatives that meet the purpose and need for the proposed action. Each action alternative is comprised of different combinations of components (i.e., utility line route, service roads, pole material and type, size of poles, etc.). Alternatives that did not meet these screening criteria were not carried forward for full analysis in this EA (see Section 2.3).

2.2.2.1 Resilience

For the purposes of this EA, resilience is defined as how well the components of the utility line withstand degradation from the natural environment. On Salinas Peak, the proposed distribution line would be subject to high winds, rain, snow, high UV radiation from sunlight, caustic soils, and other factors that impact the functional lifespan of key components.

To address the natural conditions found within the project area, the following recommendations should be implemented:

- Steel utility poles should be used in most areas, as their properties (i.e., greater strength than wood and resistance to corrosion) can be used to create a more "hardened" system;
- Size of poles should be increased from Class 2 poles to provide greater capacity to bear heavy loads;
- Use of H-structure utility poles could be used in areas with high slope and/or high wind conditions; and
- The conductor should be of size 4/0 or larger.

2.2.2.2 Access to Service Roads

Access to the distribution system is key to construction and maintenance of the distribution line. The current distribution corridor includes road access to roughly 55 of the existing 77 utility poles. One stretch in particular is roughly 0.5 miles (805 m) long with no road access due to extreme slope. There are 17 poles along this stretch that cannot be accessed with heavy equipment. Should the existing corridor be selected for the proposed action, alternative inspection, construction, and maintenance methods would need to be employed. These methods could utilize helicopters, aerial drones, and foot patrols to inspect the distribution system, as well as assist with construction and maintenance activities.

To address this issue of limited-service road access, a second distribution line corridor has been proposed, west of the current line. This alternative corridor is approximately 2.5 miles (4.0 km) long and would require construction of approximately 0.6 miles (0.97 km) of new service road with a width of 16 ft (4.9 m). This new proposed service road would run along a ridgeline, with no extreme slopes.

Going forward, these two routes (i.e., the existing eastern route and proposed western route) will be the primary distinguishing factor for action alternatives considered in this EA.

2.2.2.3 Ease of Construction

To maximize ease of construction, alternatives analyzed in this EA should consider incorporating the following:

- Steel poles should be used to the fullest extent possible due to the relative ease for transport and handling (e.g., more poles per shipment when compared to wood, lighter poles are easier to handle and would require lighter equipment);
- Use of higher, more sturdy poles would reduce the number of new poles installed, as the span between poles is increased;
- To avoid the need for angle poles and dead-end structures, poles should be installed in straight lines, to the fullest extent possible;
- Due to higher lateral strength than monopoles, H-structures (two parallel utility poles braced together by a horizontal support beam) should be considered for use in areas with high slope and/or high wind shear; and
- New poles should be built near service roads to avoid the need for helicopters, drones, or other specialized equipment.

It should be noted that H-structures would require installation and maintenance of two poles rather than one, making construction and maintenance costs higher than traditional monopoles.

2.2.2.4 Ease of Maintenance

Ease of maintenance of the Salinas Peak distribution line will depend on the number of poles requiring maintenance, ease of access to the poles, and adaptability of the poles. To maximize the ease of maintenance the following recommendations should be implemented:

- Replacement poles should be bigger than the existing poles to allow for a reduction in the number of poles, as the spans between poles is increased;
- Use of the western route alternative would allow access to nearly all poles within the distribution line; and
- Steel poles should be used to take advantage of their modular design, allowing for easier modification and maintenance;

2.2.2.5 Minimize Impacts to Raptors

The current distribution line uses wood poles with crossarm structures to connect the Salinas Base Camp to the facilities near the summit. These poles include pin type insulators that currently do not provide adequate spacing to ensure adequate isolation from the energized components, generally accepted as 60 in (150 cm). As such, WSMR has installed insulation covers, perching deterrents, and other raptor protection devices on the distribution line. Many of the raptor protection devices have blown off the distribution system, increasing the need for maintenance and repair (Cutler 2022).

Considering this, the following measures should be implemented to provide raptor protection on the forthcoming distribution system:

- Taller poles should be used to provide at least 60 in (150 cm) spacing between the phased conductors; and
- Suspension insulators should be used, instead of pin type insulators, to remove perching hazards on crossarm structures.

Both of these measures would provide adequate isolation from the energized components, eliminating the need for insulation devices and the associated maintenance and repair activities. If used for portions of the distribution alignment, H-structures would provide even greater isolation distance between the energized components and birds than found with monopole structures with suspension insulators.

2.2.3 The No-Action Alternative

Under the No-Action Alternative, no large-scale replacement or repair actions would be taken on the existing Salinas Peak distribution system. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. This alternative would not meet the purpose and need for the Proposed Action, as no improvements will be made and the distribution system would remain susceptible to failure due to extreme weather events.

2.2.4 Alternative 1 – Eastern (Existing) Route

Under Alternative 1, the existing distribution line corridor would be used. This alternative would be performed in four phases:

1. Comprehensive inspection of each utility pole in the distribution system to identify poles needing repair or replacement;
2. Removal and replacement of the utility poles and structures flagged during inspection;
3. Removal and replacement of the conductor; and
4. Routine inspection and maintenance.

<u>Comprehensive Distribution Line Inspection</u>

A comprehensive survey of the utility poles and structures would be conducted to establish a record of the individual structures and their condition. This inventory will help WSMR decide which structures need replacement and note those that are showing wear, so they can be monitored more closely on subsequent inspections.

<u>Removal and Replacement of Existing Poles and Structures</u>

For Alternative 1, the temporary disturbed area is assumed to be approximately 30.3 acres ([12.3 ha], 2.5 miles (4 km) of distribution corridor with a width of 100 ft [30m]). Where needed, new utility poles would be placed in or near the holes of the existing poles. The existing holes would be cleaned out and re-drilled to a total depth of 7 to 12 ft (2.1 to 3.7 m). Additional soil removed by an auger would be used as overburden at the base of the poles and spread evenly around the structure sites. If the existing hole could not be reused, then the structure would be located as close to the existing hole as feasible and sensitive natural and cultural resources would be avoided, if practical. No blasting would be anticipated for structure replacement activities.

Some of the existing structures have guy wires. The existing guy wires would be cut off and dug out and WSMR would install replacement guy wires and plate anchors in the same location as they currently exist, where applicable. Guy wire anchors would be set in crushed rock about 10 ft (3 m) deep and the remainder of the hole would be backfilled with native soil.

Taking advantage of their material strengths, steel poles would be used to harden the power line in areas with steep slopes and high wind. Wood poles would be used in areas near the Salinas Base Camp, where gentle slopes, easy service road access, and lower strength winds exist.

Under this alternative, larger poles than the current Class 2 poles would be used. These larger poles would accommodate larger loads, reducing the number of poles needed. It is estimated that a total of 40 to 50 poles, ranging in length from 40 to 80 ft (12 to 24 m) would be needed to replace the existing distribution line with new poles that would be more resilient against the local weather conditions. Utility poles over 45 ft (13.7 m) in length would require two jointed segments of 45 ft (13.7 m) or less. This would be the maximum size transported from suppliers.

Approximately 0.5 miles (0.8 km) of the existing corridor is inaccessible by ground vehicle traffic, due to extreme slopes. This stretch is comprised of 17 existing poles (one pole has already failed) that would need to be removed and replaced. Alternative removal and installation methods would be needed, as the slopes generate unsafe conditions to operate ground-based equipment. Such alternative methods would include the use of chain saws and other handheld equipment to remove the utility poles and conductors. All-terrain vehicles (ATV) would be the only vehicles that can access this area.

<u>Removal and Replacement of Conductor</u>

The existing phased conductors and fiber optic cables would be removed from the distribution system. The conductors and cables would be recycled to the extent possible.

Conductor and shield wires (for lightning protection) will be installed via a tensioning system. Tensioning systems typically use ropes threaded through stringing blocks or dollies for each conductor and shield wire. Conductor and shield wires will be pulled by the ropes and held tight by a tensioner to keep the wires from coming in contact with the ground and other objects that could damage the wire. After the wire is tensioned to the required sag, the wire will be taken out of the blocks and placed in the suspension and dead-end clamps for permanent attachment.

Similar, but smaller, tensioning equipment would be used to install the fiber optic cable on the utility line. Installation of new fiber optic cabling shall be performed in a manner that will minimize network downtime. Existing fiber optic cable on pole line shall remain in working order during installation of the new fiber optic cable and during removal and installation of new poles.

Coordination with the WSMR Test Center Range Operations Directorate Information Management Office will be required to ensure new cable endpoints are in an appropriate location to transition back to existing cabling that feeds to the exterior of construction limits. Appropriate cable slack shall be left by installation activity for WSMR Test Center personnel to perform splicing actions.

Under Alternative 1, there would be four temporary work areas established to carry out the conductor removal and replacement.

<u>Routine Inspection and Maintenance</u>

Routine inspection of the distribution line would generally be conducted via automobile or ATV traveling on existing access and service roads. Pedestrian inspection would be required for the utility poles without road access. These ground surveys of all equipment should be completed annually but may occur more frequently based on system reliability and local weather conditions.

In addition to inspection of poles, the surrounding area would be checked for tree clearances, brush and potential fire hazards, water or wind erosion, and slides or wind-caused dirt or debris piled on poles. Access and service roads would be checked for water or wind erosion; rocks or slides that may block access; overhanging brush; trees that intrude into the roadway; and grass, weeds, or other combustible materials that may cause a fire hazard. No surface disturbance or off-road motorized activity would occur during routine patrols.

2.2.5 Alternative 2 – Western Route

Under Alternative 2, a new distribution line corridor would be developed, taking advantage of less-extreme slopes west of the current alignment. As with Alternative 1, this alternative would be conducted in four phases:

1. Inspection of utility poles in the vicinity of Salinas Base Camp;
2. Installation of a new distribution system;
3. Removal of existing poles and conductors; and
4. Routine inspection and maintenance.

Distribution System Inspection near Salinas Base Camp

For Alternative 2, the only existing poles that may be kept would be near Salinas Base Camp, as the remainder of the corridor follows a new route. Up to six existing wood poles could be retained and used to the end of their functional lifespans, should they meet inspection criteria.

Installation of New Distribution System

For Alternative 2, the total temporary land disturbance is approximately 24.2 acres in size (2.0-mile corridor that is 100 ft wide). Roughly 4.2 acres of permanent land disturbance would result from installation of the service roads and utility poles. The new distribution system would utilize only up to six of the existing wood poles comprising the existing Salinas Peak Distribution System. The remaining 71 poles would not be disturbed during the installation of the new system, as none of the existing system infrastructure would interfere with the proposed corridor for Alternative 2. Considering this, most of the existing wood poles can remain in place during installation of the new distribution system, allowing for use of the existing system until construction is complete.

Under this alternative, larger poles than the current Class 2 poles would be used. These larger poles would accommodate larger loads, reducing the number of need poles from the original 77-pole alignment. It is estimated that a total of 40 to 50 poles, ranging in height from 40 to 80 ft (12 to 24 m) would be needed to replace the existing distribution line with new poles that would be more resilient against the local weather conditions.

Approximately 0.6 miles (0.97 km) of new service road would be constructed along a ridgeline, with a width of 16 ft (4.9 m).

Removal of Existing Poles and Conductors

Once the new distribution system is installed and functional, the old wood pole distribution system would be removed. Pole removal would start once the fiber optic cable on the existing distribution system has been removed and mounted on the new western alignment. The wood poles and conductors would be recycled to the extent possible. Materials that are not recycled would be disposed, in accordance with guidance provided by the WSMR Environmental Division (Environmental Division).

Routine Inspection and Maintenance

Routine inspection of the distribution line would generally be conducted via automobile or ATV traveling on existing access and service roads. These ground surveys of all equipment should be completed annually, but may occur more frequently based on system reliability and local weather conditions.

In addition to inspection of poles, the surrounding area would be checked for tree clearances, brush and potential fire hazards, water or wind erosion, and slides or wind-caused dirt or debris piled on poles. Access and service roads would be checked for water or wind erosion; rocks or slides that may block access; overhanging brush; trees that intrude into the roadway; and grass, weeds, or other combustible materials that may cause a fire hazard. No surface disturbance or off-road motorized activity would occur during routine patrols.

2.2.6 Comparison of Alternatives

Table 2-2 provides comparative summaries of the utility pole construction activities and estimated land disturbance for each of the three alternatives considered in this EA. A feasibility study has been conducted to assess the conditions (e.g., slope, soils, and accessibility) associated with the existing distribution line alignment, as well as a potential alternative route connecting to the Salinas Peak facilities. This document is provided as Appendix B to this EA (Epsilon 2022).

The table provides the estimated number of utilities poles needed for three types: tangential, angle, and dead-end poles. The distinction is given to better estimate the permanent ground disturbance following construction. Tangential poles are the most common pole and are used in straight stretches.

Angle poles accommodate turns greater than 5 degrees. These poles often have two set insulators, one on either side of the angle.

A dead-end structure is where conductors and ground wires are pulled only on one side, unless it is a double dead-end structure. These structures are where the line ends, where turns are at a large angle, at major crossings like highways or rivers, and where the line branches into two or more segments.

All of these structures can either be guyed or unguyed. A guyed structure provides extra support by fastening a wire from the structure to the ground or another structure, whereas an unguyed structure is self-supporting. One side of a guy wire is connected to a point high on the structure, with the other anchored to a safe point on solid ground, creating a diagonal line. An anchor concreted into the solid ground is used to hold one or more guy wires steady.

For the purposes of this EA, it assumed that each tangential pole will create an area of permanent ground disturbance with a radius of 5 ft (1.5 m). Angle poles and dead-end poles are assumed to require guy wires, occupying permanent ground disturbance areas with 50-ft (15.2-m) radii.

Table 2-2 Comparison of Alternative

Resource/Use Description	No-Action	Alt. 1	Alt. 2
Estimated number of poles removed from service	0	50	71
Estimated number of new poles	0	40	50
# Tangential poles	0	26	36
# Angle poles	0	10	10
# Dead-end poles	0	4	4
Conductor voltage (kV)	14.4/24.9	14.4/24.9	14.4/24.9
Conductor size	4/0	4/0	4/0
New service road requirements (linear feet)	0	0	3,200
Total land disturbance (in acres)	***0***	***33.33***	***28.4***
Service road construction	0	0	1.18
Temporary work areas*	0	0.46	0.46
Distribution ROW – during construction*	0	30.3	24.2
Utility poles – post-construction	0	2.57	2.59

Note: * Represents temporary land disturbance

2.2.7 Selection of a Preferred Alternative

After consideration, WSMR has selected Alternative 2 – Western Route as the Preferred Alternative. Although this alternative would have more permanent land disturbance than Alternative 1, the western route is preferred for the following reasons:

1. The western route has greater potential for access to service roads along its entirety;
2. The western alignment does not include extreme slopes (over 70% in some locations) as present in the existing eastern alignment; and
3. Maintaining the eastern alignment during construction on the western alignment will allow for system redundancy, reducing the risk of power outage.

2.3 Alternatives Considered But Not Carried Forward

2.3.1 Utility Line Burial

WSMR considered burying the utility line from Salinas Base Camp to the Salinas Peak Site, within the service road ROW. However, it was determined that this approach to the project would be prohibitively expensive, prone to failure, and would be very difficult to repair. As such, this alternative was omitted from further consideration in this EA.

2.3.2 Solar Power Supply at Salinas Peak

Installation of solar panels at the Salinas Peak site was considered as a standalone power source for the facilities. After investigation, it was determined that the solar energy potential at the site would not be sufficient to meet the energy demands. Therefore, this alternative was eliminated from further consideration.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter provides a summary of the valued environmental components (VECs), a description of the environmental conditions potentially affected by the Proposed Action, and an analysis of potential impacts associated with the Proposed Action. Additionally, potential mitigation measures are identified to minimize potential impacts identified.

3.0 VALUED ENVIRONMENTAL COMPONENTS

Army NEPA Analysis Guidance (Army 2007) provides an approach to screen VECs based on information from tiered NEPA analysis and Proposed Action. A VEC analysis was conducted to identify environmental resource areas potentially impacted by the Proposed Action. This analysis considered natural and human environmental resources which are applicable to WSMR and could be impacted by combinations of past, present, and reasonably foreseeable future actions. Potentially useful federal EISs and EAs prepared for WSMR were identified and analyzed to establish regional issues, impacts, and their sources. If the screening approach determines that the cumulative impacts of this action were no greater than anticipated from previously completed analysis, then no further analysis for that VEC was captured in this document. In addition to actions and impacts, useful references and potential mitigation measures were identified for possible inclusion.

Based on this approach, regionally important VECs were identified and ranked as to the likelihood of impact from the Proposed Action. Regionally important VECs at WSMR, as characterized by incorporated EAs, were ranked based on the likelihood of potential impacts caused by the Proposed Action. Each of the VEC categories to include air quality, cultural resources, the Migratory Bird Treaty Act ([MBTA], 16 USC §§ 703-712), and the Bald and Golden Eagle Protection Act (16 USC § 668, [the Eagle Act]), human health, etc. are described in the Army NEPA Guidance Manual (Army 2007) will be assigned to one of five impact potential categories:

- Very Low (VL) – No impact or minor impacts are anticipated;
- Low (L) – Minor impact anticipated;
- Medium (M) – Moderate impact anticipated (less than significant);
- High (H) – Significant impact potential anticipated (likely to be mitigated to less than significant); and
- Very High (VH) – Significant adverse impact anticipated (mitigation would be applied to minimize adverse effects).

In support of this EA, a VEC analysis was conducted in accordance with The U.S. Army Environmental Command NEPA Analysis Guidance Manual (Army 2007). Components rated moderate to high (no VECs ranked VH in this assessment) for the Proposed Action include:

- Cultural resources (includes the topics of historic properties, archaeological resources, and Native American resources);
- Soil erosion effects;
- Biological resources (includes the topics of threatened and endangered species, MBTA, Bald and Golden Eagle Protection Act, and general biological resources); and
- Human health and safety.

Table 3-1 provides a review of a VEC analysis conducted by WSMR Test Center and Garrison personnel.

1 **Table 3-1 Valued Environmental Components Considered in this Environmental Assessment**

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
Land Use	Area within and adjacent to the project area	Significant impacts could occur if the land use were incompatible with existing military (WSMR, Holloman Air Force Base, Fort Bliss) or institutional (National Aeronautics and Space Administration, BLM) land uses and designations (including recreation). Additionally, significant impacts could occur if certain natural land cover types (wetlands and forests of particular interest) were to be converted to other land cover (such as built environment).	No	The Proposed Action would not permanently affect the land use in the project area. The planned activities would be consistent with all area planning documents,
Visual Aesthetics	Area within and adjacent to the project area	The Proposed Action would be considered to have a significant effect to visual impacts if: long-term alteration of the viewshed would occur that would require mitigation; negative alterations to the viewshed of a historical resource would be expected; and it was not compliant with the overall viewshed of adjacent areas.	No	There are no sensitive receptors in the vicinity of the project area. No planned activities would be visible to members of the public.
Air Quality	El Paso-Las Cruces-Alamogordo Air Quality Control Region 153	Significant impact would occur if the Proposed Action were to affect the achievement or maintenance of National Ambient Air Quality Standards (NAAQS).	Yes	Although *de minimis* thresholds will not be exceeded, impacts could occur as heavy equipment and vehicles are used regularly during construction. Emissions from burning of fossil fuels could increase potential for acid rain, impacting endemic land snails and other sensitive species.
Noise (soundscape)	Area within and adjacent to the project area	Impacts would be considered significant if noise from the Proposed Action were to cause harm or injury to personnel, members of nearby communities, or wildlife communities. Significant impacts would also occur if noise	Yes	There are no sensitive human receptors present. However, construction noise may temporarily impact area wildlife. Long-term impacts

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
		levels exceed any applicable noise limit guidelines.		may occur due to power line "hum."
Soil Erosion Effects	Land surfaces where construction will occur	Impacts of geology, topography, and soils would be significant if: the surrounding landscape were affected in a manner that would not support existing land uses, excessive soil loss impairs plant growth, or federal, state, or local laws pertaining to geology and soils are violated.	Yes	The Proposed Action would include ground-disturbing activities over areas with high erosion potential.
Cultural Resources	Area within and adjacent to the project area	Impacts would be significant if an action adversely affects any National Register of Historic Places (NRHP)-eligible property or resource.	Yes	Salinas Peak is a TCP, revered by multiple Native American tribes. Facilities at summit of Salinas Peak are over 50 years old. The district has Cold War significance.
Biological Resources	Area within and adjacent to the project area and associated habitat	For federally-listed threatened or endangered (T&E) species, a significant impact occurs when the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally-listed T&E species, or would result in the destruction or adverse modification of federally-designated critical habitat.	Yes	Species at risk may be impacted by the Proposed Action. The project area includes multiple species of concern, which may be impacted by construction activities or post-construction change of behavior (i.e., shift of migration corridor, avoidance of utility line area).
Wetlands	U.S. Army Corps of Engineers jurisdictional wetland resources within the project area	Impacts to wetlands would be considered significant if Proposed Action activities do not comply with policies, regulations, and permits related to wetlands conservation and protection.	No	Wetlands are not present within the vicinity of the Proposed Action.
Water Resources	For surface water resources, the area of influence includes the drainage basins of local streams and arroyos. Groundwater resources are defined by the aquifers that underlie the project area.	Impacts would be significant if an action results in exceedance of water quality standards established by federal, state, local, and tribal agencies or if contamination of public drinking water supply occurs that may adversely affect public health.	No	The Proposed Action would not directly affect any surface water sources in the vicinity. BMPs would be implemented to control runoff and/or sedimentation from

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
				construction activities to protect local surface waters. Groundwater sources would not be affected by the Proposed Action through implementation of the runoff and sedimentation BMPs.
Human Health and Safety	For worker safety, the immediate area of interest includes the construction areas associated with the Proposed Action. Additionally, effects to non-involved WSMR personnel must be considered in the analysis. Public health analysis considers the impacts to the communities surrounding WSMR (e.g., Las Cruces, Alamogordo, and others).	Public health impacts are considered significant if the Proposed Action would result in the conditions that could negatively affect the health of involved workers or members of the public. Public safety impacts are considered significant if the general public is substantially endangered as a result of Proposed Action activities on the WSMR ranges.	Yes	Construction of the planned distribution line involves remote areas with steep slope and the potential for inclement weather. Maintenance activities may be required during extreme weather conditions.
Socioeconomics and Environmental Justice	The community living on WSMR and neighboring towns, cities, and communities.	When determining whether a potentially affected minority population or low-income population influences the extent of the affected environment, agencies can be informed by considering the Proposed Action's: 1) exposure pathways (routes by which the minority or low-income population may come into contact with chemical, biological, physical, or radiological effects); 2) ecological, aesthetic, historic, cultural, economic, social, or health consequences to the community; and 3) distribution of adverse and beneficial impacts from the Proposed Action.	No	The project would be confined to the Salinas Peak area, and all construction would be conducted within WSMR boundaries. As such, the Proposed Action would not affect local community growth trends and would not affect area minority populations. No additional cumulative socioeconomic effects analysis would be needed.
Traffic and Transportation	Traffic is the flow of motor vehicles on local (WSMR) and regional road networks. Transportation systems include the regional network, traffic control equipment, and public transportation vehicles.	Factors considered in assessing significance included the extent or degree to which implementation of an alternative would result in traffic increases that would exceed the design capacity of an affected portion of the roadway system or the level of service (LOS) of a key intersection. Significant impacts to the	No	Traffic in the Salinas Peak area would increase during construction of the proposed distribution line. Traffic would further increase, if mission related construction at Salinas

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
		transportation system would occur if the Proposed Action negatively impacts the regional road network through degradation (wear and tear on the roads due to increased traffic) or construction activities that may temporarily affect traffic on the roadway		Peak coincides with the distribution line installation. The road connecting Salinas Peak to the base camp is a one-lane road. Deliveries will need to be coordinated, so that only one vehicle travels on the road at any given time.
Airspace Management	Airspace is a three-dimensional resource defined by latitude, longitude, and altitude. There are six classes of airspace—A, B, C, D, E (controlled), and G (uncontrolled)—available to all users (civilian and military). The airspace classes dictate pilot qualification requirements, rules of flight that must be followed, and the type of equipment necessary to operate within that airspace.	Significant impact would occur if the Proposed Action were to affect the flight patterns, times of flight, or general use of the airspace by military, commercial, or general aviation aircraft.	No	The Proposed Action would not affect the regional airspace, as no activities involve activities at altitudes greater than 200 ft above ground level (tallest pole would be 80 ft), which is the threshold for notification to the Federal Aviation Administration (FAA) under its Obstruction Evaluation/Airport Airspace Analysis program.
Facilities	In general, federal facilities are defined as buildings, installations, structures, land, public works, equipment, aircraft, vessels, other vehicles, and property, owned, constructed or manufactured for leasing to the federal government.	Impacts would be considered significant if implementation of the Proposed Action results in undesirable effects to existing facilities (i.e., impacts on function and/or accessibility).	Yes	In accordance with the National Historic Preservation Act (NHPA), impacts to the existing built environment on WSMR and in the vicinity of Salinas Peak must be considered.
Energy Demand, Generation, Transmission, and Use	The facilities and infrastructure needed to generate and transmit electricity. The resource area also considers the local generating capacity and use of electricity.	A significant impact would occur if the Proposed Action results in disruption of power generation or transmission/distribution of electricity. Impacts may include physical impact on the distribution system (utility poles, conductors, support equipment) or disruption of power generation.	Yes	The Proposed Action would provide a more reliable and resilient distribution system to the facilities on Salinas Peak. Short planned disruptions to the existing distribution system are expected as construction is completed.

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
Hazardous Materials and Waste	Hazardous materials management refers to the handling of hazardous materials and includes the purchase, storage, and distribution of hazardous materials such as paints, solvents, lubricants, and batteries. Hazardous waste management refers to the handling of hazardous wastes generated as part of industrial activities. These wastes must be containerized, labeled, stored, and transported in accordance with EPA, state, and Army/WSMR requirements.	Factors considered in assessing impacts associated with hazardous materials and hazardous wastes are the extent or degree to which an action would significantly increase the amount of hazardous materials used or the amount of hazardous wastes generated (including waste generated from spills).	Yes	Replacement of existing poles will create a solid waste (not a hazardous waste) that will require coordination with the Environmental Division for disposal.

3.1 AIR QUALITY

The principal framework of national, state, and local efforts to protect air quality in the United States is the Clean Air Act (42 USC § 7401 et seq., [CAA]). Under the CAA, the U.S. Environmental Protection Agency (EPA) has set health-based standards known as National Ambient Air Quality Standards (NAAQS) for six criteria pollutants considered to be key indicators of air quality: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), lead (Pb), and two categories of particulate matter—namely particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) and particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$) (40 CFR Part 50).

The primary NAAQS define levels of air quality, with an adequate margin of safety that sets limits to protect the public health (i.e., "health-based"). The secondary NAAQS define levels of air quality judged necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (i.e., "welfare-based").

The EPA is responsible for ensuring that all air quality standards are met or attained in cooperation with state, tribal, and local governments through national strategies to control air pollutant emissions. Under the CAA, state and local agencies may establish state Ambient Air Quality Standards (AAQS) of their own, provided these are at least as stringent as the federal requirements. Pertinent State regulations are found in Title 20, Chapter 2, Part 3 of the New Mexico Administrative Code (NMAC) 20.2.3.1 to 20.2.3.11 issued by the Environmental Improvement Board on September 6, 2006. Federal NAAQS and the State of New Mexico AAQS are shown in Table 3-2.

Army Regulation (AR) 200-1, part 1-24, *Environmental Protection and Enhancement*, states (in part) that Garrison Commanders will: "Comply with applicable federal, state, and local environmental laws, regulations, internal directives and goals, EOs, and overseas Foreign Governing Standards." To that end, the Environmental Asset section of AR 200-1 lists the following air quality policies and program goals:

- Comply with applicable federal, state, and local air quality regulations, permit requirements, and overseas Final Governing Standards;
- Identify and implement cost-effective pollution prevention measures that will reduce toxic or criteria air emissions;
- Eliminate dependency on ozone-depleting substances; and
- Achieve and maintain air quality standards to protect human health and the environment while minimizing mission impacts.

3.1.1 Affected Environment

3.1.1.1 Attainment Status

The lands within WSMR's boundaries are in attainment for all criteria pollutants. The nearest nonattainment area to WSMR lies 17 miles south of the southernmost boundary of WSMR at Anthony in Doña Ana County, classified as moderate nonattainment for PM_{10}. Sunland Park, New Mexico, is located approximately 39 miles south of WSMR and is in nonattainment for ozone.

Table 3-2 National and State of New Mexico Ambient Air Quality Standards

Pollutant	NAAQS		New Mexico State AAQS
	Standard	Type[1]	
Carbon monoxide (CO)			
8-hour average[2]	9 ppm	Primary	8.7 ppm
1-hour average[2]	35 ppm	Primary	13.1 ppm
Nitrogen dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	Primary & Secondary	0.05 ppm
24-hour average	None	None	0.10 ppm
Ozone (O_3)			
8-hour average[3]	0.075 ppm	Primary & Secondary	None[4]
Lead (Pb)			
Quarterly average	1.5 µg/m^3	Primary & Secondary	None[4]
Fine particulate matter ($PM_{2.5}$)			
Annual arithmetic mean[5]	15 µg/m^3	Primary & Secondary	None[4]
24-hour average[6]	35 µg/m^3	Primary & Secondary	None[4]
Particulate matter (PM_{10})			
24-hour average[7]	150 µg/m^3	Primary & Secondary	None[4]
Sulfur Dioxide (SO_2)			
Annual arithmetic mean	0.03 ppm	Primary	0.02 ppm[8]
24-hour average	0.14 ppm	Primary	0.10 ppm[8]
3-hour average	0.50 ppm	Secondary	None[4]
Hydrogen Sulfide (H_2S)			
1-hour average[9]	None	None	0.10 ppm
Total Reduced Sulfur			
Half-hour average[10]	None	None	0.003 ppm

1. Primary Standards are “health-based,” and Secondary Standards are “welfare-based.”
2. Not to be exceeded more than once per year.
3. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
4. When no state AAQS exists, the NAAQS applies.
5. To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
6. To attain this standard, the 3-hour average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3.
7. Not to be exceeded more than once per year on average over three years.
8. For the entire State of New Mexico except for the area within 3.5 miles of the Chino Mines Company smelter furnace stack near Hurley, where higher levels (same as NAAQS) apply.
9. 1-hour average not to be exceeded more than once a year. For the entire State of New Mexico, except for those parts of the Pecos-Permian Basin Intrastate Air Quality Control Region, where higher levels apply.
10. Total reduced sulfur does not include H_2S. Applies to the entire State of New Mexico, except for those parts of the Pecos- Permian Basin Intrastate Air Quality Control Region, where higher levels are in effect.

Sources: 40 CFR Part 50, NMAC 20.2.3.1 to 20.2.3.11

3.1.1.2 Area Meteorology

Air quality is closely intertwined with day-to-day meteorological weather conditions and the influences of longer-term climate. Concentrations of atmospheric air pollutant gases/species can be influenced by meteorological variables (e.g., wind speed) which affect the dispersion of particulates from soils; wind direction and speed which affects transportation; mixing depths and stability which affect dispersion; and temperature, humidity, sunlight, and cloud water which can play a role in the chemical formation of certain air pollutants.

WSMR encompasses the Tularosa Basin in southern New Mexico, which lies between the Sacramento Mountains to the east and the San Andres and Oscura mountains to the west and the Jornada del Muerto

Basin in the northwestern portion of the range. The climate of the Tularosa and Jornada del Muerto basins is typical of the arid regions of the state at lower altitudes. Table 3-3 provides a summary of climate conditions at Salinas Peak, based on instrument readings taken at the summit.

Wind speeds are usually moderate. Strong winds often accompany occasional frontal activity during late winter and spring months, or occasional thunderstorms. Frontal winds may exceed 30 knots (55.6 km per hour) for several hours and reach peak speeds of more than 50 knots (92 km per hour). As noted in Table 3-3, peak winds recorded at Salinas peak have been as high as 106 knots (122 miles per hour [MPH] or 106 km per hour). As recently as February 2023, winds over 87 knots (100 MPH, 161 km per hour) were recorded at Salinas Peak. Spring is the windy season. Blowing dust and soil erosion can occur during dry spells. Winds generally predominate from the southeast in summer and from the west in winter.

Monsoonal flows generate significant rains between the months of June and October, with peak rains usually falling during the month of July (WSMR 2021).

Table 3-3 Salinas Peak Climate Summary

Metric	Month												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Max Temp[1]	38.5	41.3	48.0	55.3	64.0	73.8	73.6	71.8	66.0	56.6	46.2	38.7	57.7
Min Temp[1]	25.3	26.8	31.4	37.1	46.0	54.8	55.7	55.1	50.6	42.1	32.7	25.7	41.6
Avg. wind[3]	16.0	16.4	15.3	16.3	14.4	13.0	10.1	10.0	11.3	13.9	15.4	16.9	13.8
Avg. peak wind[2]	42.3	44.6	44.9	48.2	44.3	42.0	34.7	32.5	33.7	37.8	40.0	43.1	40.5
High peak wind[2]	100	107	103	122	92	76	64	62	70	100	105	105	91
Precipitation[2]	0.52	0.66	0.33	0.30	0.25	0.70	1.91	1.70	1.36	1.09	0.52	0.31	9.34

1. In degrees Fahrenheit
2. In MPH
3. In inches

Source: WSMR 2021

3.1.1.3 Greenhouse Gases

Climate describes the long-term weather conditions of a region. Variations in average weather conditions that persist for multiple decades or longer are referred to as climate change (DoD 2021). Greenhouse gases (GHGs) such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) warm the earth by absorbing energy and trapping heat in the atmosphere. In general, GHGs are generated from both natural sources (e.g., volcanoes and biological processes) and through human (anthropogenic) activities such as the burning of fossil fuels and land use changes. Because emissions of CO_2, CH_4, N_2O and other GHGs result in different levels of warming, GHG emissions are often converted into carbon dioxide equivalent (CO_{2e}) emissions to account for differences in their global warming potential. Further discussions on climate change, the project's effects on climate change, and climate change effects on the project are provided in Section 3.2.7.

President Biden signed Executive Order (EO) 13990 (86 FR 7037), titled "Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis" on January 20, 2021. Among other actions, the EO's fifth section, titled "Accounting for the Benefits of Reducing Climate Pollution," reestablished the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG). The Order directed the IWG, among other things, to publish estimates of the social cost of carbon, social cost of methane, and social cost of nitrous oxide that reflect the best available science and provide recommendations to the President regarding the areas of decision-making, budgeting, and procurement by the Federal government where the social costs of pollutant emissions should be applied. The social costs represent the monetary value of the societal impacts associated with adding a ton of CO_2, CH_4, or N_2O to the atmosphere in a given year allowing agencies to understand the social benefits of reducing GHG emissions, or the social costs of increasing such emissions, in cost-benefit analyses of regulatory and other actions (IWG 2021). Formal guidance has yet to be released on implementation of the cost-benefit analysis procedure.

Army Directive 2020-08, *U.S. Army Installation Policy to Address Threats Caused by Climate Change and Extreme Weather*, provides policy guidance to installation commanders to plan for and adapt to the projected impacts of climate and extreme weather threats by adding the results of projection analysis tools, such as the Army Climate Assessment Tool, into all facility and infrastructure-related plans, policies, and procedures.

On January 27, 2021, President Biden signed Executive Order 14008 (86 FR 7619), titled "Tackling the Climate Crisis at Home and Abroad," in order to stimulate domestic action to avoid or mitigate climate change impacts. Among other things, the order establishes a National Climate Task Force that includes the Secretary of Defense to "facilitate the organization and deployment of a Government-wide approach to combat the climate crisis." In order to prioritize climate in national security, the order also requires the Department of Defense to develop an analysis of the security implications of climate change (Climate Risk Analysis) and account for them in "developing the National Defense Strategy, Defense Planning Guidance, Chairman's Risk Assessment, and other relevant strategy, planning, and programming documents and processes."

GHG emissions for an action can be inventoried based on methods prescribed by state and federal agencies. However, the specific contributions of a particular project to global or regional climate change generally cannot be identified based on existing scientific knowledge, because individual projects typically have a negligible effect (IPCC 2018). Also, climate processes are understood at only a general level.

3.1.2 Environmental Consequences

Criteria pollutant emissions resulting from proposed construction and maintenance activities have been evaluated for the Proposed Action. Air quality impacts would be significant if emissions associated with the Proposed Action would: 1) increase ambient air pollution concentrations above the NAAQS; 2) contribute to an existing violation of the NAAQS; 3) interfere with or delay timely attainment of the NAAQS; or 4) impair visibility within federally mandated Prevention of Significant Deterioration Class I areas. Additionally, a conformity analysis would be required before initiating a 6ny action that may lead to nonconformance with a State Implementation Plan, an exceedance of *de minimis* criteria pollutant thresholds, or contribution to a violation of the NAAQS.

Since WSMR is considered in attainment/unclassified for the NAAQS, the provisions of the General Conformity Rule do not apply. However, emission estimates for the Proposed Action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes. At WSMR, dust generation and control are of principal concern. In the sections below, fugitive dust is the largest contributor to PM_{10} emissions.

3.1.2.1 The No-Action Alternative

Under the No-Action Alternative, there would be no construction on the Salinas Peak distribution system, and no new operations would be introduced to WSMR. Therefore, there would be no increase in criteria pollutant or GHG emissions. Therefore, the No-Action Alternative would have no effect on regional air quality.

3.1.2.2 Alternative 1 – Eastern (Existing) Route

Criteria Air Pollutants

Estimated annual criteria air pollutant emissions were calculated for the actions associated with Alternative 1. These include the construction and maintenance activities at Salinas Peak, material deliveries for construction, grading and improvements to Salinas Road and service roads, as well as roundtrip travel from Socorro for non-WSMR personnel. No round trip transportation was included for WSMR employees, as their commute was considered as part of the WSMR FEIS (WSMR 2010) air quality analysis.

Total emissions resulting from project activities have been estimated using data presented in Chapter 2, and the general air quality assumptions and emission factors are listed in Appendix C. Emission calculations for all project activities are provided in Appendix C. As the WSMR area is in attainment for all criteria pollutants and estimated emissions are below *de minimis* thresholds, implementation of Alternative 1 would have no significant impact on regional air quality. Table 3-4 provides a summary of the criteria pollutant emissions associated with Alternative 1.

Table 3-4 Total Emissions (tons/year) – Alternative 1

Emission Source	VOC	NO_X	CO	SO_X	PM_{10}	CO_2[2]	CH_4[2]
Construction and maintenance[1]	0.0555	0.3144	0.3066	0.0171	1.14	129.3	0.0488
de minimis threshold [3]	**100**	**100**	**100**	**100**	**100**	**NA**	**NA**

Notes: [1]Emissions provided in tons/year.

[2].CO_2 and CH_4 emission estimates provided for GHG analysis.

[3] *de minimis* thresholds do not apply to actions taken on WSMR as it is in attainment/unclassified for the NAAQS. However, emissions estimates for the Proposed Action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes.

NA = Not Applicable.

Greenhouse Gas Emissions

In the absence of formally adopted thresholds of significance, this EA compares GHG emissions that would occur with Alternative 1 actions to the 25,000 metric ton level, as well as comparing the net GHG emissions associated with the Proposed Action to the U.S. GHG baseline inventory of 2018 of 5.98×10^9 metric tons (tonnes; EPA 2022) to determine the relative increase in proposed GHG emissions. Table 3-5 summarizes the annual GHG emissions associated with the implementation of the Proposed Action. Appendix C presents estimates of GHG emissions generated by the Proposed Action. These data show that the CO_{2e} emissions associated with the Proposed Action would amount to approximately 0.0000196% of the total CO_{2e} emissions generated by the U.S. Emissions under the Proposed Action are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance by the CEQ (Table 3-5).

Table 3-5 GHG Emissions for Alternative 1

Pollutant	Actual emissions (tonnes/year)	CO2e emissions (tonnes/year)
CO_2	117.3	117.3
CH_4	0.0043	0.146
Total		**117.45**
% U.S. emissions		**0.0000196**

3.1.2.3 Alternative 2 – Western Route

Criteria air pollutants were estimated for Alternative 2 included the same project phases as Alternative 1 (i.e., delivery of materials to Salinas Peak, commuter traffic for non-WSMR personnel, operation of equipment, and fugitive dust generation).

Emission calculations for all project activities under this alternative are provided in Appendix C. As the WSMR area is in attainment for all criteria pollutants and estimated emissions are below *de minimis* thresholds, implementation of Alternative 2 would have no significant impact on regional air quality. Table 3-6 provides a summary of the criteria pollutant emissions associated with Alternative 2.

Table 3-6 Total Emissions (tons/year) – Alternative 2

Emission Source	VOC	NO_X	CO	SO_X	PM_{10}	CO_2[2]	CH_4[2]
Construction and maintenance	0.0741	0.411	0.438	0.00175	1.32	171.1	0.00653
de minimis threshold [2]	**100**	**100**	**100**	**100**	**100**	**NA**	**NA**

Notes: [1] Emissions provided in tons/year.
[2].CO_2 and CH_4 emission estimates provided for GHG analysis.
[3] *de minimis* thresholds do not apply to actions taken on WSMR as it is in attainment/unclassified for the NAAQS. However, emissions estimates for the Proposed Action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes.
NA = Not Applicable.

Greenhouse Gas Emissions

In the absence of formally adopted thresholds of significance, this EA compares GHG emissions that would occur with Alternative 2 actions to the 25,000 metric ton level, as well as comparing the net GHG emissions associated with the Proposed Action to the U.S. GHG baseline inventory of 2018 of 5.98×10^9 metric tons (EPA 2022) to determine the relative increase in proposed GHG emissions. Table 3-7 summarizes the annual GHG emissions associated with the implementation of the Proposed Action. Appendix C presents estimates of GHG emissions generated by the Proposed Action. These data show that the CO_{2e} emissions associated with the Proposed Action would amount to approximately 0.0000263% of the total CO_{2e} emissions generated by the U.S. Emissions under the Proposed Action are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance by the CEQ (Table 3-7).

Table 3-7 GHG Emissions for Alternative 2

Pollutant	Actual emissions (tonnes/year)	CO_{2e} emissions (tonnes/year)
CO_2	155.2	155.2
CH_4	0.00592	2.07
Total		**157.3**
% U.S. emissions		**0.0000263**

3.1.3 Best Management Practices

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all best management practices BMPs or mitigation measures are implemented. The following BMP would be applied to reduce impacts to meet the emission standards described in Section 3.1:

- To the fullest extent possible, unpaved roads and other cleared areas would be wetted to minimize fugitive dust emissions during heavy usage;
- All equipment would be properly maintained; and
- Creation of new roads would be avoided to the fullest extent possible.

3.2 Natural Resources

For the purposes of this EA, natural resources would include multiple resource areas grouped together to analyze potential crossover effects. The resource areas considered in this section include:

- **Soil erosion effects** – How would the Proposed Action affect sedimentation and erosion, given the existing geology, soil profiles, and topography?
- **Biological resources** – How would the Proposed Action affect existing vegetative and wildlife communities?
- **Threatened and endangered species** – Would the Proposed Action affect plant and animal species listed under the federal Endangered Species Act (ESA) of 1973 or their habitats?
- **Migratory birds** – Would the Proposed Action affect species listed under the MBTA?
- **Raptors** – Would the Proposed Action affect raptor populations? Would the Proposed Action affect bald eagle or golden eagle individuals or populations, as specified in the Bald and Golden Eagle Protection Act?
- **Climate change** – How has climate change affected the existing distribution system? How would the Proposed Action affect regional climate change?

3.2.1 Soils and Soil Erosion Effects

Soil erosion effects are generally dependent upon a variety of factors, including soil structure and composition, climate, topography, and vegetative cover. The structure and composition refer to the physical features of soil, such as compaction, moisture, and composition, based on the bedrock material and mineral deposits. Climatic soil erosion effects primarily revolve around the abundance and intensity of precipitation in each environment. Topographic descriptions are typically in respect to the elevation, slope, aspect, and surface features (e.g., surface roughness) found within a given area. Vegetative cover is an interface between the atmosphere and soil surface, therefore, influencing the overall permeability and potential runoff. When considered together, these factors determine a soil's potential for wind and water erosion.

Descriptions of the WSMR geology and topography, seismicity and geologic hazards, geologic resources, and soils can be found in the WSMR FEIS, Section 3.6 *Earth Sciences* (WSRM 2010).

3.2.1.1 Affected Environment

Geology

The geologic history of WSMR is described in detail in the WSMR FEIS, Section 3.6, and the INCRMP, Section 6.3. The 2003 Geologic Map of New Mexico (NMBGMR 2003) was utilized to determine the geographic regions for the Proposed Action.

Salinas Peak geology is categorized as – Ti – Tertiary intrusive rocks of intermediate to silicic composition (Pliocene to Eocene). This unit is comprised of manzanitic to granitic plutons, stocks locoliths, and porphyritic dikes in deeply eroded magmatic centers; and andesitic, dacitic, or rhyolitic plugs and dikes near cauldrons or stratovolcanoes.

Soils

The primary soil type on Salinas Peak is Rubble land-Rock Outcrop-Far complex (3 to 90% slopes). This soil type is found near the summit. The Rubble land and Rock Outcrop components are miscellaneous areas and largely undefined. The Far component soils are well-drained with parent material of colluvium (i.e., loose sediments that deposit at the base of hillslopes) derived from rhyolite and/or residium weathered from rhyolite (NRCS 2023).

Lower stretches of Salinas Peak are comprised of three soil types: Deama-Penagua-Rock outcrop complex (35 to 90% slopes), Deama-Rock outcrop complex (30 to 90 percent slopes), and Desario- Cuate complex (5 to 35% slopes). All these soil types are well-drained with parent material similar to the Far component soils (NRCS 2023).

Topography

Salinas Peak represents one of the greatest areas of topographic relief at WSMR, with elevations ranging from approximately 6,800 ft (2,070 m) above sea level (asl) at the Salinas Base Camp to 8,965 ft (2,732 m) asl at the peak. Salinas Road has multiple switchbacks and will require widening in some portions for materials to reach the peak. This roadwork is beyond the scope of this EA and would require further evaluation outside this analysis.

Soil Erodibility

Soil erosion from wind, water, and road use is a concern due to its impacts on the surrounding plant communities and the resulting cost of road maintenance. The Natural Resources Conservation Service (NRCS) uses several factors to evaluate soil erodibility (NRCS 2023):

- Surface Water Erosion The erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- Wind Erosion A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.
- Erosion Hazards Erosion hazard rating are based on soil erosion factor K, slope, and content of rock fragments from manmade linear features such as roads and trails.

A rating of "slight" indicates that little or no erosion is likely. "Moderate" indicates that some erosion is likely, that the roads or trails may require periodic maintenance. "Severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed. Table 3-8 provides a summary of the soil erodibility for the predominant soil types present on Salinas Peak.

The highest potential for erosion is at Salinas Peak within the Far soils, which are found at the higher reaches of the peak. While grouped in similar complexes, the remaining soil types at Salinas Peak are designated with severe risk for erosion or are not currently rated by NRCS.

Table 3-8 Soil Erodibility by Type

Map Unit Name	Erosion Hazard (Road, Trail)	Wind Erodibility Group	K factor, Whole Soil
Rubble land-Rock Outcrop-Far complex, 3 to 90 percent slopes	**Severe or Not Rated** Poorly suited or not rated for roads	6 or not rated	0.20 or not rated
Deama-Penagua-Rock outcrop complex, 35 to 90 percent slopes	**Severe** Poorly suited for roads	6 and 8	0.20-0.37
Deama-Rock outcrop complex, 30 to 90 percent slopes	**Severe or Not Rated** Poorly suited or not rated for roads	6 or not rated	0.32 or not rated
Desario-Cuate complex, 5 to 35 percent slopes	**Severe** Poorly suited for roads	4L and 6	0.28-0.32

Source: NRCS 2023.

3.2.1.2 Environmental Consequences

Impacts to soils would occur due to auguring of structure holes (i.e., poles, guy wires, and other support equipment); removal of vegetation; grading of access roads; temporary soil piling; compaction or rutting from heavy equipment; spreading of excess soils around the base of the structure; preparation of temporary work areas; burying guy wires; or potential contamination from wood-pole preservative or accidental fluid spills from equipment and containers. Ground that has been cleared of vegetation could be susceptible to erosion and establishment of invasive plants. Ground compaction could degrade the soil structure and reduce soil productivity and the soil's ability to absorb water.

The No-Action Alternative

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no new soil erosion effects associated with this alternative.

Alternative 1 – Eastern (Existing) Route

The distribution system alignment with a 100-ft (30.5-m) buffer would represent roughly 30.3 acres of temporary land disturbance. Coupled with the 0.46 acres (0.19 hectares) of temporary work areas, the total temporary land disturbance associated with Alternative 1 would be 30.8 acres. Impacts on soils due to tree removal would include soil erosion and dust generation. The number of trees removed would be kept to a minimum through strategic placement of poles and other equipment. In combination with mitigation measures listed below, these impacts would be low.

Permanent land disturbance would include the installation of poles and guy wires, for an approximate total of 2.57 acres. The existing structure holes would be reused where possible for the new structures, minimizing potential soil disturbance. Additional soil removed by an auger would be used as overburden at the base of the poles and spread to slope grade and cast aside downhill.

The wood pole structures treated with a wood preservative, pentachlorophenol (PCP), commonly used for treatment of utility poles. PCP contains chlorinated dibenzodioxins and chlorinated dibenzofurans that have the potential to leach into adjacent soils or water (such as in a wetland). PCP can move through the pole and leach from the bottom of the pole into the soil near the underground portion of the pole (EPA 2008). PCP tends to move through the pole rapidly for the first few years of use, and then becomes relatively constant with time (EPA 2008). PCP tends to degrade rapidly in the environment, and concentrations decrease rapidly with distance by as much as two orders of magnitude between 3 inches (in) to 8 in (7.6 to 20.3 cm) from the wood pole, but that migration is dependent on localized factors such as soil type, soil chemistry, local weather and topography, initial level of pole treatment, and age of pole (EPRI 1995). Steel pole structures, which would be used outside the Salinas Base Camp area, do not contain PCP and therefore present no contamination risk. Wood poles removed from service would be stored in temporary working areas before being transported offsite for characterization and final deposition.

Through implementation of BMPs provided in Section 3.2.1.3, Alternative 1 would have less than significant impacts on soils and soil erosion effects.

Alternative 2 – Western Route

Under Alternative 2, construction of new temporary work areas would result in roughly ½ acre of land disturbance, and the entire distribution corridor would account for approximately 24.2 acres of temporary land disturbance, for a total of 24.7 acres. Impacts on soils due to tree removal would include soil erosion and dust generation. In combination with mitigation measures listed below, these impacts would be low.

Permanent land disturbance would include construction of new service roads accounting for 1.18 acres of disturbance and 2.59 acres for the installation of poles and guy wires, for an approximate total of 3.77 acres of land disturbance. The existing structure holes would be reused where possible for the new structures, minimizing potential soil disturbance. Soil removed by an auger would be used as overburden at the base of the poles and spread evenly around the structure sites.

New construction and reconstruction of service roads would increase the risk of erosion; however, erosion control measures would be implemented to reduce impacts so there would be a low risk of erosion on slopes less than 30% and a low-to-moderate risk of erosion on slopes greater than 30%.

Wood poles removed from service would be stored in temporary working areas before being transported offsite for characterization and final deposition.

3.2.1.3 Best Management Practices

- Place new structures (e.g., poles and guy wire anchors) in existing structure holes to the maximum extent practicable to reduce ground disturbance;
- The number of trees removed would be kept at a minimum through strategic placement of poles and other equipment;
- Conduct project construction, including tree removal, during the dry season when rainfall and runoff are low to minimize erosion, compaction, and sedimentation, to the extent practical;
- Include water control structures on newly constructed and improved service roads using low grades, water bars, and drain dips to help control runoff and prevent erosion;
- Apply water from water trucks on an as-needed basis to minimize dust and reduce erosion due to wind;
- Wood poles removed from service would be stored in temporary working areas before being transported offsite for characterization and final deposition;
- Revegetate disturbed areas to help stabilize soils as soon as work in that area is completed and appropriate environmental conditions exist, such as moderate temperatures and adequate soil moisture;
- The seed mixes used for revegetation would be reviewed and approved by the Environmental Division;
- Inspect revegetated areas to verify adequate growth and implement contingency measures as needed; and
- Inspect and maintain service roads and cross-drains to ensure proper function and nominal erosion levels after construction.

3.2.2 Biological Resources

Native or naturalized vegetation, wildlife, and their associated habitats are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites were reviewed, with particular emphasis on the presence of any species listed as threatened or endangered by federal or state agencies to assess their sensitivity to the effects of the Proposed Action. For this EA, biological resources are divided into three areas: vegetation communities, wildlife communities, and protected species. Species with protective status are protected based on regulations such as those listed below:

- Threatened or endangered under the federal Endangered Species Act of 1973 ([ESA], 16 USC § 1531 et seq.) by the USFWS;
- Threatened or endangered wildlife species under the New Mexico Wildlife Conservation Act (17-2-40.1 New Mexico Statutes Annotated [1978]) by the New Mexico Department of Game and Fish (NMDGF);
- Rare and endangered plants species by the New Mexico State Forestry Division’s Endangered Plant Program;
- Protected species under the MBTA (16 USC §§ 703-712 [2004]); and

- Bald and golden eagles, as protected under the Bald and Golden Eagle Protection Act (16 USC § 668 [1972]).

3.2.2.1 Affected Environment

A field survey of the preferred alternative alignment, the proposed western distribution corridor associated with Alternative 2, was conducted in October 2022. The purpose of the survey was to evaluate the potential impacts from project activities on threatened and endangered species, wetlands and waterways, migratory birds, noxious weeds, and other sensitive biological features. A biological assessment document provides the findings of the survey, which are discussed in the sections below and is provided as Appendix D to this EA (Epsilon 2023).

<u>Vegetative Communities</u>

The vegetation of WSMR is widely diverse, ranging from basin floors dominated by desert shrublands to mountaintops dominated by ponderosa pine forests. Muldavin et al. (2000) developed a model for describing the vegetation communities for the range, called vegetation map units. Salinas Peak lies within the Salinas Peak Eco-Area Landscape unit, predominantly Pinyon Pine Woodland map unit, all as defined by Muldavin et al. (2000). A description of the map unit is provided below.

A survey of the western distribution alignment was conducted in October 2022. The survey found that the proposed western alignment had been used for a previous distribution system. Nearly the entirety of the alignment is followed by an abandoned service road, and remnants of poles were observed (cut off near ground level and abandoned). Table 3-9 summarizes the plant species observed in the October 2022 survey of the western distribution corridor.

The eastern alignment has been used for over 60 years, and its biological communities have been disturbed during this period. As such, the eastern alignment was not surveyed in support of this EA.

Pinyon Pine Woodland

This Rocky Mountain/Great Basin Woodland unit is characterized by pinyon pine types that dominate the higher elevations of the mountainous areas, including the Chalk Hills, Chupadera Mesa, and the San Andres, San Augustine, Big Gyp, and Oscura Mountains. The Pinyon Pine/Scribner's Needlegrass *(Achnatherum scribneri)* and Pinyon Pine/Wavyleaf Oak *(Quercus undulata)* Plant Associations (PA) typically occur on platform summits or relatively gentle dipping slopes. In contrast, the steep escarpment and canyon side slopes commonly support Pinyon Pine/Gambel's Oak *(Quercus gambelii)* (north-facing) and Pinyon Pine/New Mexico Muhly *(Muhlenbergia cuspidate)* (south-facing). The Pinyon Pine/Mountain Mahogany *(Cercocarpus breviflorus),* is also important, particularly on sites that have been burned (Muldavin et al. 2000).

These woodlands are most extensive to the north, where they form dense, uniform stands on Chupadera Mesa and in the Oscura Mountains. To the south, in the San Andres Mountains, the woodlands become less abundant, more fragmented, and increasingly intermixed with Montane Scrub. At lower elevations, pinyon pine decreases, and juniper woodlands become more prevalent (Muldavin et al. 2000).

The project area also hosts small plots of Ponderosa Pine Forest and Montane Scrub, as described in Muldavin, et al. (2000). Full text description of these map units can be found in the WSMR INCRMP (WSMR 2015).

Table 3-9 Flora Observed in October 2022 Survey

Common Name	Scientific Name	Abundance
Jimson weed	*Datura stramonium*	Common
Rubber rabbit bush	*Ericameria nauseosa*	Rare
Texas sotol	*Dasylirion texanum*	Common
One-seed juniper	*Juniperus monosperma*	Common
Ponderosa pine	*Pinus ponderosa*	Common
Desert prickly pear	*Opuntia phaeacantha*	Common
Desert mountain mahogany	*Cercocarpus breviflorus*	Abundant
Soaptree yucca	*Yucca elata*	Rare
Black grama	*Bouteloua eriopoda*	Common
Sideoats grama	*Bouteloua curtipendula*	Common
Blue grama	*Bouteloua gracilis*	Common
Indian paintbrush	*Castilleja* spp.	Rare
Alligator juniper	*Juniperus deppeana*	Common
Gambel oak	*Quercus gambelii*	Common in patches
Desert scrub oak	*Quercus turbinella*	Common in patches
Tree cholla	*Cylindropuntia cactaeae*	Rare
Desert muhly	*Muhlenbergia glauca*	Common
Banana yucca	*Yucca baccata*	Rare
Fourwing saltbush	*Atriplex canecens*	Common
New Mexico thistle	*Cirsium neomexicanum*	Common
New Mexico rubber plant	*Partenium incanum*	Common
Kingcup cactus	*Echinocereus triglochidiatus*	Rare
Desert bitterbush	*Purshia tridentata*	Rare
Russian thistle	*Salsola tragus*	Common
Arizona fescue	*Festuca arizonica*	Common
Little bluestem	*Schizachryium scoparium*	Common
Prairie sagewort	*Artemisia frigida*	Rare
Pinyon pine	*Pinus edulis*	Common
Hairy-seed bahia	*Bahia absinthifolia*	Rare
Creosotebush	*Larrea tridentata*	Common
Skeleton-leaf goldeneye	*Viguiera stenoloba*	Rare
Englemann’s hedgehog cactus	*Echinocereus engelmannii*	Rare
Cows tongue cactus	*Opuntia engelmannii*	Very rare
Graham’s nipple cactus	*Mammillaria grahamii*	Very rare
Ladyfinger cactus	*Echinocereus pentalophus*	Rare
Parry’s agave	*Agave parryi*	Rare
Various grasses, forbs, shrubs		Common

<u>Noxious Weeds</u>

The Noxious Weed Management Act directs the New Mexico Department of Agriculture (NMDA) to develop a noxious weed list for the state, identify methods of control for designated species, and educate the public about noxious weeds. NMDA coordinates weed management among local, state, and federal land managers, as well as private landowners (NMDA 2020). The Environmental Division has developed an Integrated Pest Management Plan for the range. This plan outlines the resources necessary to identify, survey, manage, and the environmental and personnel requirements to control pest (Rodden 2021).

No noxious weeds were discovered during the pedestrian survey of the proposed project area.

Wildlife Communities

The proposed project areas include habitats ranging from lowland desert scrub to high elevation woodlands. Complete lists of wildlife species present on WSMR can be found in the 2009 FEIS and 2015 INCRMP (WSMR, 2010; WSMR 2015). Table 3-10 provides a list of the wildlife species observed in the 2022 survey of the western distribution alignment.

Table 3-10 Fauna Observed in 2022 Survey

Common Name	Scientific Name	Abundance
Jay	*Corividae* spp.	Rare
Common raven	*Corvus corax*	Common
Mule deer	*Odocoileus hemionus*	Rare
Wren	*Troglodytidae* spp.	Rare
Brown harvester ants	*Pogonomyrmex* spp.	Rare
Desert cottontail	*Sylvilagus audubonii*	Rare
Sparrow	*Passeridae* spp.	Rare
American crow	*Corvus brachyrhynchos*	Common
Unidentified land snail (shell)		Very rare
Pack rat middens		Common
Elk scat	*Cervus*	Common
Rabbit scat	*Lepus* or *Sylvilagus*	Common
Mole/vole burrows		Rare
Mountain lion scat	*Puma concolor*	Very rare
Cicada casing		Rare
Oryx tracks	*Oryx gazella*	Rare

Mammals

The forest, woodland, and scrub habitats are highly associated with several carnivores including the gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), and to a great extent mountain lion (*Puma concolor*; Logan et al. 1996). A survey in the San Andres and Oscura Mountains in 2009 reported nine black bears, and a survey in 2012 yielded 22 different bear individuals. Other mammals documented during the 2012 survey were gray fox, rock squirrel *(Otospermophilus variegatus)*, cougar, mule deer *(Odocoileus hemionus)*, ringtail *(Bassariscus astutus)*, javalina *(Pecari tajacu)*, coyote *(Canis latrans)*, and bobcat *(Lync rufus)* (ECO Inc. 2012). The grizzly bear *(Ursus actos horribilis)* and Mexican gray wolf *(Canis lupus baileyi)* are noted to be extirpated from these habitats. Importantly, the Mexican gray wolf has been reintroduced across the southwest, and a male and female pair have been noted on WSMR near the Stallion Ranch area. These individuals were probably transients, but they do demonstrate that the species does have the potential to occur on WSMR.

On WSMR aoudad (barbary sheep [*Ammotragus lervia*]) are observed primarily in precipitous mountainous regions. There are frequent annual sightings in the San Andres and Oscura mountains on WSMR. WSMR maintains a year-round kill permit for Aoudad due to the potential threat the species poses to bighorn sheep.

The montane shrew (*Sorex monticolus*), southwest bat (*Myotis auriculus*), long-eared bat (*Myotis evotis*), eastern cottontail (*Sylvilagus floridanus*), and feral goat are further species associated with only possible occurrences on WSMR (WSMR 2015).

Birds

Habitats within WSMR support approximately 290 documented avian species (WSMR 2013). WSMR has resident populations of raptors, game birds, and songbirds. Raptor species common on WSMR include red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), and Swainson's hawk (*Buteo swainsoni*). Game birds found on WSMR include Gambel's quail (*Callipepla gambellii*), scaled quail

(*Callipepla squamata*), white-winged dove (*Zenaida asiatica*), and mourning dove (*Zenaida macroura*). Songbirds common to WSMR include black-throated sparrow (*Amphispiza bilneata*), pyrrhuloxia (*Cardinalis sinuatus*), and horned larks (*Eremophila alpestris*) (WSMR 2010).

<u>Amphibians and Reptiles</u>

WSMR contains habitats that support diverse herpetofauna: seven species of amphibians and 47 species of reptiles, representing three orders and 12 families, have been documented. There are six toad species (three spadefoot toads and three true toads), one salamander species, one turtle species, 27 snake species, and 19 lizard species (WSMR 2015). Five rattlesnake species occur on WSMR, and 11 other snakes occurring on WSMR are either non-venomous or mildly venomous and are not dangerous to humans (WSMR 2010).

<u>Fishes</u>

There are no known fish collections from or reports of such species from aquatic habitats in the San Andres or Oscura mountains. The only native fish species at WSMR is the White Sands pupfish (*Cyprinodon tularosa*), which is endemic to the Tularosa Basin, natively occurring at Salt Creek and Malpais Spring and introduced to Mound Spring within WSMR and Lost River on Holloman Air Force Base. This small fish is considered a species at risk by the Army and is under evaluation for listing by the USFWS. Itoccupies a variety of microhabitats, ranging from deep spring ponds to shallow pools and calm spring runs varying in salinity (WSMR 2010).

Nonnative fish species introduced to WSMR include largemouth bass (*Micropterus salmoides*), mosquitofish (*Gambusia affinis*), goldfish (*Carassius auratus*), and sunfish (*Lepomis* spp.), which have been introduced into springs and ponds and can pose a threat to native White Sands pupfish populations (WSMR 2010).

<u>Invertebrates</u>

Invertebrate fauna of WSMR plays a major role in the processes of pollination, soil aeration, decomposition, and seed dispersal. Invertebrates are also an important source of nutrition for many vertebrate species. A complete inventory of invertebrate species for WSMR has not yet been documented (WSMR 2015), but common orders of insects found on WSMR include Coleoptera (beetles), Hemiptera (true bugs), Hymenoptera (ants, bees, and wasps), Lepidoptera (butterflies and moths), and Diptera (flies). Other common arthropod orders include Scholopendromorpha (bark centipedes), Thelyphonida (vinegaroons), Scorpiones (scorpions), and Araneae (spiders).

One species of aquatic snail, the Tularosa springsnail (*Juturnia tularosae*), is endemic to WSMR, occurring within soft-sediment areas of Salt Creek. This species also is presumed to act as an intermediate host to a trematode that parasitizes the White Sands pupfish (*Cyprinodon tularosa*). This species overlaps with pupfish habitat; however, it has a more restricted range than the pupfish occurring in locations of Salt Creek with moderate to lower salinity levels (WSMR 2010). The current known locations of the Tularosa springsnail are outside the proposed project and action areas.

3.2.2.2 Environmental Consequences

<u>The No-Action Alternative</u>

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no impacts on vegetation and wildlife communities.

Alternative 1 – Eastern (Existing) Route

Direct and temporary effects on vegetation are expected as a result of implementing Alternative 1. Potential effects on vegetation from the proposed project are expected to be minimal and short-term because of the previously disturbed nature of the project area.

Smaller, less-mobile soil-dwelling animals and insects could be lost due to installation activities. Impacts would include permanent loss of habitat due to installation of distribution system equipment and direct loss of an undefined number of small burrowing animals and insects during construction activities.

No direct losses of large mammals or birds are expected as a result of this project. Removal of marginal foraging habitat for wildlife species, coupled with wildlife avoidance of the project area during construction would yield negligible impacts. Indirect effects to wildlife from the proposed project include the temporary loss of available habitat, the majority of which falls within previously disturbed areas. Through the implementation of BMPs and mitigation measures provided in Section 3.2.6, Alternative 1 would not likely adversely affect vegetation and wildlife populations.

Alternative 2 – Western Route

Direct and temporary effects on vegetation are expected as a result of implementing Alternative 2. Potential effects on vegetation from the proposed project are expected to be minimal and short-term because of the previously disturbed nature of the project area. However, it should be noted that Alternative 2 involves installation of service road, creating approximately 1.2 acres of greater permanent land disturbance than compared to Alternative 1.

Smaller, less-mobile soil-dwelling animals and insects could be lost due to installation activities. Impacts would include permanent loss of habitat due to installation of distribution system equipment and the direct loss of an undefined number of small burrowing animals and insects during construction activities.

No direct losses of large mammals or birds are expected as a result of this project. Removal of marginal foraging habitat for wildlife species, coupled with wildlife avoidance of the project area during construction would yield negligible impacts. Indirect effects to wildlife from the proposed project include the temporary loss of available habitat, the majority of which falls within previously disturbed areas. Through the implementation of BMPs and mitigation measures provided in Section 3.2.6, Alternative 2 would not likely adversely affect vegetation and wildlife populations.

3.2.3 Threatened and Endangered and At-Risk Species

The ESA mandates that all federal agencies consider the potential effects of their actions on species listed as federally threatened or endangered. Section 7 of the ESA requires federal agencies that fund, authorize, or carry out an action to ensure that their action is not likely to jeopardize the continued existence of any federally listed threatened or endangered species (including plant species) or result in the destruction or adverse modification of designated critical habitats. The lead federal agencies for implementing the ESA are the USFWS and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The USFWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

The ESA requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited.

For the purposes of this EA, it is assumed that a "species at risk" is plant and animal species that are not yet federally listed as threatened or endangered under the ESA, but that are either designated as candidates for listing or are regarded by the Army as critically imperiled or imperiled throughout their range.

3.2.3.1 Affected Environment

Table 3-11 lists federal and state threatened or endangered listed wildlife and plants that occur or have the potential to occur within WSMR and the vicinity of the proposed distribution corridor. The potential occurrence was determined based on past documentation of each species and suitability of habitat within the Proposed Action areas. There is one critical habitat on WSMR, but it is outside of the proposed project area (USFWS 2022).

In addition to the federally and state threatened or endangered plant species, there are 13 federal and state species of concerns and one state species of concern without federal listing. There are four federal or state bird species of concern that have the potential to occur at WSMR. There are 10 mammal species of concern that have the potential to occur at WSMR, with eight of these being bat species. Descriptions of these species can be found in the WSMR INCRMP (WSMR 2015). No threatened or endangered plant or wildlife species were observed during the pedestrian survey.

Table 3-11 Protected Species Potentially Occurring at WSMR and the Proposed Action Area

Species	Federal	State	Base Presence	Potential to Occur on Project Sites
Todsen's pennyroyal, *Hedeoma Todsenii*	E	E	Gypseous-limestone soils on north-facing slopes of the San Andres Mountains.	No
Night-blooming cereus, *Peniocereus greggii* var. *greggi*	SOC	E	San Andres Mountains	No
Organ Mountains pincushion cactus, *Escobaria organensis*	SOC	E	Organ Mountains	No
Mescalero milkwort, *Polygala rimulicola*	SOC	E	San Andres Mountains	No
White Sands pupfish *Cyprinodon Tularosa*	Under review	T	Creeks and within the Tularosa Basin	No
Least tern (interior population) *Sterna antillarum*	E	E	Transient	No
Northern aplomado falcon *Falco femoralis septentrionalis*	E	E	Chihuahuan desert grasslands containing scattered tall yuccas and mesquite, Stallion Ranch	No
Southwestern willow flycatcher *Empidonax trailii extimus*	E	E	One individual observed; potentially on migration	No
Bald eagle *Haliaeetus leucocephalus*	--	T	Rarely observed in winter	Yes
Mexican spotted owl *Strix occidentalis lucida*	T	SGCN	Species or critical habitat not on WSMR	No
American peregrine falcon *Falco peregrinus anatum*	SOC	T	Suspected breeding in Oscura and San Andres mountains	Yes
Baird's sparrow *Ammadramus bairdii*	SOC	T	Grasslands, Jornada Plain	No
Bell's vireo *Vireo bellii*	SOC	T	Early successional riparian thickets, San	No

Species	Federal	State	Base Presence	Potential to Occur on Project Sites
			Andres Mountains (<5,000 ft)	
Yellow-billed cuckoo *Coccyzus americanus*	T	SGCN	Limited riparian woodland	No
Brown pelican *Pelecanus occidentalis*	--	E	Migration/stopover only	No
Neotropic cormorant *Phalacrocorax brasilianus*	--	T	Migration/stopover only	No
Broad-billed hummingbird *Cyanthus latirostris*	--	T	Higher desert canyons and washes, riparian and foothill woodlands	No
Costa's hummingbird *Calypte costae bourcier*	--	T	Shrublands within dry washes and canyons	No
Gray vireo *Vireo vicinior*	Species at risk	T	Juniper and foothill woodlands	Yes
Varied bunting *Passerina versicolor*	--	T	Dense thorny scrub in canyons, San Andres Mountains	No
Pinyon jay *Gymnorhinus cyanocephalus*	Species at Risk	SGCN	Pinyon-juniper woodlands	Yes
Oscura Mountains Colorado chipmunk *Neotamias quadrivittatus oscuraensis*	Species at risk	T	Oscura Mountains pinyon-juniper associations	No
Organ Mountains Colorado chipmunk *Neotamias quadrivittatus australis*	SOC	T	Texas Canyon, Organ Mountains	No
Spotted bat *Euderma maculatum*	--	T	Chihuahuan Desert to tree line; Mound Springs	No

E = endangered, T = threatened, C = candidate, Expn = Experimental, SOC = species of concern, SGCN = species of greatest conservation need, -- = no listing. Sources = WSMR 2015, NMDGF 2022, USFWS 2022.

As noted in the table, there are three Army Species at Risk potentially occurring within the project area: the gray vireo, pinyon jay, and Oscura Mountains Colorado chipmunk. The chipmunk is found in the Oscura Mountains and is not anticipated to be encountered during project activities. As such, it is not discussed further in the impacts analysis below.

3.2.3.2 Environmental Consequences

<u>No-Action Alternative</u>

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no adverse impacts on threatened and endangered species communities or species at risk.

<u>Alternative 1 – Eastern (Existing) Route</u>

There are no known populations of federally or state-listed threatened or endangered species or critical habitats present within the proposed project area; however, there is potential for the American peregrine falcon and bald eagle to occur seasonally, as transients, or as foraging individuals. The only species known to occur near the Salinas Peak project area is the golden eagle.

The American peregrine falcon may occur downslope of the Salinas Peak site. Peregrine falcons prefer wooded and forested cliffs with large gulfs. They hunt over a wide variety of habitats that include a very open, featureless habitat, so long as there is ample prey. The proposed construction is outside known nest or breeding areas and therefore is not anticipated to have any direct impact. The known habitat association at WSMR is near Stallion Ranch and is outside this project's proposed footprint.

Salinas Peak does fall within the potential habitat for the White Sands pupfish (a state-listed threatened species) in the Oscura Watershed. While falling within the potential habitat, the proposed project location on Salinas Peak does not have any available water resources for the White Sands pupfish to reside. However, there is a potential for impact from water runoff during the construction process as Salinas Peak does fall within a watershed that connects to Salt Creek. Development and implementation of a stormwater pollution prevention plan (SWPPP) will minimize runoff impacts and potential impacts to the pupfish.

Two state-listed bird and Army Species at Risk have the potential to occur within the proposed project corridor: the pinyon jay and gray vireo. Habitat associations within the proposed project meet the qualifications for both of these species, and both have the potential to occur in the project area. WSMR has developed specific measures for the avoidance and minimization for the gray vireo and pinyon jay, which are provided in Section 3.2.6. Through implementation of these BMPs and mitigation measures, no adverse impacts to threatened and endangered species and their habitat are anticipated.

Alternative 2 – Western Route

Alternative 2 would include construction activities at Salinas Peak, as provided in Section 2.2.5. Construction would abandon most of the existing eastern alignment.

The potential impacts and effects on vegetation, wildlife, threatened and endangered species, migratory birds, and golden and bald eagles would be similar as those detailed in Alternative 1 relative to the Salinas Peak location. No direct or indirect effects are anticipated to critical habitat as none exists within the proposed project corridor.

As such, the same BMPs and mitigation measures would be applied (Section 3.2.6), with no anticipated adverse impact to threatened or endangered species.

3.2.4 Migratory Birds

The MBTA protects migratory birds and prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except with a federal permit (16 USC 703 [2009]; 50 CFR 21 [1974]; 50 CFR 10 [1973]). Under the MBTA, "take" is defined as "to pursue, hunt, shoot, shoot at, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." Most actions that result in taking or the permanent or temporary possession of a protected species or nests containing eggs or young constitute violations of the MBTA, and the MBTA has no specific provision for authorizing incidental take.

Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs federal departments and agencies to take certain actions to further implement the MBTA. Federal agencies must ensure that EAs of federal actions required by NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on bird species of concern. In addition, federal agencies must minimize the intentional take of species of concern by (i) delineating standards and procedures for such take; and (ii) developing procedures for the review and evaluation of take actions. This Executive Order specifies the need to avoid or minimize adverse impacts on migratory birds and bird habitat when conducting agency actions, as well as the need to restore and enhance the habitat of migratory birds. To streamline the review and evaluation process, a Memorandum of Understanding was signed between the U.S. Department of Defense and the USFWS in June 2006.

Protocols and procedures for the protection of migratory birds on WSMR are discussed in the WSMR INCRMP (WSMR 2015). The project areas associated with the Proposed Action cover a wide range of vegetative communities and habitat associations. As such, a variety of birds protected by the MBTA are expected to occur within these sites.

3.2.4.1 Affected Environment

WSMR hosts a large number of resident and transient birds, including a variety of raptors, game birds, and songbirds. Of the total bird species known to the State of New Mexico, approximately 60 percent have been reliably documented at WSMR (WSMR 2015). There are many resident populations located on WSMR. Of the 290 documented species, 17 orders and 55 families have been reported. The greatest numbers of bird species occur during the spring and fall. There are 158 resident species that are documented during the summer, winter, or year-round. The European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock pigeon (*Columbia livia*) are the only three exotic species documented on WSMR (WSMR 2010).

3.2.4.2 Environmental Consequences

The No-Action Alternative

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no adverse impacts on migratory birds.

Alternative 1 – Eastern (Existing) Route

Environmental consequences for migratory birds at the construction site would be direct if work occurs during the nesting season and nesting birds are present. Direct effects include possible noise and visual disturbance to adjacent nesting birds and potential harm to nesting birds and their young that might occur in proposed project construction areas that require removal of vegetation.

It is recommended that construction activities be conducted outside of the migratory bird nesting season which is typically between mid-March through the end of August for most species, but variations occur based on bird species and climate conditions.

Surveys for nesting migratory birds would take place seven days before construction activities. The surveys would be conducted by a qualified biologist and use methods accepted by Environmental Division (e.g., point transects or time-area counts). If occupied bird nests are found during surveys, avoidance mitigation would be employed to either move distribution system locations or delay construction until the nestlings have fledged. The Environmental Division would be consulted to determine how to best address the situation. The Environmental Division would consult with the USFWS, if needed, to avoid MBTA violations. Through the implementation of these measures, the Proposed Action would not adversely affect migratory bird populations.

Alternative 2 – Western Route

Alternative 2 could result in direct impacts to migratory birds if work occurs during the nesting season and nesting birds are present. It is recommended that construction activities be conducted outside of the migratory bird nesting season, if possible.

Surveys for nesting migratory birds would take place seven days before construction activities. The surveys would be conducted by a qualified biologist and use methods accepted by WSMR (e.g., point transects or time-area counts). If occupied bird nests are found during surveys, avoidance mitigation would be employed to either move distribution system locations or delay construction until the nestlings have fledged. WSMR would be consulted to determine how to best address the situation. WSMR would consult with the USFWS, if needed, to avoid MBTA violations. Through the implementation of these measures, the Proposed Action would not adversely affect migratory bird populations.

3.2.5 Raptors

The Bald and Golden Eagle Protection Act makes it illegal to import, export, take (which includes molest or disturb), sell, purchase, or barter any bald eagle or golden eagle or parts thereof. Under the Eagle Act (72 Federal Register [FR] 31132, June 5, 2007), "take" is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb." "Disturb" is defined as "to agitate or bother a bald or golden eagle to the degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (72 FR 31132, June 5, 2007).

3.2.5.1 Affected Environment

Raptor species common on WSMR and likely to hunt over the Salinas Peak area include red-tailed hawk, Swainson's hawk, northern harrier, and prairie falcon (*Falco mexicanus*). Proximity to rocky outcrops and cliffs of the San Andres and Oscura mountains, there is potential for raptors and other resident birds to nest nearby, including red-tailed hawks, prairie falcons, golden eagles, ravens (mostly Chihuahuan raven [*Corvus cryptoleucus*] with some common raven), and turkey vultures (*Cathartes aura*). All these species are protected under the MBTA.

There are 24 documented golden eagle nesting sites on the eastern slopes of Salinas Peak. The nesting locations were observed and plotted using latitude and longitude coordinates into ArcGIS. Management guidelines for the golden eagle from the USFWS recommend a minimum buffer for construction activities of 660 ft (200 m) if the construction is visible from the nest. Buffers were places on each of the nesting locations, and it was determined that the closest nesting location is a minimum of 0.5 mile (800 m) from the Salinas Peak proposed construction location.

Golden eagles are the largest bird of prey in North America and use a wide variety of habitats for foraging and breeding. Golden eagles may either be permanent residents or migrants throughout New Mexico. They often nest on cliffs in this area. Nests are built out of sticks shaped to create a flat or bowl-shaped platform. A breeding pair can lay two to four eggs a year.

The Peregrine Fund (TPF) conducts annual occupancy surveys, including every breeding territory on WSMR. Surveys between 2013 and 2014 documented 32 territories on WSMR lands (WSMR 2015). Golden Eagles are protected under several federal statutes, which include the Eagle Act, the MBTA, Executive Order 13186 - Responsibilities of Federal Agencies to Protect Migratory Birds, and Tribal Trust Coordination.

3.2.5.2 Environmental Consequences

<u>The No-Action Alternative</u>

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no adverse impacts on golden eagles or other raptor species.

<u>Alternative 1 – Eastern (Existing) Route</u>

It is possible for an eagle to be injured or killed by electrocution while roosting or flying near the distribution corridor. However, the nearest known golden eagle nest is over 0.5 mile away (800 m) and golden eagles will tend to avoid the area while construction crews are working. The following avoidance/minimization measures would be implemented to prevent take of eagles or eagle nests:

- Eagle biologists (via the Environmental Division) will monitor the eagle nests at or adjacent to each impact to determine which nests are active during a given breeding season.
- The Environmental Division will participate in pre-construction government to contractor meetings to point out physiographic limits for human activities.
- Human and vehicle activity will remain outside of the 0.5-miles (800-m) buffer area for any active eagle nest throughout the nesting season of mid-January through July; and
- Suspension insulators would be used to increase the space between phased conductors to a distance greater than 60 in (150 cm).

Through implementation of these measures, no adverse impacts to raptors are anticipated.

<u>Alternative 2 – Western Route</u>

Alternative 2 would include construction activities at Salinas Peak, as provided in Section 2.2.5. Construction would abandon most of the existing eastern alignment.

The potential impacts and effects on vegetation, wildlife, threatened and endangered species, migratory birds, and golden and bald eagles would be similar as those detailed in Alternative 1 relative to the Salinas Peak location.

As such, the same BMPs and mitigation measures would be applied (Section 3.2.6), with no anticipated adverse impact to raptors.

3.2.6 Best Management Practices and Mitigation Measures – Biological Resources

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all BMPs and mitigation measures are implemented. The following BMPs and mitigation measures would be applied to minimize impacts to biological resources:

BMPs:

- When vegetation removal or modification must be conducted during bird nesting season, surveys would be conducted by qualified biologists and coordinated with the Environmental Division;
- Avoid removal or destruction of productive pinyon pine trees;
- To protect potential gray vireo nesting areas, retain more mature, taller junipers and attempt to remove only smaller, younger trees during vegetation removal;
- Erosion control measures will be implemented using U.S. Army Corps of Engineers approved storm water prevention standards;
- All openings inside and out of buildings and structures that allow wildlife (e.g., rodents, birds, snakes, etc.) entry would be blocked;
- Trash and uneaten food would be removed from project areas and stored in secure receptacles to prevent attracting wildlife;
- All piping, conduits, and associated equipment would be protected to prevent rodents and other small mammals from entering or destroying vinyl coated wires;
- Construction personnel will not harass, collect, possess, harm, disturb, or destroy wildlife or their parts to include but not limited to snakes, bats, birds, nests, eggs, or nestlings;
- Report to Environmental Division any injured or dead birds or active nests with eggs or nestlings discovered at the project sites; and
- The Environmental Division would be contacted regarding any issues regarding migratory birds, raptors, lizards, snakes, or other wildlife species of concern.

Mitigation Measures

- Surveys for migratory birds would be conducted days before construction activities during nesting season (mid-March through end of August);
- Follow the avian protection plan guidelines and guidelines for protection of eagles, pinyon jay, and gray vireo, as provided in the current Integrated Natural Resources Management Plan;
- Human and vehicle activity will remain outside a 0.5-mile (800-m) buffer area for any active eagle nest throughout the nesting season of mid-January through July;
- Human and vehicle activity will remain outside a 0.5-mile (800-m) buffer area for any identified pinyon jay nest throughout the nesting season of March through May;
- If bird nests are found during surveys, the Environmental Division would be consulted to determine actions to be taken;
- Environmental Division would consult with the USFWS regarding MBTA and ESA issues;
- Eagle biologists (via the Environmental Division) would monitor the eagle nests at or adjacent to each impact to determine which nests are active during a given breeding season; and
- Suspension insulators will be used to increase the space between phased conductors to a distance greater than 60 in (150 cm).

3.2.7 Climate Change

"Climate change" can be defined as any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. "Global warming" refers to the recent and ongoing rise in global average temperature near Earth's surface. It is caused mostly by increasing concentrations of GHG in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents only one aspect of climate change. Climate can act both as a driving force and a limiting factor for ecological, biological, and hydrological processes, and has potential to influence resource management (DOE 2016).

3.2.7.1 Affected Environment

According to the *Assessment of Climate Change in the Southwest United States*, the American Southwest is expected to experience heat waves that are both longer and hotter. Snowmelt, a major source of water for the Southwest, is occurring earlier in the year, resulting in earlier arrival of spring streamflow. This change in seasonal flow timing has led to decreases in water supply reliability to Southwest streams and rivers, lengthening wildfire season. Climate change models predict that the Southwest will experience reduction in spring seasonal snowpack (Garfin, et al 2013).

The higher temperatures and decreases in precipitation have led to increased numbers of wildfires and outbreaks of forest pests and disease. The increases in temperature can make electrical plants less efficient and can affect transformer performance. Higher temperatures coupled with lower relative humidity increase the threat of wildfire due to electrical transmission and distribution system failures (Overpeck et al. 2013).

In February 2023, a series of storms passed over the Salinas Peak area. Reported wind gusts exceeded 100 mph (161 km per hour). At least one pole along an extreme slope area failed, with the phase conductors separating from the crossarms. These storms cannot be attributed to climate change, but are discussed as an example of the potential consequences of extreme weather events that are occurring more often at Salinas Peak.

3.2.7.2 Environmental Consequences

For the purposes of this EA, climate change is considered by asking three different questions suggested by U.S. Forest Service NEPA guidance (USFS 2016).

1. ***What are the proposed project's impacts on climate change through GHG emissions and sequestration?*** The indirect effects of increasing GHG emissions attributable to climate change may include increasing precipitation and extreme weather events, decreasing water availability, and increased risk of wildfire.
2. ***How has climate change affected the proposed project?*** Will climate change influence the affected environment in such a way that will affect the purpose and need for the project?
3. ***What are the implications of climate change for the environmental effects of the proposed project?*** In addition to consideration of emissions and sequestration caused by a proposed project, it may be necessary to consider the effects of a project on a particular resource in combination with those caused by climate change. Will the proposed project and climate change combine to increased impacts on a resource? Will other reasonably foreseeable actions add further impacts creating cumulative effects (See Chapter 4)?

<u>The No-Action Alternative</u>

Project Impacts on Climate Change

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Due to the age and condition of the distribution system equipment, a failure is likely. A hot conductor may spark, causing a wildfire on Salinas Peak. Wildfire impacts at Salinas Peak could be significant and long-term.

During system failure, emergency generators would be used to provide electricity until the distribution system was repaired. Additionally, crews would use motor vehicles to access the Salinas Peak site. The use of generators and repair activities would lead to generation of GHG, potentially increasing the potential for climate change impacts. The GHG emissions would be temporary in nature.

Climate Change Impacts on the Existing Project

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort.

Without large-scale replacement, the Salinas Peak distribution system would continue to deteriorate. Anticipated climate changes may increase the rate the frequency of extreme weather events (e.g., heavy monsoon rains and high wind events), which could directly impact the distribution system. As climate change increases the chances for drought in the Southwest U.S., the chance for project-affecting wildfire increases.

Other Climate Change Implications

Under the No-Action Alternative, there would be no large-scale replacement of aging structures. Climate change would intensify and hasten the deterioration of these same structures. When taken together, the lack of equipment replacement under the No-Action Alternative with the heightened wear-and-tear on distribution system structures would result in a greater risk for system failure. Such system failure would result in the use of emergency generators until repairs are complete. The increased emissions associated with the repair efforts would increase the inventory of GHG released to the environment.

Alternative 1 – Eastern (Existing) Route

Project Impacts on Climate Change

Alternative 1 would involve replacement of the existing wood pole distribution system with a predominantly steel pole system. There would be a temporary increase in GHG emissions during these construction activities, leading to potential increase in climate change.

Installation of the new distribution system with steel poles would be more resilient and be resistant to wildfire, reducing the need for future repair efforts and extending the operational life of the distribution system. With implementation of BMPs provided in Section 3.2.7.3, the Proposed Action would have less than significant impacts on climate change.

Climate Change Impacts on the Project

Climate change has increased the severity and frequency of extreme weather events on Salinas Peak, increasing the risk of distribution system failure. Under existing conditions, the aging wooden pole distribution system is increasingly subject to failure.

Under Alternative 1, replacement of the wood pole distribution system with steel poles, in addition to the BMPs provided in Section 3.2.7.3, would minimize climate change impacts on the project.

Other Climate Change Implications

Under Alternative 1, the existing aging distribution system would be replaced by a more resilient steel pole system. The new system would be hardened against the impacts of extreme weather. As a result, it is anticipated that there would be a significant reduction in the frequency of maintenance and repair activities. As a result, there would be reduction in GHG emissions and potentially a reduction in climate change impacts.

Alternative 2 – Western Route

Project Impacts on Climate Change

Alternative 2 would involve replacement of the existing wood pole distribution system with a predominantly steel pole system. There would be a temporary increase in GHG emissions during these construction activities, leading to potential increase in climate change. As provided in Table 3-7, Alternative 2 would have higher GHG emissions than Alternative 1. However, this increase in GHG would not be significant (approximately 40 metric tons, compared to an action level of 25,000 metric tons) and would be temporary in nature.

Installation of the new distribution system with steel poles would be more resilient and be resistant to wildfire, reducing the need for future repair efforts and extending the operational life of the distribution system. With implementation of BMPs provided in Section 3.2.7.3, the Proposed Action would have less than significant impacts on climate change.

Climate Change Impacts on the Project

Climate change has increased the severity and frequency of extreme weather events on Salinas Peak, increasing the risk of distribution system failure. Under existing conditions, the aging wooden pole distribution system is increasingly subject to failure.

Under Alternative 2, replacement of the wood pole distribution system with steel poles, in addition to the BMPs provided in Section 3.2.7.3, would minimize climate change impacts on the project. Alternative 2 would provide a redundant electricity supply after the new steel pole distribution system is installed. This redundancy would be in place until the older eastern alignment is removed or experiences catastrophic failure.

Other Climate Change Implications

Under Alternative 2, the existing aging distribution system would be replaced by a more resilient steel pole system. The new system would be hardened against the impacts of extreme weather. As a result, it is anticipated that there would be a significant reduction in the frequency of maintenance and repair activities. As a result, there would be reduction in GHG emissions and potentially a reduction in climate change impacts.

3.2.7.3 Best Management Practices

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all best management practices BMPs or mitigation measures are implemented. The following BMPs would be applied to reduce impacts to natural resources:

- Upgrade transformers to forced-air or forced-oil to better adjust to high temperatures;
- Install smart grid devices to identify system faults, expediting repairs;
- Where possible, install micro-grid systems to isolate failures;
- Increase system redundancy to minimize effects of power outages; and
- Replace wood poles with more fire-resistant materials such as steel or concrete.

3.3 CULTURAL RESOURCES

3.3.1 Definition of Resource

Cultural resources include prehistoric and historic archaeological sites; as well as historic buildings, structures, objects, and districts that depict evidence of human activity considered important to any culture, subculture, or community. Cultural resources consist of archaeological resources, architectural resources, and traditional cultural properties (TCPs).

Archaeological resources consist of the material remains of prehistoric and/or historic human activity. The Archaeological Resources Protection Act of 1979 (ARPA) defines archaeological resources as “pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items” (16 USC 470bb [1988]).

Architectural resources include manmade structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the National Historic Preservation Act of 1966 (NHPA) (Public Law [PL] 89-665, as amended by PL 96-515; 16 USC 470 et seq.), only architectural resources older than 50 years are considered for protection; however, younger structures can be afforded the same protection under special circumstances (e.g., Criteria Consideration G).

TCPs may include archaeological resources, architectural resources, topographic features, plant and animal habitat, and any other inanimate object deemed essential to the continuance of a traditional culture by Native Americans and other groups.

The NHPA provides for the establishment of the National Register of Historic Places (NRHP), an official list of districts, archaeological sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Section 106 of the NHPA requires federal agencies with jurisdiction over a proposed federal project to consider the undertaking’s effect on cultural resources listed or eligible for listing in the NRHP and affords the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) opportunity to comment regarding the undertaking.

NRHP eligibility criteria have been defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60 [1981]). To be considered eligible for listing in the NRHP, cultural resources must covey the quality of significance in American history, architecture, archaeology, engineering, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the following criteria:

- Criterion A: The resources are associated with the events that have made a significant contribution to the broad patterns of American history;
- Criterion B: The resources are associated with the lives of persons significant in our past;
- Criterion C: The resources embody the distinctive characteristic of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant or distinguishable entity whose components may lack individual distinction; and
- Criterion D: The resources have yielded or may likely yield information important in prehistory or history.

3.3.2 Methodology

The process of agency review and assessment of the effect of an undertaking on cultural resources is set forth in the implementing regulations formulated by the ACHP (36 CFR 800, Protection of Historic Properties [2000]). Other applicable laws and guidelines include:

- Executive Order 11593, Protection and Enhancement of Cultural Environment (16 USC 470 [Supp. 1, 1971]);
- Native American Graves Protection and Repatriation Act (PL 101 – 601 [1990], USC 3001 – 3013);
- Determination of Eligibility for Inclusion in the NRHP (36 CFR 63 [1981]);
- Curation of Federally Owned and Federally Administered Archaeological Collections (36 CFR 79 [1990]); and
- DoD Directive 4710.1, Archeological and Historic Resources Management (1984).

Section 101(d)(6)(B) of the NHPA requires federal agencies to consult with Indian tribes that attach religious or cultural significance to historic properties. Compliance with 36 CFR 800.2 (2004), which implements consultations with Native Americans, may be conducted by federal agencies as part of a government-to-government undertaking.

In accordance with Section 101(b)(3) of the Act, SHPOs advise and assist federal agencies in carrying out their Section 106 responsibilities and assist agencies, organizations, and individuals to ensure that historic properties are taken into consideration at all levels of planning and development. In New Mexico, the SHPO is the director of the New Mexico Historic Preservation Division (HPD) of the Department of Cultural Affairs. Consultation between WSMR and SHPO is an ongoing process regarding actions performed at WSMR, and SHPO will be consulted whenever a new ground disturbance is planned in support of the Proposed Action.

The definition of effect is contained within 36 CFR Part 800 (2000): "Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." As per this regulation, an adverse effect occurs:

> "…when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling,

or association…. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative."

Examples of adverse effects may include, but are not limited to, the following:

I. Physical destruction of or damage to all or part of the property;
II. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68 [1995]) and applicable guidelines;
III. Removal of property from its historic location;
IV. Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;
V. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
VI. Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
VII. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure the long-term preservation of the property's historic significance.

Effects can be direct, indirect, and cumulative. Direct effects include physical destruction or damage. Indirect effects include the introduction of visual, auditory, or vibration impacts as well as neglect to a historic property. Cumulative effects are the impacts of a project taken into account with known past or present projects as well as foreseeable future projects.

An intensive (100%) pedestrian survey of the project Area of Potential Effects (APE) was conducted by Epsilon Systems Solutions, Inc. staff on October 22, 2022. Subsequent site recordation was conducted on October 23 and November 1, 2022. The survey was performed under New Mexico Archaeological Survey Permit Number (No.) NM-24-266-S. The Archaeological Records Management Section (ARMS) designated the survey as New Mexico Cultural Resources Information System (NMCRIS) Activity No. 151810 (WSMR Project No. 1152). A cultural resources inventory report was developed based on the surveys, which has been approved and accepted by the Environmental Division Cultural Resources Manager (CRM).

3.3.2.1 Affected Environment

<u>Alternative 1 – Eastern (Existing) Alignment</u>

The existing eastern alignment follows the existing distribution line from the Salinas Base Camp up to the facilities on Salinas Peak, as described in Section 1.1.2. The area is disturbed along its entirety, with much of the area previously surveyed and investigated. No surveys of the eastern alignment have been conducted in support of this EA.

Current listings of the NRHP and the New Mexico State Register of Cultural Properties were also consulted to determine the presence of any cultural resources, historic properties, or historic districts within 0.31 miles (500 m) of the western alignment center line. The results of the records search indicated that one previous cultural resource survey was conducted within 0.31 miles (500 m) of the current inventory area. The records search also identified one previously recorded historic archaeological site, Laboratory of Anthropology (LA) No. 116568, within the project APE. LA 116568, consists of the archaeological remnants of Salinas Base Camp (Historic Cultural Property Inventory No. 32914), which was mostly demolished in 2010. To date, the resources within the site have undetermined eligibility for the NRHP. As such, the site will need to be surveyed for eligibility.

Should Alternative 1 be selected as the preferred alternative, surveys will be conducted prior to any ground-disturbing activity, including road improvement or maintenance. Consultation with SHPO will be conducted following these surveys.

Alternative 2 – Western Alignment

An intensive (100%) pedestrian survey of the APE associated with the Preferred Alternative, the western alignment, was conducted on October 22, 2022. Subsequent site recordation was conducted on October 23 and November 1, 2022.

The APE was defined in consultation with WSMR as the 2.5 mile by 20-ft wide (4 km by 6 m) distribution line corridor, in addition to a buffer of 50 ft (15 m) on either side, for a total width of 120 ft (37 m). In total, the APE encompasses 29 acres (11.7 ha). The project area was defined in consultation with the Environmental Division and in compliance with the New Mexico HPD's guidelines.

A total of 18 isolated occurrences (IOs) and one archaeological site (Laboratory of Anthropology [LA] No. 201912) were located and documented within the APE during the current inventory. Due to their limited information potential, the 18 IOs have not contributed, and are unlikely to contribute, important information toward our understanding of area prehistory or history; therefore, no further management consideration is warranted for the IOs.

There was one site identified near the northern extent of the eastern alignment. LA 201912 is a historic mining site consisting of 15 features, including adits, prospecting pits, a shaft, a trail, a structure, activity areas, and associated artifacts. The number and size of the mining features (such as adits and a shaft), in addition to the remnants of a structure, indicate the mine was likely in the exploitation phase when abandoned. Diagnostic artifacts observed at the site and a review of historic maps and records are suggestive of an occupation during the late 19th to mid-20th centuries (circa 1895-1930s). Temporal diagnostics and archival records suggest a lengthy history of development associated with LA 201912, potentially among the earliest mining developments in the Salinas Peak Mining District.

The presence of large adits and a shaft connected by a mining trail further suggests LA 201912 retains integrity of location, design, association, and feeling with regard to the site's layout and mining system. This is most evident at an adit which is connected to a shaft and contains a large tailings pile with steel ore tracks. These features also retain integrity of workmanship, evidenced by saw-cut timber shoring and supports visible in the adit tunnel and shaft (Noble and Spude 1997). These mining features, when considered with other features on the site, such as the ore cart, the structure, the bulldozed cut, and the activity area, suggest the site's overarching mining system remains largely intact. Portions of the site have been previously disturbed by the military development of Salinas Peak, including the construction of Salinas Base Camp, the construction of the Salinas Peak access road, and the installation of the existing power line. However, these activities have disturbed a relatively small percentage of the total site area, and the site still retains numerous intact features as documented in the current recording.

Along with cattle ranching, mining was the other major economic activity in the Tularosa Basin during the late 19th and early 20th centuries. Sporadic mining efforts were still ongoing in the San Andres and Organ mountains when WSMR was established in 1945, which largely eliminated mining as a significant industry in the area. As a good example of regional small-scale mining projects, LA 201912 is associated with the themes of engineering, industry, and labor during the late 19th and early 20th centuries in the Tularosa Basin. As such, it is recommended that LA 201912 is eligible for listing in the NRHP under Criterion A.

The stone masonry piers constructed on the site (Feature 7) merit consideration under Criterion C. A meaningful amount of workmanship was put into the construction of these piers, including the collection of locally available stone and sorting it by material type, size, and shape. The feature location also had to be cleared and leveled, and the piers were apparently sized and leveled per pre-planned specifications. The stone was roughly shaped before being used in the pier construction, which relied on mortar that also appears to have been mixed on-site. This method of construction was relatively labor intensive, but also required minimal expenditure on construction materials and their transportation to the mine's remote location. This seems fairly typical of small mining endeavors during the late 19th and early 20th centuries, which relied more on the availability of cheap manual labor than financial backing and industrial equipment. The masonry construction of Feature 7 therefore embodies distinctive characteristics of type, period, and method of construction, per the language of Criterion C. The other mine shafts, trails, and adit features on the site are also good examples of the kind of engineering, materials, and workmanship that were applied to small-scale mines across the west during the period. For these reasons, LA 201912 is also recommended as eligible for listing in the NRHP under Criterion C.

Per the district clause of Criterion C, LA 201912 might also contribute to a larger historic district inclusive of mining sites around Salinas Peak, as the aggregate of these sites might represent "a significant entity whose components may lack distinction at an individual level." However, identification of such a district would require additional research and inventory efforts that exceed the scope of the current inventory project. As such, no such historic district can be recommended at this time.

3.3.2.2 Environmental Consequences

The No-Action Alternative

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. Therefore, there would be *no effect* on cultural resources associated with the No-Action Alternative.

Alternative 1 – Eastern (Existing) Route

The corridor associated with this alternative was not surveyed in support of this EA, as it was not chosen as the preferred alternative. In accordance with Section 9 of the 1985 Programmatic Memorandum of Agreement with SHPO, the Environmental Division will consult on any findings of adverse effect, to include unevaluated sites. Proposed construction activities that would occur in areas where cultural resource surveys have not been completed or where surveys have been conducted but NHPA Section 106 consultation is not complete would be subject to site-specific cultural resource survey and evaluation as needed. The Environmental Division CRM would determine whether site-specific cultural resource studies or consultation would be required prior to the implementation of proposed activities in these areas. Any cultural resource identification and consultation requirements would be completed prior to the implementation of these activities.

The analysis of potential effects will remain incomplete until the necessary surveys and consultation with SHPO are conducted. Therefore, no determination of effect for this alternative can be made at this time.

Alternative 2 – Western Route

Avoidance of the 15 features that contribute the eligibility of LA 201912 is the recommended protection measure for the site. In order to facilitate avoidance of these features, it is recommended that utility pole placement be determined in consultation with Environmental Division Archaeologists. Poles should be installed at the maximum distance possible within the site area to minimize disturbance. Monitoring of utility pole installation as well as ingress and egress is further recommended to ensure that the site's features are avoided. If BMPs provided in Section 3.3.2.3 are followed, subject to consultation and comment, Alternative 2 will have *no adverse effect* on LA 201912.

3.3.2.3 Best Management Practices

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all BMPs or mitigation measures are implemented. The following BMPs would be applied to reduce impacts to cultural resources:

- All personnel conducting work at WSMR will be presented an environment awareness brief;
- Support vehicles will be limited to existing roads;
- Poles in the vicinity of LA 201912 should be installed at the maximum distance possible within the site area to minimize disturbance;
- Cultural resources monitoring of utility pole installation in the vicinity of LA 201912 as well as ingress and egress would be conducted to ensure that the site's features are avoided; and
- In the event of an inadvertent discovery, program personnel would implement the WSMR inadvertent discovery policy by contacting the Environmental Division.

3.4 INFRASTRUCTURE

3.4.1 Affected Environment

3.4.1.1 Facilities

The WSMR facilities on Salinas Peak are located approximately 9,000 ft (2,740 m) asl on a ridgeline overlooking the Tularosa Basin and the Rio Grande Valley. Salinas Peak is accessible by ground vehicles and helicopters.

The military has constructed several facilities on Salinas Peak over time. This includes a small barracks, office space, radar, and communications facilities. There are plans for expansion of RDT&E activities at Salinas Peak (WSMR 2022).

3.4.1.2 Energy Demand, Generation, Transmission, and Use

Electricity at WSMR is generated off-range and is supplied by local commercial utilities with several locations linked directly to distribution lines on the local power grid. El Paso Electric Company (EPEC) supplies approximately 93 percent of the electricity used at WSMR, with additional supply provided by SCEC, Otero Electric, and Socorro Electric Cooperative.

The Salinas Peak utility line was constructed in the 1950s and is comprised of creosote-treated wood poles. Currently, WSMR maintains 77 poles along this 14.4 kV/24.9 kV three-phase distribution line. Large sections of the utility line follow steep slopes, inaccessible to most ground vehicles (see Figure 1-2). It is assumed that the steep stretches of the utility line were installed using heavy equipment. In some areas with heavy pinyon pine and juniper cover, poles are located near slopes exceeding 70 degrees.

Past failures of the Salinas Peak utility line have occurred during intense storm events such as wind and snow. Snow, ice, and rain complicate access on the steep slopes and switchback roads. Working conditions for maintenance and operations can be hazardous.

Emergency power is provided to Salinas Peak facilities by electric generators currently at the site. It should be noted that WSMR plans to upgrade the current generators as part of the Joint Directed Energy Test Center program (WSMR 2021).

3.4.1.3 Traffic and Transportation Systems

Interstate Highways 10 (I-10) and 25 (I-25) are the primary interstate highways in the vicinity of WSMR. I-10 generally traverses in an east-west direction and passes approximately 50 miles (80 km) south of the Main Post, with exits to WSMR at El Paso, Texas and Las Cruces, New Mexico. I-25 provides a north–south interstate connection to WSMR, with local exits at San Antonio (17 miles [27 km] from the Stallion Gate), and Las Cruces (22 miles [35 km] from the Las Cruces Gate). Major highways serving WSMR include US 380, US 70, and US 54 (WSMR 2010).

There are several access points onto WSMR, with the primary points being US 70 at the Las Cruces and Small Missile Range Gates; Range Road 1 at the El Paso Gate; and US 380 at the Stallion Gate. The Las Cruces and El Paso gates are the primary access control points providing ingress and egress to the Main Post area.

WSMR maintains access via a widespread network of primary and secondary range roads. Access to Salinas Peak can be achieved using mainly larger, well-maintained range roads. Range Road 327 is a one-lane paved road that connects Salinas Base Camp with the facilities on Salinas Peak. It is fairly narrow and can only accommodate one-way traffic in some locations.

3.4.2 Environmental Consequences

3.4.2.1 The No-Action Alternative

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As such, the Salinas Peak distribution system would be subject to failure, especially along areas of high slope that make site access difficult. This would be no different than the existing situation.

There would be no impact on facilities or transportation networks, as their use would not change in usage under this alternative. The potential for failure of the distribution system would still exist and would likely increase as the system components age further. System failures would lead to increased use of emergency generators, releasing more GHG and increasing the potential for climate change impacts. Not replacing aged and worn equipment would also increase the risk of wildland fire.

3.4.2.2 Alternative 1 – Eastern (Existing) Route

Implementation of Alternative 1 would have minor effect on the facilities on Salinas Peak. Construction on the distribution line could obstruct access to the facilities. This impact would be temporary in nature and would be minimized by coordinating deliveries and construction activities with personnel that work on Salinas Peak. Through this coordination, control of the final 2-mile (3.2-km) stretch leading to the summit would allow safe passage of deliveries as well as maintain employee and emergency services access to Salinas Peak. When needed, the road would be cleared allowing larger deliveries one-way traffic up and down the mountain. Salinas Road and distribution service roads would be maintained in good working order.

There would be no anticipated increase in power demand associated with Alternative 1. Replacing worn wooden poles with new steel poles, the distribution system would be more resilient and less susceptible to failure. Implementation of Alternative 1, with use of BMPs provided in Section 3.4.2, would lead to positive impacts on infrastructure in the vicinity of Salinas Peak.

3.4.2.3 Alternative 2 – Western Route

Implementation of Alternative 2 would have minor effect on the facilities on Salinas Peak, as access to the summit would be somewhat hampered during construction. This impact would be temporary in nature and would be minimized by coordinating deliveries and construction activities with personnel that work on Salinas Peak. Through this coordination, control of the final 2-mile (3.2-km) stretch leading to the summit would allow safe passage of deliveries as well as maintain employee and emergency services access to Salinas Peak. When needed, the road would be cleared allowing larger deliveries one-way traffic up and down the mountain. Salinas Road and distribution service roads would be maintained in good working order.

There would be no anticipated increase in power demand associated with Alternative 2, once construction is complete. The new distribution system, when compared to the existing system, would eliminate stretches of high slope (over 70 degrees in some locations) and would allow greater vehicle access through construction of new service roads. These conditions would make the western alignment more resilient than the existing eastern alignment. Implementation of Alternative 2, with use of BMPs provided in Section 3.4.2, would lead to positive impacts on infrastructure in the vicinity of Salinas Peak.

3.4.3 Best Management Practices

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all best management practices BMPs or mitigation measures are implemented. The following BMPs would be applied to reduce impacts to traffic and transportation systems:

- Cars and trucks used for personnel and delivery transport to Salinas Peak will follow all posted speed limits;
- The 2-mile (3.2-km) stretch of Salinas Road closest to the peak will be controlled via phone and/or radio communications to coordinate two-way traffic; and
- Salinas Road will be maintained in safe, drivable condition.

3.5 Human Health and Safety

3.5.1 Affected Environment

WSMR’s Range Control, Safety, Fire Department, and Environmental Division offices all play key roles in safety planning, training, oversight and response activities. WSMR also participates in the Emergency Operations Plan with other Federal, State, and local agencies as part of an extended response network for emergencies (fires, hazardous material spills, mishaps, or multi-hazard events) which requires an expanded team of trained responders, whether on a local or broader regional level.

WSMR has over 500 military sites dispersed across the installation; most of which serve as missile launch sites, tracking sites, communication sites, or testing facilities for defense systems. Most of the weapon system RDT&E, operational testing, and training activities on WSMR have hazardous elements that could pose safety risks to participants and the local public if not properly planned and controlled.

Elements of the WSMR area environment may potentially expose individuals to natural and biological hazards, including seasonal exposure to temperature extremes, lightning strikes, and flash flooding in arroyos and other low-lying areas.

Biological hazards include exposure to thorny plants; bees and wasps, spiders, and scorpions; and several species of rattlesnake. Additional biological hazards include the documented presence of the hantavirus pulmonary syndrome (carried in rodent feces and deer mice urine), rabies (transmitted through infected skunks, bats, and foxes), and the West Nile Virus (WSMR 2010).

There are military sites on the summit of Salinas Peak. Due to the nature and history of the overall range as an active test site, personnel shall receive the WSMR Unexploded Ordnance (UXO) Range Hazard awareness training prior to entering any range training areas and commencing construction. Personnel are also required to receive the WSMR Wildlife Hazards brief. Both the UXO Range Hazard Awareness and the Wildlife Hazard safety briefs are located on the WSMR web page, or briefs may be received from participants' government representative.

The proposed action would replace the existing utility poles near these facilities. The distribution line would begin near the base of Salinas Peak and terminate on the summit. Given the large range of habitat types, a wide range of biological hazards would be anticipated.

3.5.2 Environmental Consequences

An alternative would have a significant adverse impact on safety and occupational health if it would (1) substantially increase risks to human health or the environment; or (2) result in noncompliance with applicable installation, local, state, or federal regulations governing occupational health and safety.

3.5.2.1 The No-Action Alternative

Under the No-Action Alternative, no large-scale replacement or repair actions on the existing Salinas Peak distribution system would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. Therefore, there would be no effect on cultural resources associated with the No-Action Alternative.

3.5.2.2 Alternative 1 – Eastern (Existing) Route

Workers would be exposed to risks comparable to those associated with other construction projects and maintenance activities. To manage these risks, the contractor would be required to prepare site-specific health and safety plans for construction and maintenance prior to commencing the work. The health and safety plans would address site-specific safety concerns such as watching for rodent burrows that might cause a worker to trip and fall, venomous snake identification and avoidance, protecting workers from electrical shock, and inspecting electrical contacts regularly to ensure they are in good condition and would not start a fire. The health and safety plans would be protective of workers, the public, and the environment and would be prepared in accordance with DoD and Army regulations and would comply with Occupational Safety and Health Administration (OSHA) standards.

The existing distribution system is aging and poses risk of utility pole or conductor failure. Additionally, stretches of the alignment have extreme slopes (over 70% in some locations). The health and safety plan developed for this alternative would provide prescriptive procedures, addressing these and other risks to public health and worker safety. Adherence to the health and safety plan would ensure that short- and long-term adverse effects would be minor. If UXO is found, activities will immediately cease, the area will be secured, and immediate government representatives will be contacted.

3.5.2.3 Alternative 2 – Western Route

Workers would be exposed to risks comparable to those associated with other construction projects and maintenance activities. To manage these risks, the contractor would be required to prepare site-specific health and safety plans for construction and maintenance prior to commencing the work. The health and safety plans would address site-specific safety concerns such as watching for rodent burrows that might cause a worker to trip and fall, venomous snake identification and avoidance, protecting workers from electrical shock, and inspecting electrical contacts regularly to ensure they are in good condition and would not start a fire. The health and safety plans would be protective of workers, the public, and the environment and would be prepared in accordance with DoD and Army regulations and would comply with OSHA standards. If UXO is found, activities will immediately cease, the area will be secured, and immediate government representatives will be contacted.

Worker safety risks would be lower under Alternative 2, as compared to Alternative 1 largely due to two factors:

- Under Alternative 2, no work would be performed on the existing distribution system while energized. The proposed western alignment would be constructed while the existing eastern alignment is still in use, providing electricity to the Salinas Peak facilities. The existing system would be deactivated and removed after the western alignment is operational. Removal of the deactivated system removes risk of electrocution of workers and greatly reduces the risk of wildfire.
- The slopes of the western alignment are not as steep as the existing alignment, making construction activities safer than those associated with Alternative 1.

3.5.3 Best Management Practices

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all best management practices BMPs or mitigation measures are implemented. The following BMPs would be applied to reduce impacts to human health and safety:

- Cars and trucks used for personnel and delivery transport to Salinas Peak will follow all posted speed limits;
- The 2-mile (3.2-km) stretch of Salinas Road closest to the peak will be controlled via phone and/or radio communications to coordinate two-way traffic;
- Salinas Road will be maintained in safe, drivable condition;
- All personnel would be trained on how to avoid venomous snakes and how to reduce the risks of inclement weather and dehydration; and
- During construction and any use of heavy equipment, a 20-pound ABC fire extinguisher will be kept on the job site, as well as two shovels and two 5-gallon backpack pumps for fire suppression; and
- If UXO is found, activities will immediately cease, the area will be secured, and immediate government representatives will be contacted.

3.6 SUMMARY OF POTENTIAL IMPACTS AND MITIGATIONS

BMPs are standard practices that are implemented as part of the Proposed Action to minimize or avoid adverse impacts. Additional mitigation measures are proposed to rectify or compensate for unavoidable adverse environmental effects that could be significant without mitigation. Table 3-12 provides a summary of the potential impacts associated with the Proposed Action alternative, as well as the proposed BMPs and mitigation measures.

Table 3-12 Environmental Effects Summary

Impacts of the Proposed Action Alternatives	Proposed Best Management Practices and Mitigation Measures
Air Quality Impacts	***BMPs***
No significant impacts • Ground disturbance would within distribution line corridor, service roads, and temporary work areas; • Fugitive dust would be generated construction, vehicle traffic on unpaved roads, and during road maintenance; and • Criteria air pollutants would be generated by motor vehicles and equipment.	• To the fullest extent possible, unpaved roads and other cleared areas would be wetted to minimize fugitive dust emissions during heavy usage; • All equipment would be properly maintained; and • Creation of new roads would be avoided to the fullest extent possible.
Soils and Soil Erosion Effects	***BMPs***
No significant impacts • Salinas Peak has high slopes, with high potential for erosion; and • Increased traffic and ground disturbance on Salina Road would lead to higher erosion potential.	• Place new structures (e.g., poles and guy wire anchors) in existing structure holes to the maximum extent practicable to reduce ground disturbance; • The number of trees removed would be kept at a minimum through strategic placement of poles and other equipment; • Conduct project construction, including tree removal, during the dry season when rainfall and runoff are low to minimize erosion, compaction, and sedimentation, to the extent practical; • Include water control structures on newly constructed and improved service roads using low grades, water bars, and drain dips to help control runoff and prevent erosion; • Apply water from water trucks on an as-needed basis to minimize dust and reduce erosion due to wind; • Wood poles removed from service would be stored in temporary working areas before being transported offsite for characterization and final deposition; • Revegetate disturbed areas to help stabilize soils as soon as work in that area is completed and appropriate environmental conditions exist, such as moderate temperatures and adequate soil moisture; • The seed mixes used for revegetation would be reviewed and approved by the Environmental Division; • Inspect revegetated areas to verify adequate growth and implement contingency measures as needed; and • Inspect and maintain service roads and cross-drains to ensure proper function and nominal erosion levels after construction.

Impacts of the Proposed Action Alternatives	Proposed Best Management Practices and Mitigation Measures
Biological Resources Impacts	***BMPs and Mitigation Measures***
No significant impacts • Reduction in habitat may occur on a small scale but would not impact the ability to maintain plant populations; • Some risk of spreading invasive plant species; • Individual mortality may occur; however, no population-level impacts are anticipated; and • No critical habitat located within the project areas.	**BMPs** • When vegetation removal or modification must be conducted during bird nesting season, surveys would be conducted by qualified biologists and coordinated with the Environmental Division; • Avoid removal or destruction of productive pinyon pine trees; • To protect potential gray vireo nesting areas, retain more mature, taller junipers and attempt to remove only smaller, younger trees during vegetation removal; • Erosion control measures will be implemented using U.S. Army Corps of Engineers approved storm water prevention standards; • All openings inside and out of buildings and structures that allow wildlife (e.g., rodents, birds, snakes, etc.) entry would be blocked; • Trash and uneaten food would be removed from project areas and stored in secure receptacles to prevent attracting wildlife; • All piping, conduits, and associated equipment would be protected to prevent rodents and other small mammals from entering or destroying vinyl coated wires; • Construction personnel will not harass, collect, possess, harm, disturb, or destroy wildlife or their parts to include but not limited to snakes, bats, birds, nests, eggs, or nestlings; • Report to Environmental Division any injured or dead birds or active nests with eggs or nestlings discovered at the project sites; and • The Environmental Division would be contacted regarding any issues regarding migratory birds, raptors, lizards, snakes, or other wildlife species of concern. **Mitigation Measures** • Surveys for migratory birds would be conducted days before construction activities during nesting season (mid-March through end of August); • Follow the avian protection plan guidelines and guidelines for protection of eagles, pinyon jay, and gray vireo, as provided in the current Integrated Natural Resources Management Plan; • Human and vehicle activity will remain outside a 0.5-mile (800-m) buffer area for any active eagle nest throughout the nesting season of mid-January through July; • Human and vehicle activity will remain outside a 0.5-mile (800-m) buffer area for any identified pinyon jay nest throughout the nesting season of March through May; • If bird nests are found during surveys, the Environmental Division would be consulted to determine actions to be taken; • Environmental Division would consult with the USFWS regarding MBTA and ESA issues;

Impacts of the Proposed Action Alternatives	Proposed Best Management Practices and Mitigation Measures
	• Eagle biologists (via the Environmental Division) would monitor the eagle nests at or adjacent to each impact to determine which nests are active during a given breeding season; and • Suspension insulators will be used to increase the space between phased conductors to a distance greater than 60 in (150 cm).
Climate Change Impacts	***BMPs***
No significant impacts • Climate change has impacted the existing distribution system by hastening system deterioration and generating more extreme weather events; and • The Proposed Action would install a more resilient system, requiring less repair and maintenance.	• Upgrade transformers to forced-air or forced-oil to better adjust to high temperatures; • Install smart grid devices to identify system faults, expediting repairs; • Where possible, install micro-grid systems to isolate failures; • Increase system redundancy to minimize effects of power outages; and • Replace wood poles with more fire-resistant materials such as steel or concrete.
Cultural Resources Impacts	***BMPs***
No adverse effect • Project would cross an identified mining site, which can be sufficiently avoided through proper placement of poles.	• All personnel conducting work at WSMR will be presented an environment awareness brief; • Support vehicles will be limited to existing roads; • Poles in the vicinity of LA 201912 should be installed at the maximum distance possible within the site area to minimize disturbance; • Cultural resources monitoring of utility pole installation in the vicinity of LA 201912 as well as ingress and egress would be conducted to ensure that the site's features are avoided; and • In the event of an inadvertent discovery, program personnel would implement the WSMR inadvertent discovery policy by contacting the Environmental Division.
Infrastructure Impacts	***BMPs***
No significant impacts • The Proposed Action may be conducted concurrent with planned JDETC construction, leading to potential strain on local roads and temporary work areas; and • After construction, the Proposed Action would be beneficial to the local electricity infrastructure.	• Cars and trucks used for personnel and delivery transport to Salinas Peak will follow all posted speed limits; • The 2-mile (3.2-km) stretch of Salinas Road closest to the peak will be controlled via phone and/or radio communications to coordinate two-way traffic; and • Salinas Road will be maintained in safe, drivable condition.
Human Health and Safety	***BMPs***
No significant impacts • All construction and RDT&E activities would comply with Army and WSMR policies and procedures; and • Public access to WSMR is generally restricted.	• Cars and trucks used for personnel and delivery transport to Salinas Peak will follow all posted speed limits; • The 2-mile (3.2-km) stretch of Salinas Road closest to the peak will be controlled via phone and/or radio communications to coordinate two-way traffic;

Impacts of the Proposed Action Alternatives	Proposed Best Management Practices and Mitigation Measures
	• All personnel would be trained on how to avoid venomous snakes and how to reduce the risks of inclement weather and dehydration; • During construction and any use of heavy equipment, a 20-pound ABC fire extinguisher will be kept on the job site as well as two shovels and two 5-gallon backpack pumps for fire suppression; and • If UXO is found, activities will immediately cease, the area will be secured, and immediate government representatives will be contacted.

CHAPTER 4 CUMULATIVE IMPACTS

CEQ regulations implementing the procedural provisions of NEPA define cumulative impacts as:

> …the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7 [2020])

Each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects based on its own time and space parameters. Therefore, cumulative effects analysis will typically encompass a Region of Influence (ROI) or geographic boundaries beyond the immediate area of the Proposed Action and a time frame including past actions and foreseeable future actions, to capture these additional effects.

For the Proposed Action to have a cumulatively significant impact on an environmental resource, two conditions must be met. First, the combined effects of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the effects of the Proposed Action, must be significant. Second, the Proposed Action must make a substantial contribution to that significant cumulative impact. In order to analyze cumulative effects, a cumulative effects region must be identified for which effects of the Proposed Action and other past, present, and reasonably foreseeable actions would occur. The Army uses a process for cumulative effects analysis that follows 11 steps identified by the CEQ:

- Step 1 identifies the significant, or potentially significant, cumulative impacts issues associated with the Proposed Action and define the assessment goals;
- Step 2 establishes the geographic scope, or ROI, for the analysis;
- Step 3 establishes the time frame for the analysis;
- Step 4 identifies other actions affecting the VECs (see Section 3.0);
- Step 5 characterizes the VECs identified in scoping in terms of their response to change and capacity to withstand adverse impacts;
- Step 6 characterizes the natural and human factors that adversely affect these VECs and their relation to safety or security thresholds established through regulations;
- Step 7 defines a baseline condition for the VECs;
- Step 8 identifies the important cause-and-effect relationships between VECs;
- Step 9 determines the magnitude and significance of cumulative impacts;
- Step 10 modifies or adds alternatives to avoid, minimize, or mitigate adverse significant cumulative impacts arising from federal activities, and identifies opportunities to work with others to avoid, minimize, or mitigate adverse effects caused by non-federal activities; and
- Step 11 monitors cumulative impacts of the selected alternative and applies adaptive management.

For purposes of this cumulative effects analysis, the ROI includes projects considered within the vicinity of the Proposed Action. This includes any project that would involve resources within 500 ft (152 m) of the distribution corridor, existing roads, or new service roads associated with the Proposed Action. This analysis depends on the availability of data and the relevance of effects of past, present, and future actions. Although certain data (e.g., extent of forest cover) may be available for extensive periods in the past (i.e., decades), other data (e.g., water quality) may be available for much shorter periods. Because specific information and data on past projects and action are usually scarce, the analysis of past effects is often qualitative (CEQ 1997).

Table 4-1 lists the past, present, and reasonably foreseeable future actions within the ROI that have had, continue to have, or would be expected to have some impact on the natural and human environment. The projects in this table are limited to those implemented in the last five years or those with ongoing contributions to environmental effects. Projects with measurable contributions to impacts within the ROI for a resource area were included in the cumulative analysis.

Table 4.1. Reasonably Foreseeable Actions within the Region of Influence

Project Title	Project Description	Past	Present	Future
Joint Directed Energy Test Center (JDETC)	The JDETC Program would perform developmental testing and operational testing of directed energy weapon systems at facilities on Salinas Peak as well as near the existing High Energy Laser System Test Center Facility.		✓	✓
Energy Resiliency	Construction of up to 20 MW of solar power, micro-grid systems, battery energy storage systems with generators, solar carports, and electric vehicle charging station. Note: Salinas Peak power distribution is an aspect of energy resiliency being assessed separately.			✓

4.1 AIR QUALITY

The Proposed Action would lead to criteria air pollutant emissions below de minimis thresholds and would not trigger a conformity determination under Section 176(c) of the CAA. Moreover, these negligible impacts, when added to the other listed projects and activities, would account for a small percentage increase of overall air emissions for the region. However, it should be noted that construction activities associated with the JDETC project may be concurrent with the Proposed Action of this EA.

Through use of BMPs, coordination between the projects, and staggered use of Salinas Road, the emissions associated with the Proposed Action would not be expected to have a cumulative impact on air quality.

4.2 NATURAL RESOURCES

The Proposed Action would have soil erosion effects, limited to the project areas. Such effects are limited to ground disturbance during construction activities, maintenance and repair of service roads, and post-demolition recovery of the native vegetation. As described in the NEPA documents for the past, ongoing, and proposed future projects listed in Table 4-1, the regional activities are not expected to significantly affect geology and soils. Due to the scope of potential impacts associated with the Proposed Action of this EA, impacts to soils will be limited to the affected area and best management practices will be used to aid in recovery. Hence, there would be no cumulative impact on soil erosion effects.

Implementation vegetation removal associated with the Proposed Action would have small-scale impacts to vegetation communities but would not impact the ability to maintain plant populations. When possible, work would be done outside nesting season to minimize impacts on migratory birds. Under the Proposed Action, all work would be conducted outside any eagle nest buffer. Work plans developed for Proposed Action construction would follow guidelines for protection of eagles, pinyon jay, and gray vireo, as provided in the current INRMP. The proposed project areas do not contain critical habitat. When combined with the effects of other past, present, and foreseeable project activities, implementation of the Proposed Action is unlikely to have any additional cumulative effect on regional plant and animal populations, including threatened and endangered species and Army Species at Risk.

Implementation of the Proposed Action and the Energy Resiliency project would result in fewer electrical system outages, reducing the need for use of emergency generators at WSMR and reducing the risk of wildfires. Resiliency of the Salinas Peak distribution system will improve due to implementation of the

Proposed Action. The Proposed Action would also reduce the number of power outages and risk to personnel involved in repairs. Both would provide beneficial impacts with regards to climate change impacts.

4.3 Cultural Resources

The preferred alternative, Alternative 2 – Western Route, would have *no adverse effect* on LA 201912 if recommendations of avoidance provided in Section 3.3.2.3 are implemented. A cultural resources monitor will be present during construction in the vicinity of LA 201912. These measures would minimize potential impacts on historic and prehistoric resources. Following completion of Section 106 analysis, the Proposed Action in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

Implementation of Alternative 1 would require Section 106 consultation before a determination of effect can be made. However, it is anticipated that any resources discovered through the Section 106 process could be avoided through implementation of BMPs provided in Section 3.3.2.3. Following completion of Section 106 analysis, the Proposed Action in conjunction with other past, present, and foreseeable activities, would not result in adverse effect to historic properties.

4.4 Infrastructure

As construction associated with the Proposed Action could be conducted concurrently with JDETC construction, coordination would be needed to minimize impacts to infrastructure on Salinas Peak. Through implementation of BMPs provided in Section 3.4.2, these impacts are expected to be minor.

Construction of the proposed distribution system would yield benefits to WSMR, as the resulting system would provide more reliable energy and require less maintenance and repair. No significant cumulative impacts are anticipated through implementation of these projects.

4.5 Human Health and Safety

All Proposed Action activities would comply with Army and WSMR health and safety policies and procedures. Public access to WSMR is restricted, limiting public exposure to the construction activities. Therefore, implementation of the Proposed Action in conjunction with other past, present, and foreseeable actions would not result in cumulative impacts to human health and safety.

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CHAPTER 7 AGENCIES AND CONSULTATIONS

Reviewing agencies encompass federal, state, and local government agencies and tribes which have a vested interest in the planning area and wish to collaborate with WSMR to implement the requirements of NEPA. Federal and state agencies and local and tribal governments have qualified as reviewing agencies because of proximity or estate ownership within the planning area or by legal jurisdiction or special expertise.

Collaboration can be used to describe a wide range of external and internal working relationships, including the relationship between reviewing agencies. WSMR strongly supports the engagement of reviewing agencies in developing EAs.

APPENDIX A COMPARISON OF UTILITY POLE MATERIALS

INTRODUCTION

Utility poles that support overhead power and telephone lines have historically been constructed of wood. Wood is readily available worldwide, is relatively lightweight compared to most building materials, does not conduct electricity, and is durable when treated with preservative.

Alternative materials have been developed that provide longer lifespans than wooden poles. Most of these alternatives are environmentally inert and do not pose contamination risks to water and air. This document provides an overview of some of the widely used utility pole materials as well as some of the risks and benefits associated with each. Recommendations for use on the Salinas Peak Power Distribution Line Replacement project on White Sands Missile Range (WSMR), New Mexico are provided.

Utility Pole Materials

All poles in the existing Salinas Peak distribution line are made of wood. Through continual exposure to wind, precipitation, and ultraviolet (UV) radiation from the sun; some of the poles have warped and demonstrate other symptoms of age.

Utility poles can also be made of steel, concrete, and composite materials. Each of these materials has its advantages and disadvantages for use in various environments. Table 1 compares some properties of steel, concrete, and composite utility poles.

Wood Utility Poles

Most utility poles in the United States are manufactured from pressure-treated wood, with some form of preservative added for protection against rot and insect. The traditional preservative used in utility poles has been creosote, but due to environmental concerns, this preservative is being phased out and replaced with alternatives such as pentachlorophenol, copper naphthenate and borates. The standard life of a preserved wood pole is 25 to 50 years depending upon climate. Without preservatives, the natural wood decomposes and cannot be used as for utility structures (ORNL 2021).

As a general rule, wood utility poles are direct buried to a depth of one-tenth of the total pole height plus two feet. Using this formula, a 40-foot utility pole would be buried six feet below the ground surface with 34 feet above.

Advantages for the use of wood utility poles include:

- well-known by the industry and readily available;
- strong material for support of the transmission equipment;
- good insulator;
- Manufacturing takes less energy and water than other materials; and
- Less expensive

Disadvantages for the use of wood utility poles include:

- Rot, especially near the ground surface;
- Not fire resistant;
- Not as uniform as engineered materials;
- Preservatives can leach from poles into groundwater;
- Some preservatives make it difficult to recycle or dispose of treated poles;
- Susceptible to degradation by woodpeckers and insects; and
- Greater maintenance requirements, compared to wood and composite poles.

Table 1 Comparison of Utility Pole Materials

Attribute	Pole Material			
	Wood	Steel	Concrete	Composite
Readily available	✓			
Relative strength of material		✓	✓	✓
Engineered material (uniform size, taper and repetitive pole design)		✓	✓	✓
Weight of Class 2 pole (40-ft) in pounds	1,476	587	3,411	376
Weight of Class 1 pole (60 ft) in pounds	3,013	1,589	9,177	903
Weight of Class H1 pole (60 ft) in pounds	3,530	1,658	9,227	941
Insulator (would not conduct during line failure)	✓		✓	✓
Termite resistant		✓	✓	✓
Rot proof		✓	✓	✓
UV protection			✓	✓
Corrosion resistant		✓		✓
Fire resistant		✓		
Relative low cost	✓			
Ease of transport	✓	✓		✓
Ease of installation		✓		✓
Ease of maintenance	✓	✓		✓
Number of Class 1 poles (60 ft) per shipment [1]	15	27	6	53
Environmentally friendly to manufacture	✓			
Recyclable after use		✓		
Service life (years)[2]	45	60	60	70-100

Notes: 1. Source: RST 2022.
2. Source: ORNL 2021.

Components of a Utility Pole

Figure 2 provides an overview of the parts of a utility pole and descriptions these components play in electrical transmission. Each of the components provided in the figure would be used in the proposed distribution system; however, not all components would be found on each pole.

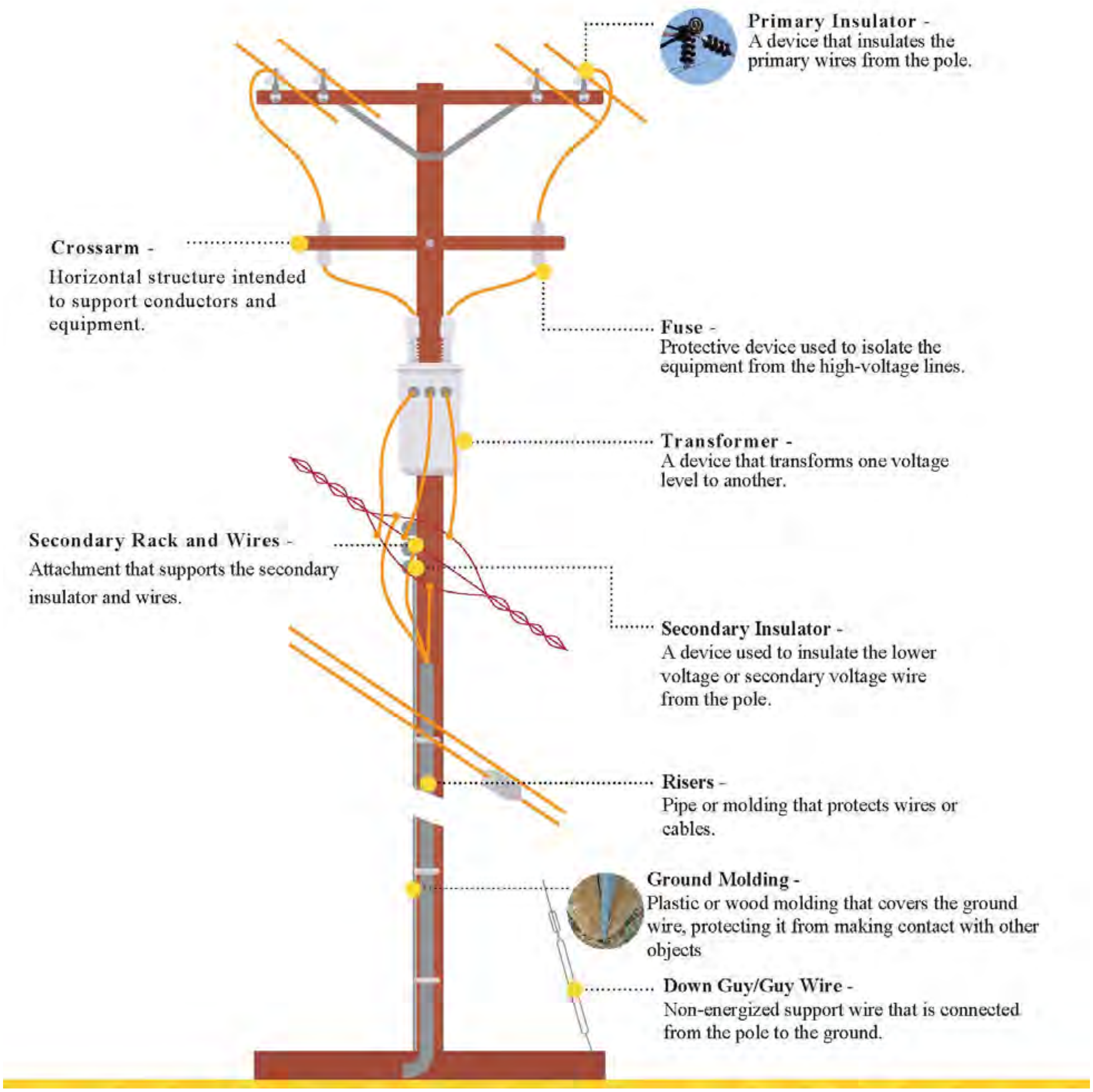

Figure 2. Components of a Utility Pole

<u>Wood Utility Pole Size Classifications</u>

The American National Standards Institute (ANSI) sets the standards by which single-pole wood utility structures are classified based on size in ANSI O5.1-2017, Wood Poles – Specifications and Dimensions (ANSI 2017). The greatest variations in these classifications are in length and tip circumference. Load-bearing capability is also included in the classification, which is related to size and other factors such as pole material. Manufacturers of utility poles of other materials (e.g., steel or concrete) use design classifications similar to the wood pole classes described in ANSI O5.1-2017. Theses poles are similarly designed and classified by applying an "equivalent" horizontal tip load two feet from the top of the structure. The equivalent horizontal tip load is found by multiplying the horizontal tip load found in ANSI 05.1-2002 by the ratio of factors of safety of the other material to wood. For example, for NESC Grade B district loading, the wood pole strength factor is 0.65 and the steel pole strength factor is 1.00. Thus, the equivalency factor will be 0.65/1.00 = 0.65 (USDA 2019).

Class H5 to Class H1 Utility Poles

The "H" classification indicates the largest wood utility poles in terms of circumference and height. H5 poles can range from 45 to 125 ft (13.7 to 38.1 m) tall and are no less than 37 inches ([in], 94 cm) in circumference at their tip. The lower the number after the H the smaller the pole. The sizes go down incrementally by two inches of tip circumference (i.e., tip circumference drops by 2 in as the utility pole goes down in size). As the largest pole classification, H6 is 45 to 125 ft (13.7 to 38.1 m) tall, but it is a minimum of 39 inches (99 cm) in circumference at the tip. H5 is the next classification down and would have a tip circumference 2 in (5 cm) less than an H6 utility pole, or 37 in (94 cm) and would be available in the same lengths as H6 poles.

The horizontal loads that the H-classification poles can hold range from 11,400 pounds ([lb], 50,700 newtons [N]) for H6 to 5,400 lb (24,000 N) for H1 (ANSI 2017).

Class 1 thru Class 5 Utility Poles

Just below the H classification poles the scale starts over and goes from 1 to 10, so a Class 1 pole is the next smallest after a Class H1. Class 1 poles range from 35 to 125 ft (10.7 to 38.1 m) in height and have a minimum 27-in (69-cm) circumference at the tip. Their horizontal load-bearing capacity is 4,500 lb (20,000 N). The sizes drop incrementally down to Class 5, which are 20 to 50 ft (6.1 to 15.2 m) in length and a minimum of 19 in (48 cm) in circumference. They have a horizontal load capacity of 1,900 lb (8,450 N) (ANSI 2017).

Class 6 thru Class 10 Utility Poles

The Class 6, 7, 9, and 10 poles represent the smallest utility poles. There is no Class 8 pole designation. The Class 6 poles are 20 to 45 ft (6.1 to 13.7 m) in length and a minimum of 17 in (43 cm) in circumference at the tip. This drops incrementally down to the smallest classification. Class 10 poles are 20 to 25 ft (6.1 to 7.6 m) in length and a minimum of 12 in (30.5 cm) in circumference at the tip. The horizontal load-bearing weights for Class 6 through 10 range from 1,500 to 370 lb (6,670 to 1,650 N) (ANSI 2017).

Existing Conditions of the Distribution System and Recommendations – The existing utility line is comprised of Class 2 wood poles. It is recommended that action alternatives consider using Class 2 poles as a minimum design standard. Higher classifications are recommended in areas that hardening or increasing the resiliency of the utility line is needed (e.g., remote locations where heavy equipment can't reach, areas of high slope, or areas scoured by wind).

Steel Utility Poles

Given its material characteristics, steel utility poles are hollow allowing for the same strength as wood poles with less weight. The lower weight allows installation with smaller equipment (i.e., cranes, trucks, and helicopters) than used for wood pole installation. As an engineered material it is manufactured to meet ASTM standards, providing uniform size, taper, and repetitive features.

Advantages of steel poles include:

- Very uniform engineered product;
- Strong, resilient material;
- Lighter than wood due to hollow construction;
- Transport more poles per shipment than wood;
- As poles conduct electricity, no need for external grounding wire is needed;
- Less required maintenance than wood poles; and
- Recyclable.

Disadvantages of steel poles:

- Not as readily available as wood poles;
- More expensive than wood poles;
- Steel poles are subject to corrosion in reducing soils;
- Steel utility poles are subject to corrosive effects of chemicals and pollution. Coatings can be applied to steel poles, decreasing corrosion and UV degradation. The poles can be an electrocution hazard (to personnel and wildlife) near downed power lines.
- Untreated poles are susceptible to UV degradation; and
- Can be an electrocution or fire hazard in the vicinity of downed lines.

Concrete Utility Poles

Concrete utility poles possess the highest load capacity of the materials considered in this document. Like steel, they are resistant to rot and wildlife damage, require minimal maintenance, and weather well in harsh climatic conditions. However, concrete poles may be subject to corrosion in acidic or high salt content soils. The insulating properties of concrete are also similar to those of wooden poles.

Concrete utility poles are heavy and can be very difficult to transport if not made on-site. Given this and the fact that repairs on concrete poles can be labor-intensive, it is not considered further as a material to be used for the project.

Composite Material Utility Poles

Composite, fiber-reinforced polymer, or fiberglass utility poles were first installed in Hawaii in the early 1960’s for use in high-humidity, high-wind environments. These poles have lasted approximately 50 years and were replaced due to degradation from UV light exposure. With the incorporation of UV inhibitors, the anticipated life of the composite poles is now projected to be over 80 years (ORNL 2021). The main advantages are:

- Inherent corrosion resistance of the material;

- Low maintenance requirements;
- Immunity to termites and pest infestation;
- Ease of transport (over three times as many poles per shipment as compared to wood); and
- Structurally, composites have very high stiffness and strength.

The primary disadvantages are:

- Poor fire resistance without treatment;
- Higher cost than wood; and
- Uses more energy to produce than wood or steel (ORNL 2021).

Recommendations for the Salinas Peak Power Distribution Line Replacement Project

Currently all utility poles of the distribution line are wooden, with many poles are in need of replacement. The following recommendations are suggested for the Salinas Peak Power Distribution Line Replacement project:

- The replacement distribution system should be comprised of Class 2 poles as a minimum design standard. Higher classifications are recommended in areas that hardening or increasing the resiliency of the utility line is needed
- If wood is to be used for replacement poles, it is recommended only for areas that are easily serviced from existing roads and are shielded from high wind conditions. As an example, wood poles could continue to be used near Salinas Base Camp.
- Steel utility poles are recommended over wood poles due to their strength, ease of transport, and durability;
- Steel poles have been used for decades now, with a proven record of resiliency and relative ease of maintenance and repair (ORNL 2021). Currently, there is a lack of data regarding the long-term resiliency of composite utility poles in extreme environments. Therefore, use of composite poles is not recommended for the Salinas Peak Power Distribution Line Replacement project;
- For most of the proposed alignment, steel poles should be for tangent poles used given their comparable strength to existing wood poles at less than half the weight.

APPENDIX B FEASIBILITY STUDY – SALINAS PEAK DISTRIBUTION SYSTEM

A Feasibility Study for the Salinas Peak Line Replacement, White Sands Missile Range, Sierra County, New Mexico

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August 2022

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Contents

Introduction

White Sands Missile Range (WSMR) is planning to repair, replace (partially or fully), and develop maintenance planning for the approximately 3-mile utility line that connects facilities on Salinas Peak with the base of the mountain at Salinas Camp. The existing utility line was installed before environmental analysis was required, and most of the history for current positioning is lost. Therefore, the Environmental Division at WSMR decided to analyze the feasibility of the existing line and surrounding area.

The basic goals of the feasibility study were to:

1. Obtain information such as slope, soils, winds, cultural resources, sensitive species, etc. to establish go/no-go regions for pole and line placement,
2. Create a GIS model based on the above data and overlay it with the existing line,
3. Ideinfity if alternatives routing areas exist,
4. Determine and weigh various risks associated with alternative line placements, and
5. Provide corridor alternatives with defined limitations.

Initial Questions

Team members from WSMR's Environmental Division, several Engineers and maintenance employees in the Department of Water and Powerand Epsilon Systems Solutions, Inc. (Epsilon) met and performed field visits to Salinas Peak to establish a series of questions about the existing line. The goal was to make the data collection process streamlined and relevant to the needs of the WSMR staff that would ultimately be maintaining the future line. Questions that arose included: What impacts the current lines the most? Are there known areas to avoid? What is the maximum and ideal slope for transmission lines and poles to be installed? What are the maximum wind speeds for each type of pole?

Methods

Two studies were used as examples of how to frame the analysis. Monteiro et al. 2005 were used for the selection of overall variables. They identify accessibility, specific characteristics such as soil, vegetation cover, endangered species, terrain, wind speed, altitude, and existing obstacles as the basis for their analysis. Schmidt 2009 was primarily utilized for its approach to defining the area, ranking the features, and then scoring the model.

Upon receiving answers to the questions from WSMR personnel, physical data such as soil, vegetative cover, slope, aspect, water, and other features were obtained primarily from internal WSMR data and the Natural Resource Conservation Service (NRCS) databases. This data was combined with broader data of Salinas Peak such as historic wind gusts, existing structures and infrastructure, cultural resources, eagles, sensitive species, and other known factors. All the data was scored on similar relative scales and converted to shapefiles and imported into ArcGIS. The first step identified areas to remove as no-go areas based on criteria such as being too steep, road and water crossings, or no access. The areas deemedviable were then evaluated and given a suitability value.

Existing Conditions & Initial Analysis

It was established that WSMR's portion of the transmission line is from Salinas Camp to Salinas Peak. Below Salinas Camp, maintenance and operation of the line is the responsibility of the Socorro Electric Cooperative. The following analysis worked to classify the region between Salinas Camp and Salinas Peak into its physical features and known concerns. Once compiled, the model generated was used to compare to the current conditions (Figure 1) to see what areas of the transmission line should be considered for realignment versus remaining in place.

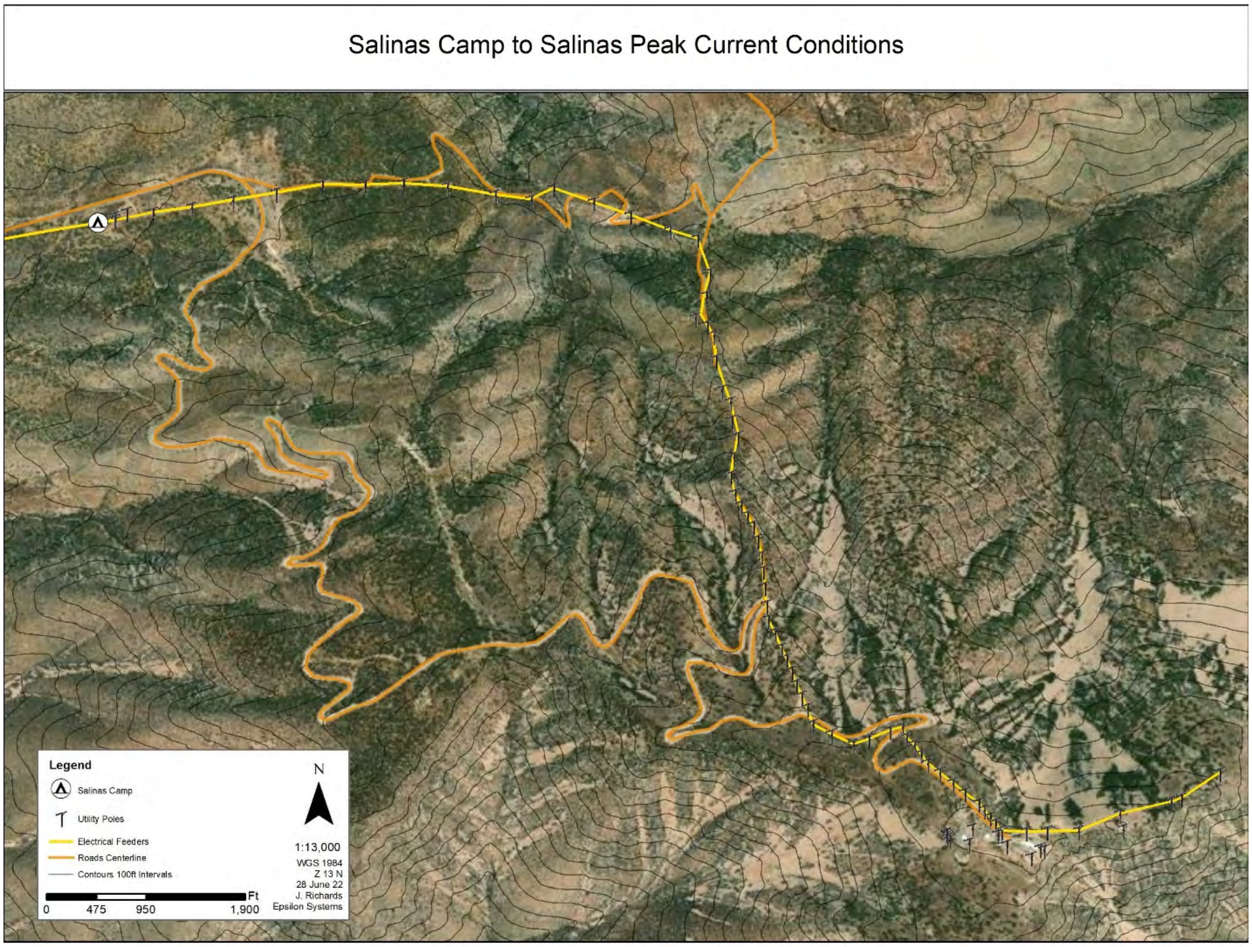

Figure 1. Existing conditions from Salinas Camp to Salinas Peak with 100' contour lines.

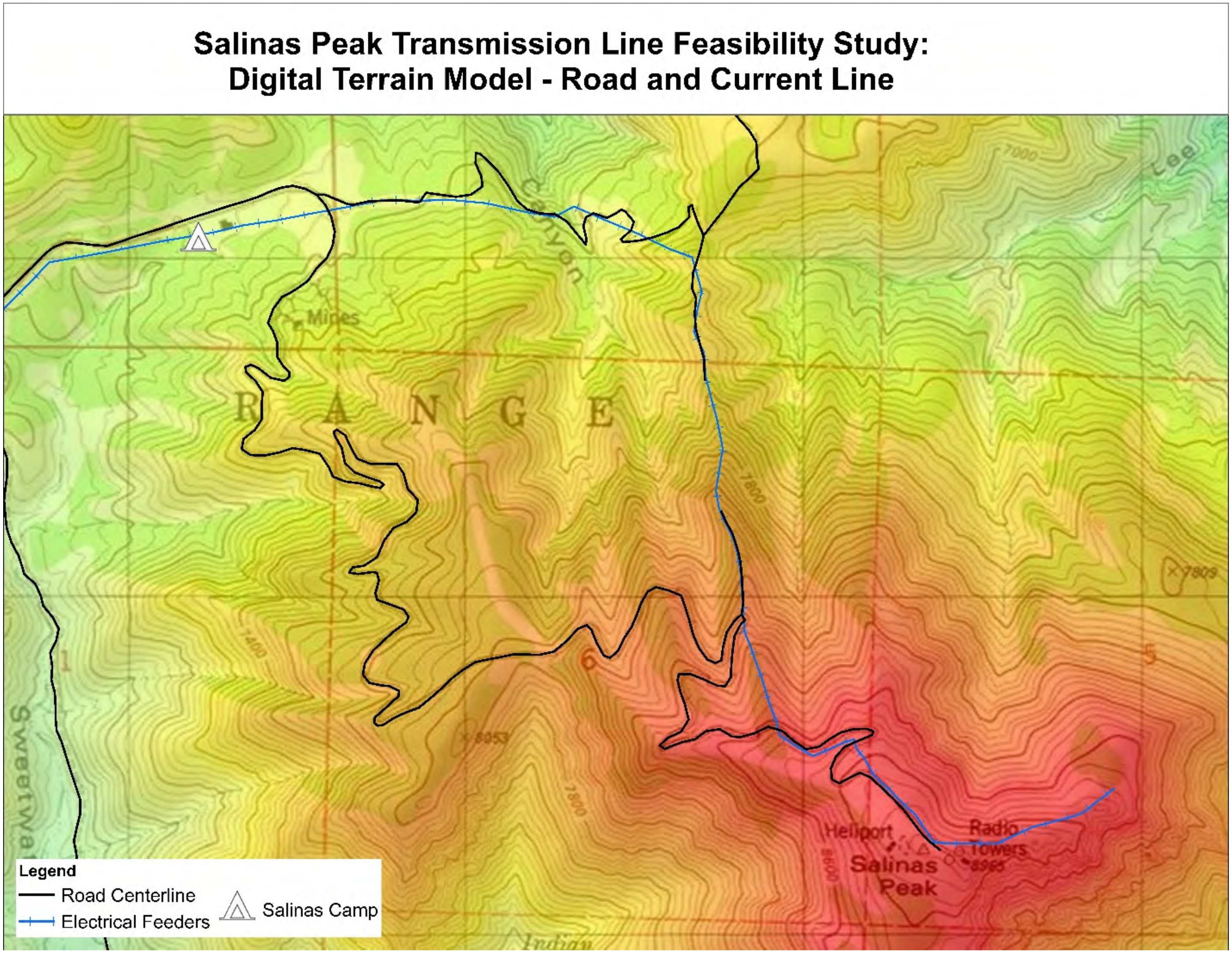

Figure 2. Salinas Camp to Salinas Peak current conditions overlain on DTM.

Slope

In the questionnaire, it was mentioned that a 70% grade is the max for maintenance of poles, but lower slopes are preferred. Upon further questioning, the WSMR staff mentioned that 60-80% slopes were known on Salinas Peak, and these areas are increasingly improbable or impossible to operate in. The contour map, Digital Terrain Model (DTM), and slope analysis show that these slopes exist within the area of the existing line.

Using the slope function in ArcGIS the 5-meter interval DTM was classified by degree slope. A total of 4,764,622-degree slope values were generated for the project area. The degree slope values were classified using Jenks Natural Break Optimization into five classes. Importantly, while the classes generated below largely fall within mathematically natural breaks, the values also roughly correspond to slope percentages discussed with WSMR staff.

The raster calculator function was used to convert the raster pixels from floating points to signed integers. The purpose of this function was to create a classifiable attribute table of the slope data. Finally, the data was classified in the same Jenks Natural Break Optimization and rounded down to a whole number to facilitate classification.

To easily depict the values in the model format, each of the five classes was given an artificial value of 1 to 5. The values are generally defined as follows: 1 is the most ideal location, 3 being acceptable locations, and 5 being areas that are unacceptable – no-go's. Values 2 and 4 can range between either end and should be evaluated to see where they fall on the spectrum.

The five classes generated are presented below in Table 1 and shown in percent form in Figure 2.

Table 1. Jenks Natural Break Optimization Classes generated for Slope Analysis.

Degrees	Percent	Model Value
0 – 12 degrees	0% – 21.25%	1
12 – 21 degrees	21.25% – 38.40%	2
21 – 30 degrees	38.40% – 57.75%	3
30 – 40 degrees	57.75% – 83.90%	4
40 – 81 degrees	83.90% – 631.25%	5

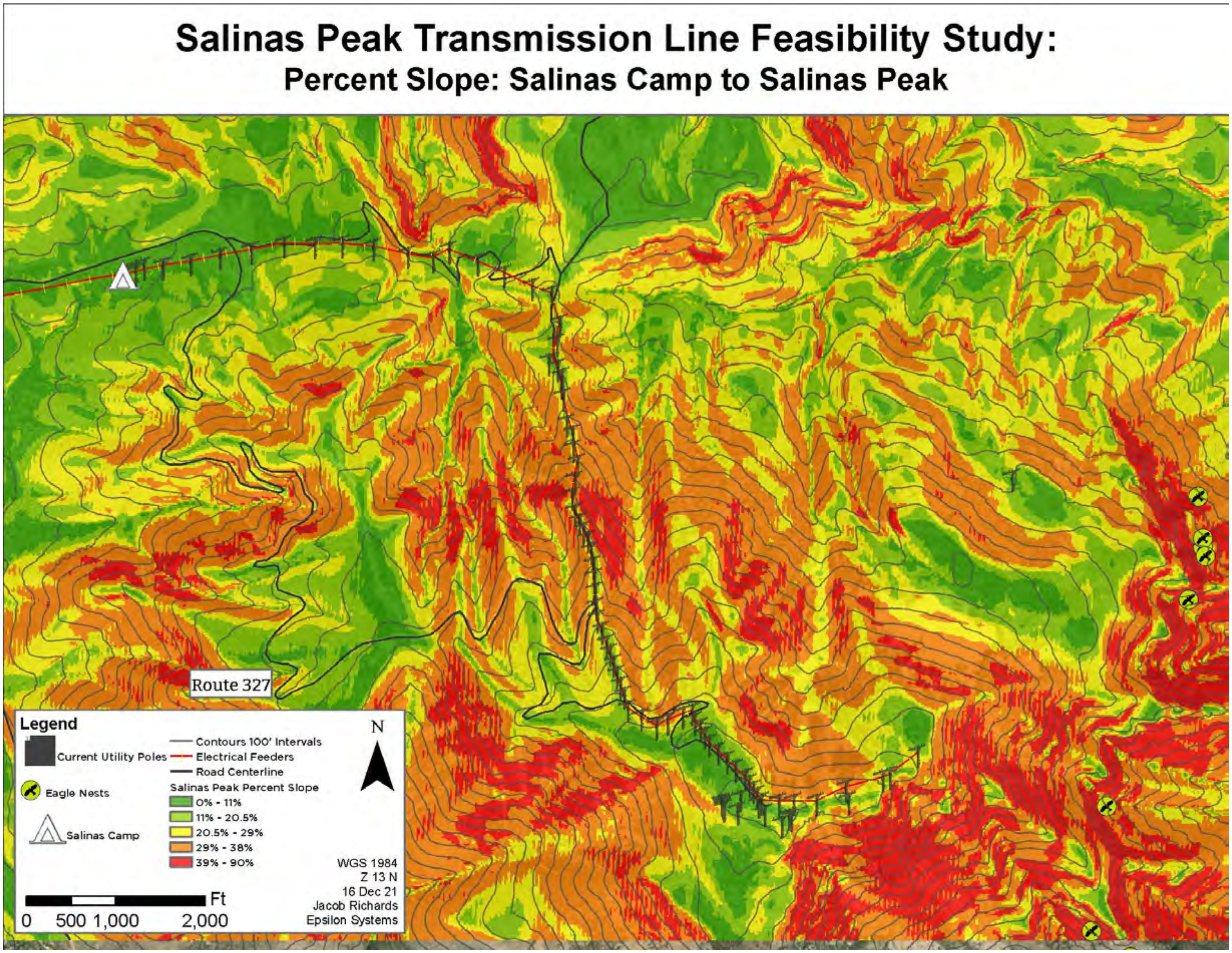

Figure 3. Percent slope analysis with 100' contour lines.

Soils

Soil types were queried from NRCS using the project area provided by WSMR. The data was refined further to only include the areas adjacent to the current roadway and transmission line. *There was an assumption made at this point based on the line generally needing to originate and terminate at the same general locations, and this corridor provides for the greatest ease of access and maintenance.*

The analysis found seven general soil classifications surrounding the Salinas Peak area. The clipped area was uploaded to the NRCS database where the following series of maps were generated with scoring already provided.

NRCS provided the rankings for each of these which generally are as follows:

- Green – 1 (good)
- Yellow – 2 (intermediate)
- Red – 3 (bad)

The scored values were moved into a spatial table with the soil layer. Once scored each layer now represents different variables to be used in the model. The original NRCS tool outputs used to classify soil conditions are provided below. Full reports for these are available by request but are generally described further as components of the model.

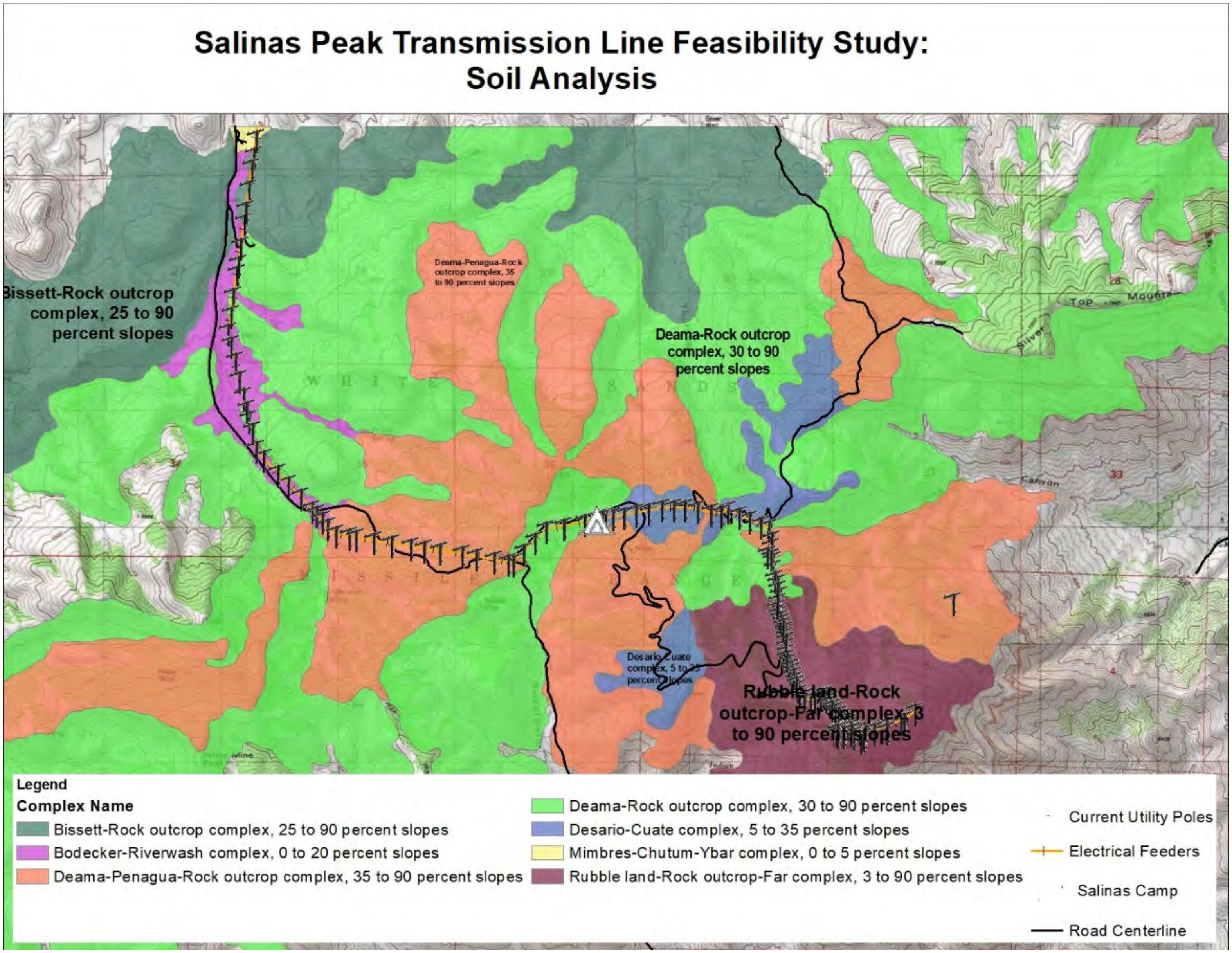

Figure 4. Soils within Salinas Peak area.

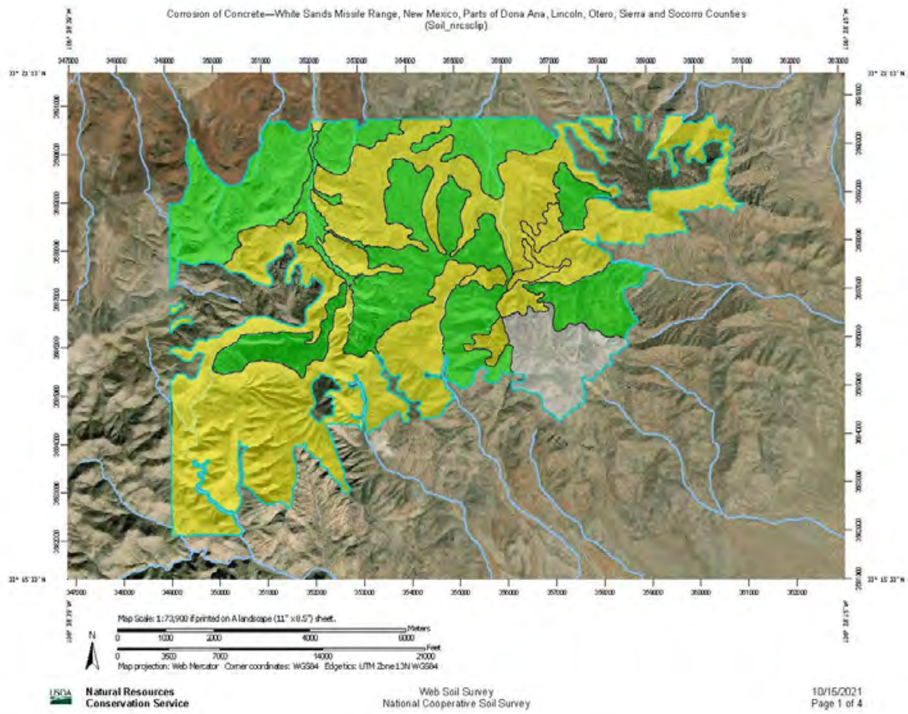

Figure 5. Risk of corrosion to concrete by the soil.

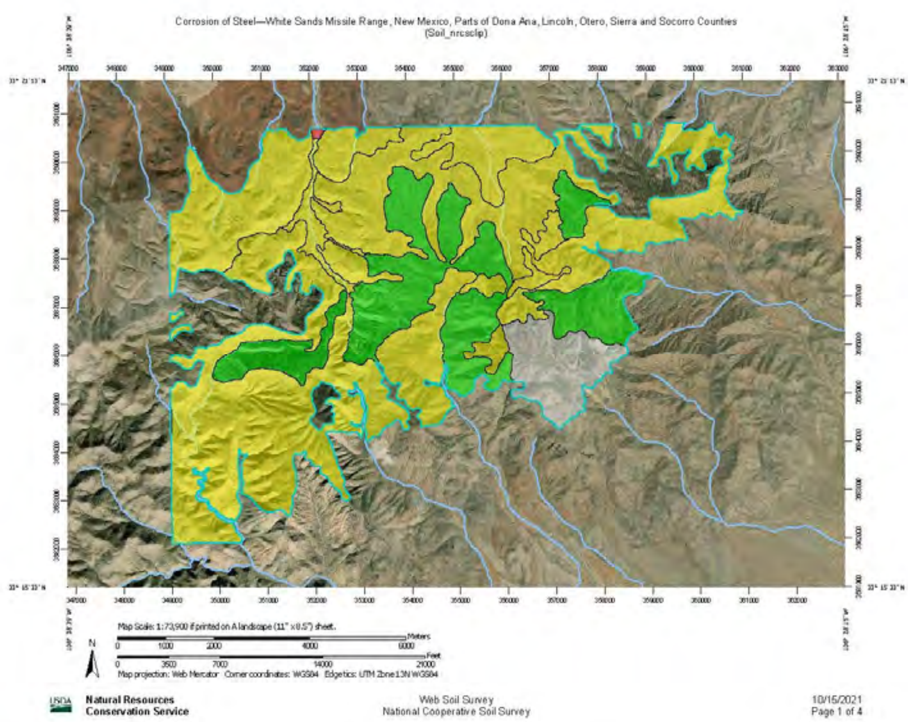

Figure 6. Risk of corrosion to steel by the soil.

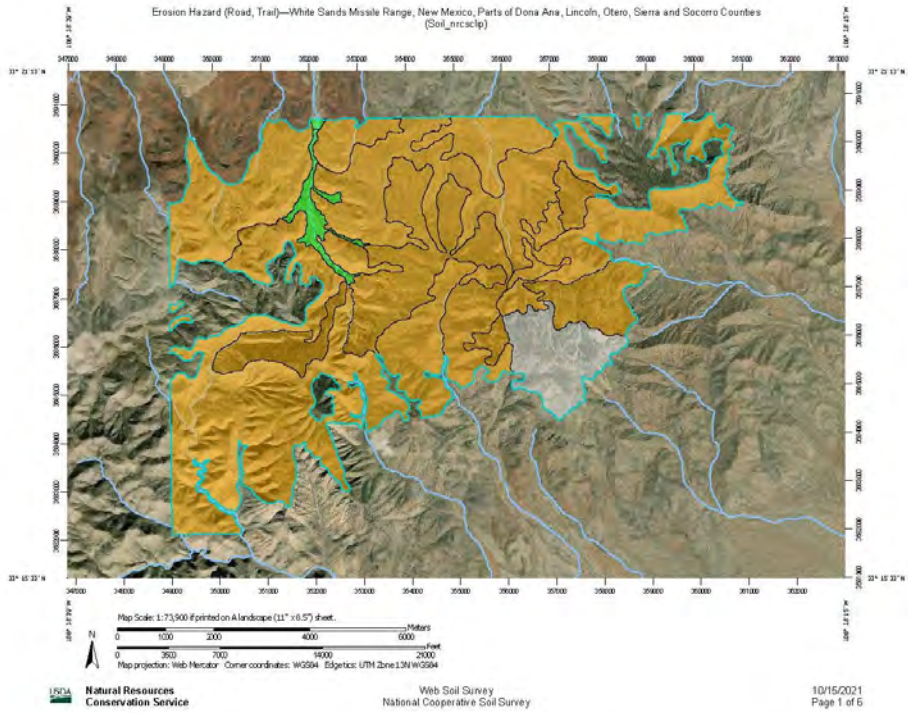

Figure 7. Unsurfaced soil loss hazard (erosional hazards).

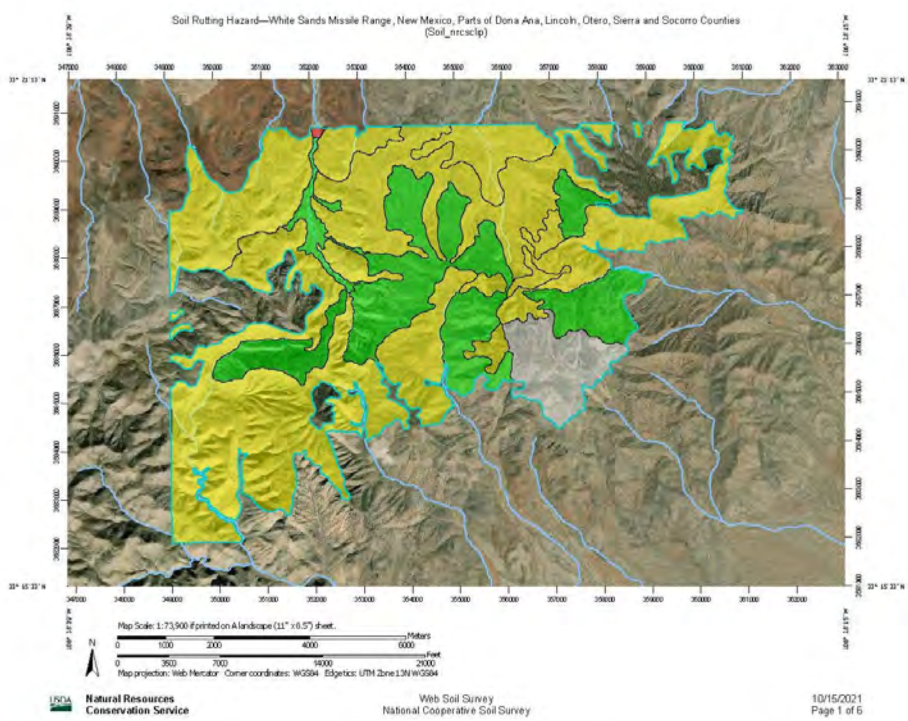

Figure 8. Hazard of surface rutting through operations.

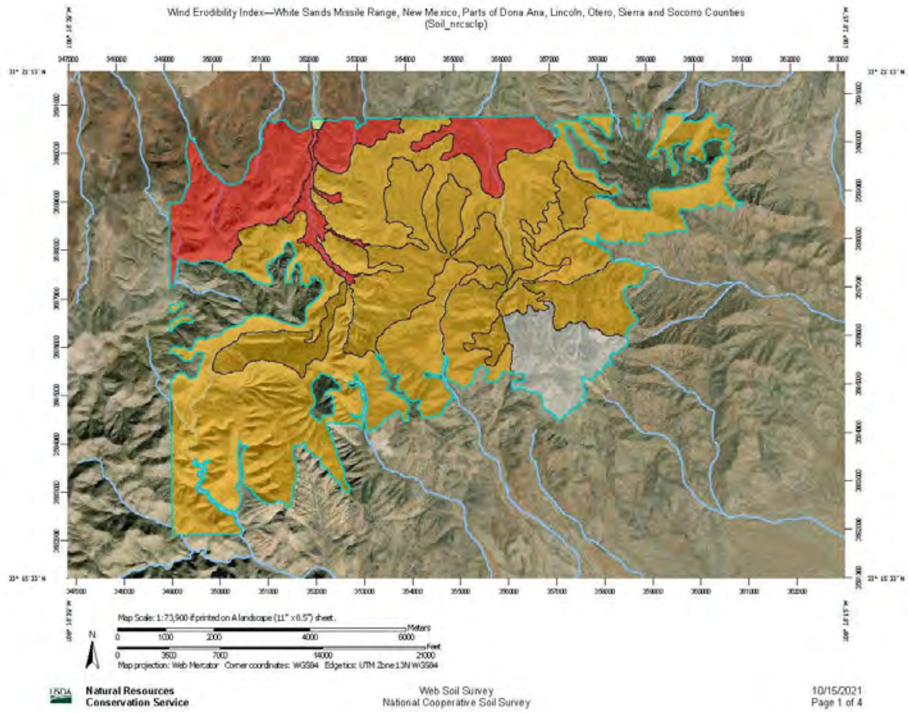

Figure 9. Soil susceptibility to wind erodibility.

Roads

Using the centerline of the road, five buffer zones were created.

- 25-foot buffer – 1 (best),
- 50-foot buffer – 2 (fine),
- 100-foot buffer – 3 (acceptable),
- 250-foot buffer – 4 (tolerable),
- >250-foot buffer – 5 (no benefit).

An assumption was made, and later confirmed by WSMR Staff, that proximity to the roadway itself would make installation, maintenance, and monitoring generally easier and safer for crews

Nearly all the current utility poles fall within the 250-foot buffer zone, although there are notable exceptions near Salinas Camp and along the final approach to the peak.

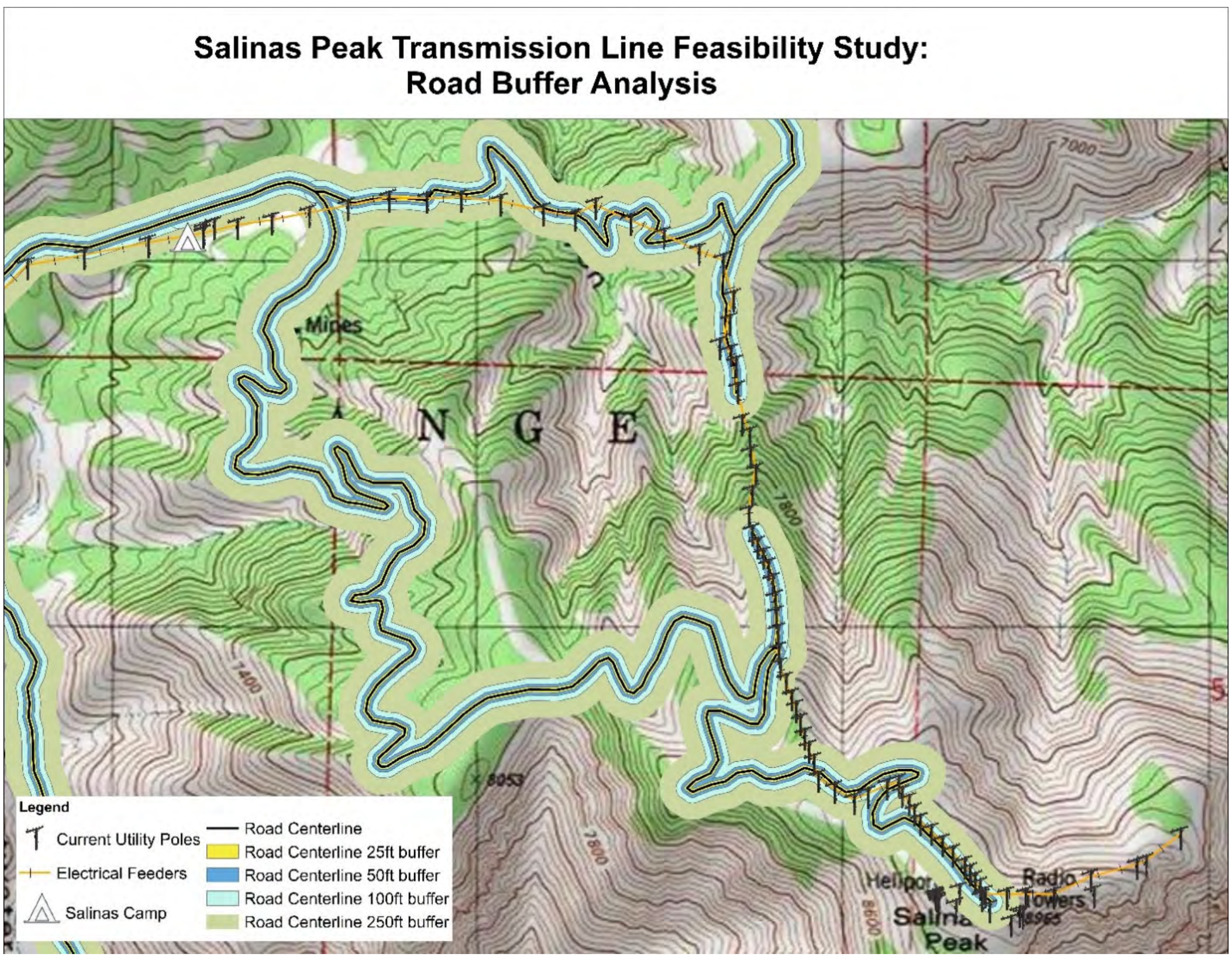

Figure 10. Access to existing line buffer analysis.

Physical Features

Using the centroid for a variety of features including cultural resources, military sites, ranches, structures, water tanks, propane tanks, springs, wildlife water units, and historic water resources, two buffer zones were created.

- >50 feet from a known feature were scored a 1 for no further consideration,
- <50 feet from a known feature were scored a 2 for further consideration.

No ranches, mines, or other cultural resources were identified along the current or potential route of the transmission line. Therefore, this portion of the analysis will not be included in the final model.

Eagles and Avian Protection

Using the centroid of each nest provided by WSMR, two zones were created. Some recommendations from US Fish and Wildlife Service (USFWS) say to buffer nests by 660 feet while others suggest 2,640 feet (half-mile) from the nest location. None of the known nests fall within the 660 feet buffer, so out of an abundance of caution, the 2,640-foot buffer was used for the analysis.

The two categories defined are:

- >2,640 feet from a known feature were scored a 1 for no further consideration,
- <2,640 feet from a known feature were scored a 2 for further consideration.

Four current utility poles fall within the buffer zone (Shown in Figure 11).

- 1 – 2,060 feet from a known nest,
- 2 – 2,159 feet from a known nest,
- 3 – 2,418 feet from a known nest,
- 4 – 2,530 feet from a known nest.

Upon discussion with WSMR staff, it was determined that Pole number 1 is not connected to the existing utility line and was removed from further consideration.

The map below shows that there are only a handful of poles to consider moving based on known eagles' nests and they are pole number 3 and number 4. Poles 2 – 8 are on the edge of the buffer zone. These may require different considerations of material and spaces. A discussion of the Avian Protection Plan, as well as the overall consideration for eagles, Migratory Bird Treaty Act (MBTA), and how they are impacted by the project is ongoing and will be included as a detailed analysis within the Environmental Assessment (EA).

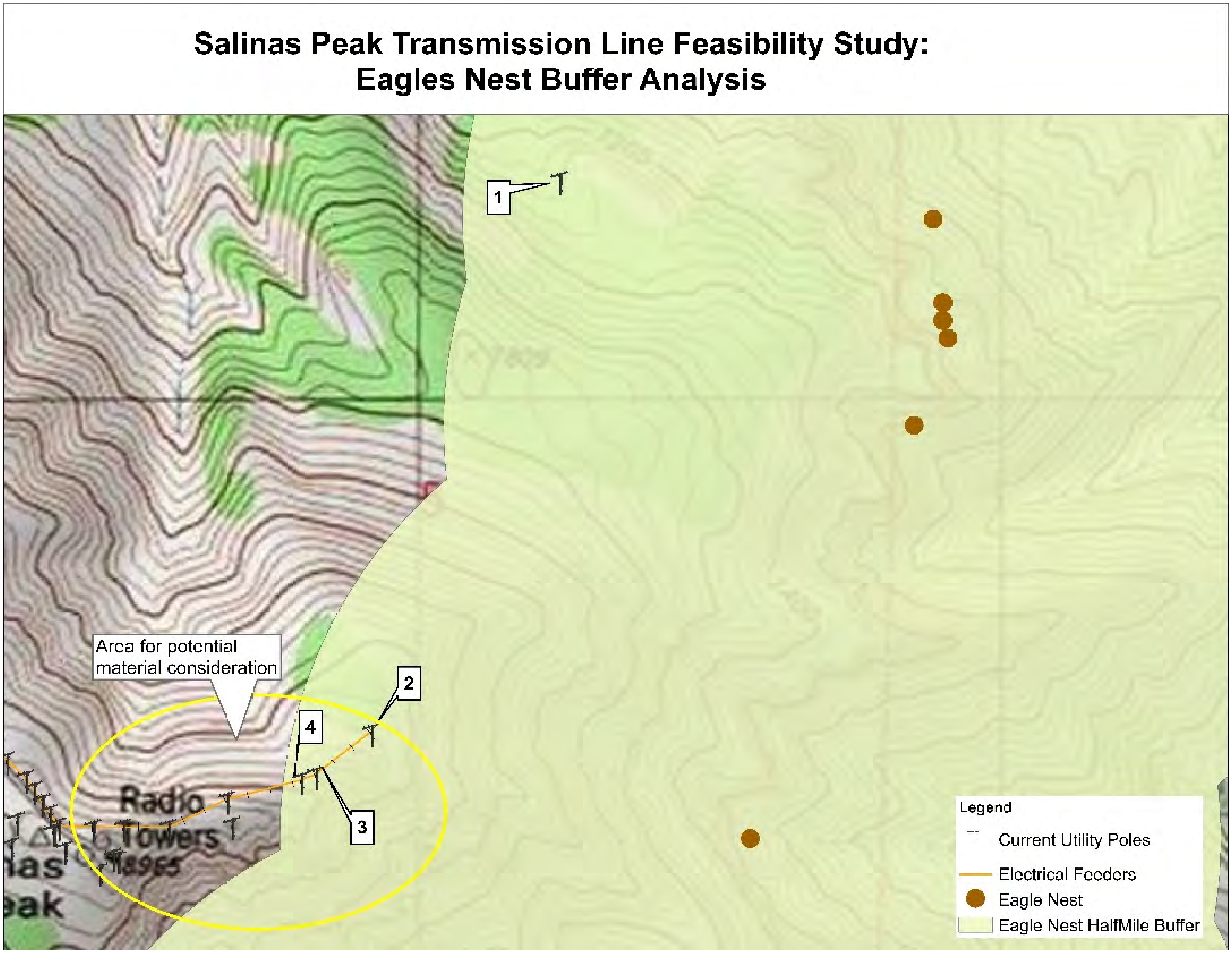

Figure 11. Salinas Peak known eagles nest proximity to the existing line.

Model Exports

All of the above features and considerations were converted from shapefiles to raster files based on the common ranking system of 1 to 5 with 1 being the most ideal and 5 being the least ideal as described earlier. For some soil classifications that were unrated, a value of 5 was arbitrarily assigned. These areas were almost entirely limited to the extreme peak where conditions are generally less than ideal.

100% Weight of Slope

Based on site visits, the questionnaire, and discussions with WSMR Staff, slope seems to be the primary limiting factor, especially on the approach to the summit where the slope is the most extreme, no access exists or can be sustained, and the amount of available space to work is extremely limited on all sides. Based on these needs, an initial model weighted solely on the slope was generated. Figure 12 shows the full extent of Salinas Peak. Figure 13 shows the difficulties on the existing line.

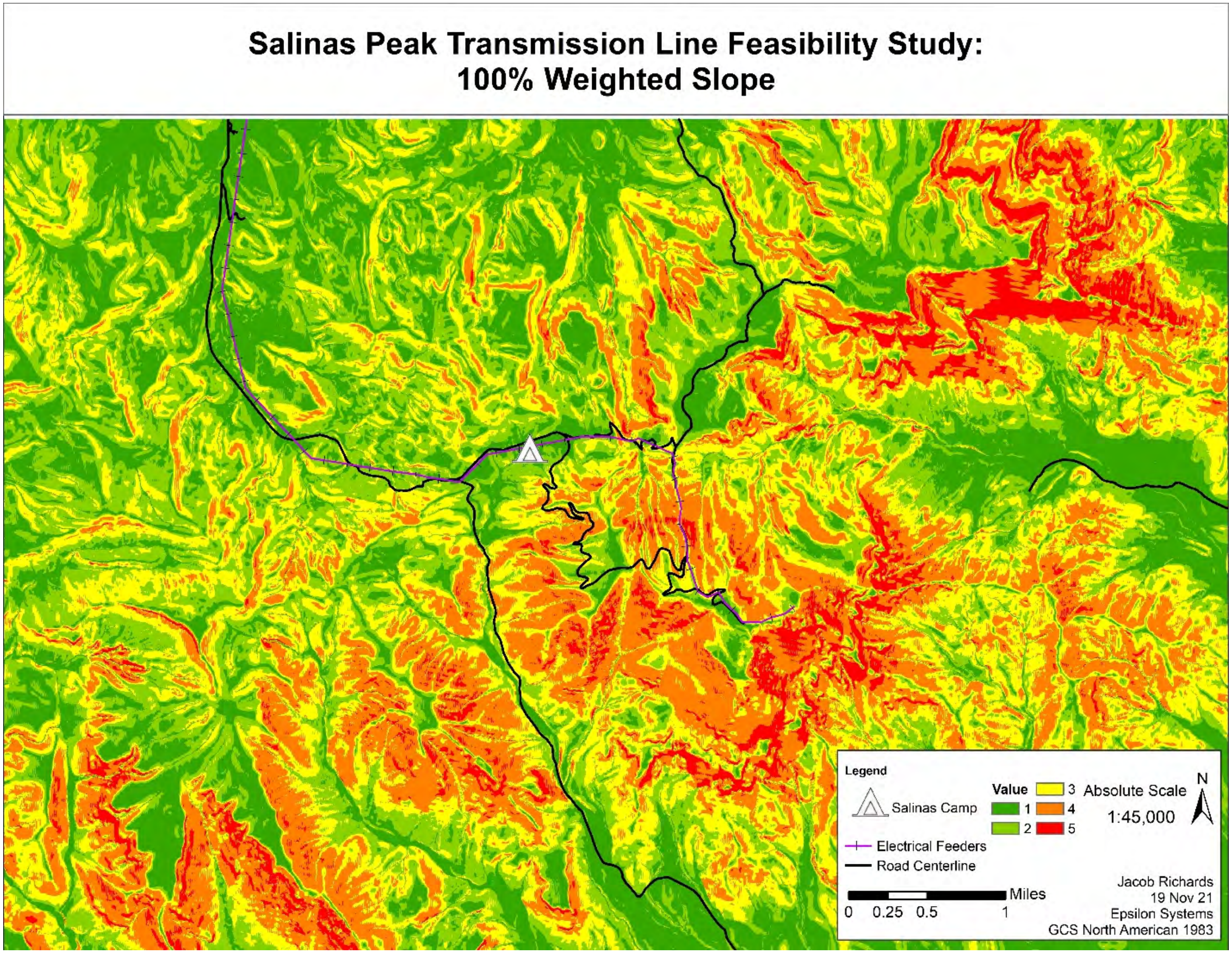

Figure 12. 100% Slope weighted model for Salinas Peak.

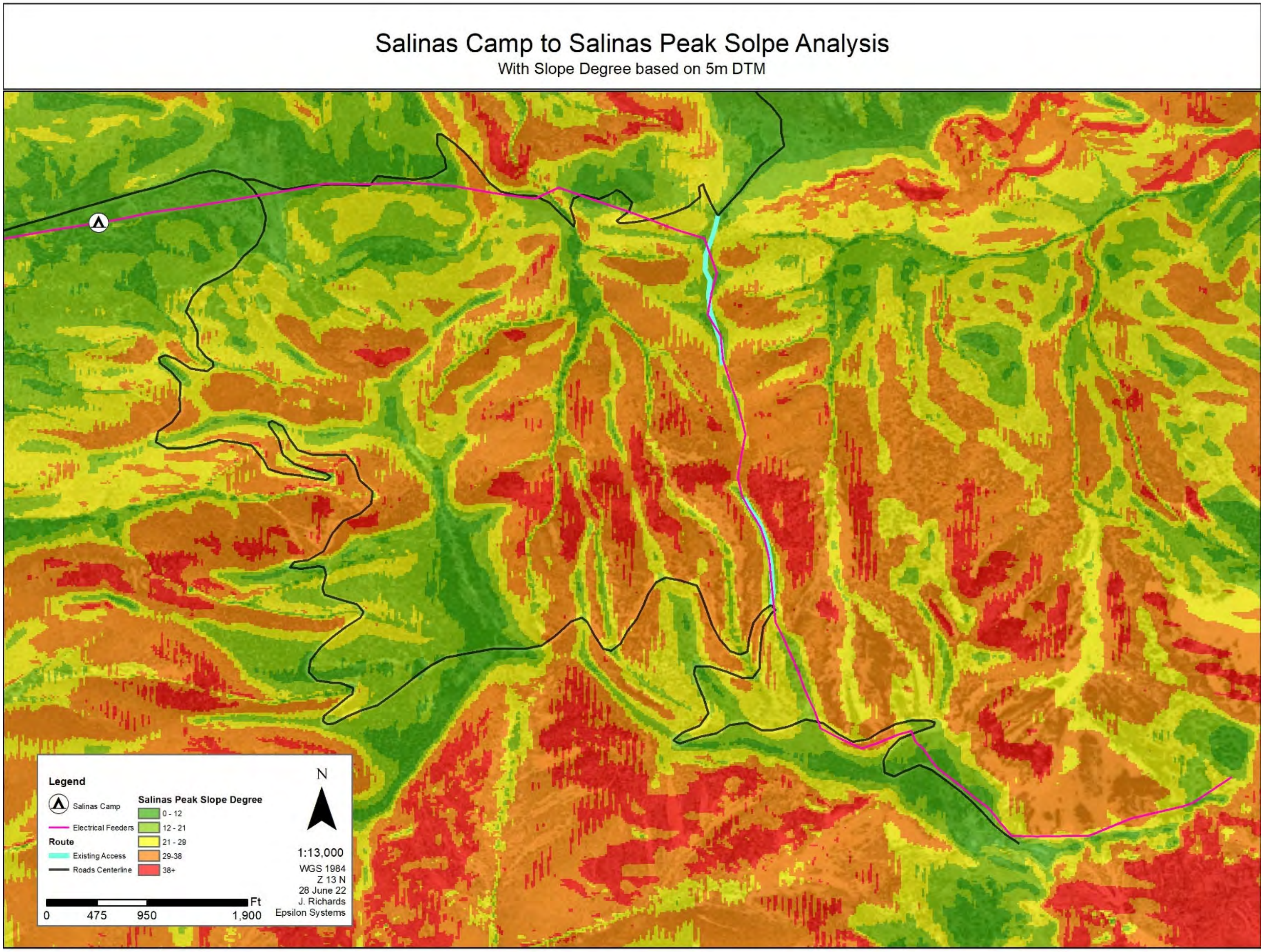

Figure 13. Existing conditions overlain on the slope analysis.

For the sake of space, the following model outputs are all referenced and described below and the corresponding maps are on the following pages.

Figure 14: 100% Weight for corrosion of steel
Consideration for the materials supporting the transmission line and the soil they are placed in is a means to attempt to place the correct materials on the most appropriate site for longevity, decreased maintenance, and overall sustainability.

This map projects the ranked values for the NRCS output for Risk of Corrosion to Steel pertaining to potential soil-induced electrochemical or chemical action that can weaken steel.

Figure 15: 100% Weight for corrosion of concrete
This map is identical in nature to the above map, but instead of steel corrosion displays the risk of corrosion for concrete.

Figure 16: 50% weight slope 50% erosion
Slope and erosion seem specifically important for the transmission poles. This places equal weight on each to see the likelihood of increased erosion based on slope.

Figure 18: 50% weight slope 50% rutting
Slope and soil rutting also seem specifically important for the transmission poles. This places equal weight on each to see the likelihood of increased rutting based on slope.

Figure 18: 50% weight slope 50% all other soil types
This output is based on a 50% slope and the other 50% comprises the 5 soil categories.

Risk of corrosion of concrete, risk of corrosion of steel, erosion hazards, rutting hazards, and wind erodibility were each given a 10% weight.

This depicts how slope and the various soil components are acting together and shows a slightly different scale of how soil and slope interact.

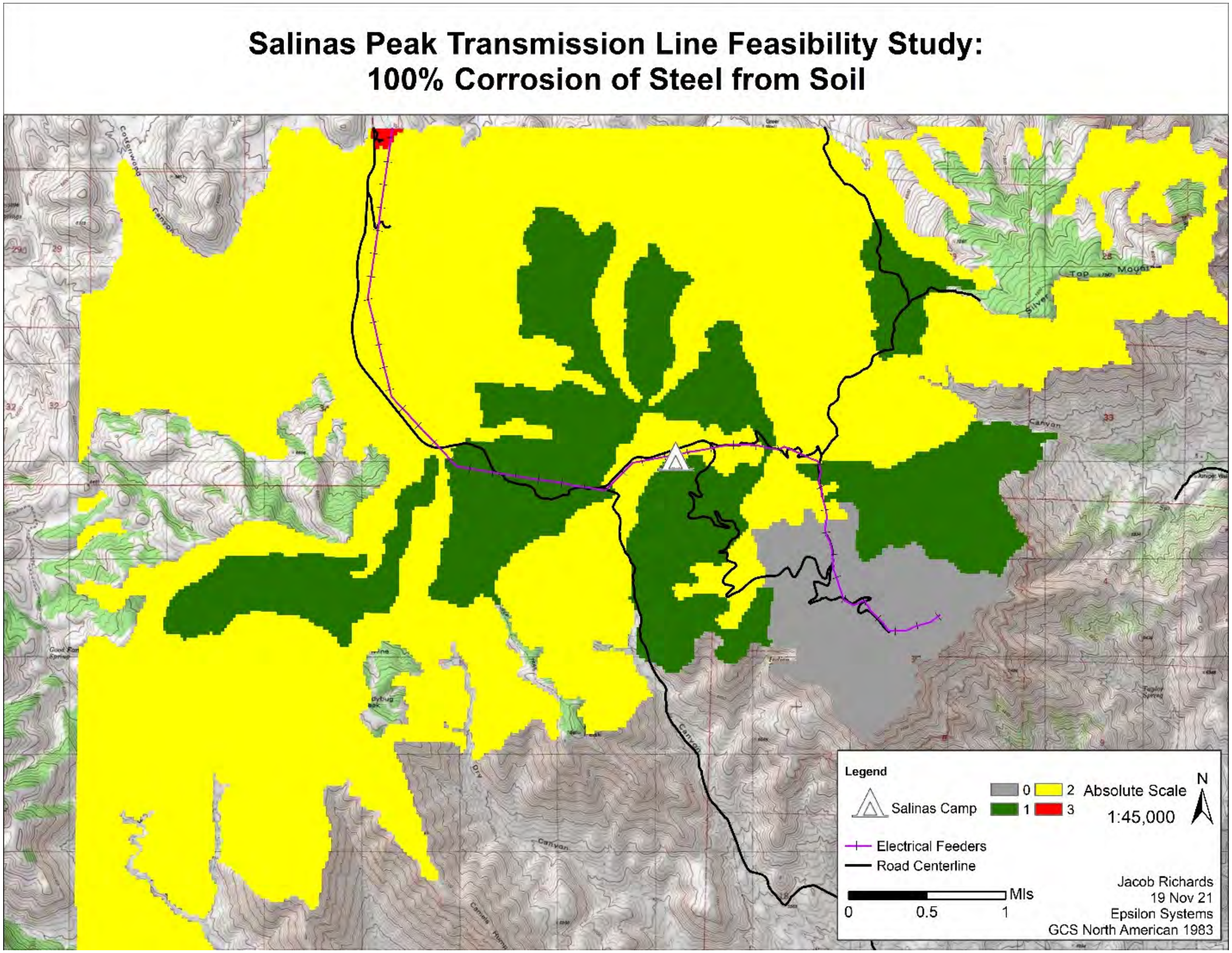

Figure 14. 100% Weighted model for corrosion of steel.

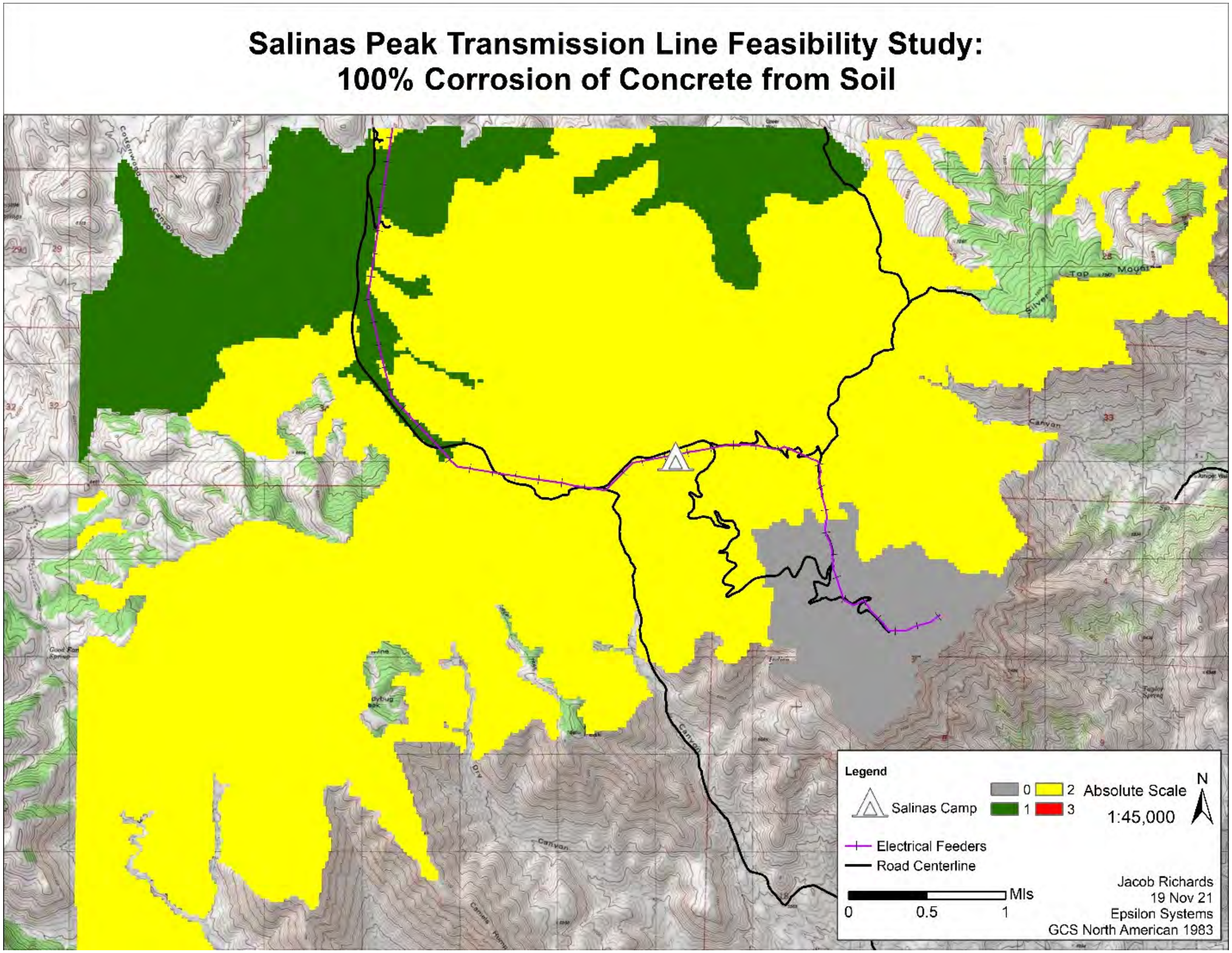

Figure 15. 100% Weighted model for corrosion of concrete.

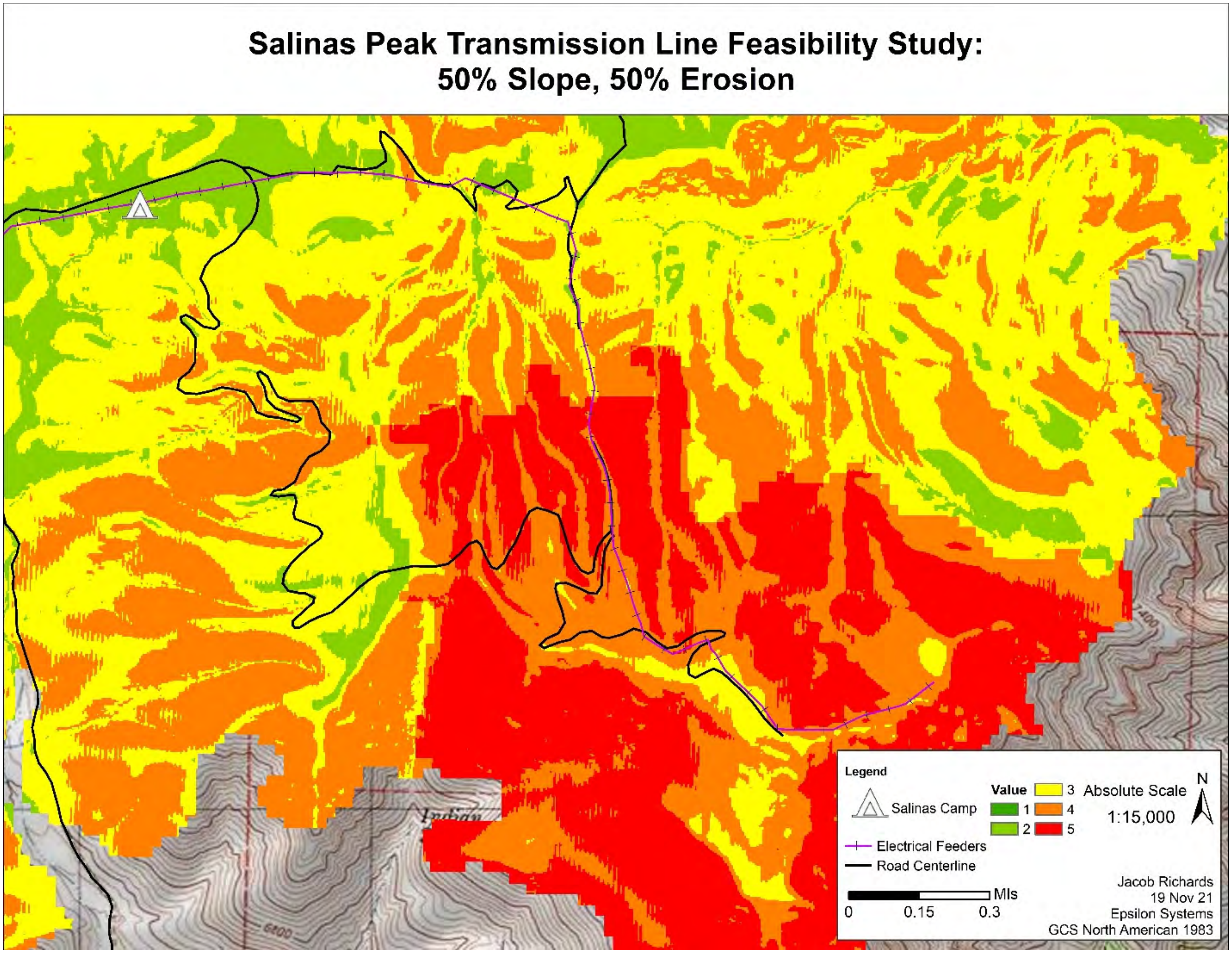

Figure 16. 50% weight slope 50% erosion.

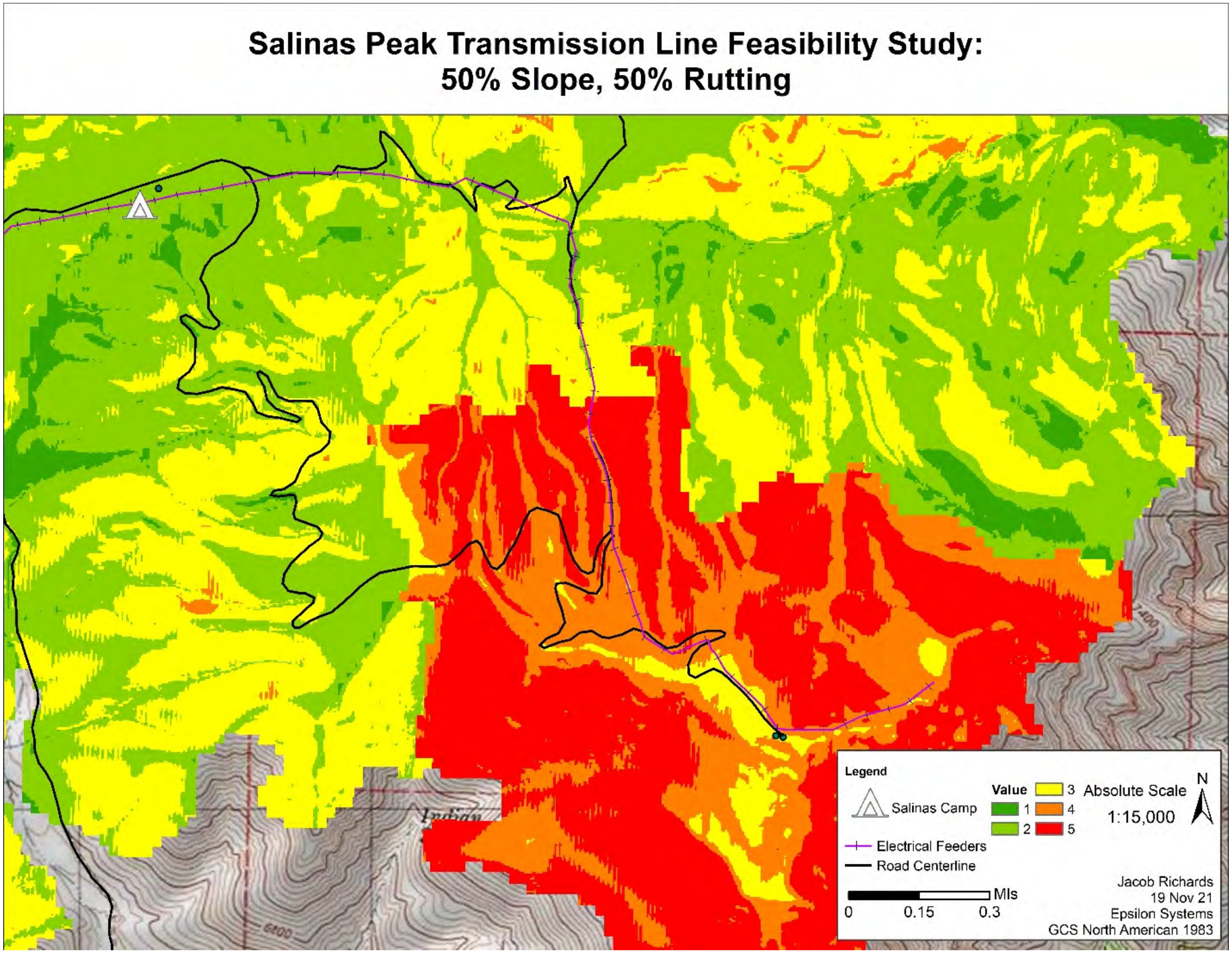

Figure 17. Model output based on 50% weight slope 50% erosion.

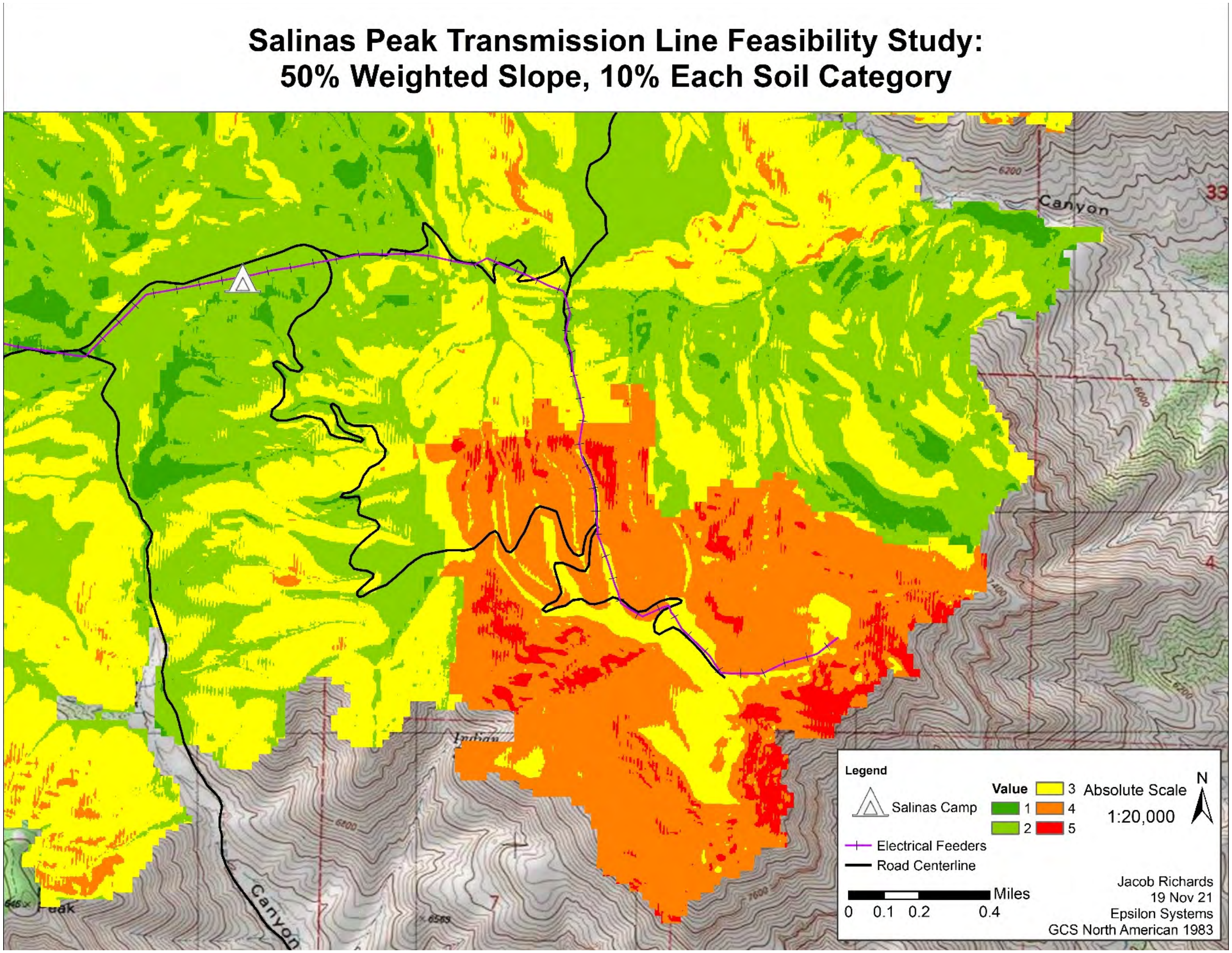

Figure 18. Model output based on 50% weight slope 50% all other soil types.

Current Pole Identification:

Pole ID Full: This shows the last two digits of the Pole ID number. The full number is within the metadata, and each pole should have a corresponding tag with the number listed on this map.

Pole ID lower, middle, and upper: These break the full line into three components for easier viewing.

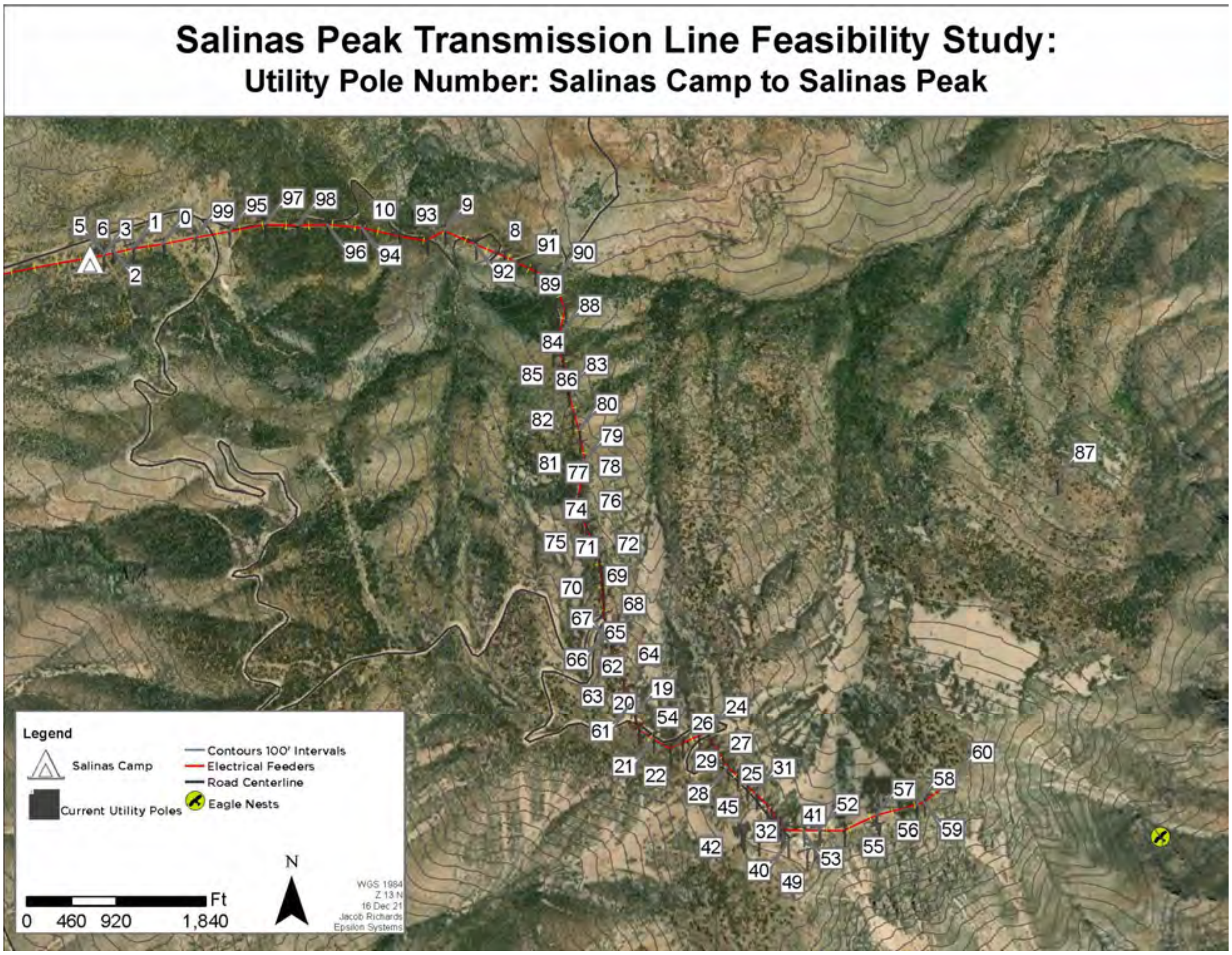

Figure 19. Current pole identification number. Full extent of the existing line.

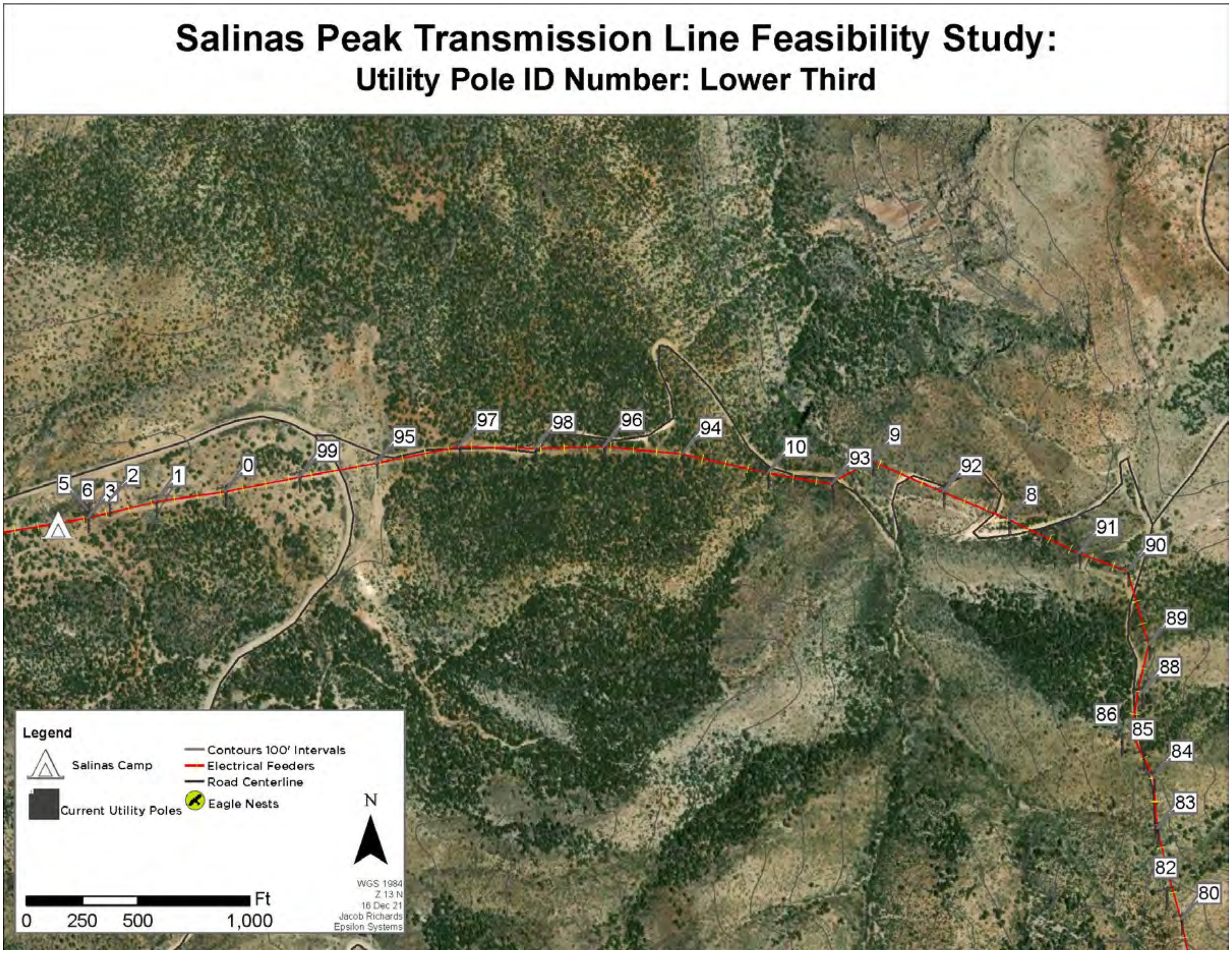

Figure 20. Current pole identification number. Lower third of the existing line.

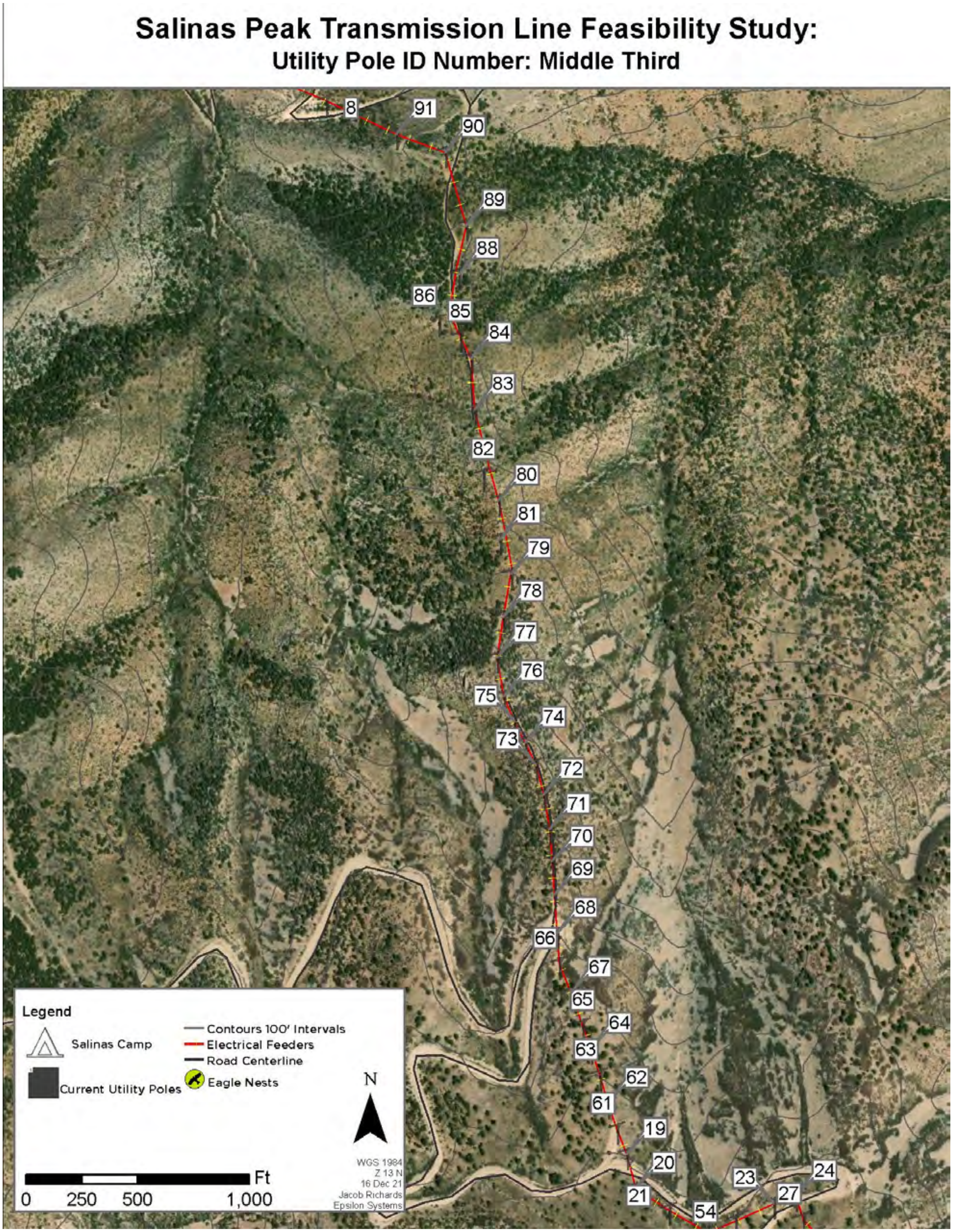

Figure 21. Current pole identification number. Middle third of the existing line.

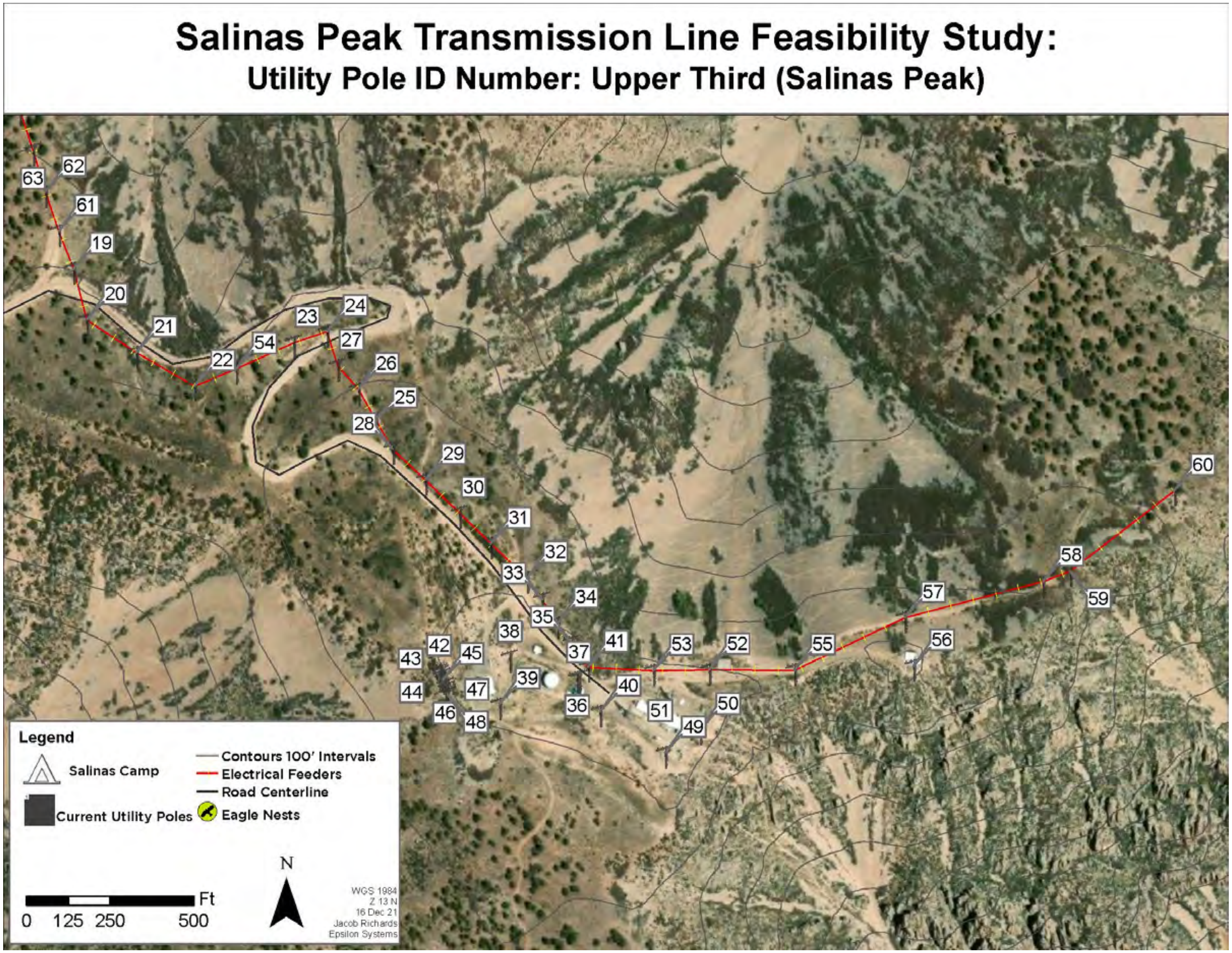

Figure 22. Current pole identification number. Upper third of the existing line.

Results for Existing Line

The entire length of the transmission line starting at Salinas Camp was broken out into easily viewable sections provided in the following figures. The analysis starts at Salinas Camp and moves towards Salinas Peak. Each section shows the current poles, the current feeder line, and the two-digit WSMR pole ID number. Each section is shown with the base imagery and then with the slope feasibility ranking. This was done because, as mentioned earlier, more often than not, the slope of the hillside is the single most limiting factor for determining current pole locations and potential relocations in most cases.

Attached to the symbol for each pole is a ranking of 1,2, or 3. The rankings were developed from the various components of the model including slope, proximity to the roadway, soils, the physical site visit, as well as other variables outlined.

Generally speaking, a pole with a ranking of 1 is considered generally sited well. These are represented by a green circle. Based on visual confirmation and model outputs, these poles seem to currently be in logical and sustainable positions.

A pole with a ranking of 2 is considered not ideal or adjacent to an issue. In several areas, the physical pole could be moved at the next opportunity for maintenance or when adjacent poles are serviced but do not require immediate action. Others are placed on the landscape in such a way that they are fine currently but eventually will need to be addressed and relocated to a more sustainable location.

A pole with a ranking of 3 is considered to need replacement consideration. These poles do not need to be immediately removed, but they are placed and operate outside sustainable locations. The poles ranked 3 should have the highest priority for planning.

Importantly, while this potion of the analysis is for the existing utility line and the individual pole placement, the line is a contiguous unit and does not operate in sections. The primary purpose of this portion of the analysis was to glean what siting works, doesn't work, and what potential conflicts between the known variables would present themselves moving along the line. These interactions informed the recommendations for moving forward in developing the EA alternatives related to repairing or replacing parts of or the entire line.

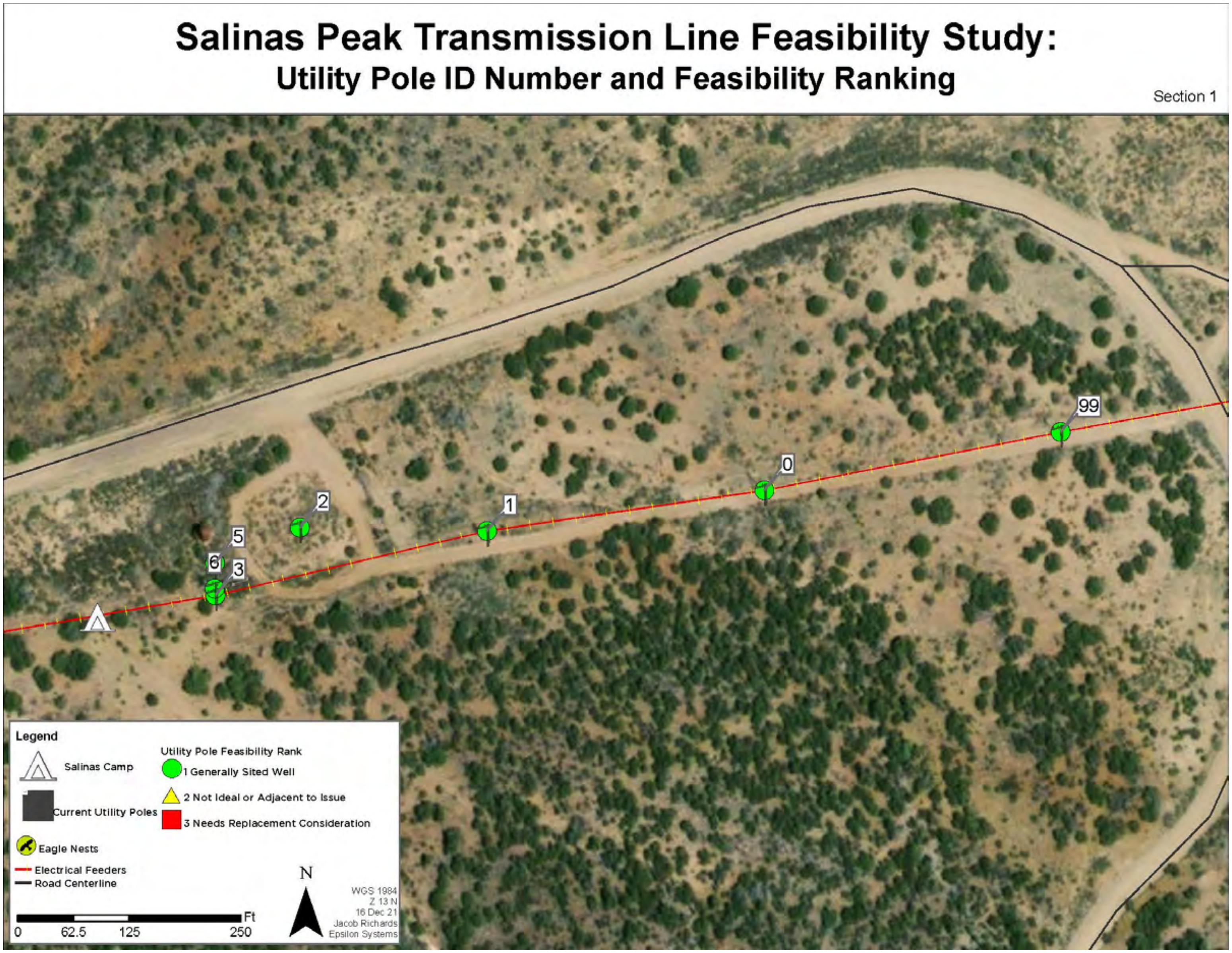

Figure 23. Existing Line Section 1 pole rankings.

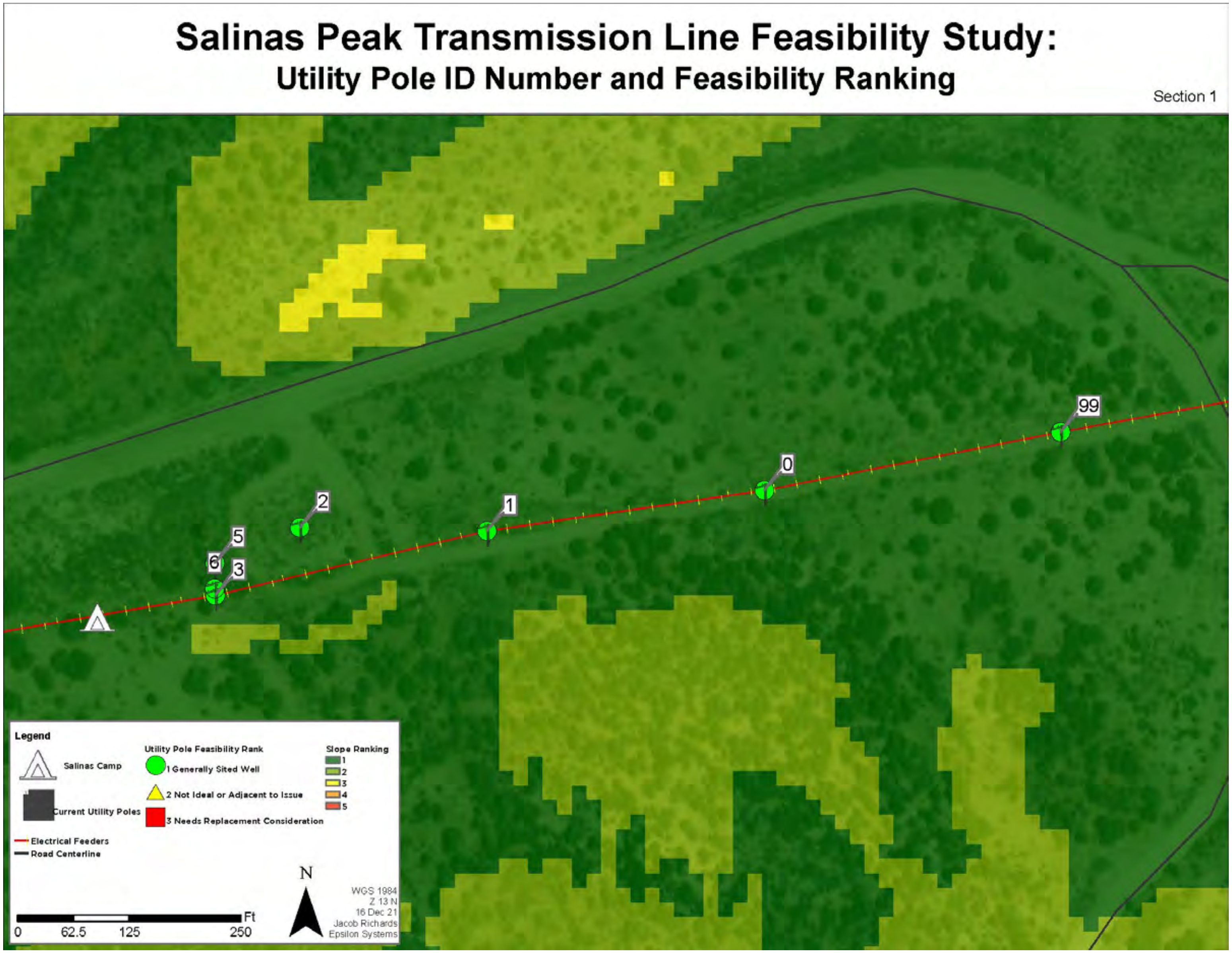

Figure 24. Existing Line Section 1 pole rankings with slope overlay.

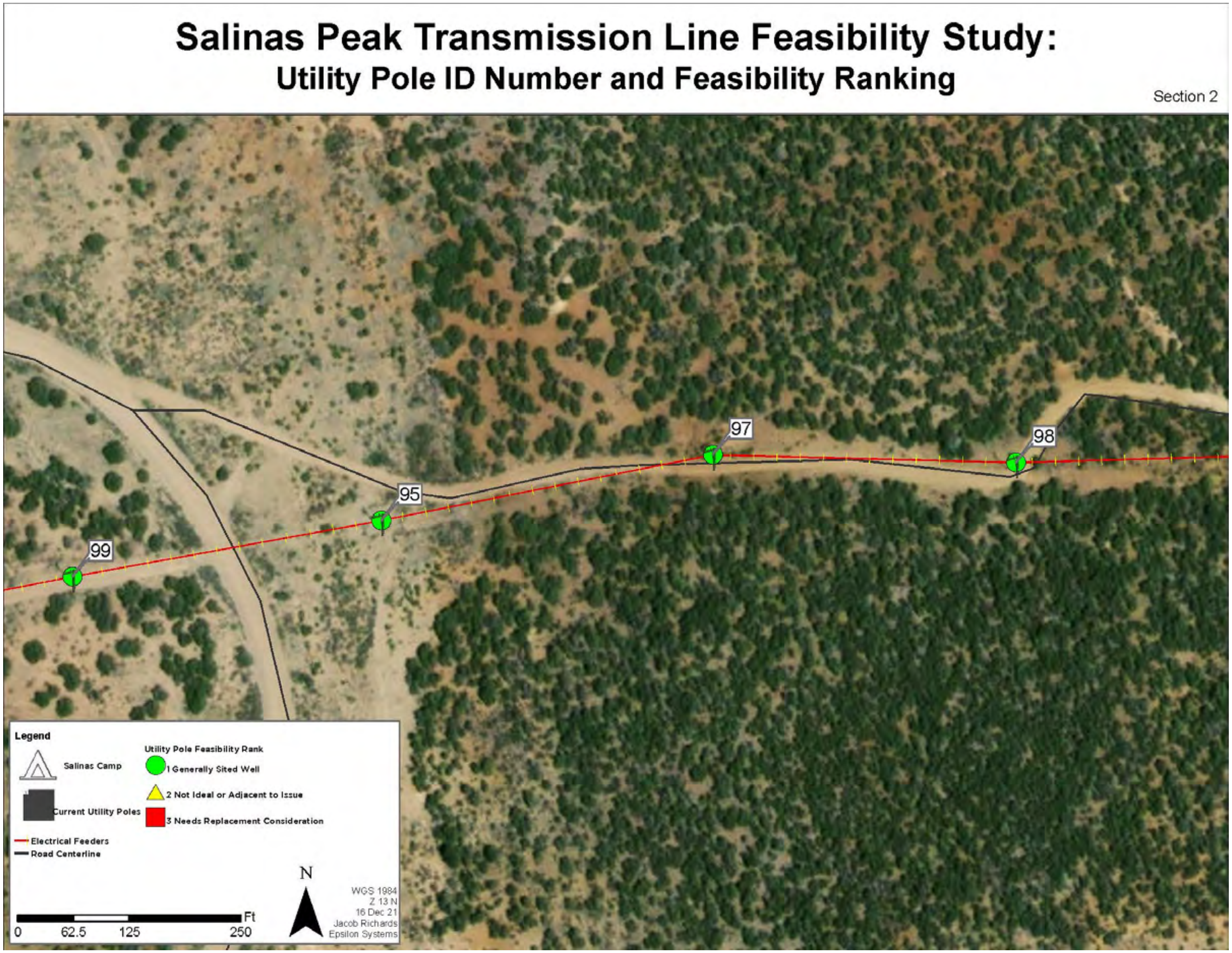

Figure 25. Existing Line Section 2 pole rankings.

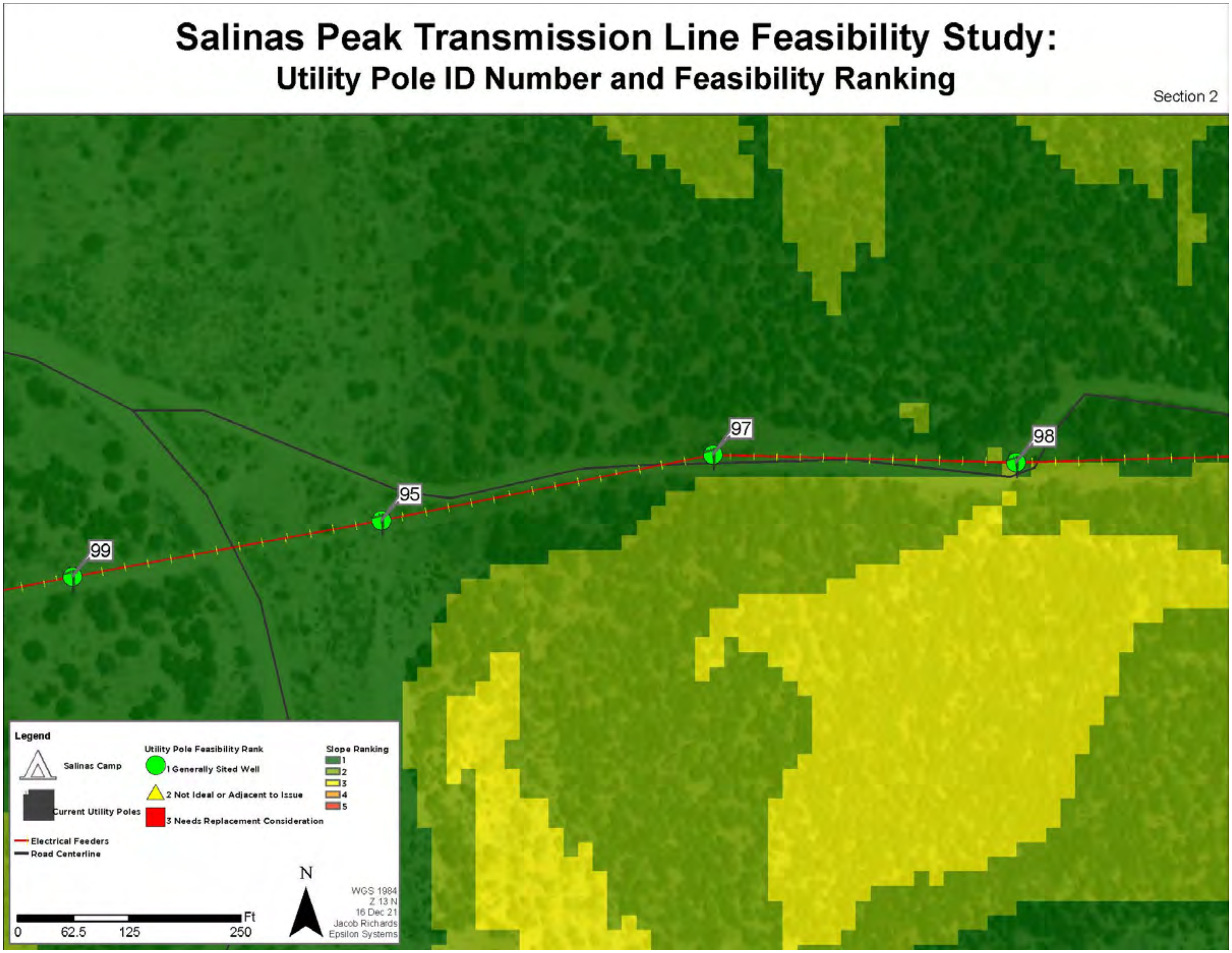

Figure 26. Existing Line Section 2 pole rankings with slope overlay.

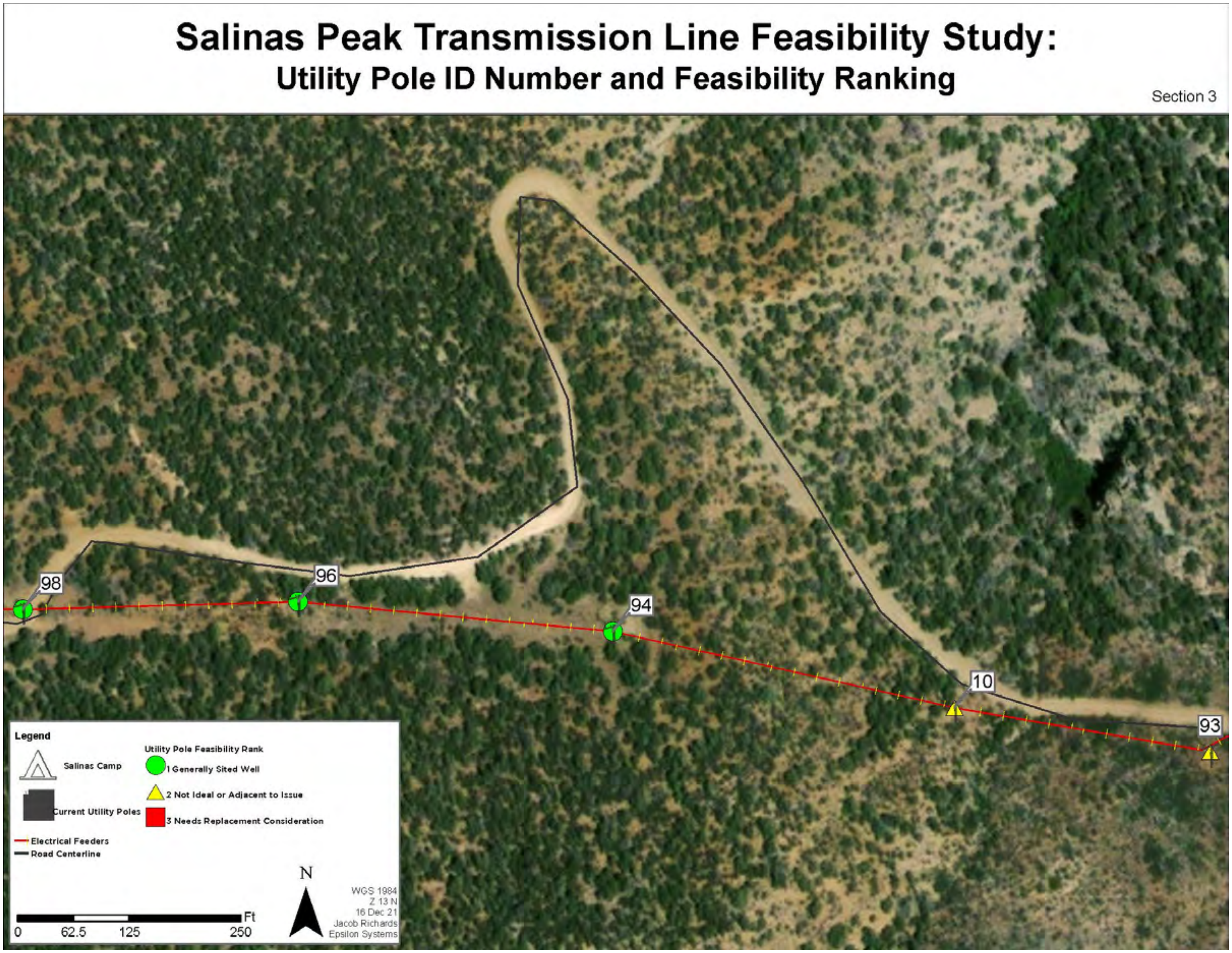

Figure 27. Existing Line Section 3 pole rankings.

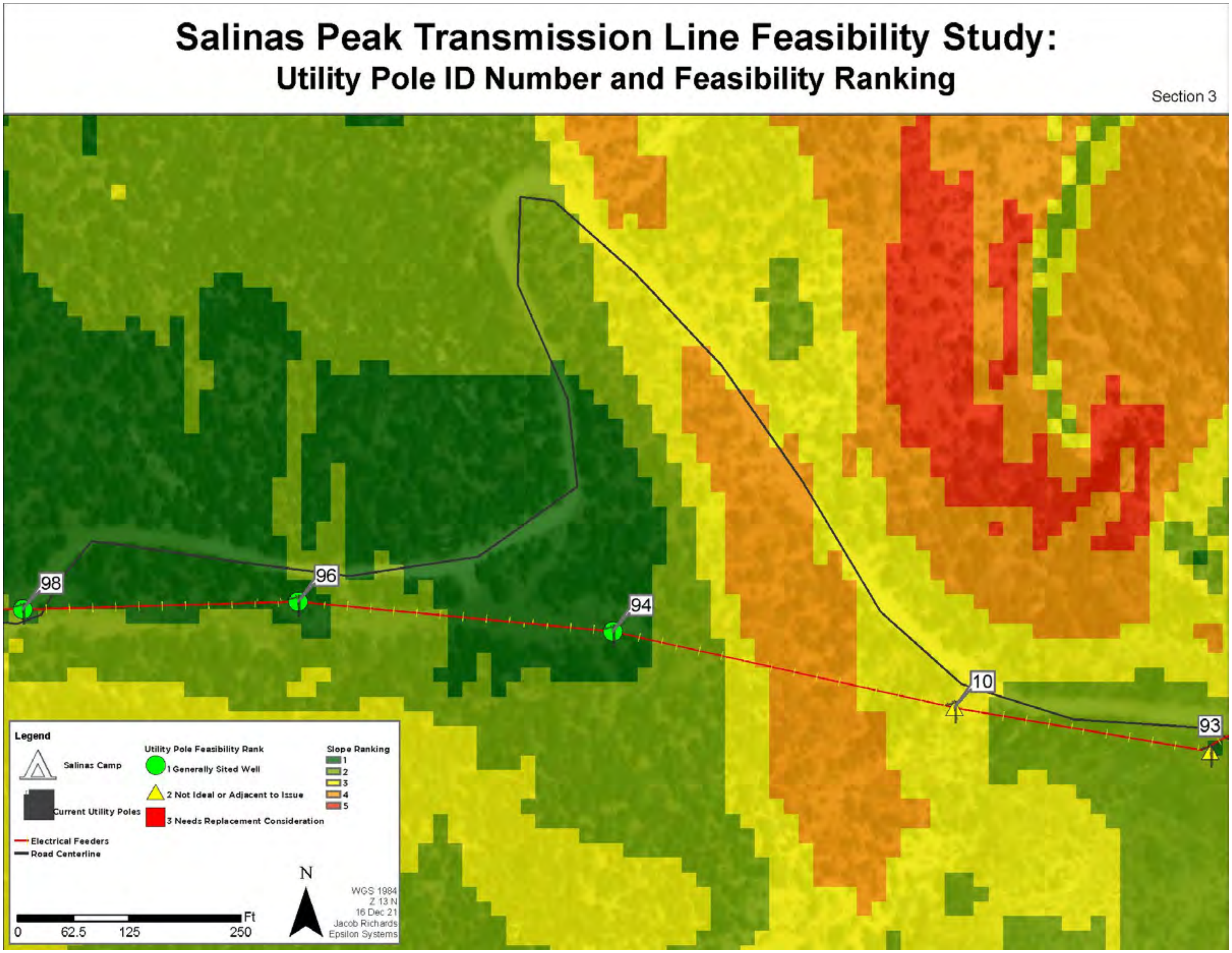

Figure 28. Existing Line Section 3 pole rankings with slope overlay.

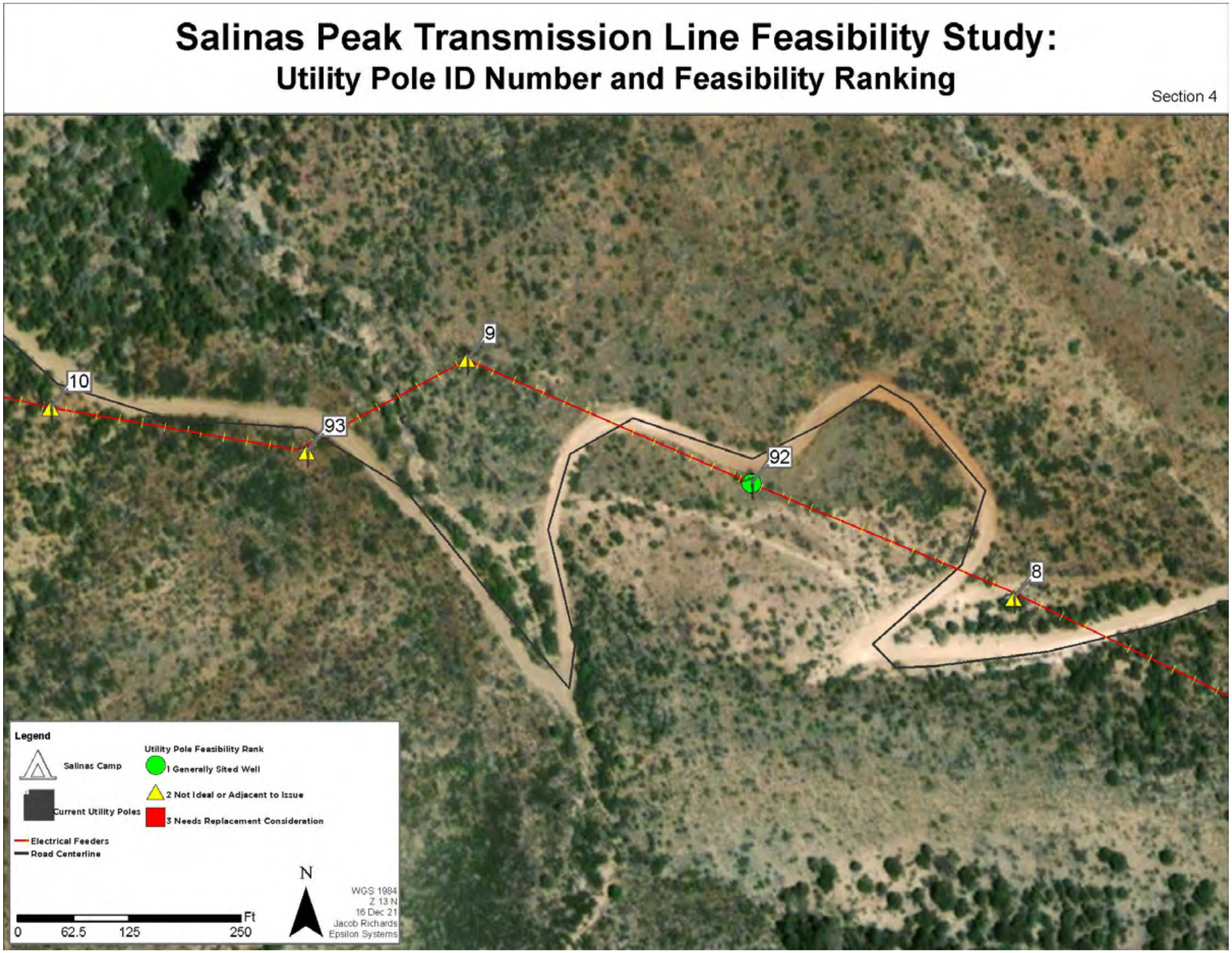

Figure 29. Existing Line Section 4 pole rankings.

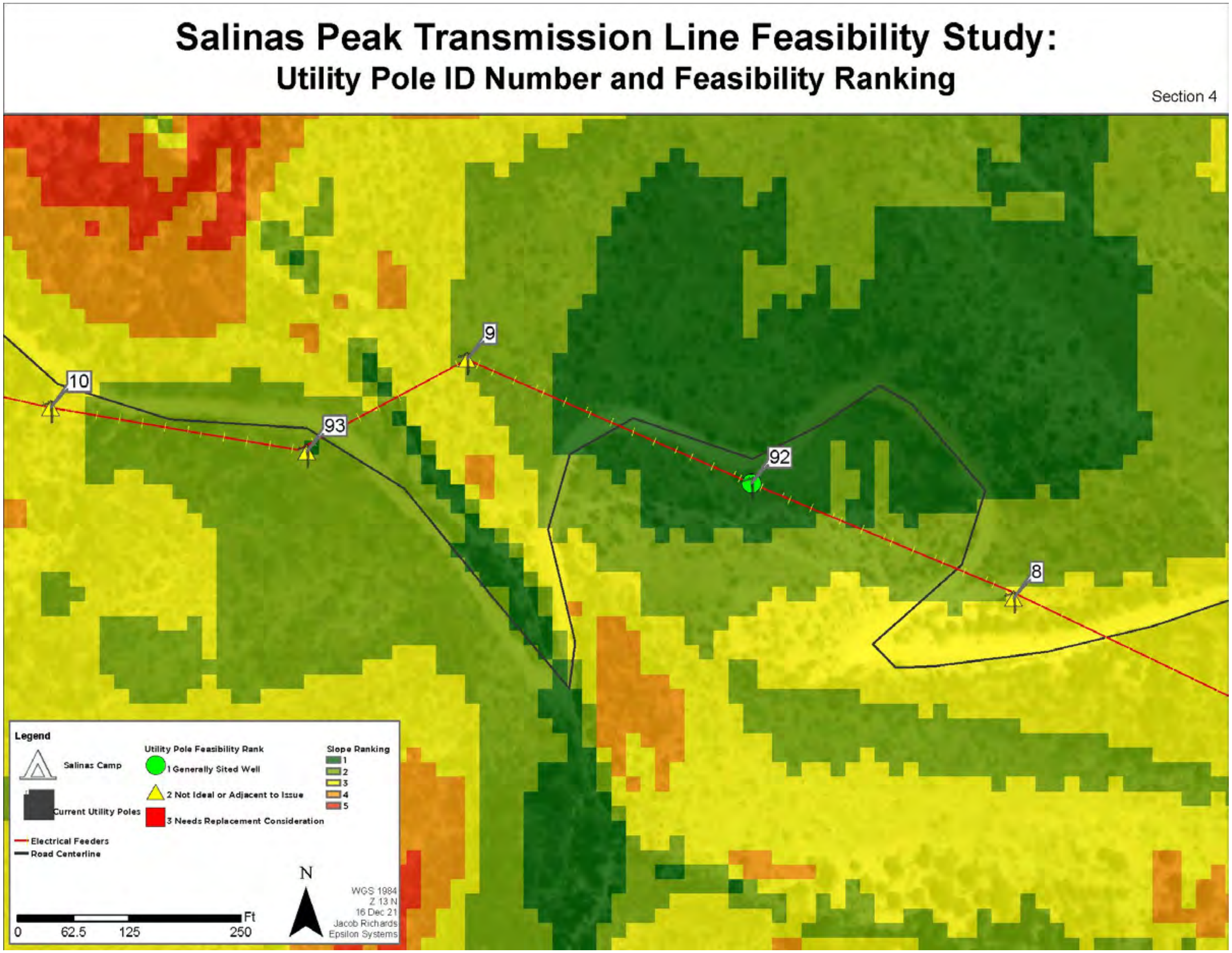

Figure 30. Existing Line Section 4 pole rankings with slope overlay.

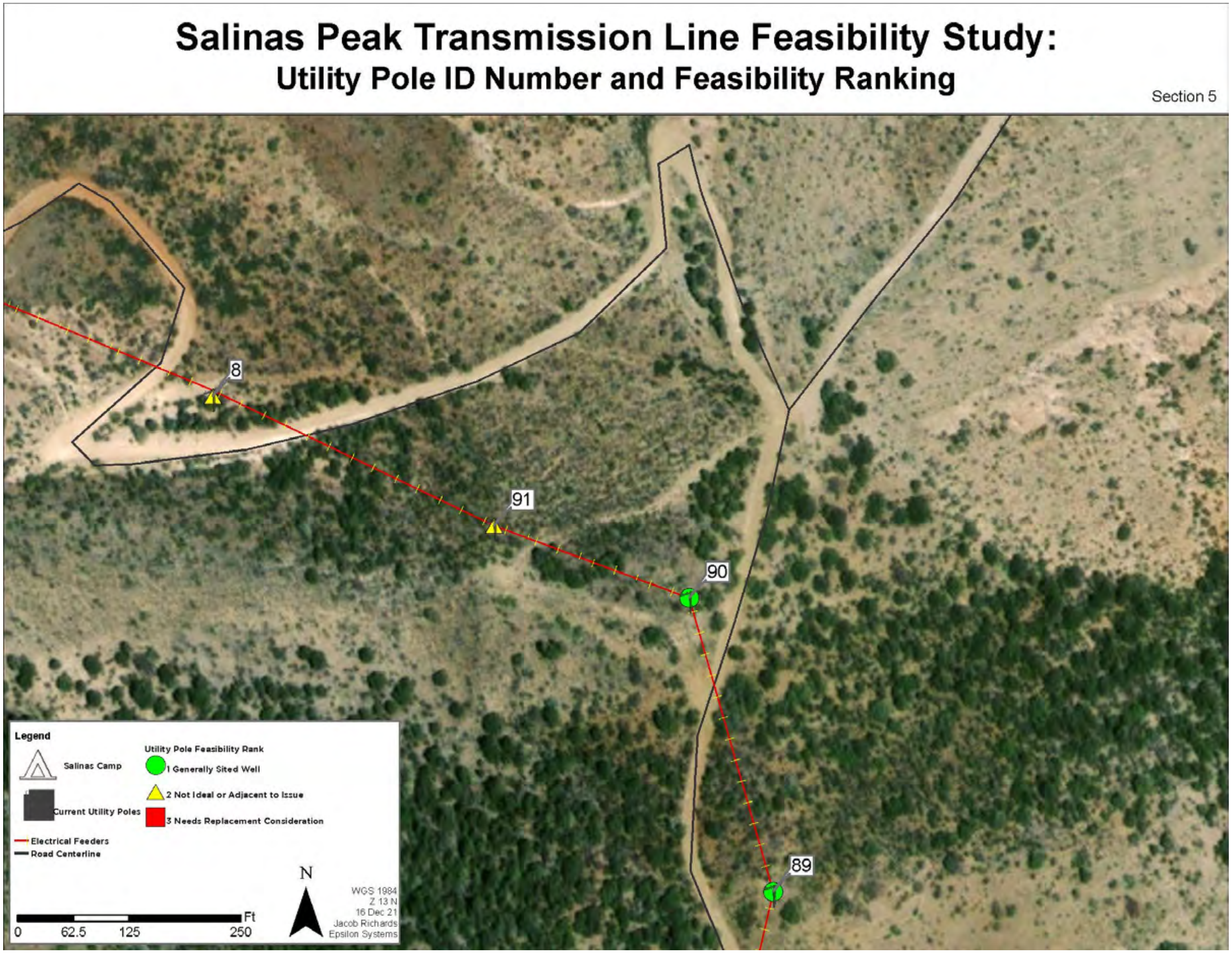

Figure 31. Existing Line Section 5 pole rankings.

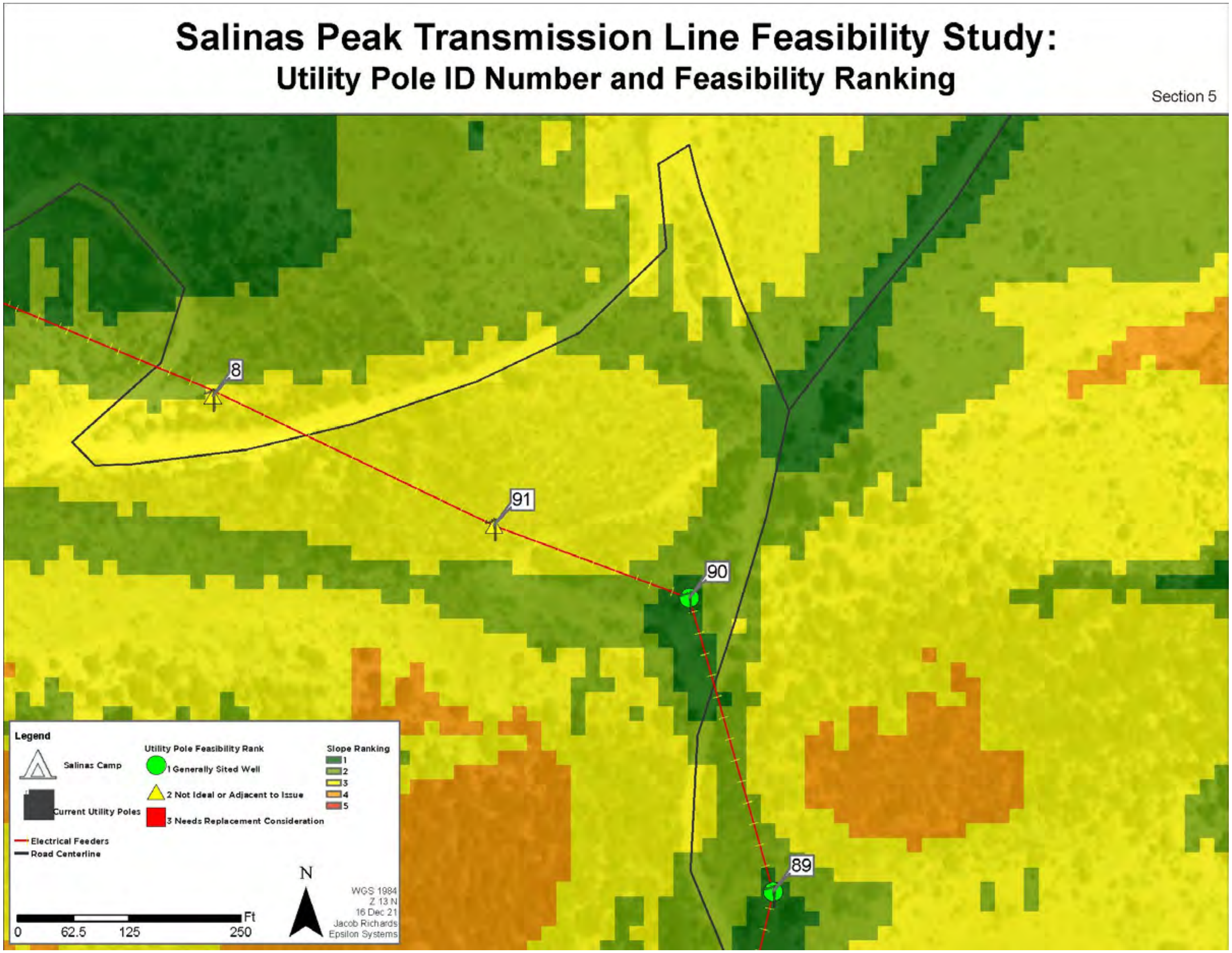

Figure 32. Existing Line Section 5 pole rankings with slope overlay.

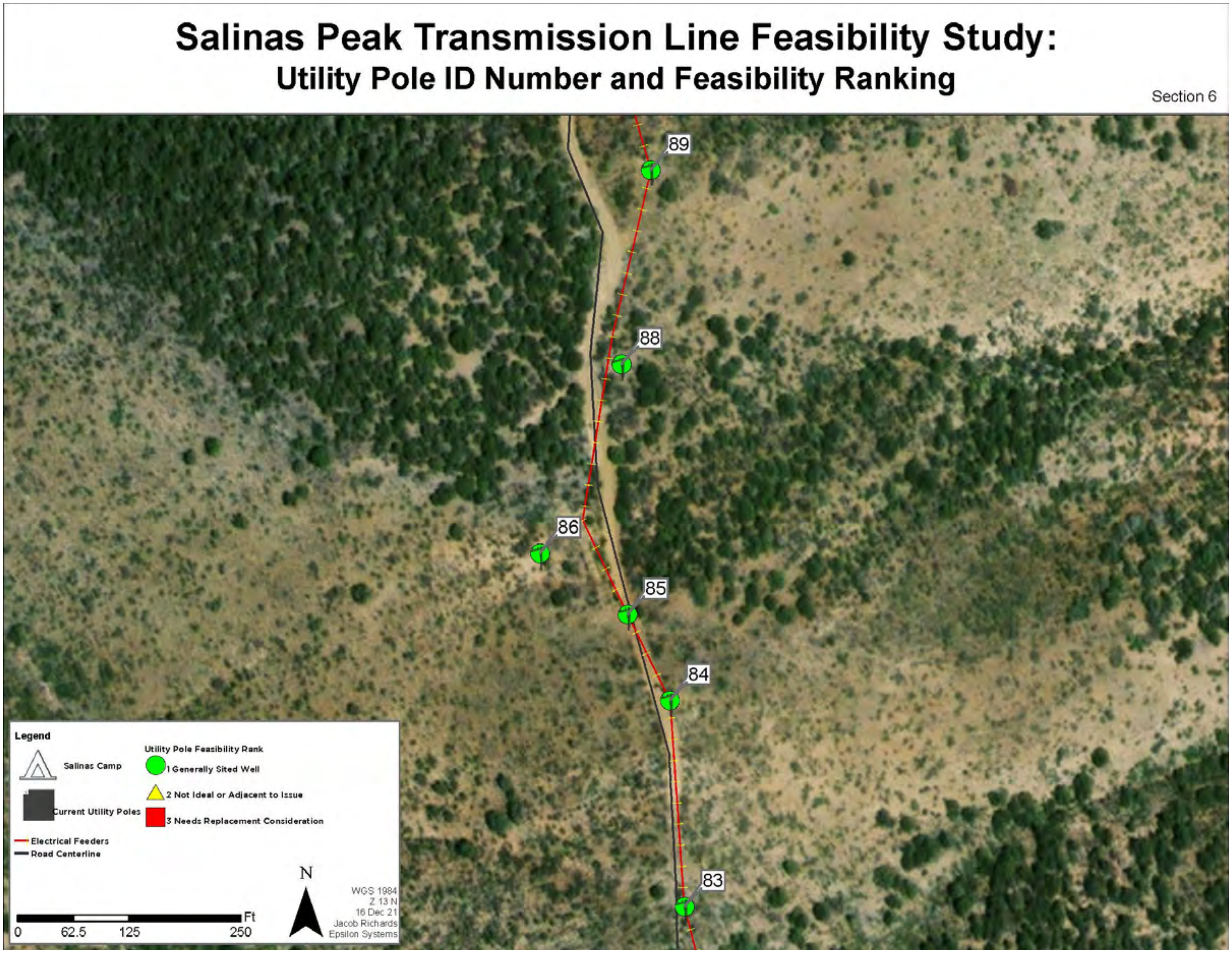

Figure 33. Existing Line Section 6 pole rankings.

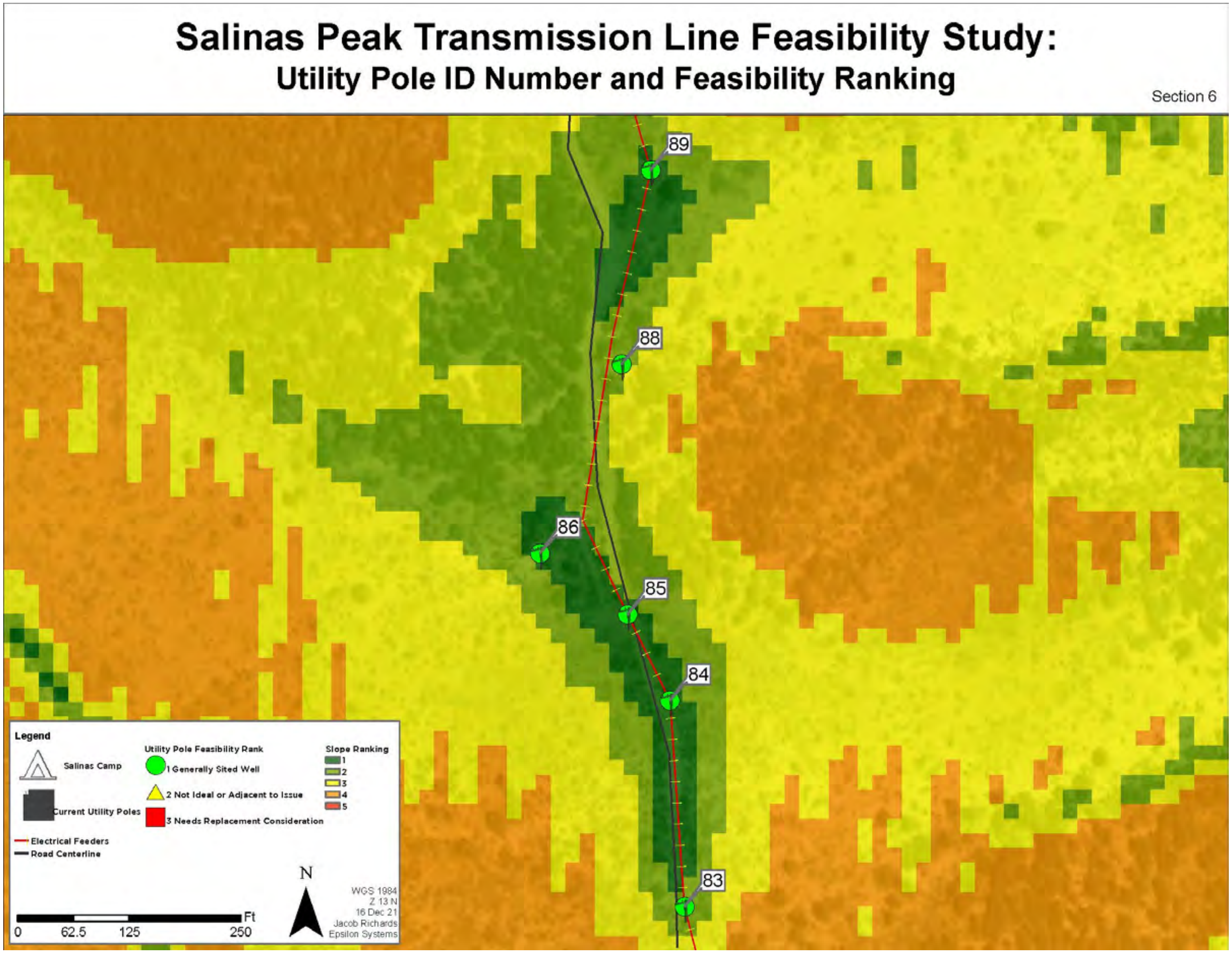

Figure 34. Existing Line Section 6 pole rankings with slope overlay.

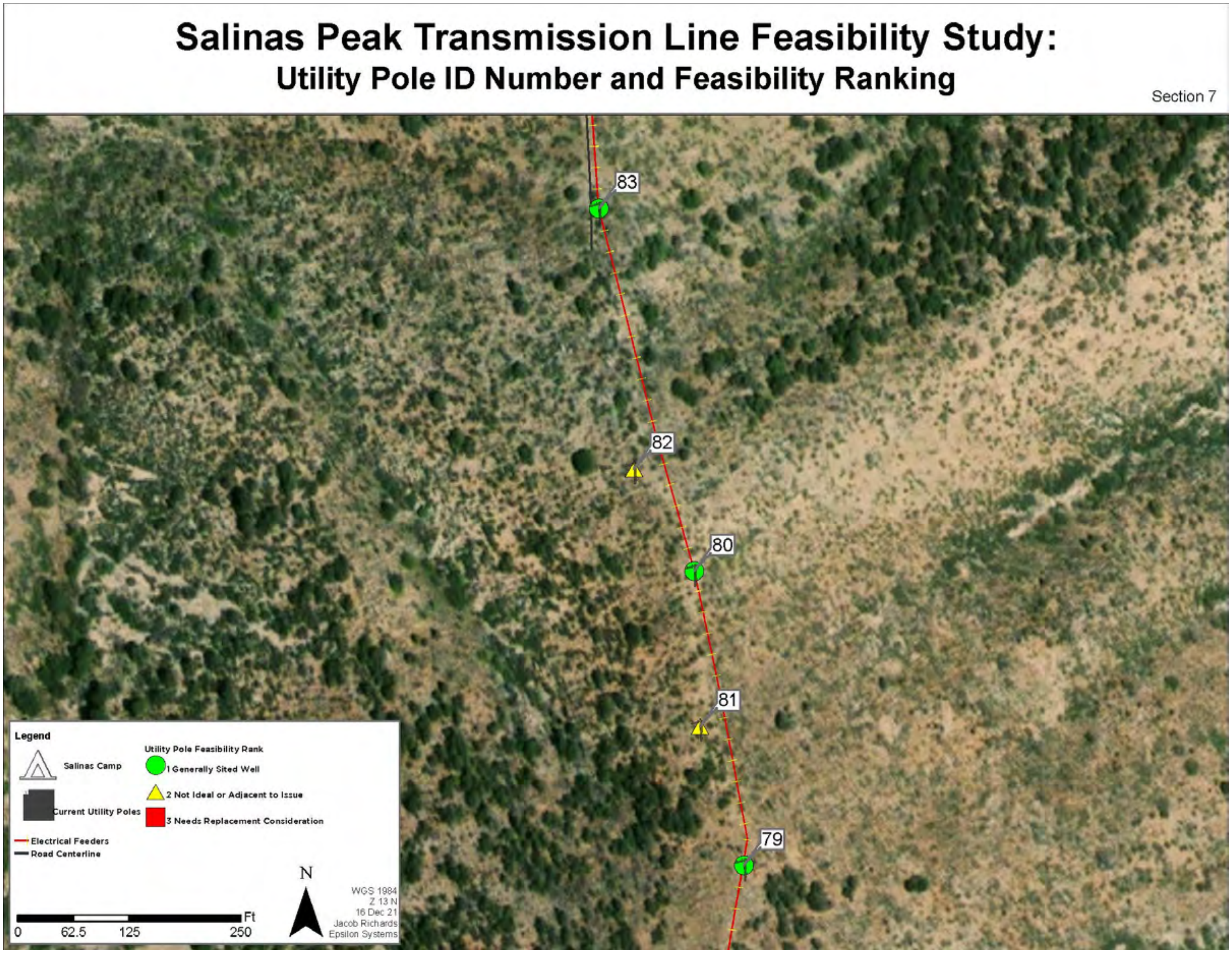

Figure 35. Existing Line Section 7 pole rankings.

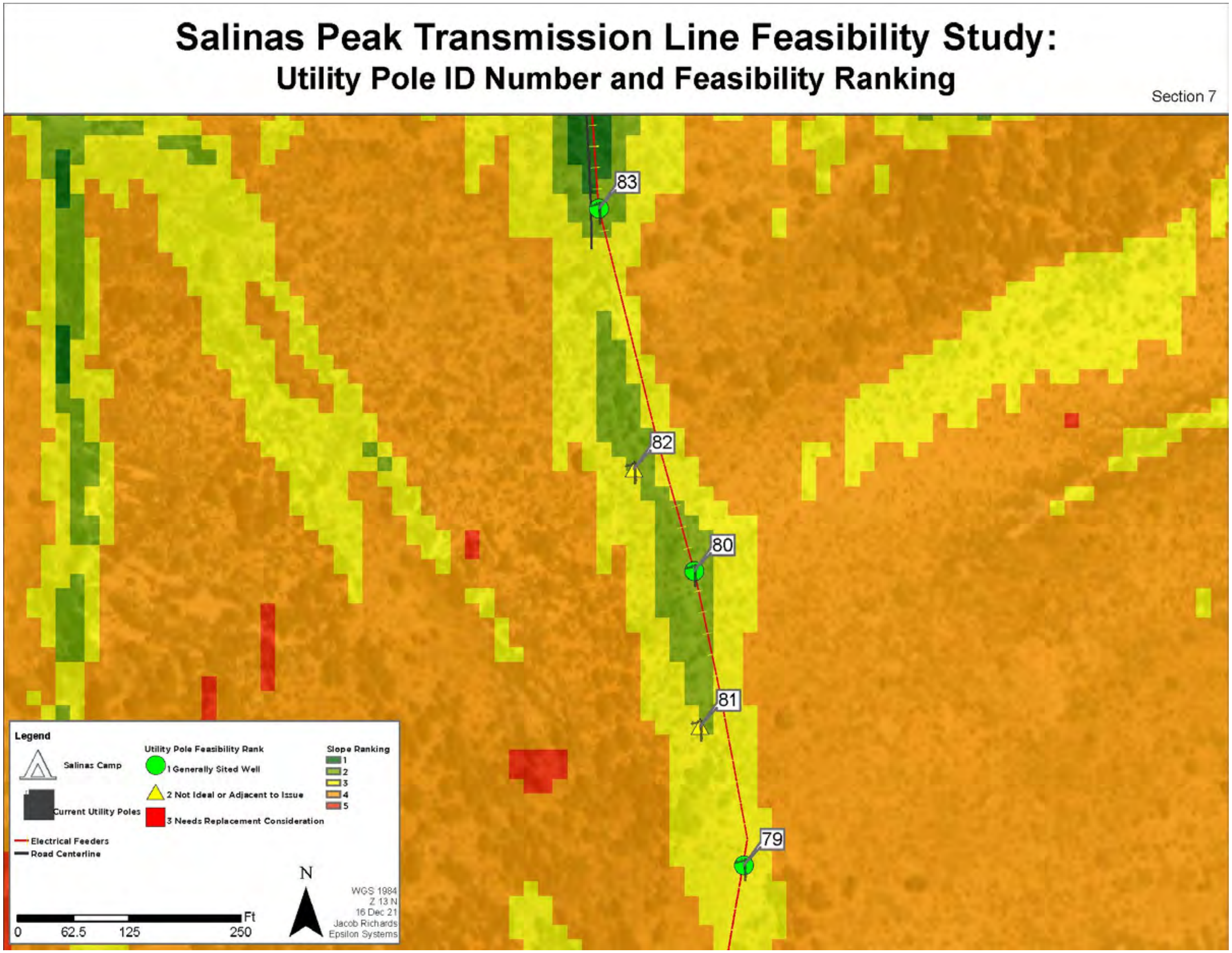

Figure 36. Existing Line Section 7 pole rankings with slope overlay.

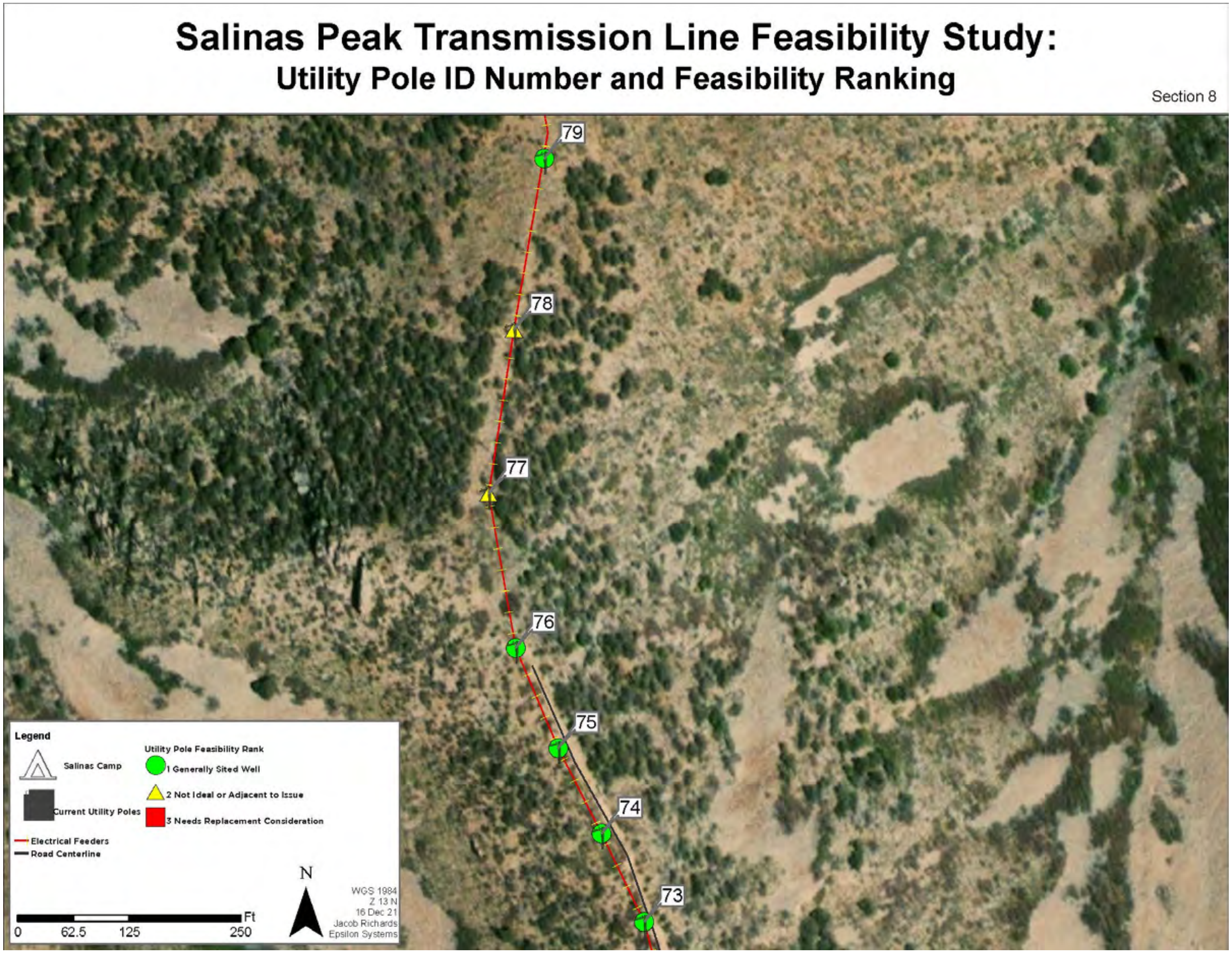

Figure 37. Existing Line Section 8 pole rankings.

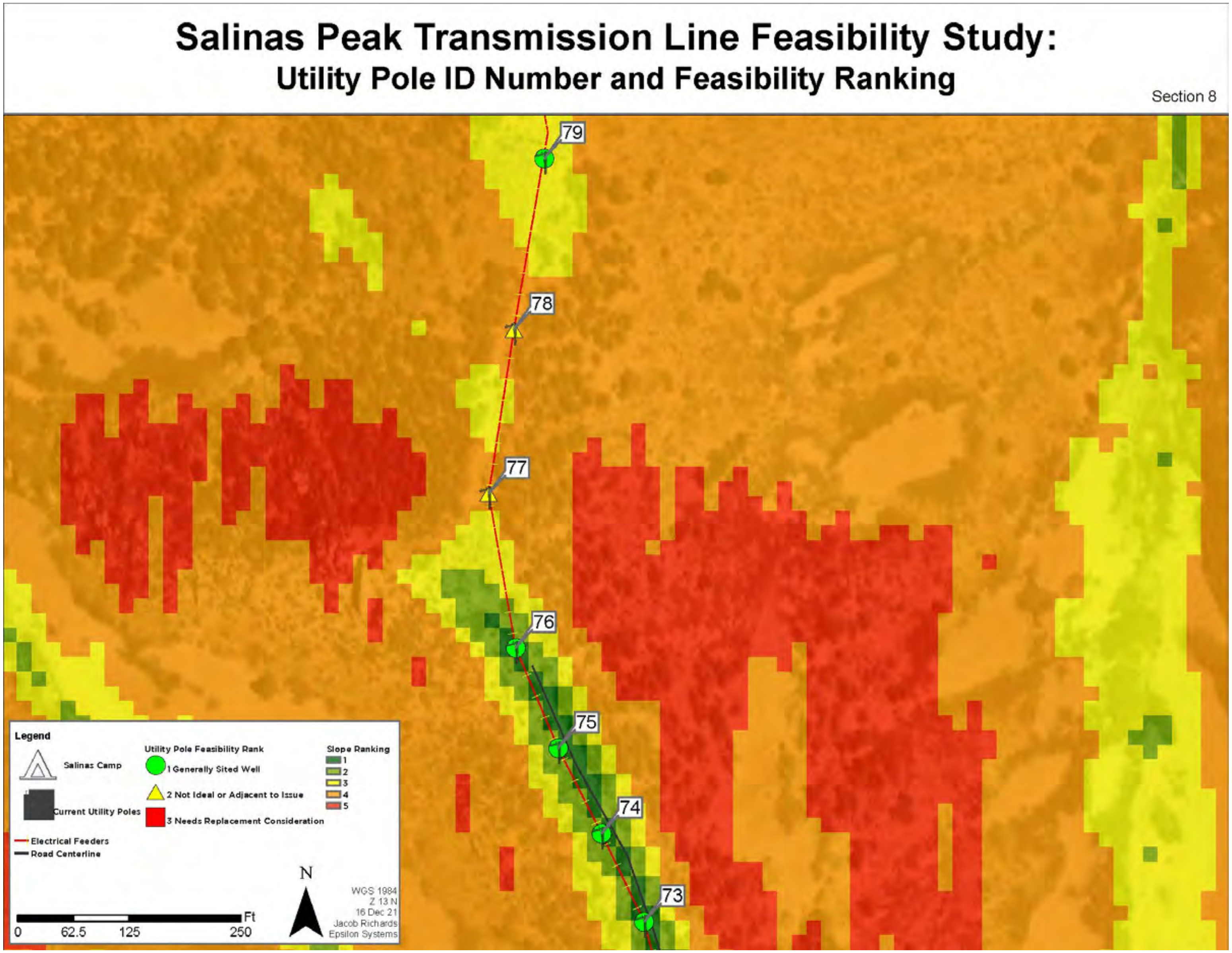

Figure 38. Existing Line Section 8 pole rankings with slope overlay.

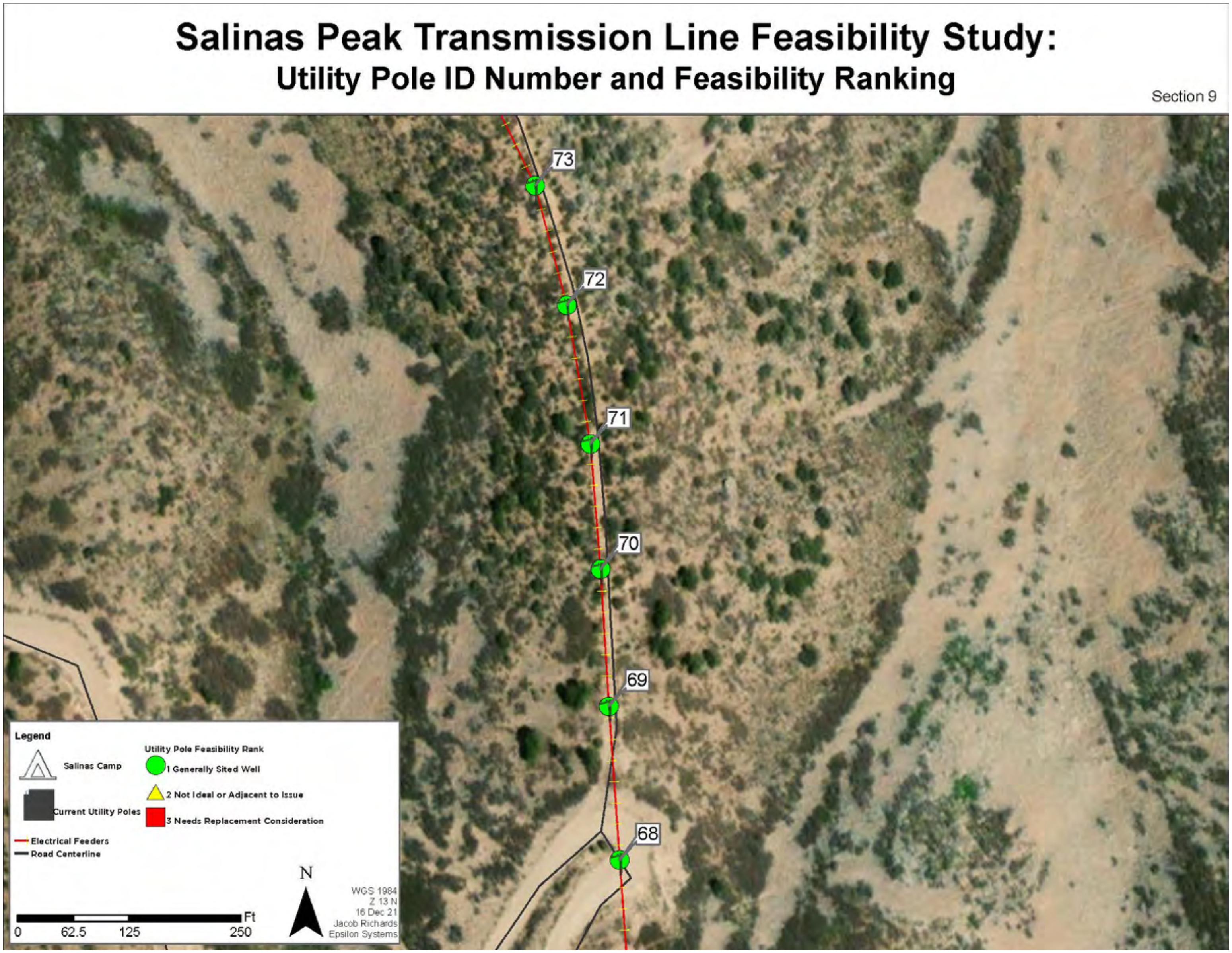

Figure 39. Existing Line Section 9 pole rankings.

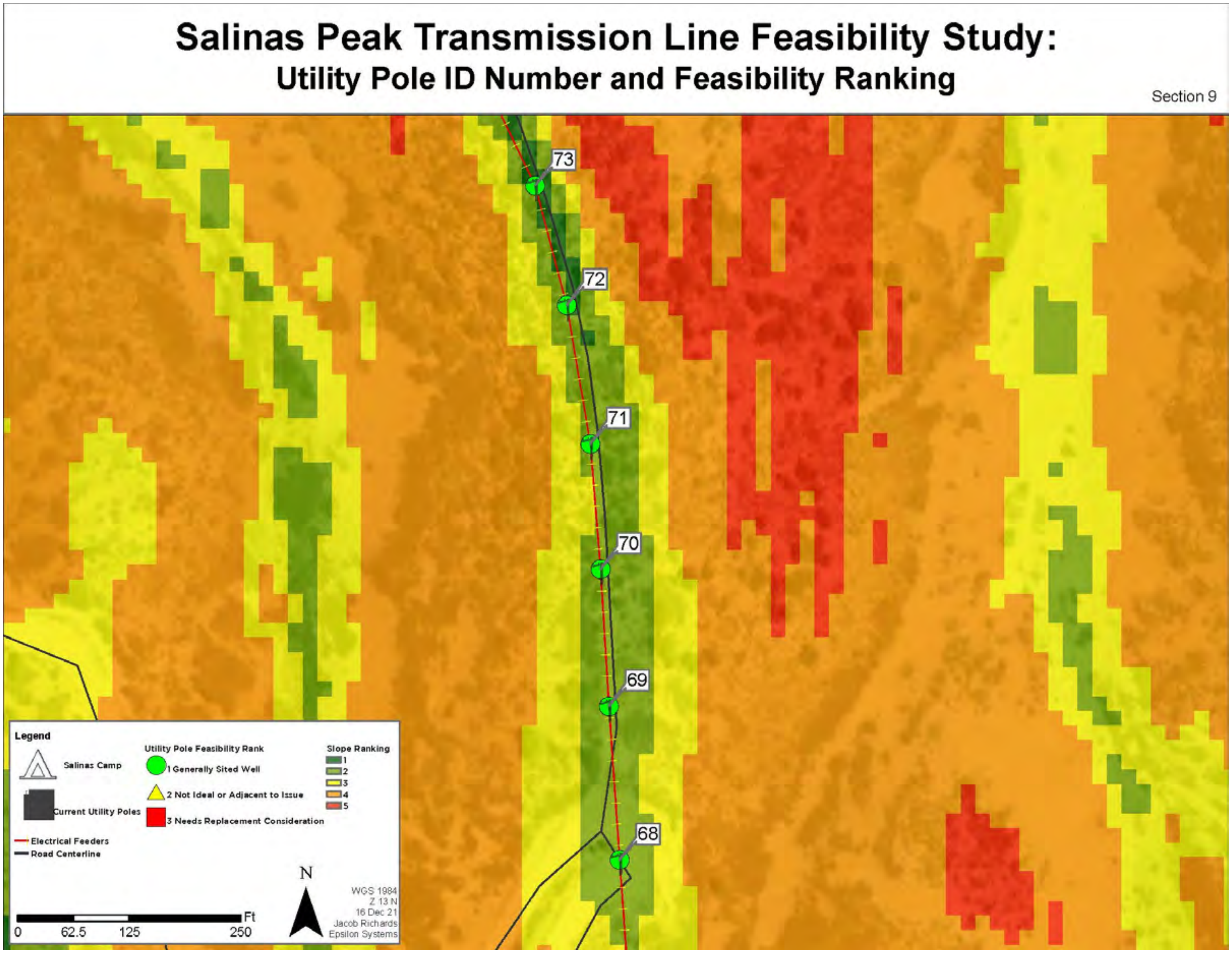

Figure 40. Existing Line Section 9 pole rankings with slope overlay.

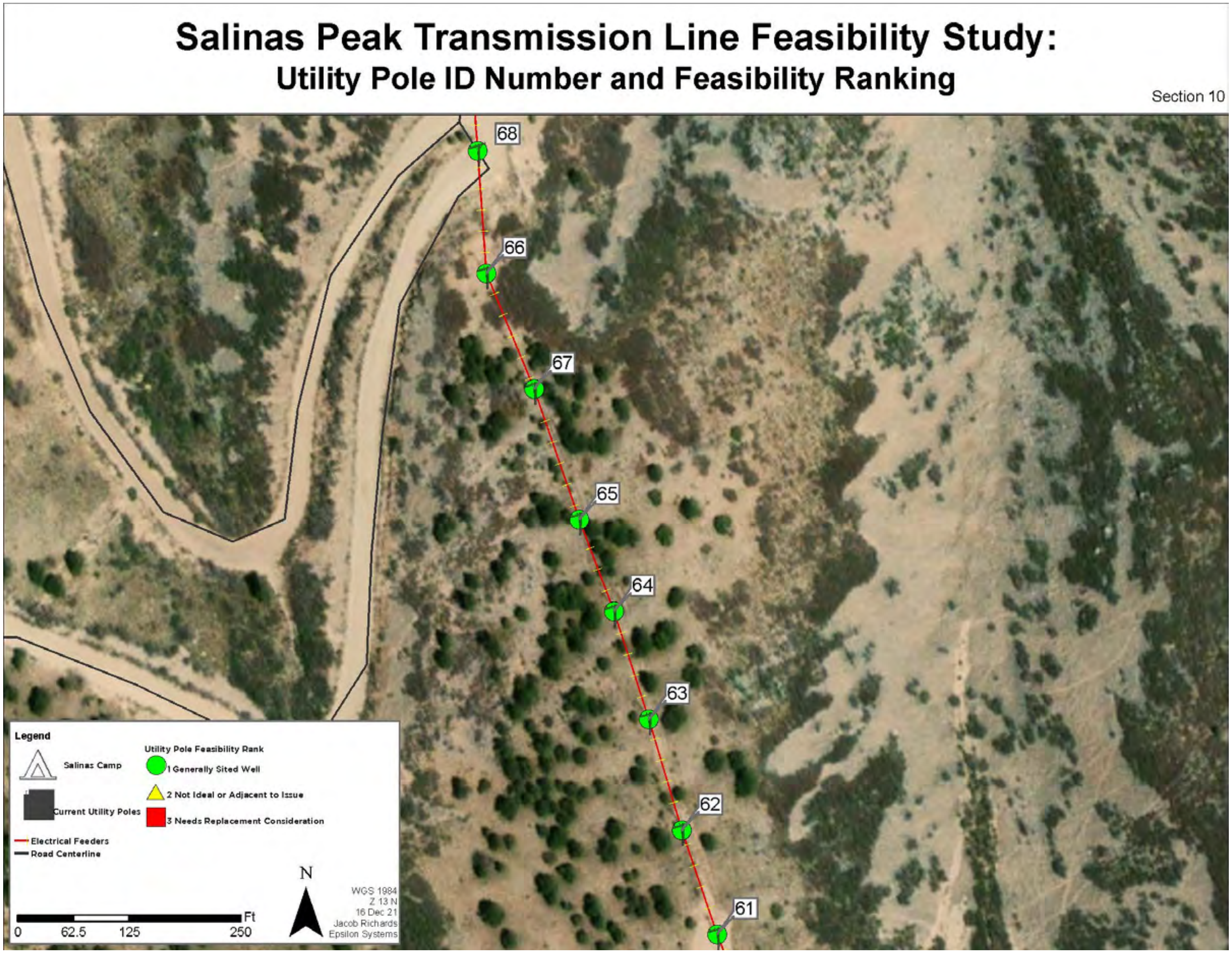

Figure 41. Existing Line Section 10 pole rankings.

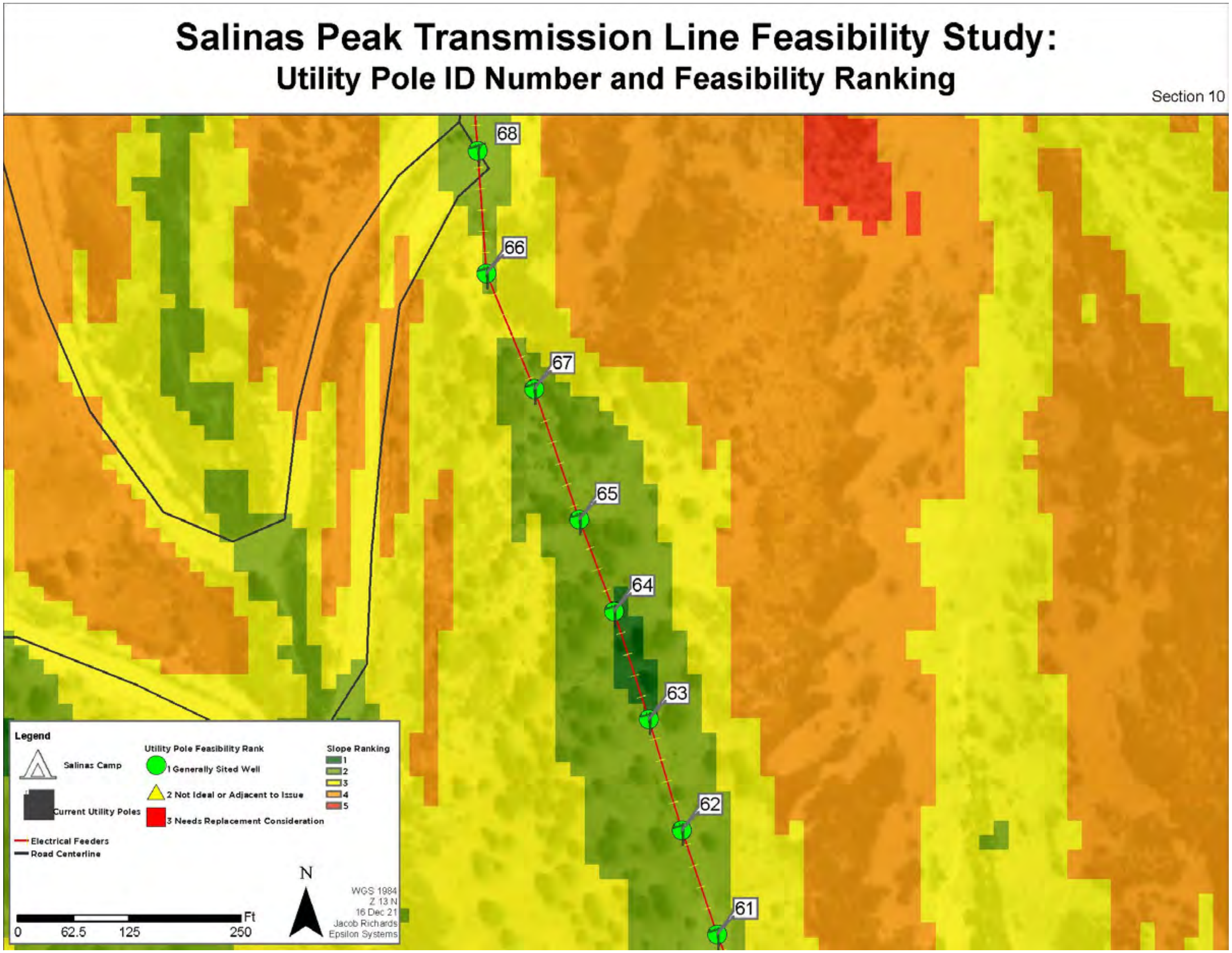

Figure 42. Existing Line Section 10 pole rankings with slope overlay.

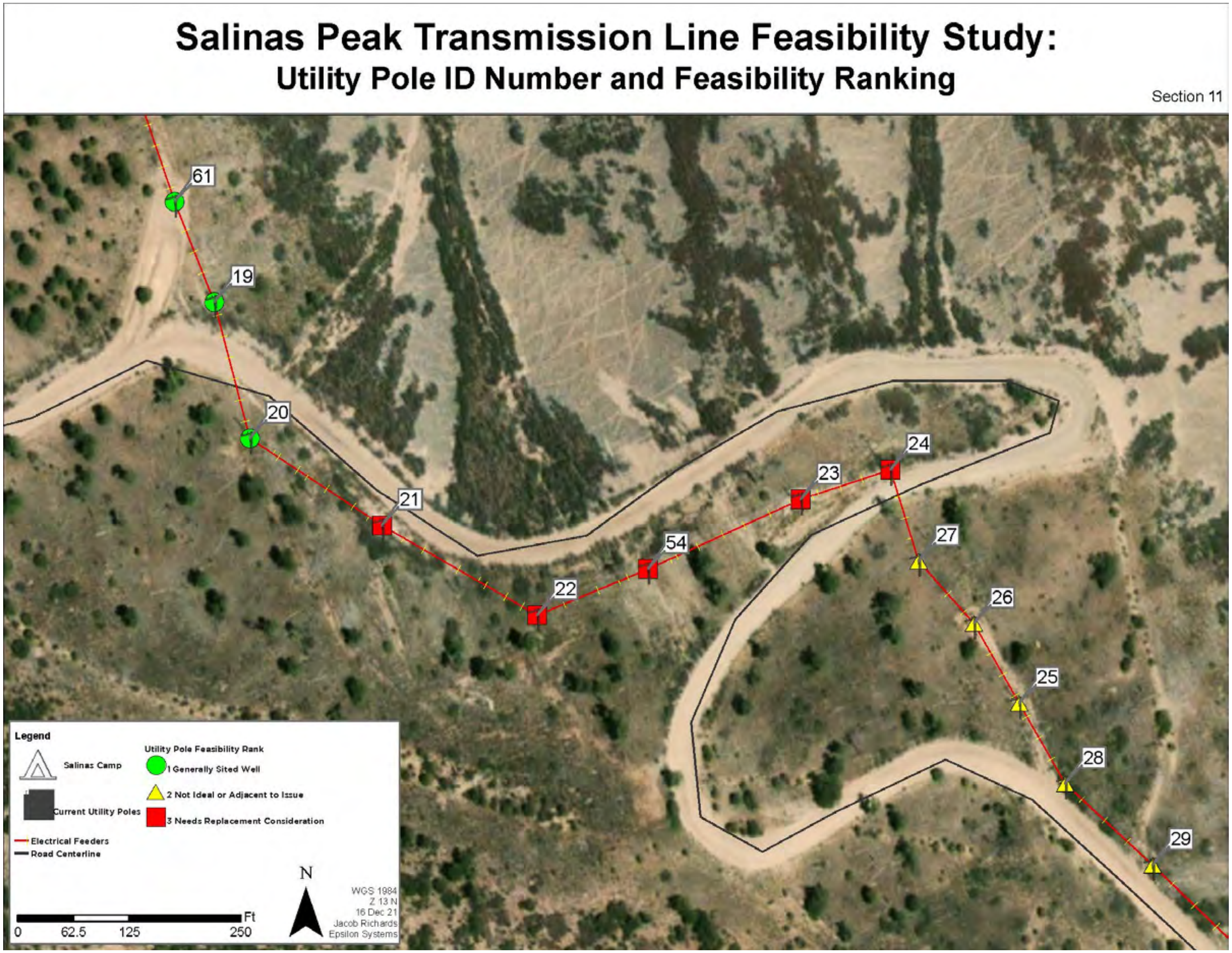

Figure 43. Existing Line Section 11 pole rankings.

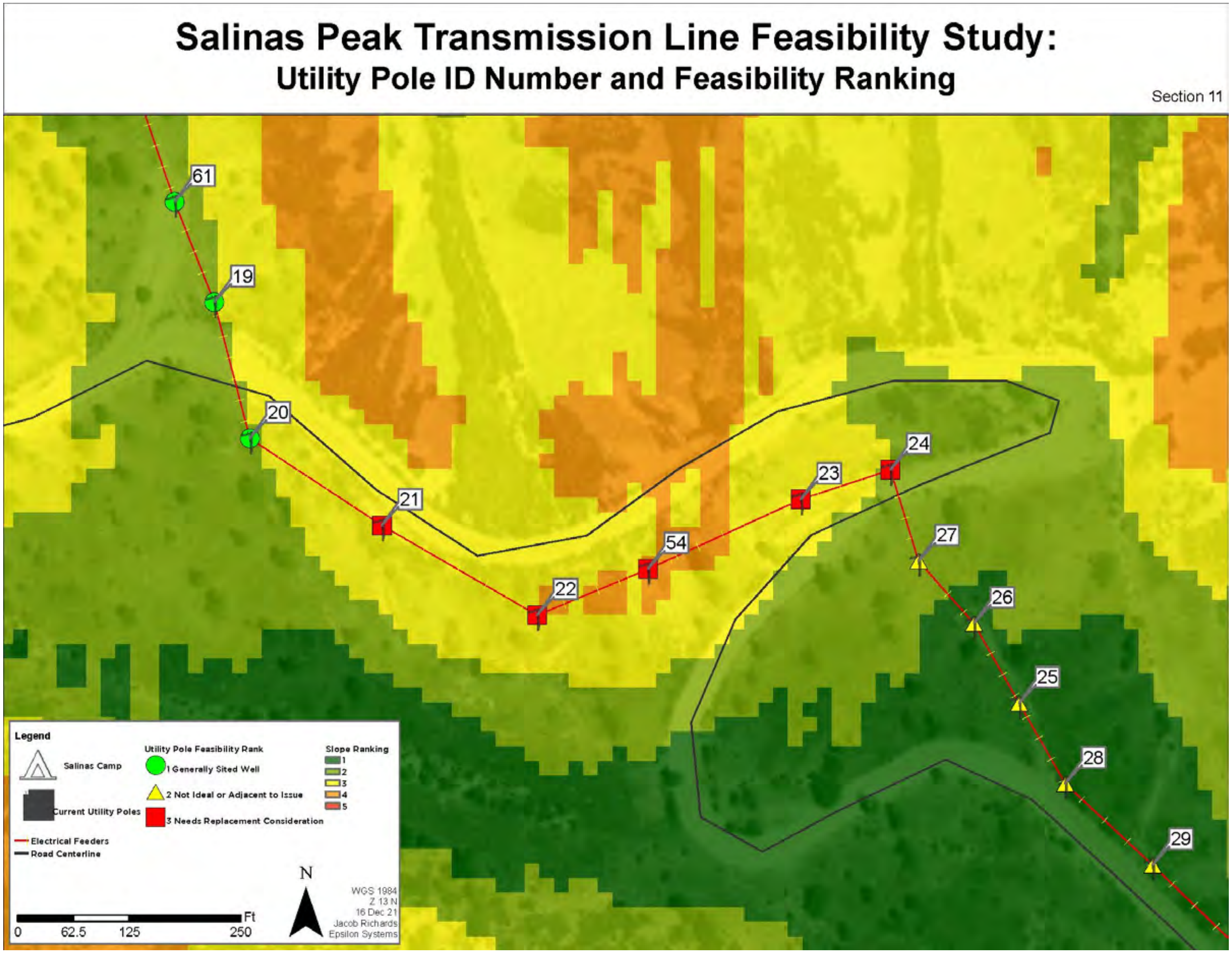

Figure 44. Existing Line Section 11 pole rankings with slope overlay.

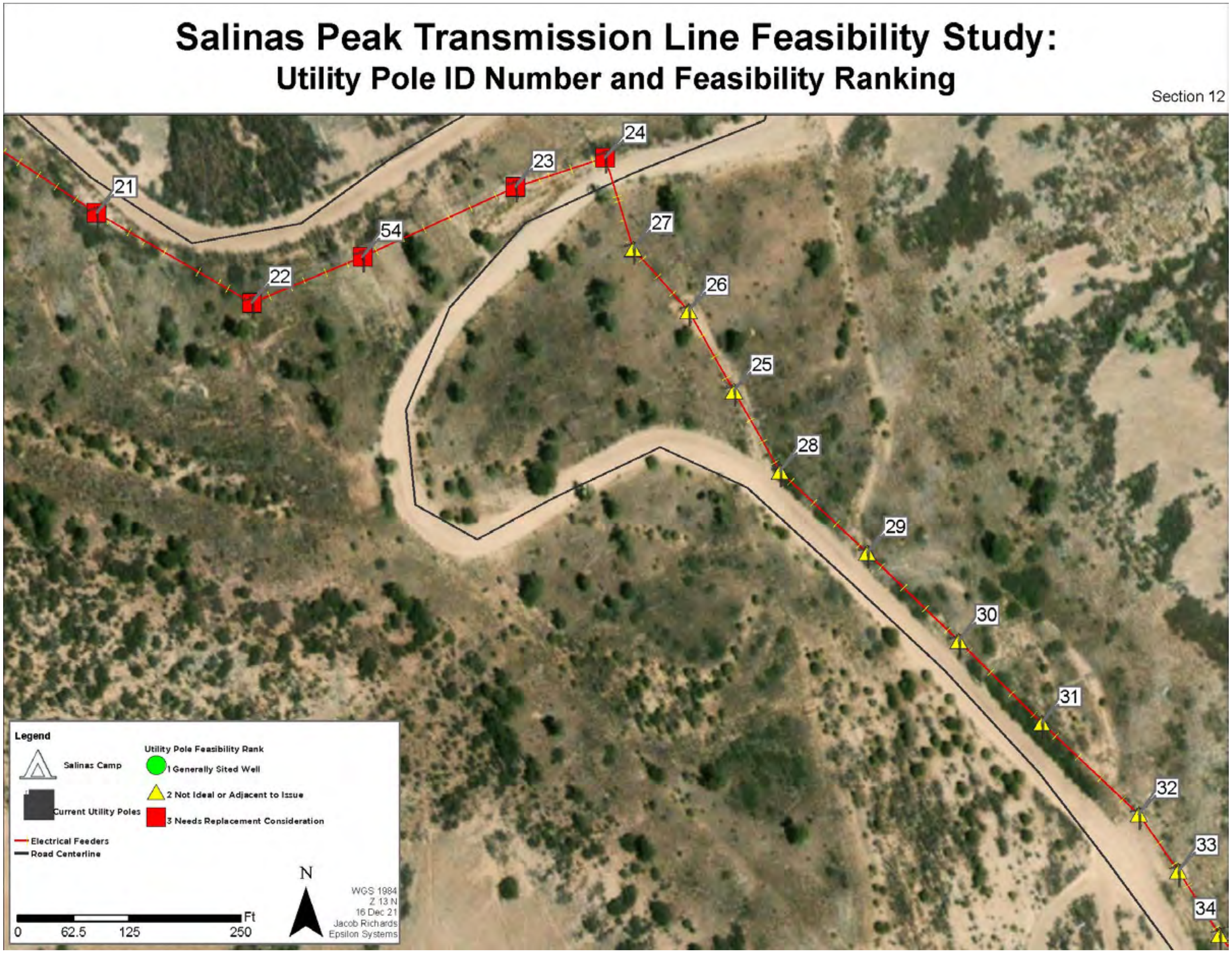

Figure 45. Existing Line Section 12 pole rankings.

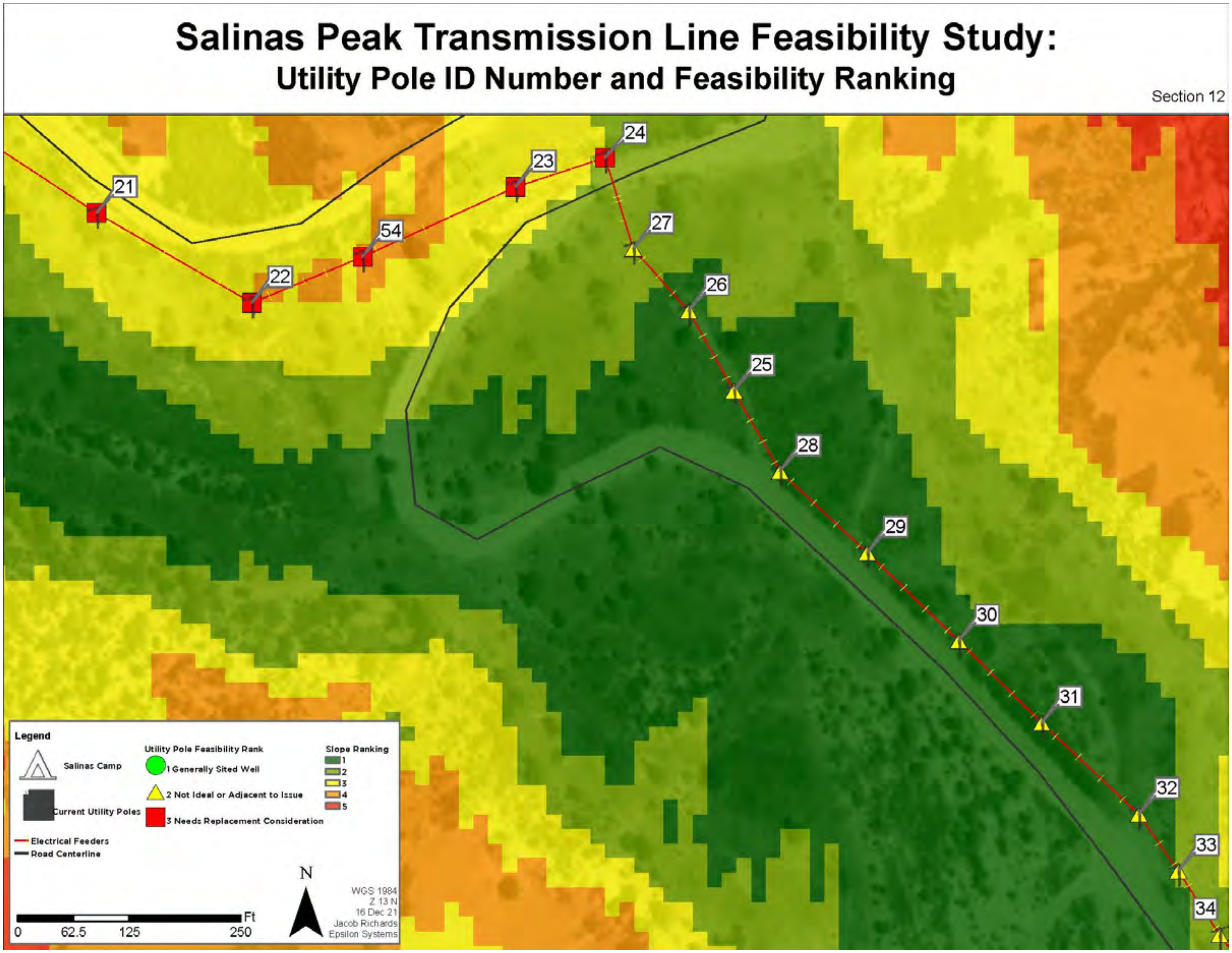

Figure 46. Existing Line Section 12 pole rankings with slope overlay.

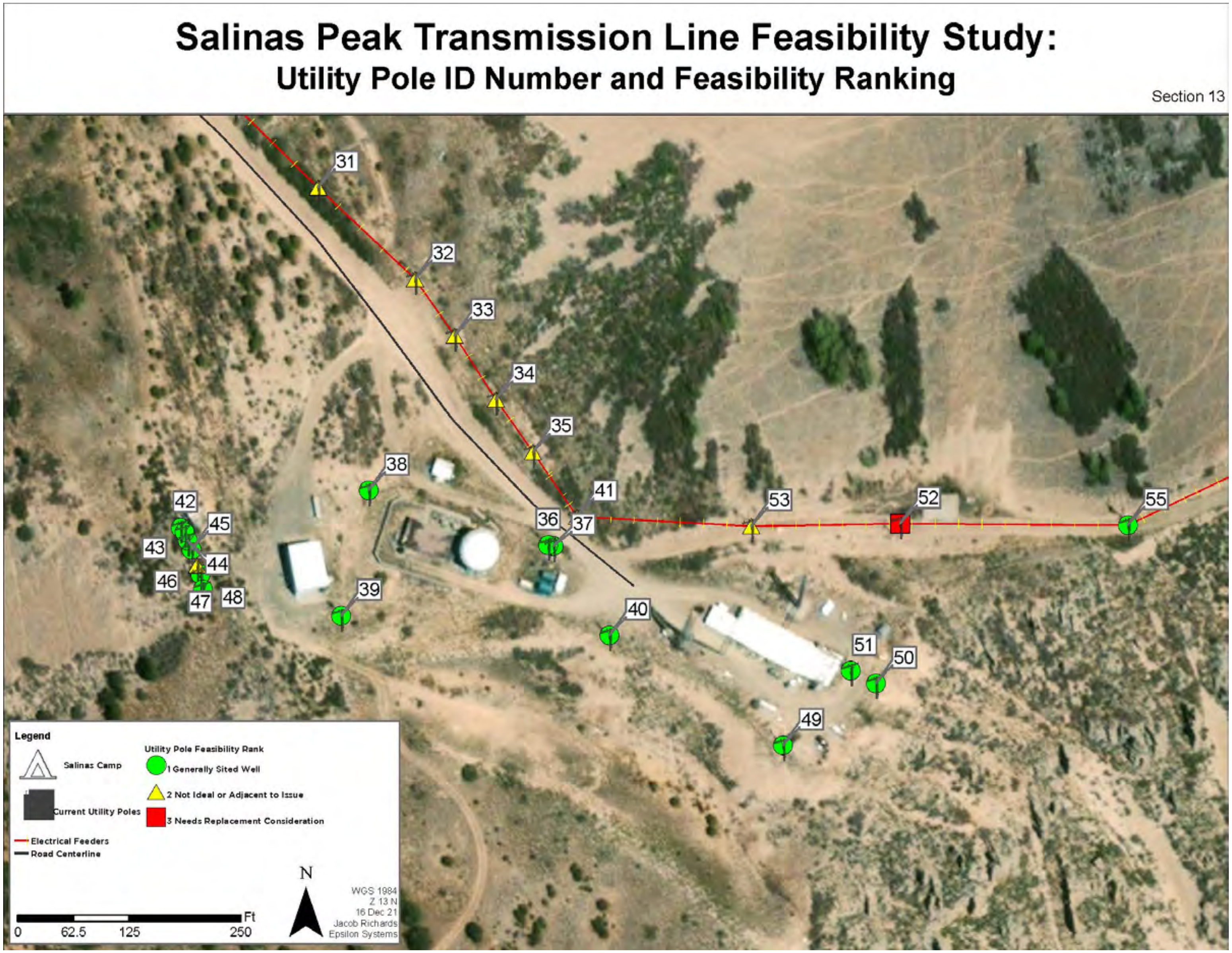

Figure 47. Existing Line Section 13 pole rankings.

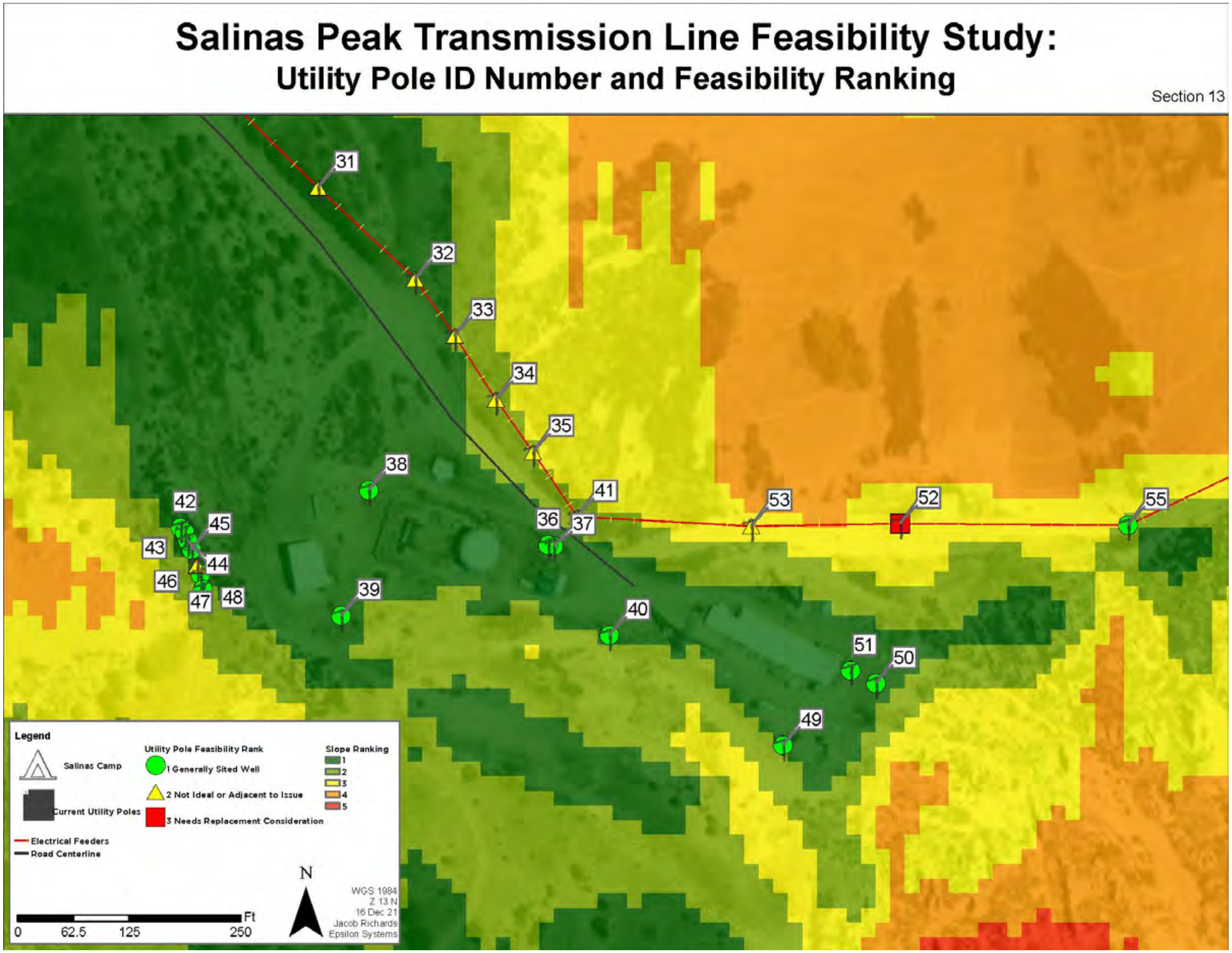

Figure 48. Existing Line Section 13 pole rankings with slope overlay.

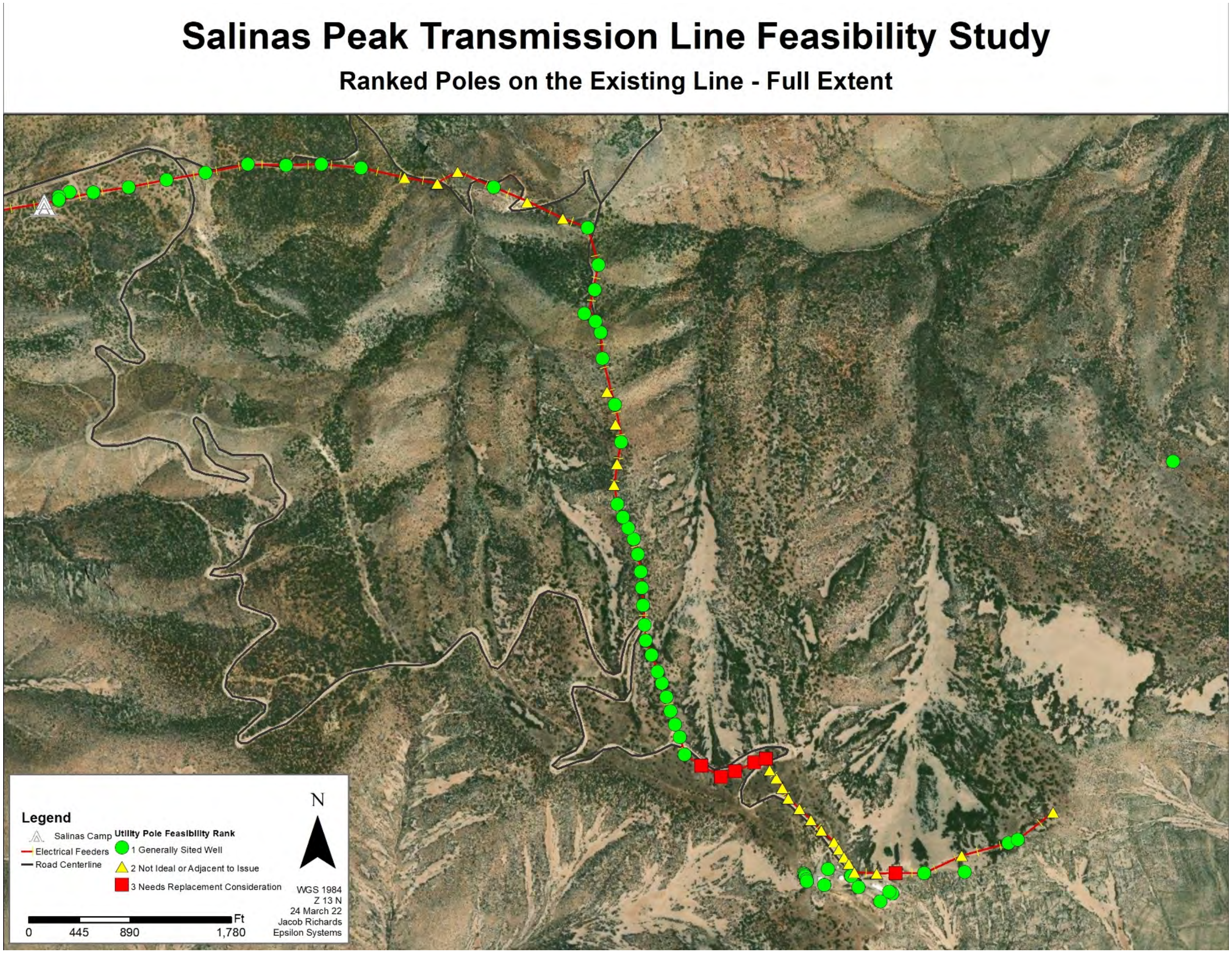

Figure 49. Existing Line pole rankings full extent.

Conclusions

Existing Line

The analysis of the existing transmission line found that most of the poles are generally sited well. The largest issue concerning the overall viability of the line is the gap in access between the existing roadways. The area of Poles 75 – 83 are generally sited in areas that have favorable, albeit less than ideal slopes. The problem is that the slopes are too great in the surrounding areas, and the pass is too narrow to install permanent access. Essentially, the route is within a reasonable Slope Category ranking of 1 or 2, but the buffered areas are largely Slope Category rankings of 4 and 5.

The erosional and rutting analysis also yielded that the current route largely falls within soils that are highly susceptible to both rutting and erosion. The above section that does not contain permanent access should be considered at greater risk for erosion and rutting because of the required techniques to access and work on the poles in the area.

As mentioned earlier, this current line is not modular and functions as a singular system. The section between poles 75 and 83 currently presents health and safety issues to the crew, increased wind loads to the poles, and high maintenance costs that are likely unsustainable in the long term. While this accounts for a handful of poles, and they did not receive the highest rating of concern, the area is likely a disqualifying factor for the existing line to remain viable without high costs associated with repairs and personnel qualifications.

If the existing line is chosen, a primary issue exists that could easily be addressed to increase the overall viability and decrease the maintenance of the line. Currently, both the lower and upper portions of the line have 14 various road crossings and a handful of low line crossings that could easily be altered. These areas have a large number of poles that could easily be moved minimally, and the overall sustainability of the existing line would be dramatically increased.

Alternative Route

While conducting the above analysis for the areas of Salinas Peak that were deemed 'go' areas for site placement, one logical alternative route emerged. This route maintains the existing overall pathing from Salinas Camp to Salinas Peak but generally takes a more western approach along the hillside. This route requires only two road crossings in total and would have access points along most of the route. Importantly, the route follows the natural slope and nearly the entire route falls within Slope Category 1 with buffered areas in Slope Category 2.

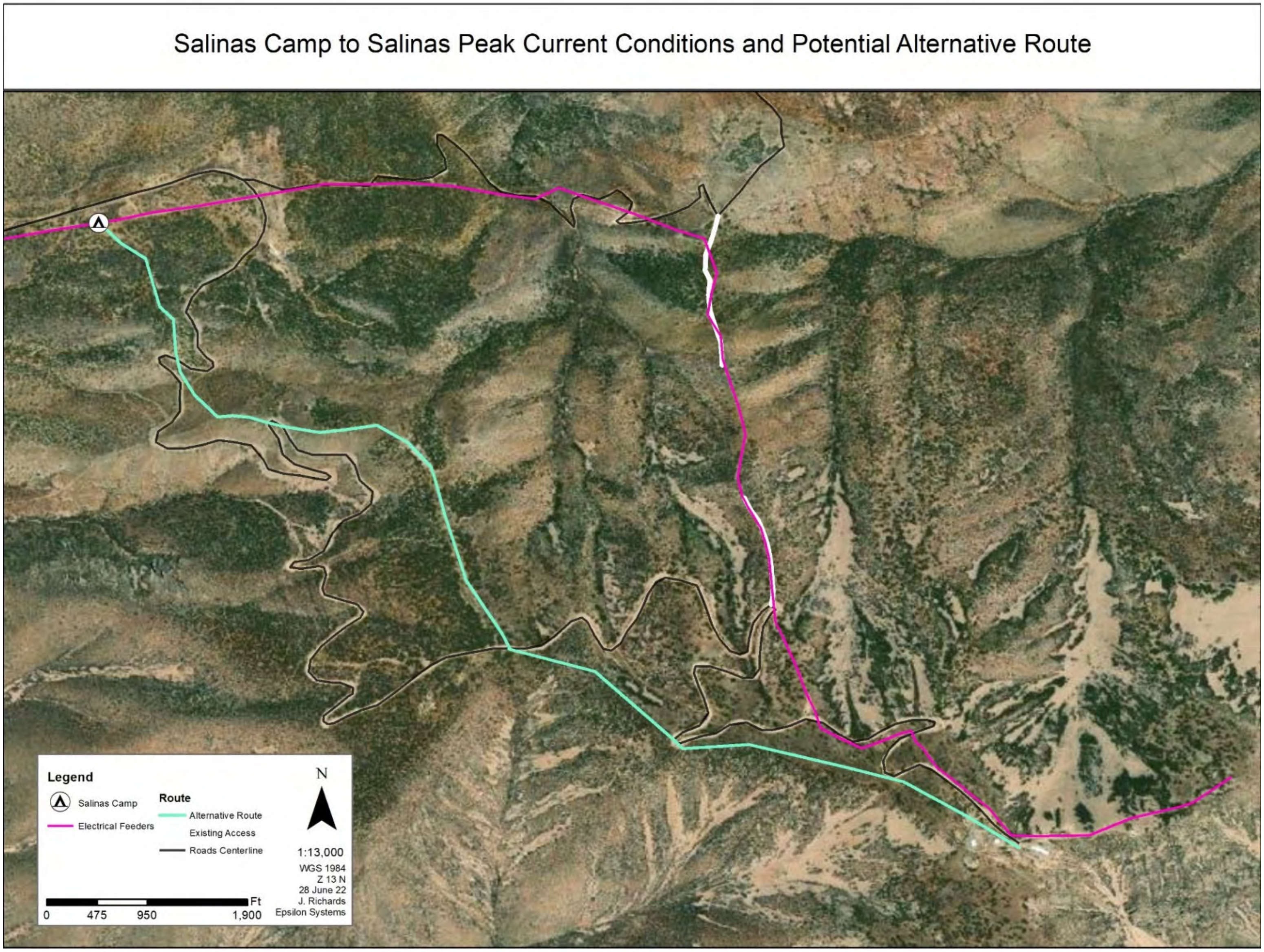

Figure 50. Alternative route and existing route from Salinas Camp to Salinas Peak on base imagery.

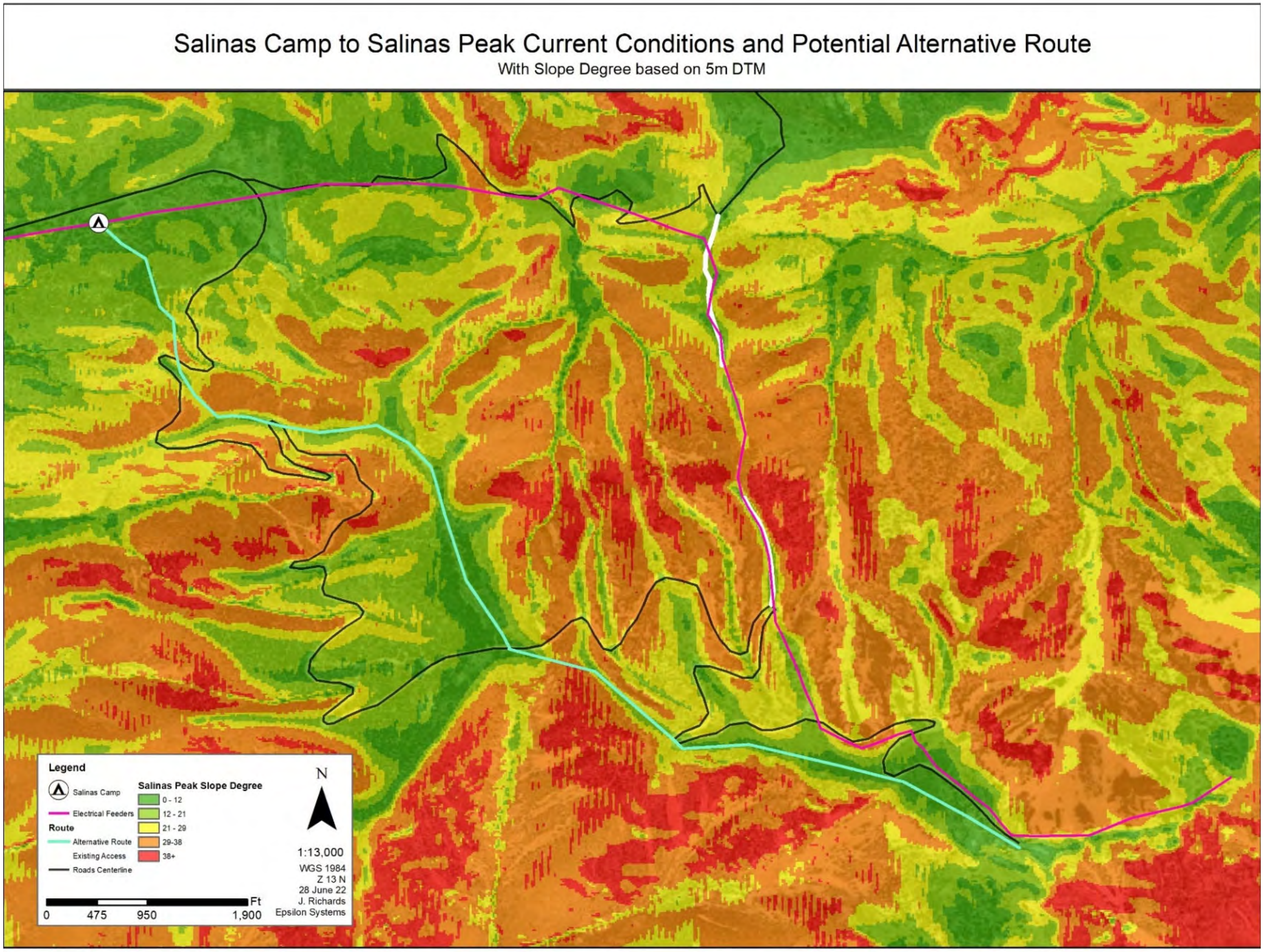

Figure 51. Alternative route and existing route from Salinas Camp to Salinas Peak overlain on slope degree.

Recommendations

Existing Line

If the existing line is chosen to be repaired and retained, it is suggested that the 14 various road crossings be evaluated first. These points are easy areas to consolidate poles and reduce safety hazards to WSMR staff and others operating in the area.

Several of the crossings near the lower portions of the line (Sections 2 – 6) are low to the road and require increasing the height of the line to meet safety standards. Alternatively, determining if some poles could be removed or consolidated on a single side of the road would increase the overall efficiency sustainability, and longevity of the line.

Towards the peak (Sections 11 and 12), nearly a dozen poles run perpendicular to the hillside instead of the ridgeline. These poles are illogically placed and need to be considered for replacement, even if only to the other side of the road. Every combination of the model analysis showed that moving these poles off the side slopes and onto the ridge should yield better functionality and sustainability.

Sections 7 and 8 have no current access and likely cannot have access installed in any meaningful capacity. It should be determined if these poles could be replaced or consolidated to reduce maintenance demands. This portion of the existing line does pose the greatest issues for maintenance of the line and mission continuality. A concern with the increasing development and activities on Salinas Peak is to maintain a steady supply of power required for operations. The larger analysis in the EA should explore if materials can address this region. Otherwise, it may not be sustainable financially to maintain this line in the long term.

Alternative Route

The alternative route largely emerged during the analysis because it met all the criteria established when evaluating the existing transmission line. This line takes a generally gentle slope approach up the mountain. There are consistent ridgelines that allow for a new line to be installed that would almost entirely fall on slopes under 12% (Slope Category 1).

There are areas within the alternative route that scored 3 and 4 within erosion and rutting. Importantly, these areas are near the center of the proposed line where an existing *ad hoc* maintenance road exists. This road is not officially in the WSMR database but is on the landscape. Some vegetative clearing would be required, but this access lane largely already exists and enables nearly all the problem areas identified along the alternative route to be accessed safely and easily.

Road crossings would be cut to two, with turns of the existing roadway serving as access points at several points along the line. These turns provide a large pad for staging and work. Planning of road closures and traffic would be a large concern during periods of maintenance but given the need for existing traffic to coordinate between Salinas Camp and Salinas Peak, this would be a minimal change.

Ultimately, this alternative route meets the need for a transmission line between Salinas Camp and Salinas Peak within the parameters analyzed in this study. The largest unknown consideration for the alternative line is cost. Replacing the existing line at once would be a large cost, but arguably continuing to repair and replace the poles within the existing line that are at high environmental hazard risks requiring specialized equipment and training to operate on may be as costly, if not more so in the long term.

References Cited

Monteiro, Claudio et al. April 2005. GIS Spatial Analysis Applied to Electric Line Routing Optimization. Volume 20 Number 2, IEEE Transactions of Power Delivery. Ministerio de Educación y Ciencia of the Spanish Government, Gobierno de La Rioja of Spain. Retrieved 20 April 2021.

Schmidt, Andrew, J. 2009. Implementing a GIS Methodology for Siting High Voltage Electric Transmission Lines. Volume 11, Papers in Resource Analysis. 17 pp. Saint Mary's University of Minnesota University Central Services Press. Winona, MN. Retrieved 20 April 2021. http://www.gis.smumn.edu.

APPENDIX C AIR POLLUTANT EMISSION CALCULATIONS

Task 1 - Comprehensive inspection of existing system

Vehicle	Category	# used	days used	mile/day	VMT
Crew cab pickup	MDV	1	10	90	900

Assume 40 miles paved, 50 miles unpaved daily

Task 2 - Vegetation removal within distribution alignment

Vehicle/Equipment	Category	# used	days used	mile/day	VMT
Crew cab pickup	MDV	2	20	90	1800
Chipper	OFF Crushing/Proc.	1	20	4 hr/day	80 hr

Assume 40 miles paved, 50 miles unpaved daily

Task 3 - Access Road Installation and Repair

Bulldozer	Composite	1	10	6 hr/day	60 hr
Grader	Composite	1	10	6 hr/day	60 hr
Water truck	OHW Composite	1	10	4 hr/day	40 hr
Commute	LDA	4	10	150	6000

Task 4 - Staging areas installation

Bulldozer, comp	Composite	1	15	6 hr/day	90 hr
Grader, comp	Composite	1	15	6 hr/day	90 hr
Drum type compactor	120 hp	1	4	6 hr/day	24 hr
Backhoe/front end loader	Composite	1	6	6 hr/day	36 hr
Commute	LDA	4	15	150	9000

Task 5 - Conductor removal and installation

Bucket truck - mob/demob	MHDT	1	1	150	150
Bucket truck - onsite ops	OHW truck, composite	1	10	4 hr/day	40 hr
Boom truck - mob demob	MHDT	1	1	150	150
Boom truck - onsite ops	OHW truck, composite	1	10	6 hr/day	60 hr
Bull wheel puller	16 hp	1	10	6 hr/day	60 hr
Sock line puller	300 hp	1	10	6 hr/day	60 hr
Static truck/tensioner	350 hp	1	10	6 hr/day	60 hr
Commute	LDA	4	10	150	6000

Task 6 - Pole removal

Compressor trailer	60 hp	1	15	6 hr/day	90 hr

Backhoe/front end loader	Composite	1	15	6 hr/day	90 hr
Bucket truck	OHW truck	1	15	4 hr/day	60 hr
Boom truck	OHW truck	1	15	6 hr/day	90 hr
Flatbed pole truck	OHW truck	1	15	4 hr/day	60 hr
Commute	LDA	4	15	150	2,250

Task 7 - Deliveries of equipment and materials

Heavy duty truck, lowboy trailer	HHDT	8	1	150	1200
Flatbed pole truck	HHDT	1	4	150	600
Water truck	MHDT	2	1	150	300

EMFAC 2014 Emission Factors - CY 2023 - g/mile

Category	Class	Fuel	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	Gas	0.011597	0.016914	0.597483	0.051457	262.8598	0.001852	0.001703	0.002634
Crew cab pickup	MDV	Gas	0.0284	0.041382	1.189314	0.145646	476.9282	0.001877	0.001726	0.00478
HD delivery truck	HHDT - T7 Pub	Diesel	0.088686	0.100962	0.378652	7.160338	1646.416	0.038317	0.036659	0.015708
Flatbed pole truck	MHDT - T6 Const. Heavy	Diesel	0.03958	0.045059	0.206309	1.106322	1176.798	0.003411	0.003264	0.011227
Water truck	MHDT - T6 Const. Heavy	Diesel	0.03958	0.045059	0.206309	1.106322	1176.798	0.003411	0.003264	0.011227
Boom truck	MHDT - T6 Const. Heavy	Diesel	0.03958	0.045059	0.206309	1.106322	1176.798	0.003411	0.003264	0.011227

Off-Road Mobile Source Emission Factors - Fleet Year 2023 - lb/hr

Category	MaxHP or Composite	ROG	CO	NOX	SOX	PM	CO2	CH4
Dozer	Composite	0.087924	0.512504	0.529146	0.001258	0.028001	114.017	0.007933
Grader	Composite	0.075765	0.571799	0.415574	0.001496	0.019131	132.743	0.006836
Water truck	Composite	0.12431	0.542193	0.588062	0.002658	0.018847	260.074	0.011216
Backhoe	Excavator, composite	0.061463	0.509665	0.282063	0.001315	0.011732	119.5793	0.005546
Drum compactor	Roller, 120 hp	0.044931	0.382183	0.303916	0.000692	0.018048	58.98873	0.004054
Bucket truck	OHW truck, composite	0.12431	0.542193	0.588062	0.002658	0.018847	260.074	0.011216
Boom truck	OHW truck, composite	0.12431	0.542193	0.588062	0.002658	0.018847	260.074	0.011216
Bull wheel puller	16 hp	0.016	0.054	0.101	0	0.004	13.217	0.001
Sock line puller	300 hp	0.112	0.474	0.8001	0.002	0.028	254.238	0.01
Tensioner	350 hp	0.112	0.474	0.8001	0.002	0.028	254.238	0.01
Chipper	Crushing/Proc. Equip.	0.077291	0.61987	0.447854	0.001456	0.020131	132.3079	0.006974
Compressor trailer	60 hp	0.058	0.313	0.394	0.001	0.025	63.607	0.005

Fugitive dust

Grading = 0.0306 x S^2 in lb/hr
Dozing = 0.75 x s^1.5/M^1.4 in lb/VMT
Source = AP-42.

Soil % silt, s	6.4
Soil % moisture, M	10

Mean vehicle speed, S	5
Dozer path width (ft)	10

Grading	0.765	lb/hr	4	hr/acre	3.06	lb/acre
Dozing	4.83E-01	lb/VMT	0.83	VMT/acre	0.40	lb/acre

Task 1 - Mob/demob

Vehicle	Category	ROG	TOG	CO	NOX	CO2
Heavy duty truck, lowboy trailer	HHDT	106.4231	121.1547	454.3827	8592.405	1975700
Flatbed pole truck	HHDT	53.21157	60.57733	227.1913	4296.203	987849.9
Water truck	MHDT	11.87396	13.5176	61.89282	331.8965	353039.3
	total (g)	171.5087	195.2496	743.4668	13220.5	3316589
	total (lb)	0.378114	0.430454	1.639072	29.14637	7311.865

PM10	PM2.5	SOX
45.98028	43.99119	18.8491
22.99014	21.99559	9.42455
1.023393	0.979122	3.36816
69.99381	66.96591	31.64181
0.154311	0.147635	0.069759

Task 2 - Comprehensive inspection
Assumes that work is performed by DPW staff located at Stallion (commute not included in analysis)
Goal of task is to identify poles along existing alignment that are in need of replacement.

Criteria Pollutant Emissions - Vehicles

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Crew cab pickup	MDV	2.56	3.72	107.04	13.11	42923.54	0.17	0.16	0.43
	Total (g/day)	2.56	3.72	107.04	13.11	42923.54	0.17	0.16	0.43
	Total (lb)	0.05635	0.082109	2.359803	0.288987	946.3071	0.003724	0.003424	0.009485

Fugitive dust emissions - Vehicles

Vehicle	Surface	PM10	PM2.5
Crew cab pickup	Paved	0.000861	-0.00016
	Unpaved	0.685626	0.06814
	Total (lb)	34.6257	34.06979

EF (paved) = $k_p(s/2)^{0.65}(W/3)^{1.5} - C$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = $k(s/12)^a(S/30)^d/(M/0.5)^c - C$ AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	
c = 0.2	
d = 0.5	

Vehicle	Category	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
		0.05635	2.359803	0.288987	0.009485	0.003724	0.003424	946.3071	
	Fugitive dust					34.6257	34.06979		
	total	**0.05635**	**2.359803**	**0.288987**	**0.009485**	**34.62942**	**34.07322**	**946.3071**	

Task 3 - Vegetation Removal
Assumes that work is performed by DPW staff located at Stallion (commute not included in analysis)
Goal of task is to identify poles along existing alignment that are in need of replacement.

Criteria Pollutant Emissions

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Crew cab pickup	MDV	2.56	3.72	107.04	13.11	42923.54	0.17	0.16	0.43
	Total (g/day)	2.56	3.72	107.04	13.11	42923.54	0.17	0.16	0.43
	Total (lb)	0.1127	0.164218	4.719605	0.577974	1892.614	0.007447	0.006848	0.01897

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
Crew cab pickup	Paved	0.000861	-0.00016
	Unpaved	0.685626	0.06814
	Total (lb)	34.31573	3.406979

EF (paved) = $k_p(s/2)^{0.65}(W/3)^{1.5}$ - C — AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = $k(s/12)^a(S/30)^d/(M/0.5)^c$ - C — AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10
s = 0.035 for paved
C = 0.00047 for PM10
k = 1.8 for PM10
S = 25 mph
a = 1
c = 0.2
d = 0.5

k_p = 0.0024 for PM2.5
s = 6.4 for unpaved
C = 0.00036 for PM 2.5
k = 0.18 for PM 2.5
M = 6.8

Criteria Pollutant Emissions - Equipment

Off-Road Mobile Source Emission Factors - Fleet Year 2023 - lb/hr

		ROG	CO	NOX	SOX	PM	CO2	CH4
Chipper	Crushing/Proc. Equip.	0.08	0.62	0.45	1.46E-03	0.02	132.31	6.97E-03
	Total emissions (lb)	6.18	49.59	35.83	0.12	1.61	10584.64	0.56

Assume usage for 20 days, at 4 hours per day.

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Vehicle criteria pollutants	0.1127	4.719605	0.577974	0.01897	0.007447	0.006848		
Vehicle fugitive dust					34.31573	3.406979	1892.614	
Equipment emissions	0.077291	0.61987	0.447854	0.001456	0.020131		132.3079	0.006974
Total	0.189992	5.339476	1.025828	0.020427	34.34331	3.413828	2024.922	0.006974

Task 4 - Access Road Installation and Repair

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	0.011597	0.016914	0.597483	0.051457	262.859787	0.001852	0.001703	0.002634
	Total (g/day)	9.28	13.53	477.99	41.17	210287.83	1.48	1.36	2.11
	Total (lb)	0.204532	0.298307	10.53785	0.907549	4636.07728	0.032665	0.030035	0.04645

Assume round trip commute from Las Cruces, New Mexico for four (4) vehicles traveling a round trip distance of 200 miles (assuming use of Stallion Gate) over a 10-day period.

		ROG	CO	NOX	SOX	PM	CO2	CH4
Bulldozer	Composite	5.275419	30.75025	31.74875	0.075489	1.68008295	6841.018	0.475993
Grader	Composite	4.55	34.31	24.93	0.09	1.15	7964.58	0.41
Water truck	OHW Composite	4.97242	21.68771	23.52247	0.106339	0.75386974	10402.96	0.448653
	Total (lb)	14.79377	86.74592	80.20566	0.271592	3.58180405	25208.56	1.334818

Assume a 10-day work period. With 6 hours/day use for the dozer and grader. The water truck is assumed to be usec 4 hours/day.

Category	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Commute criteria	0.011597	0.597483	0.051457	0.002634	0.00185205	0.001703	262.8598	
Commute fug. Dust					343.585519	34.06979		
Equipment criteria	14.79377	86.74592	80.20566	0.271592	3.58180405		25208.56	1.334818
total (lb)	**14.80536**	**87.3434**	**80.25712**	**0.274226**	**347.169175**	**34.0715**	**25471.42**	**1.334818**

Task 5 - Staging areas installation

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	0.011597	0.016914	0.597483	0.051457	262.8597867	0.001852	0.001703	0.002634
	Total (g/day)	9.28	13.53	477.99	41.17	210287.83	1.48	1.36	2.11
	Total (lb)	0.409064	0.596613	21.0757	1.815098	9272.154561	0.06533	0.060069	0.0929

Assume round trip commute from Las Cruces, New Mexico for four (4) vehicles traveling
a round trip distance of 200 miles (assuming use of Stallion Gate) over a 20-day period.

Off-Road Mobile Source Emission Factors - Fleet Year 2023 (in pounds)

	Category	ROG	CO	NOX	SOX	PM	CO2	CH4
Bulldozer	Composite	14.91726	65.06313	70.5674	0.319018	2.261609228	31208.88	1.34596
Grader	Composite	7.38	61.16	33.85	0.16	1.41	14349.51	0.67
Drum type compactor	120 hp	5.391743	45.8619	36.46987	0.083036	2.165787687	7078.648	0.486488
Backhoe/front end loader	Composite	1.437798	12.22984	9.725299	0.022143	0.577543383	1887.639	0.12973
	Total (lb)	29.12232	184.3147	150.6101	0.582042	6.412725267	54524.68	2.627661

Assume a 20-day work period. With 6 hours/day use for the dozer, grader, and backhoe. The drum compactor woulc
be used for a total of 32 hours for the project (8 hours per temp work area)

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Commute criteria	0.409063762	21.0757	1.815098	0.0929	0.06533	0.060069084	9272.155	
Equipment criteria	29.12232359	184.3147	150.6101	0.582042	6.412725		54524.68	2.627661
Commute fug. Dust					687.171	68.1395886		
Site prep fug. Dust					165.1176			
total (lb)	29.53138735	205.3904	152.4252	0.674942	858.7667	68.19965769	63796.84	2.627661

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
Commute	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	687.171	68.13959

Assume round trip is 150 miles paved, 50 miles unpaved

EF (paved) = $k_p(s/2)^{0.6}$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = k(s/12 AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	W = 2.7
c = 0.2	
d = 0.5	

d

Fugitive Dust - Construction equipment

grading	1.9176	lb
dozing	163.2	lb
	165.1176	lb

Task 6 - Conductor removal and installation

Vehicle	Category	ROG		CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	69.58021	101.4817	3584.89764	308.741322	1577158.72	11.11231	10.21753	15.80202
Bucket truck mob/demob	MHDT - T6 Const. Heavy	5.936979	6.758798	30.94641164	165.9482561	176519.6524	0.511697	0.489561	1.68408
Boom truck mob/demob	MHDT - T6 Const. Heavy	5.936979	6.758798	30.94641164	165.9482561	176519.6524	0.511697	0.489561	1.68408
	Total (g)	81.45	115.00	3646.79	640.64	1930198.03	12.14	11.20	19.17
	Total (lb)	0.179577	0.253531	8.03983876	1.412372041	4255.380465	0.026755	0.024685	0.042263

Assume round trip commute from Las Cruces, New Mexico for four (4) vehicles traveling a round trip distance of 200 miles (assuming use of Stallion Gate) over a 20-day period.

Offroad emissions - lb

	Category	ROG	CO	NOX	SOX	PM10	CO2	CH4
Bucket truck	OHW truck, composite	4.97242	21.68771	23.52246704	0.10633928	0.753869743	10402.96	0.448653
Boom truck	OHW truck, composite	7.458629	32.53157	35.28370055	0.15950892	1.130804614	15604.44	0.67298
Bull wheel puller	16 hp	0.96	3.24	6.06	0	0.24	793.02	0.06
Sock line puller	300 hp	6.72	28.44	48.006	0.12	1.68	15254.28	0.6
Static truck/tensioner	350 hp	6.72	28.44	48.006	0.12	1.68	15254.28	0.6
	Total (lb)	26.83105	114.3393	160.8781676	0.505848199	5.484674356	57308.98	2.381634

Total emissions - Task 5

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Vehicle onroad	1.290549	42.24596	18.03751594	0.322699575	0.167617069	0.155802	32951.74	
Offroad emissions	26.83105	114.3393	160.8781676	0.505848199	5.484674356		57308.98	2.381634
Fugitive dust					686.5529768	40.88375		
Total (lb)	28.1216	156.5852	178.9156835	0.828547774	692.2052683	41.03955	90260.72	2.381634

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
All vehicles	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	686.553	40.88375

Assume round trip is 150 miles paved, 50 miles unpaved

12 total trips (10 commuter + 1 boom truck + 1 bucket truck)

EF (paved) = $k_p(s/2)^{0.6!}$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = k(s/12 AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10 k_p = 0.0024 for PM2.5

s = 0.035 for paved s = 6.4 for unpaved

C = 0.00047 for PM10 C = 0.00036 for PM 2.5

k = 1.8 for PM10 k = 0.18 for PM 2.5

S = 25 mph M = 6.8

a = 1 W = 2.7

c = 0.2

d = 0.5

Task 6 - Pole removal Task 7 - Pole Installation and Removal

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	17.39505	25.37042	896.2244	77.18533	394289.7	2.778078	2.554382	3.950505
	Total (g)	17.40	25.37	896.22	77.19	394289.68	2.78	2.55	3.95
	Total (lb)	0.03835	0.055933	1.975847	0.170165	869.2645	0.006125	0.005631	0.008709

Offroad emissions - lb

	Category	ROG	CO	NOX	SOX	PM10	CO2	CH4
Compressor trailer	60 hp	5.22	28.17	35.46	0.09	2.25	5724.63	0.45
Backhoe/front end loader	Composite	7.375524	61.15982	33.84755	0.157845	1.407785	14349.51	0.665482
Bucket truck	OHW truck	14.91726	65.06313	70.5674	0.319018	2.261609	31208.88	1.34596
Boom truck	OHW truck	14.91726	65.06313	70.5674	0.319018	2.261609	31208.88	1.34596
Flatbed pole truck	OHW truck	9.944839	43.37542	47.04493	0.212679	1.507739	20805.92	0.897307
	Total (lb)	52.37488	262.8315	257.4873	1.098559	9.688743	103297.8	4.704709

Total emissions - Task 5

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Vehicle onroad	0.03835	1.975847	0.170165	0.008709	0.006125	0.005631	869.2645	
Offroad emissions	52.37488	262.8315	257.4873	1.098559	9.688743		103297.8	4.704709
Fugitive dust					686.3985	67.82122		
Total (lb)	52.41323	264.8074	257.6574	1.107268	696.0933	67.82686	104167.1	4.704709

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
All vehicles	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	686.3985	67.82122

Assume round trip is 150 miles paved, 50 miles unpaved

EF (paved) = $k_p(s/2)^{0.6}$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = k(s/12 AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	W = 2.7
c = 0.2	
d = 0.5	

Category	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Task 1	0.378114	1.639072	29.14637	31.64181	69.99381	66.96591	7311.865	
Task 2	0.05635	2.359803	0.288987	0.009485	34.62942	34.07322	946.3071	
Task 3	0.189992	5.339476	1.025828	0.020427	34.34331	3.413828	2024.922	0.006974
Task 4	14.80536	87.3434	80.25712	0.274226	347.1692	34.0715	25471.42	1.334818
Task 5	15.42982	96.68175	110.7183	31.94595	486.1357	138.5244	35754.51	1.341792
Task 6	28.1216	156.5852	178.9157	0.828548	692.2053	41.03955	90260.72	2.381634
Task 7	52.41323	264.8074	257.6574	1.107268	696.0933	67.82686	104167.1	4.704709
Total (lb)	111.0164	613.117	628.8634	34.1859	2290.576	318.9494	258625	9.769926
Total (ton)	0.055508	0.306559	0.314432	0.017093	1.145288	0.159475	129.3125	0.004885

Alternative 2

Task 1 - Comprehensive inspection of existing system

Vehicle	Category	# used	days used	mile/day	VMT
Crew cab pickup	MDV	1	10	90	900

Assume 40 miles paved, 50 miles unpaved daily

Task 2 - Vegetation removal within distribution alignment

Vehicle/Equipment	Category	# used	days used	mile/day	VMT
Crew cab pickup	MDV	2	20	90	1800
Chipper	OFF Crushing/Proc.	1	20	4 hr/day	80 hr

Assume 40 miles paved, 50 miles unpaved daily

Task 3 - Access Road Installation and Repair

Bulldozer	Composite	1	10	6 hr/day	60 hr
Grader	Composite	1	10	6 hr/day	60 hr
Water truck	OHW Composite	1	10	4 hr/day	40 hr
Commute	LDA	4	10	150	6000

Task 4 - Staging areas installation

Bulldozer, comp	Composite	1	15	6 hr/day	90 hr
Grader, comp	Composite	1	15	6 hr/day	90 hr
Drum type compactor	120 hp	1	4	6 hr/day	24 hr
Backhoe/front end loader	Composite	1	6	6 hr/day	36 hr
Commute	LDA	4	15	150	9000

Task 5 - Conductor removal and installation

Bucket truck - mob/demob	MHDT	1	1	150	150
Bucket truck - onsite ops	OHW truck, composite	1	10	4 hr/day	40 hr
Boom truck - mob demob	MHDT	1	1	150	150
Boom truck - onsite ops	OHW truck, composite	1	10	6 hr/day	60 hr
Bull wheel puller	16 hp	1	10	6 hr/day	60 hr
Sock line puller	300 hp	1	10	6 hr/day	60 hr
Static truck/tensioner	350 hp	1	10	6 hr/day	60 hr
Commute	LDA	4	10	150	6000

Task 6 - Pole removal

Compressor trailer	60 hp	1	15	6 hr/day	90 hr

Backhoe/front end loader	Composite	1	15	6 hr/day	90 hr
Bucket truck	OHW truck	1	15	4 hr/day	60 hr
Boom truck	OHW truck	1	15	6 hr/day	90 hr
Flatbed pole truck	OHW truck	1	15	4 hr/day	60 hr
Commute	LDA	4	15	150	2,250

Task 7 - Deliveries of equipment and materials

Heavy duty truck, lowboy trailer	HHDT	8	1	150	1200
Flatbed pole truck	HHDT	1	4	150	600
Water truck	MHDT	2	1	150	300

Alt 2

EMFAC 2014 Emission Factors - CY 2023 - g/mile

Category	Class	Fuel	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	Gas	0.011597	0.016914	0.597483	0.051457	262.8598	0.001852	0.001703	0.002634
Crew cab pickup	MDV	Gas	0.0284	0.041382	1.189314	0.145646	476.9282	0.001877	0.001726	0.00478
HD delivery truck	HHDT - T7 Pub	Diesel	0.088686	0.100962	0.378652	7.160338	1646.416	0.038317	0.036659	0.015708
Flatbed pole truck	MHDT - T6 Const. Heavy	Diesel	0.03958	0.045059	0.206309	1.106322	1176.798	0.003411	0.003264	0.011227
Water truck	MHDT - T6 Const. Heavy	Diesel	0.03958	0.045059	0.206309	1.106322	1176.798	0.003411	0.003264	0.011227
Boom truck	MHDT - T6 Const. Heavy	Diesel	0.03958	0.045059	0.206309	1.106322	1176.798	0.003411	0.003264	0.011227

Off-Road Mobile Source Emission Factors - Fleet Year 2023 - lb/hr

Category	MaxHP or Composite	ROG	CO	NOX	SOX	PM	CO2	CH4
Dozer	Composite	0.087924	0.512504	0.529146	0.001258	0.028001	114.017	0.007933
Grader	Composite	0.075765	0.571799	0.415574	0.001496	0.019131	132.743	0.006836
Water truck	Composite	0.12431	0.542193	0.588062	0.002658	0.018847	260.074	0.011216
Backhoe	Excavator, composite	0.061463	0.509665	0.282063	0.001315	0.011732	119.5793	0.005546
Drum compactor	Roller, 120 hp	0.044931	0.382183	0.303916	0.000692	0.018048	58.98873	0.004054
Bucket truck	OHW truck, composite	0.12431	0.542193	0.588062	0.002658	0.018847	260.074	0.011216
Boom truck	OHW truck, composite	0.12431	0.542193	0.588062	0.002658	0.018847	260.074	0.011216
Bull wheel puller	16 hp	0.016	0.054	0.101	0	0.004	13.217	0.001
Sock line puller	300 hp	0.112	0.474	0.8001	0.002	0.028	254.238	0.01
Tensioner	350 hp	0.112	0.474	0.8001	0.002	0.028	254.238	0.01
Chipper	Crushing/Proc. Equip.	0.077291	0.61987	0.447854	0.001456	0.020131	132.3079	0.006974
Compressor trailer	60 hp	0.058	0.313	0.394	0.001	0.025	63.607	0.005

Fugitive dust

Grading = 0.0306 x S^2 in lb/hr

Dozing = 0.75 x s^1.5/M^1.4 in lb/VMT

Source = AP-42.

Soil % silt, s	6.4
Soil % moisture, M	10

Mean vehicle speed, S	5
Dozer path width (ft)	10

Grading	0.765	lb/hr	4	hr/acre	3.06	lb/acre
Dozing	4.83E-01	lb/VMT	0.83	VMT/acre	0.40	lb/acre

Task 1 - Mob/demob

Vehicle	Category	ROG	TOG	CO	NOX	CO2
Heavy duty truck, lowboy trailer	HHDT	106.4231	121.1547	454.3827	8592.405	1975700
Flatbed pole truck	HHDT	53.21157	60.57733	227.1913	4296.203	987849.9
Water truck	MHDT	11.87396	13.5176	61.89282	331.8965	353039.3
	total (g)	171.5087	195.2496	743.4668	13220.5	3316589
	total (lb)	0.378114	0.430454	1.639072	29.14637	7311.865

PM10	PM2.5	SOX
45.98028	43.99119	18.8491
22.99014	21.99559	9.42455
1.023393	0.979122	3.36816
69.99381	66.96591	31.64181
0.154311	0.147635	0.069759

Task 2 - Vegetation Removal
Assumes that work is performed by DPW staff located at Stallion (commute not included in analysis)
Goal of task is to identify poles along existing alignment that are in need of replacement.

Criteria Pollutant Emissions

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10
Crew cab pickup	MDV	2.56	3.72	107.04	13.11	42923.54	0.17
	Total (g/day)	2.56	3.72	107.04	13.11	42923.54	0.17
	Total (lb)	0.1127	0.164218	4.719605	0.577974	1892.614	0.007447

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
Crew cab pickup	Paved	0.000861	-0.00016
	Unpaved	0.685626	0.06814
	Total (lb)	34.31573	3.406979

EF (paved) = $k_p(s/2)^{0.65}(W/3)^{1.5} - C$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = $k(s/12)^a(S/30)^d/(M/0.5)^c - C$ AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10
s = 0.035 for paved
C = 0.00047 for PM10
k = 1.8 for PM10
S = 25 mph
a = 1
c = 0.2
d = 0.5

k_p = 0.0024 for PM2.5
s = 6.4 for unpaved
C = 0.00036 for PM 2.5
k = 0.18 for PM 2.5
M = 6.8

PM2.5	SOX
0.16	0.43
0.16	0.43
0.006848	0.01897

Criteria Pol
Off-Road M

		ROG
Chipper	Crushing/Proc. Equip.	0.08
	Total emissions (lb)	6.18

Assume us

	ROG
Vehicle criteria pollutants	0.1127
Vehicle fugitive dust	
Equipment emissions	0.077291
Total	0.189992

llutant Emissions - Equipment

/obile Source Emission Factors - Fleet Year 2023 - lb/hr

CO	NOX	SOX	PM	CO2	CH4
0.62	0.45	1.46E-03	0.02	132.31	6.97E-03
49.59	35.83	0.12	1.61	10584.64	0.56

age for 20 days, at 4 hours per day.

CO	NOX	SOX	PM10	PM2.5	CO2	CH4
4.719605	0.577974	0.01897	0.007447	0.006848		
			34.31573	3.406979	1892.614	
0.61987	0.447854	0.001456	0.020131		132.3079	0.006974
5.339476	1.025828	0.020427	34.34331	3.413828	2024.922	0.006974

Task 3 - Access Road Installation and Repair

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	0.011597	0.016914	0.597483	0.051457	262.859787	0.001852	0.001703	0.002634
	Total (g/day)	9.28	13.53	477.99	41.17	210287.83	1.48	1.36	2.11
	Total (lb)	0.51133	0.745767	26.34463	2.268872	11590.1932	0.081662	0.075086	0.116126

Assume round trip commute from Las Cruces, New Mexico for four (4) vehicles traveling a round trip distance of 200 miles (assuming use of Stallion Gate) over a 10-day period.

		ROG	CO	NOX	SOX	PM	CO2	CH4
Bulldozer	Composite	13.18855	76.87562	79.37187	0.188721	4.20020738	17102.54	1.189981
Grader	Composite	11.36	85.77	62.34	0.22	2.87	19911.45	1.03
Water truck	OHW Composite	12.43105	54.21928	58.80617	0.265848	1.88467436	26007.4	1.121634
	Total (lb)	36.98441	216.8648	200.5141	0.678981	8.95451013	63021.4	3.337044

Assume a 10-day work period. With 6 hours/day use for the dozer and grader. The water truck is assumed to be usec 4 hours/day.

Category	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Commute criteria	0.51133	26.34463	2.268872	0.116126	0.08166194	0.075086	11590.19	
Commute fug. Dust					344.744382	33.27389		
Equipment criteria	36.98441	216.8648	200.5141	0.678981	8.95451013		63021.4	3.337044
total (lb)	37.49574	243.2094	202.783	0.795106	353.780554	33.34897	74611.59	3.337044

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
Commute (LDA)	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	344.7444	33.27389

Assume round trip is 150 miles paved, 50 miles unpaved

EF (paved) = $k_p(s/2)^{0.65}(W/3)^{1.5} - C$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = $k(s/12)^a(S/30)^d/(M/0.5)^c - C$ AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	W = 2.7
c = 0.2	
d = 0.5	

Grading and Dozing - Fugitive dust due to ground disturbance

Task 4 - Staging areas installation

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	0.011597	0.016914	0.597483	0.051457	262.8597867	0.001852	0.001703	0.002634
	Total (g/day)	9.28	13.53	477.99	41.17	210287.83	1.48	1.36	2.11
	Total (lb)	0.409064	0.596613	21.0757	1.815098	9272.154561	0.06533	0.060069	0.0929

Assume round trip commute from Las Cruces, New Mexico for four (4) vehicles traveling
a round trip distance of 200 miles (assuming use of Stallion Gate) over a 20-day period.

Off-Road Mobile Source Emission Factors - Fleet Year 2023 (in pounds)

	Category	ROG	CO	NOX	SOX	PM	CO2	CH4
Bulldozer	Composite	14.91726	65.06313	70.5674	0.319018	2.261609228	31208.88	1.34596
Grader	Composite	7.38	61.16	33.85	0.16	1.41	14349.51	0.67
Drum type compactor	120 hp	5.391743	45.8619	36.46987	0.083036	2.165787687	7078.648	0.486488
Backhoe/front end loader	Composite	1.437798	12.22984	9.725299	0.022143	0.577543383	1887.639	0.12973
	Total (lb)	29.12232	184.3147	150.6101	0.582042	6.412725267	54524.68	2.627661

Assume a 20-day work period. With 6 hours/day use for the dozer, grader, and backhoe. The drum compactor would
be used for a total of 32 hours for the project (8 hours per temp work area)

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Commute criteria	0.409063762	21.0757	1.815098	0.0929	0.06533	0.060069084	9272.155	
Equipment criteria	29.12232359	184.3147	150.6101	0.582042	6.412725		54524.68	2.627661
Commute fug. Dust					687.171	68.1395886		
Site prep fug. Dust					165.1176			
total (lb)	29.53138735	205.3904	152.4252	0.674942	858.7667	68.19965769	63796.84	2.627661

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
Commute	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	687.171	68.13959

Assume round trip is 150 miles paved, 50 miles unpaved

EF (paved) = $k_p(s/2)^{0.6}$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = k(s/12 AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	W = 2.7
c = 0.2	
d = 0.5	

d

Fugitive Dust - Construction equipment

grading	1.9176	lb
dozing	163.2	lb
	165.1176	lb

Task 5 - Conductor removal and installation

Vehicle	Category	ROG		CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	69.58021	101.4817	3584.89764	308.741322	1577158.72	11.11231	10.21753	15.80202
Bucket truck mob/demob	MHDT - T6 Const. Heavy	5.936979	6.758798	30.94641164	165.9482561	176519.6524	0.511697	0.489561	1.68408
Boom truck mob/demob	MHDT - T6 Const. Heavy	5.936979	6.758798	30.94641164	165.9482561	176519.6524	0.511697	0.489561	1.68408
	Total (g)	81.45	115.00	3646.79	640.64	1930198.03	12.14	11.20	19.17
	Total (lb)	0.179577	0.253531	8.03983876	1.412372041	4255.380465	0.026755	0.024685	0.042263

Assume round trip commute from Las Cruces, New Mexico for four (4) vehicles traveling a round trip distance of 200 miles (assuming use of Stallion Gate) over a 20-day period.

Offroad emissions - lb

	Category	ROG	CO	NOX	SOX	PM10	CO2	CH4
Bucket truck	OHW truck, composite	4.97242	21.68771	23.52246704	0.10633928	0.753869743	10402.96	0.448653
Boom truck	OHW truck, composite	7.458629	32.53157	35.28370055	0.15950892	1.130804614	15604.44	0.67298
Bull wheel puller	16 hp	0.96	3.24	6.06	0	0.24	793.02	0.06
Sock line puller	300 hp	6.72	28.44	48.006	0.12	1.68	15254.28	0.6
Static truck/tensioner	350 hp	6.72	28.44	48.006	0.12	1.68	15254.28	0.6
	Total (lb)	26.83105	114.3393	160.8781676	0.505848199	5.484674356	57308.98	2.381634

Total emissions - Task 5

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Vehicle onroad	1.290549	42.24596	18.03751594	0.322699575	0.167617069	0.155802	32951.74	
Offroad emissions	26.83105	114.3393	160.8781676	0.505848199	5.484674356		57308.98	2.381634
Fugitive dust					686.5529768	40.88375		
Total (lb)	28.1216	156.5852	178.9156835	0.828547774	692.2052683	41.03955	90260.72	2.381634

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
All vehicles	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	686.553	40.88375

Assume round trip is 150 miles paved, 50 miles unpaved

12 total trips (10 commuter + 1 boom truck + 1 bucket truck)

EF (paved) = $k_p(s/2)^{0.6!}$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = k(s/12 AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	W = 2.7
c = 0.2	
d = 0.5	

Task 6 - Pole removal   Task 6 - Pole Installation and Removal

Vehicle	Category	ROG	TOG	CO	NOX	CO2	PM10	PM2.5	SOX
Commute	LDA	17.39505	25.37042	896.2244	77.18533	394289.7	2.778078	2.554382	3.950505
	Total (g)	17.40	25.37	896.22	77.19	394289.68	2.78	2.55	3.95
	Total (lb)	0.03835	0.055933	1.975847	0.170165	869.2645	0.006125	0.005631	0.008709

Offroad emissions - lb

	Category	ROG	CO	NOX	SOX	PM10	CO2	CH4
Compressor trailer	60 hp	5.22	28.17	35.46	0.09	2.25	5724.63	0.45
Backhoe/front end loader	Composite	7.375524	61.15982	33.84755	0.157845	1.407785	14349.51	0.665482
Bucket truck	OHW truck	14.91726	65.06313	70.5674	0.319018	2.261609	31208.88	1.34596
Boom truck	OHW truck	14.91726	65.06313	70.5674	0.319018	2.261609	31208.88	1.34596
Flatbed pole truck	OHW truck	9.944839	43.37542	47.04493	0.212679	1.507739	20805.92	0.897307
	Total (lb)	52.37488	262.8315	257.4873	1.098559	9.688743	103297.8	4.704709

Total emissions - Task 6

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Vehicle onroad	0.03835	1.975847	0.170165	0.008709	0.006125	0.005631	869.2645	
Offroad emissions	52.37488	262.8315	257.4873	1.098559	9.688743		103297.8	4.704709
Fugitive dust					686.3985	67.82122		
Total (lb)	52.41323	264.8074	257.6574	1.107268	696.0933	67.82686	104167.1	4.704709

Fugitive dust emissions

Vehicle	Surface	PM10	PM2.5
All vehicles	Paved	0.000515	-0.00021
	Unpaved	0.685626	0.06814
	Total (lb)	686.3985	67.82122

Assume round trip is 150 miles paved, 50 miles unpaved

EF (paved) = $k_p(s/2)^{0.6!}$ AP-42, Section 13.2.1 - Paved Roads. November 2006

EF (unpaved) = k(s/12 AP-42, Section 13.2.2 - Unpaved Roads. November 2006

k_p = 0.016 for PM10	k_p = 0.0024 for PM2.5
s = 0.035 for paved	s = 6.4 for unpaved
C = 0.00047 for PM10	C = 0.00036 for PM 2.5
k = 1.8 for PM10	k = 0.18 for PM 2.5
S = 25 mph	M = 6.8
a = 1	W = 2.7
c = 0.2	
d = 0.5	

Alternative 2 Results

Category	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Task 1	0.378114	1.639072	29.14637	0.069759	0.154311	0.147635	7311.865	
Task 2	0.189992	5.339476	1.025828	0.020427	34.34331	3.413828	2024.922	0.006974
Task 3	37.49574	243.2094	202.783	0.795106	353.7806	33.34897	74611.59	3.337044
Task 4	29.53139	205.3904	152.4252	0.674942	858.7667	68.19966	63796.84	2.627661
Task 5	28.1216	156.5852	178.9157	0.828548	692.2053	41.03955	90260.72	2.381634
Task 6	52.41323	264.8074	257.6574	1.107268	696.0933	67.82686	104167.1	4.704709
Total (lb)	148.1301	876.971	821.9536	3.49605	2635.343	213.9765	342173	13.05802
Total (ton)	0.074065	0.438485	0.410977	0.001748	1.317672	0.106988	171.0865	0.006529

APPENDIX D BIOLOGICAL ASSESSMENT – SALINAS PEAK DISTRIBUTION SYSTEM

BIOLOGICAL RESOURCES SURVEY REPORT

Salinas Peak Power Distribution Line Replacement
White Sands Missile Range
Sierra County, New Mexico

Prepared for:
Environmental Division
Directorate of Public Works
White Sands Missile Range

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June 2023

Biological Resources Survey Report

Salinas Peak Power Distribution Line Replacement

White Sands Missile Range, Sierra County, New Mexico

June 2023

Acronyms and Abbreviations

ACFOR	Abundant, common, frequent, occasional, rare
AOI	Area of Interest
APLIC	Avian Power Line Interaction Committee
AZGFD	Arizona Game and Fish Department
BA	Biological Assessment
BMP	Best Management Practice
BOP	Beginning of Project
E	Endangered
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOP	End of Project
ESA	Endangered Species Act
FR	Federal Register
FT	Feet
HA	Hectare
KM	Kilometer
kV	Kilovolt
INCRMP	Integrated Natural and Cultural Resources Management Plan
MBTA	Migratory Bird Treaty Act
NAD	North American Datum
NEP	Nonessential Experimental Population
NMACP	New Mexico Bird Conservation Plan
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMSA	New Mexico Statutes Annotated
NRCS	Natural Resources Conservation Service
PA	Plant Association
ROW	Right-of-way
SCEC	Sierra County Electric Cooperative
SGCN	Species of Greatest Conservation Need
SOC	Species of Concern
T	Threatened

USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
WS	White Sands
WSMR	White Sands Missile Range
WSMR DPW	White Sands Missile Range, Directorate of Public Works

EXECUTIVE SUMMARY

White Sands Missile Range (WSMR) is proposing to construct, repair, operate, and maintain (where needed) a 14.4 kV/24.9 kV three-phase distribution line connecting facilities at Salinas Peak to a Sierra County Electric Cooperative (SCEC) supply line near the base of the mountain. The new and upgraded distribution infrastructure is common to all the action alternatives. Also common to all action alternatives is the use of service road upgrades/construction and temporary work areas.

The 2015 Integrated Natural and Cultural Resources Management Plan (INCRMP) identifies Best Management Practices (BMPs) and standard measures for avoidance and mitigation of much of the flora, fauna, and threatened and endangered species anticipated to occur within the proposed project area. The INCRMP and this Biological Assessment (BA) provide an environmental baseline of vegetation, soils, avifauna, and sensitive species across the project corridor. BMPs, adaptive management strategies, and environmental monitoring programs can be implemented based on these reports and associated data. The following summaries apply to the various biological resources analyzed in the above report.

Epsilon Systems conducted a field survey of the project area to evaluate potential impacts on natural resources, including threatened or endangered species, migratory birds, and critical habitats.

The following biological impacts were documented:

- Direct and temporary effects on vegetation are expected as a result of the project.
- Potential effects on wildlife from the proposed project are expected to be minimal because of the previously disturbed nature of the project area.
- No direct losses of large mammals or birds are expected as a result of this project, although some impacts to larger avian species, especially related to power line electrocution, are possible. The guidelines for power line mitigation measures provided in the avian power line interaction committee (APLIC) 2006 manual should be adhered to in order to minimize impacts and direct impacts on larger avians.
- No bird nests were noted during the survey of the project area. However, as noted, the survey was conducted during a single day, and all biological resources were being investigated, not simply avians. Nests could have been unoccupied, especially given the time of year the survey was conducted. There is potential habitat for a variety of birds to nest and breed along the proposed project corridor. Direct and temporary effects could occur if construction activities, especially related to vegetation removal, occur during the nesting/breeding season.
- Following the mitigation recommendations provided below should ensure that the project will minimize or mitigate the effect on state or federally-listed plants, migratory birds, bald and golden eagles, other wildlife species, or critical habitat.

If the recommendations outlined in this report are followed, the proposed project, as designed, is not expected to have a significant impact on the natural environment.

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CHAPTER 1. INTRODUCTION

White Sands Missile Range (WSMR) is located in south-central New Mexico, encompassing over 2,000,000 acres (809,000 hectares [ha]) in the five counties of Doña Ana, Socorro, Lincoln, Otero, and Sierra. The Main Post area is approximately 45 miles (72 kilometers [km]) north of El Paso, Texas, and 20 miles east-northeast of Las Cruces, New Mexico. US Highway 70 crosses WSMR from east to west and serves as the main access route to the Main Post area.

The Proposed Action would involve construction and repair activities associated with the rehabilitation of an approximately 2.5-mile-long WSMR-maintained power distribution line connecting facilities on Salinas Peak with electrical supply lines near the Salinas Base Camp, owned and maintained by Sierra County Electric Cooperative (SCEC). All land within the project vicinity is WSMR owned. No additional right-of-way (ROW) or easements will be needed to implement the Proposed Action.

1.1 PURPOSE OF THE STUDY

The purpose of the Proposed Action is to provide stable and reliable power to buildings, and equipment critical to military operations, reduce safety risks associated with maintenance of the utility, and improve resiliency to extreme weather events located on Salinas Peak. The Proposed Action is needed because the infrastructure is aging, susceptible to being damaged from extreme weather events, and lacks resiliency. This biological assessment (BA) is prepared to analyze the anticipated impacts on biological resources, provide appropriate best management practices (BMPs), and develop mitigation measures, as needed, to reduce impacts to threatened and endangered species and migratory birds below a level of significance.

1.2 CONTENT AND ORGANIZATION OF THE REPORT

This biological survey report includes a description of the environmental baseline conditions across the proposed realignment corridor, biological survey methods, and biological survey results. The organization of this report is as follows:

- **Chapter 1** provides a summary of the proposed action and purpose for this study;
- **Chapter 2** provides an environmental baseline of the area based on information from existing literature;
- **Chapter 3** summarizes the methods for the biological survey;
- **Chapter 4** provides the results of the biological survey;
- **Chapter 5** provides a summary of the findings and recommendations regarding potential impacts associated with the proposed project; and
- **Chapter 6** provides a list of the documents reviewed and cited within this report.

CHAPTER 2. SITE DESCRIPTION

2.1 LOCATION AND SETTING

The Proposed Action would involve construction and repair activities associated with the rehabilitation of an approximately 2.5-mile-long WSMR-maintained power distribution line connecting facilities on Salinas Peak with electrical supply lines near the base of the mountain, owned and maintained by SCEC. All land within the project vicinity is WSMR owned. No additional ROW or easements will be needed to implement the Proposed Action.

The White Sands Missile Range, Directorate of Public Works (WSMR DPW) proposes to construct (where needed), repair, operate, and maintain a 14.4 kilovolt (kV)/24.9 kV three-phase distribution line connecting facilities at Salinas Peak to a SCEC supply line near Salinas Base Camp at the base of the mountain. The proposed distribution line corridor is approximately 2.5 miles (4 km) long with a width of 20 feet (ft). As proposed, the corridor will include the above-ground transmission lines and pylons, in addition to access roads where practicable. All land within the project vicinity is WSMR owned; no additional ROW or easements will be needed to implement the proposed undertaking.

The pathing of the proposed line and the associated buffered area follows a previously disturbed utility alignment that includes features such as a relic roadbed, buried and exposed cable line, and remnants of the power poles and their associated components. This disturbance follows the proposed line from the peak to the road crossing before the final approach to Salinas Base Camp.

The proposed project is along Salinas Peak in Sierra County, New Mexico Township 12 South, Range 5 East, Sections 5 and 6; Township 12 South, Range 4 East, Section 1; and Township 11 South, Range 4 East, Section 36 as shown on the *Salinas Peak, NM* (1982) 7.5-Minute Series United States Geological Survey (USGS) quadrangle. The project area is defined in consultation with WSMR as the 2.5 miles by 20-ft wide distribution line corridor, in addition to a buffer of 50 ft on either side, for a total width of 120 ft. In total, the project area encompasses approximately 29 acres.

The proposed project is located from the Salinas Base Camp to Salinas Peak in a linear corridor. The Universal Transverse Mercator (UTM) coordinates for the Beginning of Project (BOP) are Zone 13, North American Datum (NAD) 83: Easting (E) 355153, Northing (N) 3687282. The UTM coordinates for the End of Project (EOP) are Zone 13, NAD 83: E 357363, N 3685435 (Figures 1-3). The approximate elevation for the project area ranges from 6,850 – 8,940 ft.

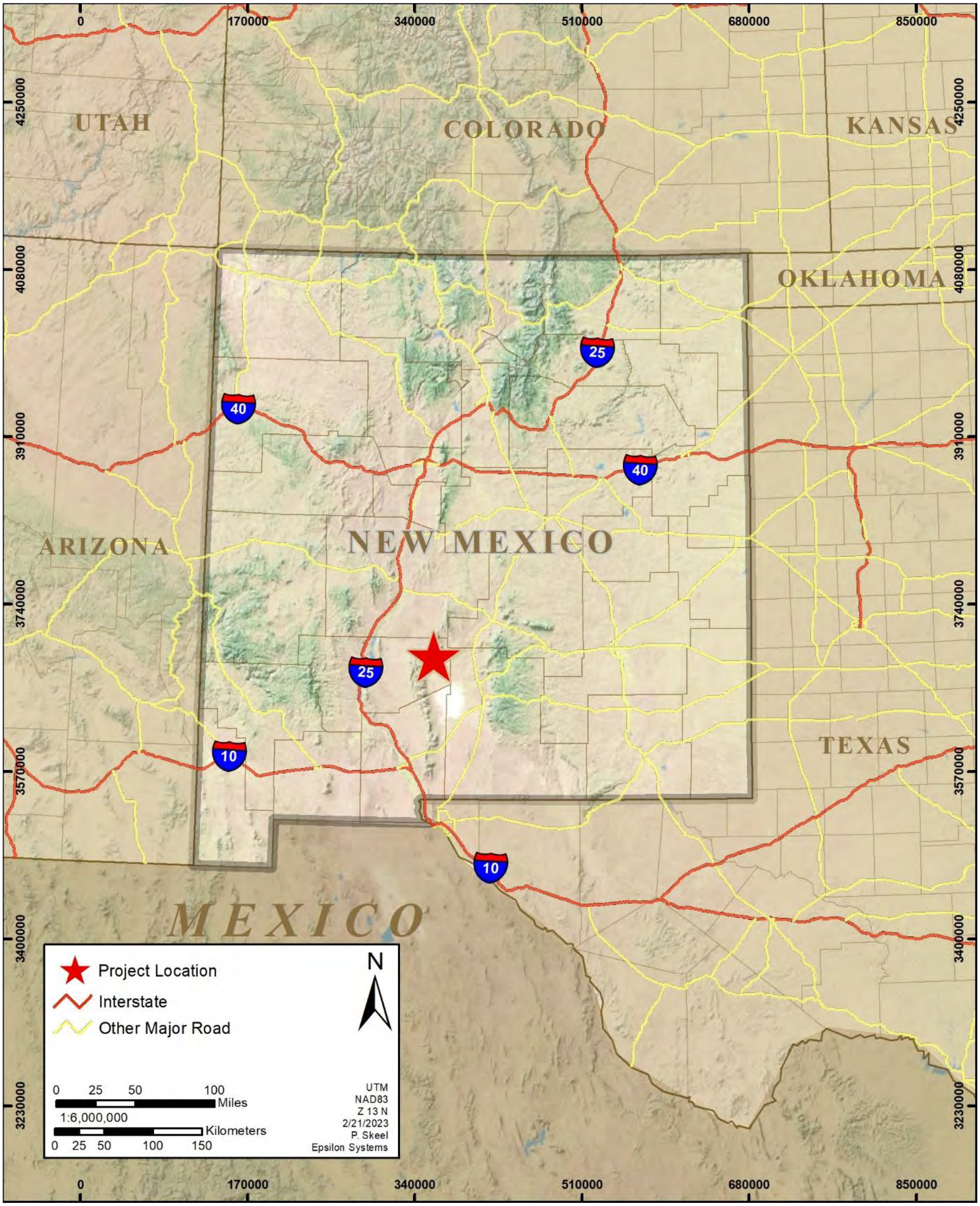

Figure 1. Project Vicinity.

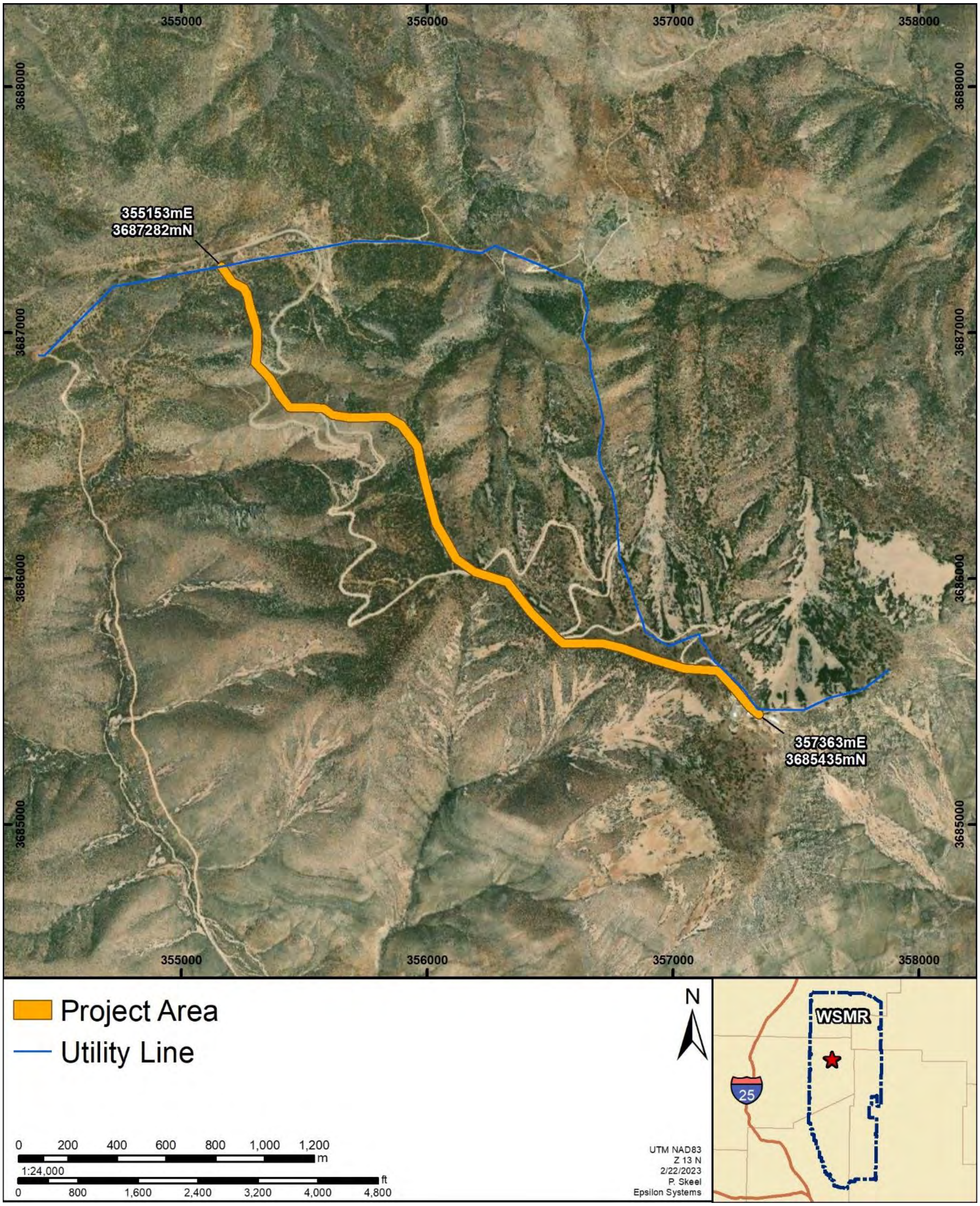

Figure 2. Aerial Image of the Project Area and Land Status (1:24,000 Scale).

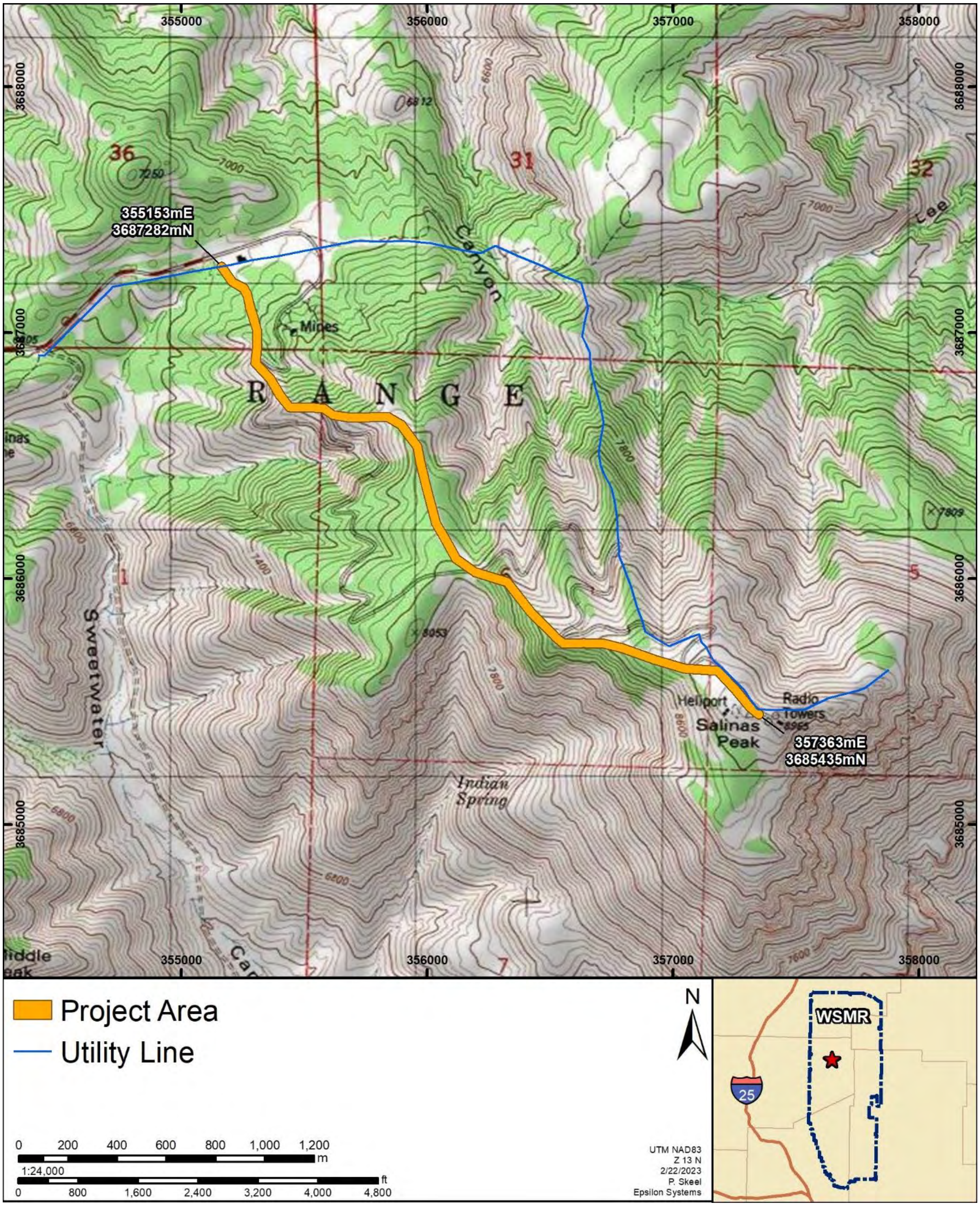

Figure 3. USGS Topographic Map of the Project Area Footprint and Land Status (1:24,000 Scale).

2.2 VEGETATION

A wide diversity of vegetation types occurs on WSMR lands, ranging from desert shrublands of basin floors to ponderosa pine *(Pinus ponderosa)* forests of mountaintops. A model for describing the vegetation communities of WSMR, called vegetation map units, was developed by Muldavin et al. (2000). The project area falls within the following eight vegetation units, presented from greatest to least order of magnitude relative to acreage: Pinyon Pine (*Pinus edulis*) Woodland, Road Disturbance, Ponderosa Pine Forest, Montane Scrub, Mixed Foothill-Piedmont Desert Grasslands, Interior Chaparral, Juniper *(Juniperus)* Woodland, and Piedmont Temperate Grasslands. Each of the eight vegetation units within the project area is described below. A map showing the vegetation units across the greater Salinas Peak area is shown in Figure 4. The cover types presented by Muldavin were largely confirmed in the field during the survey. The dominant vegetation cover type was Pinyon Pine Woodland followed by road disturbance. There is a marked transition when descending from Salinas Peak from Ponderosa Pine Forest to Pinyon Pine Woodlands.

2.2.1 Pinyon Pine Woodland – 17.25 acres

This Rocky Mountain/Great Basin Woodland unit is characterized by pinyon pine types that dominate the higher elevations of the mountainous areas, including the Chalk Hills, Chupadera Mesa, and the San Andres, San Augustine, Big Gyp, and Oscura Mountains. The Pinyon Pine/Scribner's Needlegrass *(Achnatherum scribneri)* and Pinyon Pine/Wavyleaf Oak *(Quercus undulata)* Plant Associations (PA) typically occur on platform summits or relatively gentle dipping slopes. In contrast, the steep escarpment and canyon side slopes commonly support Pinyon Pine/Gambel's Oak *(Quercus gambelii)* (north facing) and Pinyon Pine/New Mexico Muhly *(Muhlenbergia cuspidate)* (south-facing). The Pinyon Pine/Mountain Mahogany *(Cercocarpus breviflorus)* is also important, particularly on sites that have been burned (Muldavin et al. 2000).

These woodlands are most extensive to the north, forming dense, uniform stands on Chupadera Mesa and in the Oscura Mountains. To the south, in the San Andres Mountains, the woodlands become less abundant, more fragmented, and increasingly intermixed with Montane Scrub. At lower elevations, pinyon pine decreases, and juniper woodlands become more prevalent (Muldavin et al. 2000).

2.2.2 Road Disturbance – 8 acres

This unit includes all roads and associated disturbances within a 60-meter-wide road corridor (Muldavin et al. 2000).

2.2.3 Ponderosa Pine Forest – 1.75 acres

This Rocky Mountain Montane Forest unit is characterized by the Ponderosa Pine/Arizona Fescue *(Festuca arizonica)* PA. It is limited to the summit of Salinas Peak and the north-facing, high-elevation drainages of Silver Top Mountain of the San Andres Mountains. These are small stands of open-canopied forest with grassy understories. The unit also includes Gambel's oak shrubland types that occur on steep, unstable talus slopes adjacent to the forests (Muldavin et al. 2000).

2.2.4 Montane Scrub – 1.5 acres

This temperate Rocky Mountain Montane Scrub unit is characterized by mountain mahogany-dominated communities with wavyleaf oak as a common associate. They occur on slopes and ridges within the Chalk Hills and the San Andres, San Augustine, Organ, Mockingbird, Big Gyp, Fairview, and Oscura Mountains. The Mountain Mahogany/Blue Grama *(Bouteloua gracilis)*, Sideoats grama *(Bouteloua curtipendula),* or Plains Lovegrass *(Eragrostis intermedia)* PAs occur throughout the unit, mostly on steeply sloped sites. The Mountain Mahogany/Curlyleaf Muhly *(Muhlenbergia setifolia)* PA is prevalent on ridges with exposed bedrock. Stands often occur where fire has removed Pinyon or Oneseed Juniper *(Juniperus monosperma)* Woodlands (Muldavin et al. 2000).

2.2.5 Mixed Foothill-Piedmont Desert Grasslands – 0.3 acres

This map unit is an extensive complex of Plains-Mesa-Foothill Grasslands and Chihuahuan Desert Grasslands that occurs on mid to low-elevation mountain slopes, foothills, and upper alluvial fan piedmonts. These grasslands are represented by Hairy Grama *(Bouteloua hirsute)*, Black Grama *(Bouteloua eripoda)*, Curlyleaf Muhly, Blue Grama, and Sideoats Grama types. In general, the footslopes of the San Andres Mountains support the Black Grama-Sideoats Grama PA, while the upper alluvial fans are typified by the Black Grama/Mariola *(Parthenium incanum)* PAs. The interior mid-elevation canyon slopes support Hairy Grama-Black Grama, Black Grama/Ocotillo *(Fouquieria splendens)* PAs, and various grama grasses with sotol *(Dasylirion)* types. The Curlyleaf Muhly/Bigelow's Sage *(Artemisia bigelovii)*, Black Grama/Bigelow's Sage, and Curlyleaf Muhly-Grama Grass PAs tend to be restricted to the valleys and basins of the eastern Oscura Mountains. At lower elevations, the unit commonly gives way to Piedmont Desert Grasslands, and at higher elevations, Foothill-Montane Temperate Grasslands (Muldavin et al. 2000).

2.2.6 Interior Chaparral – 0.22 acres

This Interior Chaparral unit is dominated by shrub live oak *(Quercus turbinella)* types and typically occurs on mid to low-elevation slopes throughout the Chalk Hills and the San Andres, San Augustine, Organ, Mockingbird, and Oscura Mountains. The Shrub Live Oak/Black Grama, Shrub Live Oak/Hairy Grama, and Shrub Live Oak/Sideoats Grama PAs are dominant. These types are commonly found adjacent to Oneseed Juniper Woodlands or grasslands. At higher elevations, the unit grades to Montane Scrub or Pinyon Woodlands (Muldavin et al. 2000).

2.2.7 Juniper Woodland – 0.08 acres

These Rocky Mountain/Great Basin Woodlands are typified by open canopied stands of oneseed juniper with grassy understories. They occur at mid-elevations of the Chalk Hills, Chupadera Mesa, the San Andres, San Augustine, Big Gyp, Organ, and Oscura Mountains. Gentle mountain and piedmont slopes are dominated by the Oneseed Juniper/Blue Grama, Oneseed Juniper/Black Grama, or Oneseed Juniper/Hairy Grama PAs. Steeper slopes tend to support the Oneseed Juniper/New Mexico Needlegrass *(Hesperostipa neomexicana)*, Oneseed Juniper/Sideoats Grama, and Oneseed Juniper/New Mexico Muhly Pas. The Oneseed Juniper/Mountain Mahogany PA is also prevalent, particularly on sites that have been burned. As elevation increases, this unit gives way to Pinyon Pine Woodlands. At lower elevations, the canopy becomes increasingly open as sites grade into grasslands or even Chihuahuan Desert Scrub types (Muldavin et al. 2000).

2.2.8 Piedmont Temperate Grasslands – 0.02 acres

This grassland occurs within the interior valleys of the San Andres Mountains in the valley bottoms or adjacent alluvial toe slopes. Black Grama/Soaptree Yucca *(Yucca elata)* and Hairy Grama/Soaptree Yucca PAs are the dominant types of the lower slopes and bottoms, with Blue Grama-Sideoats Grama PAs on the upper slopes.

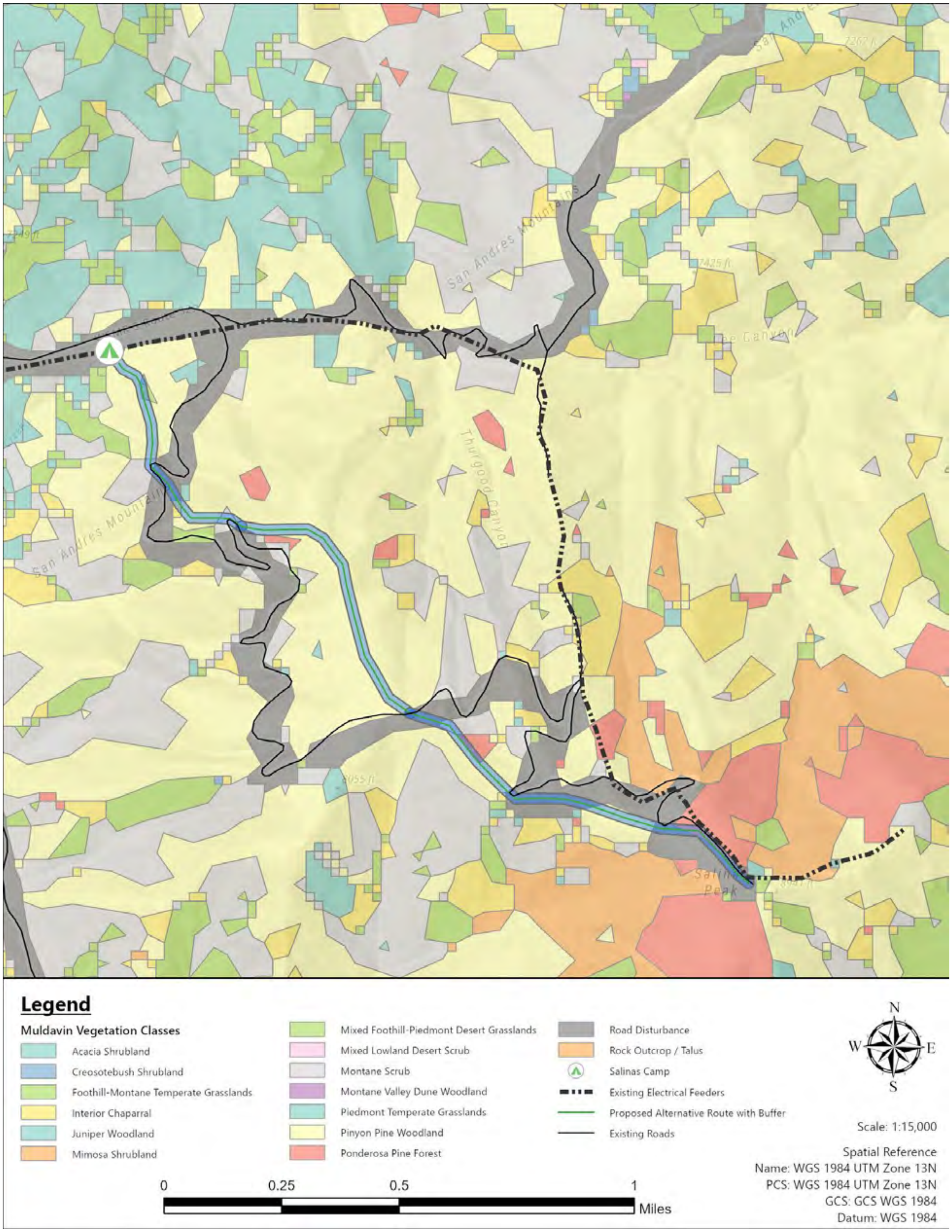

Figure 4. Muldavin vegetation classes of Salinas Peak area.

2.3 GEOLOGY AND SOILS

The San Andres Mountain, where the proposed project area is, is the most prominent mountain range of WSMR and contains Salinas Peak, the highest point on WSMR. The range generally runs north-south for approximately 75 miles. The San Andres Mountains are a portion of the eastern edge of the Rio Grande rift valley. The mountains are primarily west-dipping fault blocks made primarily of San Andres Formation limestone, but also with extensive exposures of reddish Abo Formation sandstone on the western side and quartz monzonite on the eastern side (Butterfield 2006). Gypsum deposits washed from these mountains are the main source of the dunes in White Sands National Park.

A generalized polygon of the project area was generated in ArcGIS (defined as the area of interest [AOI]) and imported into the Natural Resources Conservation Service (NRCS) soil mapping website. Soil types and their associated acreage relative to the project area are listed in Table 1. Soil types and areas related to the larger Salinas Peak area are presented in Figure 5.

Table 1. Soils present in the proposed realignment corridor.

Map Unit Name	Acres/Percent in AOI	Windthrow Hazard	Hydric	Landform / Description
Rubble land-Rock outcrop-Far complex, 3 to 90 percent slopes	17.2 Acres 59.0%	Not Rated	No	Talus slopes, mountains, summit, are well-drained, depth to the water table is more than 80 inches. Depth to restrictive features is 2 to 8 inches to lithic bedrock. Parent materials include rubbly colluvium derived from rhyolite.
Deama-Penagua-Rock outcrop complex, 35 to 90 percent slopes	8.9 Acres 30.4%	Moderate	No	Mountains, backslope; well-drained, depth to the water table is more than 80 inches. Depth to restrictive features is 14 to 20 inches to lithic bedrock. The parent material is gravelly colluvium derived from limestone.
Deama-Rock outcrop complex, 30 to 90 percent slopes	1.8 Acres 6.1%	Moderate	No	Mountains, backslope, well-drained, depth to the water table is more than 80 inches. Depth to the restrictive layer is 14 to 20 inches to lithic bedrock. The parent material is gravelly slope alluvium over residuum weathered from limestone.
Desario-Cuate complex, 5 to 35 percent slopes	1.3 Acres 4.5%	Severe	No	Mountains, summit, mountaintop, well-drained, depth to the water table is more than 80 inches. Depth to the restrictive layer is 10 to 14 inches to lithic bedrock. The parent material is colluvium, derived from limestone.

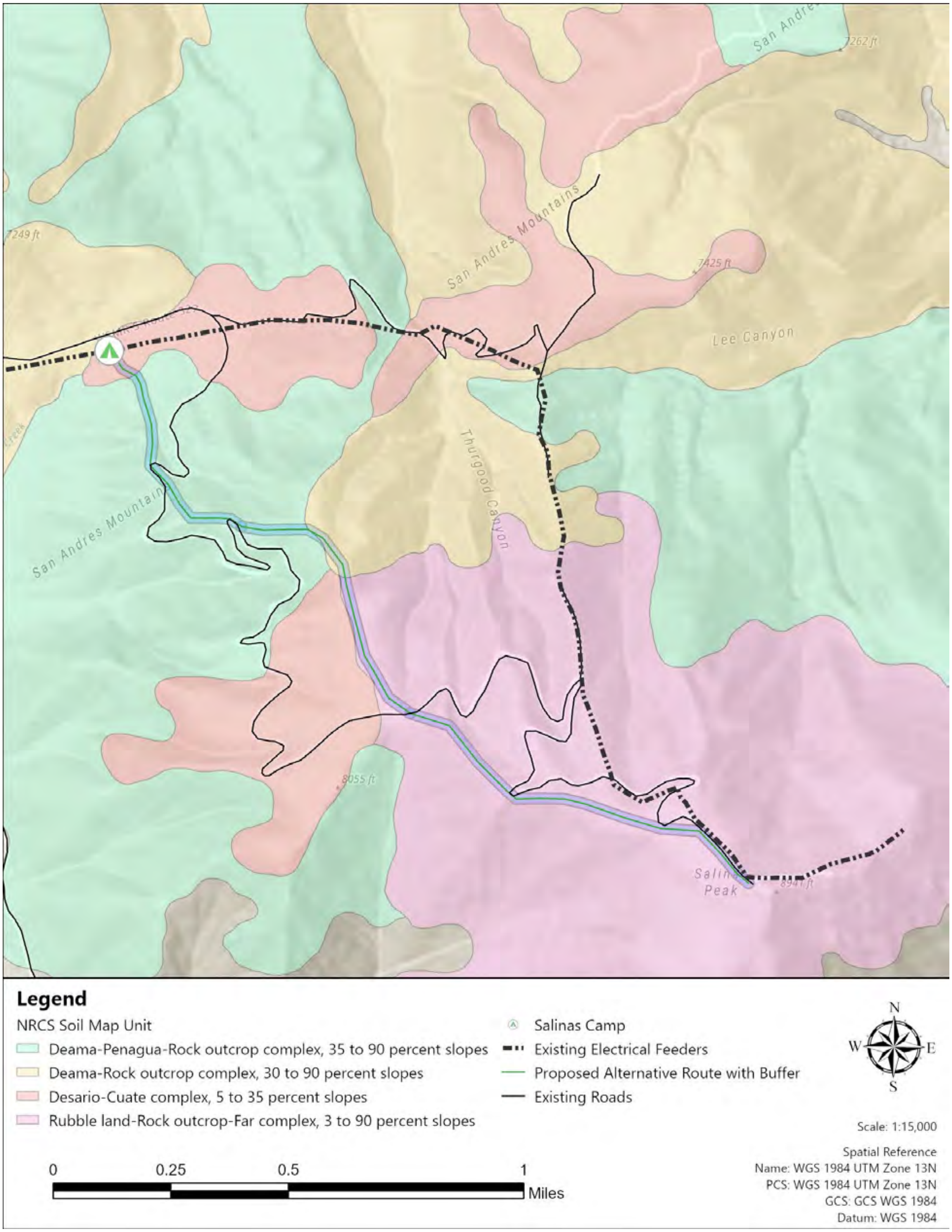

Figure 5. NRCS soil map units of Salinas Peak area.

2.3.1 Soil Erodibility

Soil erosion effects are generally dependent upon a variety of factors, including soil structure and composition, climate, topography, and vegetative cover. Climactic soil erosion effects primarily revolve around the abundance and intensity of precipitation in a given environment. Vegetative cover is an interface between the atmosphere and soil surface, influencing the overall permeability and potential runoff. When considered together, these factors determine a soil's potential for wind and water erosion.

Soil erosion from wind, water, and road use is a concern due to its impacts on the surrounding plant communities and the resulting cost of road maintenance. The NRCS uses several factors to evaluate soil erodibility (NRCS 2014):

- The erosion factor K indicates the susceptibility of soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- A wind erodibility group consists of soils with similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.
- The wind erodibility index is a numerical value indicating soil susceptibility to wind erosion or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

The proposed activities would be conducted in accordance with existing directives and BMPs, minimizing the potential for soil erosion impacts. A greater discussion of the WSMR geology, topography, and soils can be found in the WSMR Final EIS, Section 3.6 *Earth Sciences*. Table 2 provides a summary of the soil erodibility for the predominant soil types present across the project area. Of note, the soil unit on Salinas Peak is unrated in all categories. This is primarily due to the dominance of rock and rubble in the map unit group. During the survey, the area was confirmed to be largely rubble and rock outcrops.

Table 2. Soil Erodibility by Type

Map Unit Name	Wind Erodibility Index (tons per acre per year)	Wind Erodibility Group	K factor, Whole Soil
Rubble land-Rock outcrop-Far complex, 3 to 90 percent slopes	**n/a**	**n/a**	**n/a**
Deama-Penagua-Rock outcrop complex, 35 to 90 percent slopes	**48**	**6**	**0.10**
Deama-Rock outcrop complex, 30 to 90 percent slopes	**48**	**6**	**0.10**
Desario-Cuate complex, 5 to 35 percent slopes	**48**	**6**	**0.10**

2.3.2 Topography

Topographic descriptions are typically with respect to the elevation, slope, aspect, and surface features (e.g., surface roughness) found within a given area. Based on site visits, the feasibility study, and discussions with WSMR Staff, slope seems to be the primary limiting factor, especially on the approach to the summit where the slope is the most extreme, no access exists or can be sustained, and the amount of available space to work is extremely limited on all sides. The feasibility study conducted for this project, as well as the pedestrian survey, confirmed the overall steepness and inaccessibility of most of Salinas Peak, especially on the approach to the summit. The entirety of Salinas Peak can generally be described as having steep relief. The approximate elevation for the proposed realignment ranges from 6,850 – 8,950 ft. While conducting the feasibility survey, one logical alternative route emerged as the proposed realignment. This route maintains the existing overall pathing from Salinas Camp to Salinas Peak but generally takes a more western approach along the hillside. This western approach is the proposed realignment. Figure 6 shows the existing transmission line and the proposed alternative route overlain on the slope analysis for Salinas Peak. A greater analysis of the existing and proposed line, as well as the methods for calculating slope, can be found within the feasibility study (Richards, 2022).

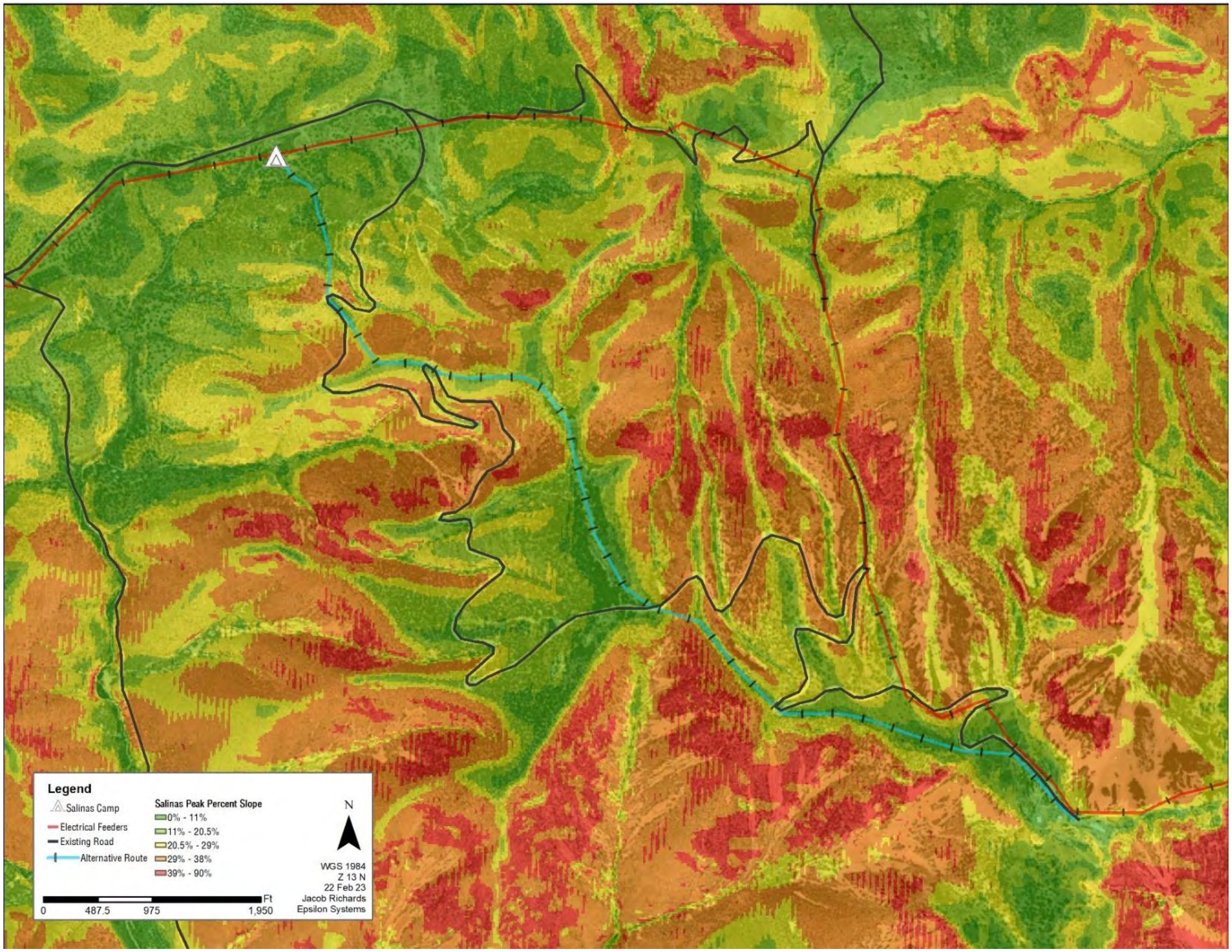

Figure 6. Percent slope analysis for Salinas Peak area.

2.4 WILDLIFE

The survey conducted on the proposed realignment was not designed to gather detailed data on wildlife; therefore, a literature review was also conducted to identify the species likely to occur in the area based on habitat present and expected ranges of wildlife. The literature review relied primarily on the following documents to develop the list of wildlife species discussed in this section:

- Mammal Checklist of WSMR (WSMR 2007);
- Bird Checklist for White Sands Missile Range (WSMR 2013);
- Status and Distribution of Terrestrial Snails in Southwestern New Mexico (Wallace 2021);
- WSMR Integrated Natural and Cultural Resources Management Plan ([INCRMP] WSMR 2015); and
- Amphibians and Reptiles of New Mexico (Dagenhardt et al. 1996).

Wildlife resources addressed in this section include native and naturalized terrestrial animals and their habitats. Sensitive species, including threatened or endangered species, are addressed in the following section.

The diversity and quality of vegetation communities on WSMR provide habitat for many of these wildlife species (Muldavin et al. 2000). The proposed project area is dominated primarily by pinyon pine woodlands and to a lesser extent, ponderosa pine forests and montane scrub, so the following wildlife descriptions are organized by these habitat types. The other vegetative habitat associations represent less than 1-acre of the project area and were therefore excluded from this portion of the analysis.

2.4.1 Mammals

The forest, woodland, and scrub habitats are highly associated with several carnivores, including the gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), and to a great extent, mountain lion (*Puma concolor*; Logan et al. 1996). A survey in the San Andres and Oscura Mountains in 2009 reported nine black bears, and a survey in 2012 yielded 22 different bear individuals. Other mammals documented during the 2012 survey were gray fox, rock squirrel *(Otospermophilus variegatus)*, cougar, mule deer *(Odocoileus hemionus)*, ringtail *(Bassariscus astutus)*, javalina *(Pecari tajacu)*, coyote *(Canis latrans)*, and bobcat *(Lync rufus)* (ECO Inc. 2012). The grizzly bear *(Ursus actos horribilis)* and Mexican gray wolf *(Canis lupus baileyi)* are noted to be extirpated from these habitats. Importantly, the Mexican gray wolf has been reintroduced across the southwest, and a male and female pair have been noted on WSMR near the Stallion Ranch area. These individuals were probably transients, but they do demonstrate that the species does have the potential to occur on WSMR.

On WSMR, aoudad (barbary sheep [*Ammotragus lervia*]) is observed primarily in precipitous mountainous regions. There are frequent annual sightings in the San Andres and Oscura mountains on WSMR. WSMR maintains a year-round kill permit for Aoudad due to the potential threat the species poses to bighorn sheep.

The montane shrew (*Sorex monticolus*), southwest bat (*Myotis auriculus*), long-eared bat (*Myotis evotis*), eastern cottontail (*Sylvilagus floridanus*), and feral goat are further species associated with only possible occurrences on WSMR (WSMR 2015).

2.4.2 Birds

Habitats within WSMR support approximately 290 documented avian species (WSMR 2013). WSMR has resident populations of raptors, game birds, and songbirds. Raptor species common on WSMR include red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), and Swainson's hawk (*Buteo swainsoni*). Game birds found on WSMR include Gambel's quail (*Callipepla gambellii*), scaled quail (*Callipepla squamata*), white-winged dove (*Zenaida asiatica*), and mourning dove (*Zenaida macroura*). Songbirds common to WSMR include black-throated sparrows (*Amphispiza bilneata*), pyrrhuloxia (*Cardinalis sinuatus*), and horned larks (*Eremophila alpestris*) (WSMR 2009).

2.4.3 Invertebrates

The San Andres Mountains provide potential habitats where new species of invertebrates have been and will continue to be discovered. (WSMR 2015). This has occurred with woodlands snails (Metcalf and Smartt 1997). Between 1966 and 1980, a survey of 50 snail species in the Organ and San Andres Mountain was ongoing. In 1995, the distribution, critical microhabitat, and endemic populations for the terrestrial gastropods in the genus *Ashmunella* was completed, including management and monitoring recommendations (Sullivan and Smartt 1995).

2.4.4 Amphibians and Reptiles

WSMR contains habitats that support diverse herpetofauna: seven species of amphibians and 47 species of reptiles, representing three orders and 12 families, have been documented. There are six toad species (three spadefoot toads and three true toads), one salamander species, one turtle species, 27 snake species, and 19 lizard species (WSMR 2015). Five rattlesnake species occur on WSMR, and bites from all are potentially lethal. All other snakes occurring on WSMR are either non-venomous or mildly venomous and are not dangerous to humans (WSMR 2009).

2.4.5 Fish

There are no known fish collections or reports of such species from aquatic habitats in the San Andres or Oscura mountains (WSMR 2015).

2.5 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act ([ESA] 16 USC § 1531 et seq.) provides authority to the US Fish and Wildlife Service (USFWS) to designate endangered and threatened species and identify critical habitats to support such species. New Mexico state-listed endangered and threatened species are managed by the New Mexico Department of Game and Fish (NMDGF) under the New Mexico Wildlife Conservation Act.

Under the New Mexico Endangered Plant Species Act of 1985, the New Mexico Endangered Plant Program, Energy Minerals, and Natural Resources Department Forestry Division have statutory responsibility for the State Endangered Plant Species List. Section 75-6-1 of the New Mexico Statutes Annotated (NMSA) 1978 directed the Division to investigate all plant species in the state for the purpose of establishing a list of endangered plant species.

Table 2 lists federal and state threatened or endangered listed plants and wildlife that occur or have the potential to occur within WSMR boundaries and within the transmission line project area. The potential occurrence was determined based on past documentation of each species within the vicinity of the project areas and on the suitability of habitat and occurrence within the region of a particular species. There are no critical habitats within the proposed project area and its vicinity (USFWS 2022).

Table 3. Protected Species Potentially Occurring at WSMR and within the Realignment Area.

Species	Status		Habitat Description	Determination of effects
	Federal	State		
Plants				
Hedeoma Todsenii Todsen's pennyroyal	E	E	A habitat specialist found in the gypseous-limestone soils associated with the Yeso formation on the north-facing slopes of the San Andres and Sacramento Mountains. Populations typically occur in pinyon-juniper woodlands ranging in elevation from 6,263 ft to 7,404 ft (1,909 m to 2,257 m). There are known populations that occur in the San Andres Mountains and the western side of the Sacramento Mountains. Critical habitat is designated in the San Andres Mountain but is outside the project area (Figure 2).	While the project area does exist within the elevation parameters for this species and critical habitat is designated, it is not within the project area. The known habitat associations are generally not found on Salinas Peak either. All activities associated with the proposed action are not within, adjacent, or near the designated WSMR habitat, or designated critical habitat. **No effect.**
Birds				
Strix occidentalis lucida; Mexican spotted owl	T	--	Mexican spotted owl habitat is limited in distribution to forested and rocky-canyon environments. They often use mixed conifer forests for nesting and roosting. Nesting typically occurs in forests with complex structures or rocky canyons. Within forested areas, nests are often found in Douglas-fir trees, in dwarf- mistletoe induced witches' broom. Mexican spotted owls nest and roost in closed-canopy forests with old-growth stands or rocky canyons. They nest and roost in closed-canopy forests with old-growth stands, and may migrate to more open habitats at lower elevations during winter. There are no known confirmed Mexican Spotted Owls occurring on WSMR (WSMR 2009). A WSMR 2003 survey concluded there was not suitable habitat for breeding, but there was some potential habitat for wintering or a vagrant between fall and spring (WSMR 2009). There are no specific conservation for this species as they have not been documented and are not expected to reside on WSMR.	Mexican spotted owls are not known to occur on WSMR. The overall habitat associations of the project area are also not ideal for this species. If individuals were to enter the project area, it would likely be only as temporary vagrants. **No Effect.**

Species	Status		Habitat Description	Determination of effects
	Federal	State		
Falco femoralis septentrionalis; Northern Aplomado Falcon	NEP	E	Aplomado falcons are strongly associated with Chihuahuan desert grasslands containing scattered tall yuccas and mesquite (Keddy-Hector 2000). Small trees and large shrubs must be widely spaced, and dense, lightly, or ungrazed grasslands are preferred. The preferred habitat often contains tobosa swales and dominant grasses, including blue, black, and sideoats grama (Montoya and Zwank 1995). The northern Aplomado falcon has been observed within WSMR, and it is probable that the Aplomado falcon was formerly a breeder on WSMR (WSMR 2015). Predictive modeling conducted by Young et al. (2005) estimated that roughly 10% of WSMR consisted of moderate to highly suitable habitat. The majority of habitat in these two categories was predicted to occur within the Stallion Range in northwestern WSMR.	While the northern Aplomado Falcon has been documented on WSMR, the habitat associated with the proposed project area does not fall within the known breeding or nesting qualifications. If individuals were to enter the project area, it would likely not be for breeding or roosting but instead as an accidental vagrant. **No effect.**
Empidonax traillii extimus; Southwestern willow flycatcher	E	E	Southwestern willow flycatchers are associated with moist microclimates and dense riparian vegetation near surface water. Wet conditions are uniformly required, but the vegetative structure and composition can vary widely by region and availability. This species typically avoids narrow, linear patches of habitat less than 10 meters wide. Habitat for the southwestern willow flycatcher was delineated by Sadoti et al. (2003), and they concluded that the breeding habitat is marginal and widely dispersed, and the migratory habitat is also widely dispersed and limited (INCRMP 2009). The known area of suitable habitat and where an individual was documented is near the Davies Tank on the southeastern portion of WSMR.	The project area does not have suitable habitat for the southwestern willow flycatcher. The project area is outside the known area on WSMR where this species exists. **No effect.**

Species	Status		Habitat Description	Determination of effects
	Federal	State		
Coccyzus americanus; Yellow-billed Cuckoo	T	--	Yellow-billed cuckoos are associated with wooded, dense cover and water nearby. They prefer mature or late-successional cottonwood/willow associations with a dense understory. Western populations will often place nests in willows along streams with adjacent cottonwoods serving as foraging sites. Surveys were performed on WSMR in 2005, resulting in three willow flycatcher detections at Davis Tank and a single yellow-billed cuckoo detection in each of two successive surveys at a Salt Creek site (Meyer 2006). However, there was no evidence that any of these birds were territorial or breeding on WSMR. Davis Tank holds the most promise as a breeding habitat for these two species (Meyer 2006).	The project area does not have suitable habitat for the yellow-billed cuckoo. If individuals were to enter the project area, it would likely not be for breeding or roosting but instead as an accidental vagrants. **No effect.**
Vireo vicinior; Gray Vireo	--	T	The gray vireo typically is associated with open pinyon-juniper woodland or juniper savannah with a shrub component. In southern NM, they are more associated with oak, madrone, or desert scrub species. This species arrives in NM from mid to late April and usually departs by mid-August. Management for gray vireos in New Mexico should focus on the protection of existing healthy pinyon-juniper woodlands in order to minimize the impacts of the recent and ongoing loss of this habitat to drought and beetle infestation. Areas containing only juniper and a shrub component may provide suitable habitat for gray vireos and should be conserved.	The project area does demonstrate some of the habitat associations for the gray vireo. WSMR has developed a gray vireo and pinyon jay Avoidance and Minimization Standards (Appendix B). These established measures should be utilized during the construction phase of the project. Assuming the various measure to avoid and minimize impacts are followed, there will likely be **No Effect.**

Species	Status		Habitat Description	Determination of effects
	Federal	State		
Gymnorhinus cyanocephalus; Pinyon Jay	--	SOC	Pinyon jays are aptly named as they have evolved mutualism with the pinon pine tree. The pinon seeds provide nutritional benefits that enhance reproductive success and survival (Ligon 1978, Marzluff and Balda 1992). Pinyon Jays are not only the piñon tree's most important long-distance seed disperser, but their caching can also enhance the tree's resilience to climate impacts: a pinyon jay flock is capable of re-planting a woodland (Ligon 1978) decimated by fire, drought, or insect pests. In NM, nesting areas are typically mid-aged to mature stands of piñon-juniper vegetation (Johnson et al. 2014, 2015, 2016). Pinyon jays nest in larger-than-average piñon and juniper trees and in areas of relatively high canopy cover and tree density (Johnson et al. 2014, 2015; Johnson and Sadoti 2019). In NM, they use juniper woodland and savanna primarily in winter and, to a lesser extent, grassland.	The project area does contain some of the habitat associates for the pinyon jay. WSMR has developed a gray vireo and pinyon jay Avoidance and Minimization Standards (Appendix B) and has further adapted the New Mexico Avian Conservation Plan (NMACP) pinyon jay (Johnson 2020). These established measures should be utilized during the construction phase of the project. Assuming the various measure to avoid and minimize impacts are followed, there will likely be **No Effect.**
Mammals				
Canis lupus baileyi; Mexican wolf	EXPN	E	Mexican gray wolves are found in a variety of habitats in the southwest in mountain woodlands and the Chihuahuan and Sonoran deserts. They are not low desert dwellers and prefer a combination of cover, water, and available prey offered by woodlands. This species is designated a nonessential experimental population in New Mexico (USFWS 2012) and is not known to occur on or near WSMR (WSMR 2015; Figure 3). While WSMR does have an area designated the "White Sands Recovery Area," it is not of sufficient size, nor does it have sufficient prey density to function as a recovery area (WSMR 2009).	The Mexican wolf is not known to occur on WSMR, and the known habitat is not a sufficient size to support populations. This includes the project area. **No Effect.**

E = endangered, T = threatened, EXPN = experimental, C = candidate, NEP = nonessential experimental population, SOC = species of concern, SGCN = species of greatest conservation need, and -- = no listing, Source = IPaC 2022.

In addition to the federal and state threatened or endangered plant species, there are 13 federal and state species of concern and one state species of concern without federal listing. There are four federal or state bird species of concern that have the potential to occur at WSMR. There are ten mammal species of concern that have the potential to occur at WSMR, with eight of these being bats or myotis species. Descriptions of these species can be found in the WSMR INCRMP (WSMR 2015). While these species are noted to exist across WSMR, habitat associations on Salinas Peak are not conducive to these species, and none have been documented or observed in the project area.

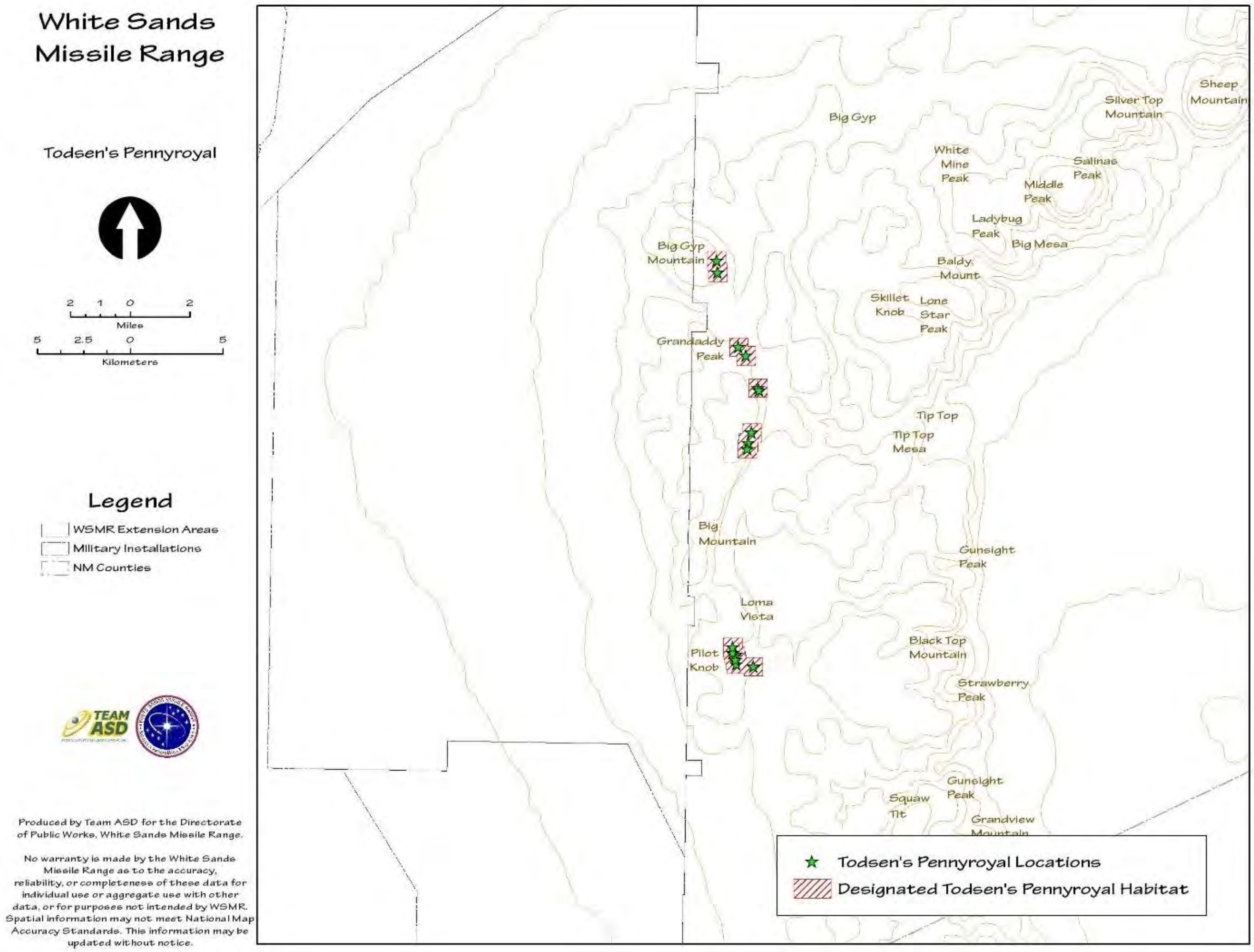

Figure 7. Todsen's Pennyroyal known locations and designated habitat.

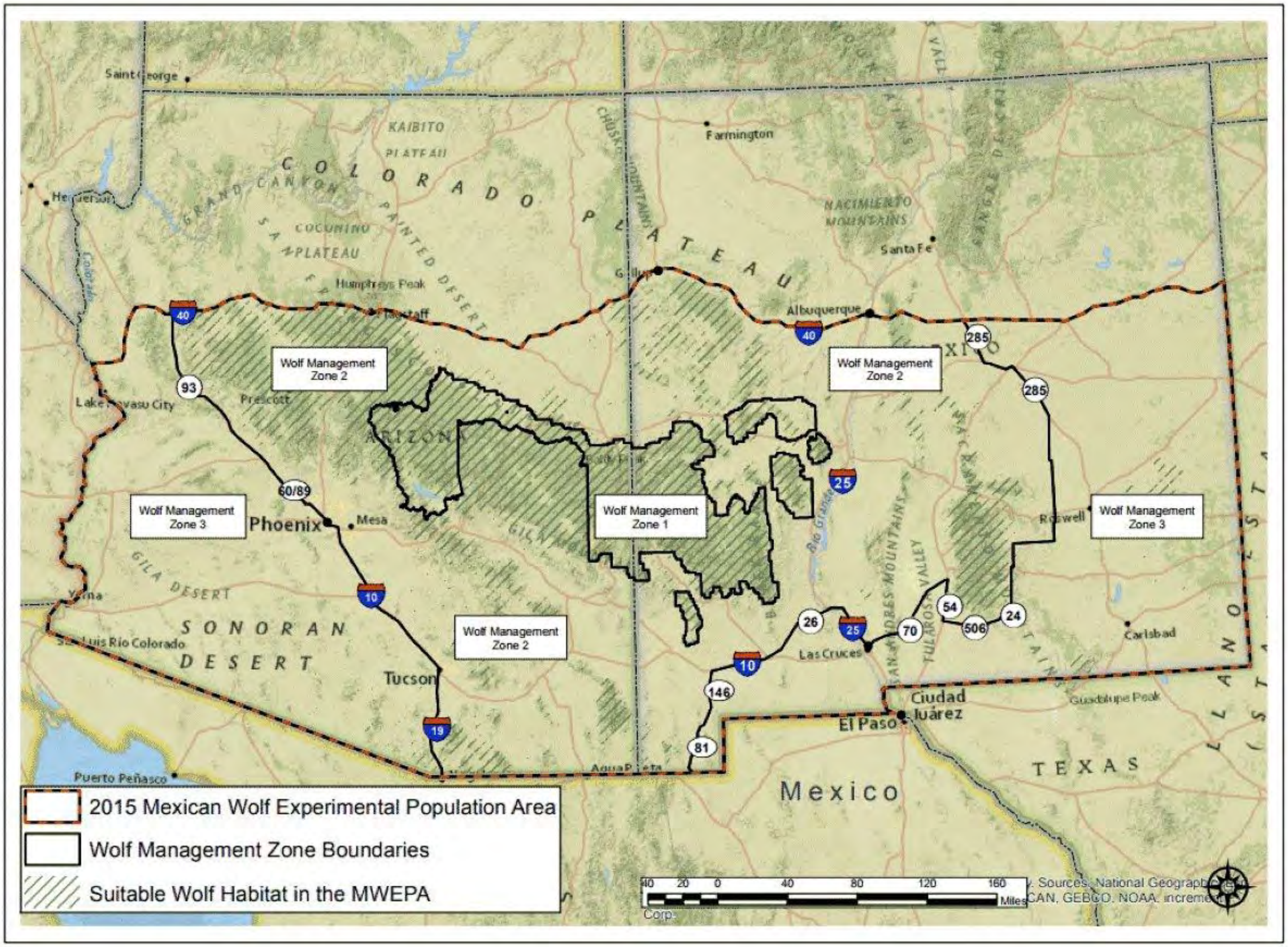

Figure 8. Mexican Wolf Experimental population area and suitable habitat.

OTHER SENSITIVE SPECIES

2.5.1 Migratory Birds

The Migratory Bird Treaty Act (MBTA) protects migratory birds and prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except with a federal permit (16 U.S.C. 703; 50 CFR 21; 50 CFR 10). Under the MBTA, "take" is defined as "to pursue, hunt, shoot, shoot at, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." Most actions that result in taking or the permanent or temporary possession of a protected species or nests containing eggs or young constitute violations of the MBTA, and the MBTA has no specific provision for authorizing incidental take.

Protocols and procedures for the protection of migratory birds on WSMR are discussed in the WSMR INCRMP (WSMR 2015). The project areas associated with the proposed action cover a wide range of vegetative communities and habitat associations. As such, a variety of birds protected by the MBTA are expected to occur within these sites.

Raptor species common on WSMR and likely to hunt over the proposed project area include the red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk *(Buteo swainsoni)*, northern harrier *(Circus cyaneus)*, and prairie falcon (*Falco mexicanus*). Proximity to rocky outcrops and cliffs of the San Andres and Oscura Mountains, there is potential for raptors and other resident birds to nest nearby, including red-tailed hawks, prairie falcons, golden eagles *(Aquila chrysaetos)*, ravens *(Corvus corax)*, and turkey vultures *(Cathartes aura)*.

2.5.2 Bald and Golden Eagles

The Eagle Act makes it illegal to import, export, take (which includes molest or disturb), sell, purchase, or barter any bald eagle or golden eagle or parts thereof. Under the Eagle Act (72 Federal Register [FR] 31132, June 5, 2007), "take" is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb." "Disturb" is defined as "to agitate or bother a bald or golden eagle to the degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (72 FR 31132, June 5, 2007).

Golden eagles are the largest bird of prey in North America and use a wide variety of habitats for foraging and breeding. Golden eagles may either be permanent residents or migrants throughout New Mexico, and nesting pairs are known to exist on WSMR, and the San Andres Mountain, albeit on the eastern slopes away from the project area. They often nest on cliffs in this area. Nests are built out of sticks shaped to create a flat or bowl-shaped platform. A breeding pair can lay two to four eggs a year. Surveys between 2013 and 2014 documented 32 territories on WSMR lands (WSMR 2015). Golden eagles are protected under several federal statutes, which include the Eagle Act, the MBTA, Executive Order 13186 - Responsibilities of Federal Agencies to Protect Migratory Birds, and Tribal Trust Coordination.

As proposed, the realignment would be entirely outside the noted buffer for nesting activities related to bald and golden eagles, as described in the Golden Eagle Avoidance and Impact Minimization Standards.

2.5.3 Noxious Weeds

The Noxious Weed Management Act directs the New Mexico Department of Agriculture (NMDA) to develop a noxious weed list for the state, identify methods of control for designated species, and educate the public about noxious weeds. NMDA coordinates weed management among local, state, and federal land managers, as well as private landowners (NMDA 2020). The Environmental Division of WSMR has developed an Integrated Pest Management Plan for the range. This plan outlines the resources necessary to identify, survey, manage, and the environmental and personnel requirements to control pests (Rodden 2021).

No noxious weeds were discovered during the pedestrian survey of the proposed project area.

CHAPTER 3. METHODS

A field survey of the proposed realignment and a buffered corridor was conducted on 21 October 2022 to evaluate the potential impacts of project activities on threatened and endangered species, wetlands and waterways, migratory birds, noxious weeds, and other sensitive biological features. The entire project site exhibits some level of previous disturbance, as noted during the survey. Nearly the entirety of the proposed realignment occurs within a former abandoned transmission line where access roads and disturbances of similar scope and scale occurred historically.

The survey encompassed the 2.5 miles by 20-ft wide distribution line corridor, in addition to a buffer of 50 ft on either side, for a total width of 120 ft. All observed plant and animal species or signs of animal species were documented. Jacob Richards from Epsilon Systems conducted the biological survey of the corridor with assistance from Brad Beacham. The survey was conducted from the general infrastructure on Salinas Peak to the southern terminus at Salinas Base Camp. The corridor was generally walked in a diagonal pattern, with any areas of interest being investigated directly. The results of the survey were assessed in relation to potential impacts on the natural environment, including whether state- and federal-listed species and their critical habitat are likely to occur in the proposed realignment corridor and its immediate vicinity.

As part of these field investigations, species lists were compiled, and a qualitative estimate of their frequency of occurrence was applied in relation to habitat composition in the project area. The investigations also included a survey for noxious weeds as designated by the NMDA and an evaluation of potential impacts on nesting birds protected under the MBTA. Table 3 provides the qualitative gradations used to assess the abundance of observed species in the project area. The various qualitative categories below were based and modified on the ACFOR (abundant, common, frequent, occasional, rare) scale, which works to rank species by the relative abundance in a given area (Morris 1995). This system does have limitations based on the investigator performing the survey but provides a relative scale to provide species presence/absence, species richness, overall biodiversity, and abundance. The scale has been adapted to capture the flora and fauna of the project area, and as such, the categories are slightly different. Importantly, all categories are subjective, and all values should be considered relative to one another.

Table 4. Qualitative Estimate of Species' Frequency of Occurrence.

Category	Plants	Animals
Abundant	Present in relatively large numbers over most or all of the project area	Species or sign seen in large numbers over most or all of the project area
Common	Easily found in most of the project area or in large numbers in select areas	Species or sign readily found in most of the project area or regularly within the species known habitat association
Rare	Present in isolated patches or small numbers	Species or sign present occasionally in the known habitat associations
Very Rare*	One or two individuals present	Species sighted only once are expected to inhabit the area only briefly or are suspected only in a very limited area

*The very rare category has no connection with any state or federal agency classification of species and is not an indication of population status.

CHAPTER 4. SURVEY RESULTS

This chapter summarizes the survey conducted within the proposed transmission line realignment and buffered area. The survey encompassed the 2.5 miles by 20-ft wide distribution line corridor, in addition to a buffer of 50 ft on either side, for a total width of 120 ft. All observed plant and animal species or signs of faunal species were documented. The survey was completed in a singular day. Conditions were sunny, with light to no winds, and temperatures were roughly in the mid-60–70-degree Fahrenheit range. There were no documented freezes in the season, and many flowers and grasses near the surface were actively blooming. The survey was used in tandem with desktop resources, conservations with personnel of the Environmental Division, other general site visits, and known historical conditions on Salinas Peak and San Andres Mountains.

4.1 VEGETATION

Table 4 summarizes the plant species observed during the 21 October 2022 survey yielded 38 species of plants. There were distinct community zones and transitional areas. These generally follow and support the findings from the Fink 2007 inventory of Salinas Peak, although not fully inclusive. Vegetation communities present include ponderosa pine forest, pinyon pine woodlands, juniper woodlands, desert grasslands, interior chaparral, mixed foothill-Piedmont desert grasslands, and montane scrub. While all of the species in these areas were not entirely inclusive of those described by Fink and Muldavin's vegetation units, many of the dominant and typical species of the community types were present. Many of the grasses and wildflowers were actively flowering.

Table 5. Flora Observed during Survey.

Common Name	Scientific Name	Abundance
Jimson weed	*Datura stramonium*	Common
Rubber rabbit bush	*Ericameria nauseosa*	Rare
Texas Sotol	*Dasylirion Liliaceae*	Common
One-seed juniper	*Juniperus monosperma*	Common
Ponderosa pine	*Pinus ponderosa*	Common
Desert prickly pear	*Opuntia phaeacantha*	Common
Desert mountain mahogany	*Cercocarpus breviflorus*	Abundant
Soaptree yucca	*Yucca elata*	Rare
Black grama	*Bouteloua eriopoda*	Common
Sideoats grama	*Bouteloua curtipendula*	Common
Blue grama	*Bouteloua gracilis*	Common
Indian paintbrush	*Castilleja spp.*	Rare
Alligator juniper	*Juniperus deppeana*	Common
Gambel oak	*Quercus fagaceae*	Common in patches
Desert scrub oak	*Quercus turbinella*	Common in patches
Tree cholla	*Cylindropuntia cactaeae*	Rare
Desert muhly	*Muhlenbergia glauca*	Common
Banana Yucca	*Yucca baccata*	Rare
Fourwing saltbush	*Atriplex canescens*	Common
New Mexico thistle	*Cirsium neomexicanum*	Common
New Mexico rubber plant	*Partenium incanum*	Common
Kingcup cactus	*Echinocereus triglochidiatus*	Rare
Russian thistle	*Salsola tragus*	Common

Arizona Fescue	*Festuca arizonica*	common
Little bluestem	*Schizachryium scoparium*	Common
Prairie sagewort	*Artemisia frigida*	Rare
Pinyon Pine	*Pinus edulis*	Common
Hairy-seed bahia	*Bahia absinthifolia*	Rare
Creosotebush	*Larrea tridentata*	Common
Skeleton-leaf goldeneye	*Viguiera stenoloba*	Rare
Engelmann's hedgehog cactus	*Echinocereus engelmannii*	Rare
Cowtongue cactus	*Opuntia engelmannii*	Very rare
Graham's nipple cactus	*Mammillaria grahamii Engelmann*	Very Rare
Ladyfinger cactus	*Echinocereus pentalophus*	Rare
Parry's agave	*Agave parryi*	Rare
Various grasses, forbs, shrubs		Common

There were no federal- or state-listed threatened or endangered plant species observed during the survey. There were also no other sensitive plant species observed.

4.2 WILDLIFE

Table 6 summarizes the wildlife species observed during the 21 October 2022 survey. Visual observations during the survey yielded 16 species or their signs. The entire project site exhibits some level of previous disturbance, as noted during the survey. Nearly the entirety of the proposed realignment occurs within a former abandoned transmission line where access roads and disturbances of similar scope and scale occurred historically. Even with the disturbed nature of the site, evidence of wildlife was observed throughout the project area. There were no federal- or state-listed threatened or endangered wildlife species observed during the survey.

Table 6. Wildlife Observed during Survey.

Common Name	Scientific Name	Abundance
Unknown snail shell	*Gastropoda sp.*	Very Rare
Jay	*Corvidae*	Rare
Common raven	*Corvus corax*	Common
Mule deer	*Odocoileus hemionus*	Rare
Wren	*Troglodytidae*	Rare
Brown harvester ants	*Pogonomyrmex spp.*	Rare
Desert cottontail	*Sylvilagus audubonii*	Rare
Sparrow	*Passeridae*	Rare
Common crow	*Corvus brachyrhynchos*	Common
Pack rack middens	*Neotoma*	Common
Elk scat	*Cervus*	Common
Rabbit scat	*Sylvilagus*	Common
Mole/vole	*Ellobius*	Rare
Mountain lion scat	*Puma*	Very Rare
Cicada casing	*Cicada*	Rare
Oryx tracks	*Oryx*	Rare

.

CHAPTER 5. SUMMARY

WSMR is proposing to construct, repair, operate, and maintain (where needed) a 14.4 kV/24.9 kV three-phase distribution line connecting facilities at Salinas Peak to a SCEC supply line near the base of the mountain. The new and upgraded distribution infrastructure is common to all the action alternatives. Also common to all action alternatives is the use of service road upgrades/construction and temporary work areas.

The 2015 INCRMP identifies BMPs and standard measures for avoidance and mitigation of much of the flora, fauna, and threatened and endangered species anticipated to occur within the proposed project area. The INCRMP and this Biological Assessment provide an environmental baseline of vegetation, soils, avifauna, and sensitive species across the project corridor. BMPs, adaptive management strategies, and environmental monitoring programs can be implemented based on these reports and associated data. The following summaries apply to the various biological resources analyzed in the above report.

Epsilon Systems conducted a field survey of the project area to evaluate potential impacts on biological resources, threatened or endangered species, migratory birds, and critical habitats.

The following biological impacts were documented:

- Direct and temporary effects on vegetation are expected as a result of the project.
- Potential effects on wildlife from the proposed project are expected to be minimal because of the previously disturbed nature of the project area.
- No direct losses of large mammals or birds are expected as a result of this project, although some impacts to larger avian species, especially related to power line electrocution, are possible. The guidelines for power line mitigation measures provided in APLIC 2006 manual should be adhered to in order to minimize impacts and direct impacts on larger avians.
- No bird nests were noted during the survey of the project area. However, as noted, the survey was conducted during a single day, and all biological resources were being investigated, not simply avians. Nests could have been unoccupied, especially given the time of year the survey was conducted. There is potential habitat for a variety of birds to nest and breed along the proposed project corridor. Direct and temporary effects could occur if construction activities, especially related to vegetation removal, occur during the nesting/breeding season.
- Following the mitigation recommendations provided below should ensure that the project will minimize or mitigate the effect on state or federally-listed plants, migratory birds, bald and golden eagles, other wildlife species, or critical habitat.

If the recommendations outlined in this report are followed, the proposed project, as designed, is not expected to have a significant impact on the natural environment.

5.1 VEGETATION

A pedestrian survey of the proposed realignment area was conducted on 21 October 2022. This survey confirmed that the project area falls primarily into the Pinyon Pine woodland and, to a lesser extent, various other vegetative map units as identified in Muldavin et al. (2000). All vegetation observed onsite was consistent with those floral species expected to be found in these vegetation units, and as described by Fink (2007) in the floristic Inventory of Salinas Peak. As noted during the survey, nearly the entirety of the proposed realignment occurs within a former abandoned transmission line where access roads and disturbances of similar scope and scale occurred historically.

The proposed action will remove a small portion of the associated vegetative communities but does not represent major long-term effects or a significant impact on local vegetation. Direct effects on plants would occur from the proposed project, but this would not adversely impact the plant community.

Direct and temporary effects on vegetation are expected as a result of the project. Potential effects on vegetation from the proposed project are expected to be minimal and short-term because of the previously disturbed nature of the project area. No direct or indirect effects are anticipated to critical habitat as none exists within the proposed project corridor. The proposed action would not likely adversely affect vegetation.

5.2 WILDLIFE

Construction associated with the proposed project is not expected to incur significant environmental consequences to wildlife species, although it is possible that some smaller, less mobile soil-dwelling animals and insects could be lost due to installation activities. Direct effects on wildlife from the proposed project include the permanent loss of habitat and the possible loss of an undefined number of non-listed, small burrowing animals and insects.

Environmental consequences for migratory birds at the construction site would be direct if work occurs during the nesting season and nesting birds with active nests are present. Direct effects include possible noise and visual disturbance to adjacent nesting birds and potential physical harm to nesting birds and their young that might occur in proposed project construction areas that require the removal of vegetation. However, no nests were observed during the pedestrian survey.

It is recommended that construction activities be conducted outside of the spring/summer migratory bird breeding/nesting season (for most species, this is between March and August, with specifics provided in the IPaC). Scheduling of construction activities, specifically related to vegetation removal for the proposed project, should consider the spring/summer breeding/nesting season for migratory birds. There were no observed active nests during the pedestrian survey, so the discovery of nests during construction is not expected; however, if active nests are found or if construction activities occur during the spring/summer breeding/nesting season, then all construction activities in the immediate area should cease and a qualified biologist from the Environmental Division of WSMR should be consulted on the best way to proceed.

Potential effects on wildlife from the proposed project are expected to be minimal because of the previously disturbed nature of the project area. No direct losses of large mammals or birds are expected as a result of this project. No bird nests were present in the project area. However, as noted, the survey was conducted during a single day, and all biological resources were being investigated, not simply avians. Nests could have been unoccupied, especially given the time of year the survey was conducted. There is potential habitat for a variety of birds to nest and breed along the proposed project corridor. Removal of marginal foraging habitat for non-listed species and non-listed species avoidance of the project area during construction are considered negligible impacts. Indirect effects on wildlife from the proposed project include the temporary loss of available habitat, the majority of which falls within previously disturbed areas. Through the implementation of these measures, the proposed action would not likely adversely affect wildlife populations.

Migratory Birds

If construction activities occur during nesting season, then surveys for nesting migratory birds are recommended to take place seven days before construction activities. The surveys would be conducted by a qualified biologist and use methods accepted by the Environmental Division (e.g., point transects or time-area counts). If occupied bird nests are found during surveys, avoidance mitigation would be employed to either adjust impact locations or delay construction until the nestlings have fledged. The Environmental Division would be consulted to determine how to best address the situation. The Environmental Division would consult with the USFWS, if needed, to avoid MBTA violations as outlined in the Memorandum of Understanding with the US Forest Service. Through the implementation of these measures, the proposed action would not likely adversely affect migratory bird populations.

Bald and Golden Eagles

There are 24 documented golden eagle nesting sites on the eastern slopes of Salinas Peak. The nesting locations were observed and plotted using latitude and longitude coordinates in ArcGIS. Management guidelines for the bald eagle from the USFWS recommend a minimum buffer for construction activities of 660 ft (200 m) if the construction is visible from the nest. Buffers were placed on each of the nesting locations, and it was determined that the closest nesting location is a minimum of half a mile from the proposed construction activities. Full guidance for avoidance and impact minimization can be found in Appendix C.

Existing avoidance and minimization strategies for migratory birds and bald and golden eagles should be followed. This includes the Species at Risk – Golden Eagles Avoidance and Impact Minimization standards as well as the Avian Protection Plan (Avian Power Line Interaction Committee [APLIC] 2006). Chapter 5 of the Avian Protection Plan provides a detailed discussion related to avians and power line design. It further provides suggested practices for the development and design of transmission lines. The suggested practices covered will be adhered to during the design and construction of the proposed line. Through the implementation of these measures, the proposed action would not adversely affect bald and golden eagles.

5.3 THREATENED AND ENDANGERED SPECIES

There are no known populations of federally or state-listed threatened or endangered species or critical habitats present within the proposed project area; however, there is potential for the American peregrine falcon, bald eagle, and golden eagle to occur seasonally, as transients, or as foraging individuals. The only species known to occur near the Salinas Peak project area is the golden eagle, which is discussed in greater detail in the previous section.

The American peregrine falcon may occur downslope of the Salinas Peak site. Peregrine falcons prefer wooded and forested cliffs with large gulfs. They hunt over a wide variety of habitats that include a very open, featureless habitat so long as there is ample prey. The proposed construction is outside known nest or breeding areas and therefore is not anticipated to have any direct impact. The known habitat association at WSMR is near Stallion Range Center and is outside this project's proposed footprint.

Two state-listed species have the potential to occur within the proposed project corridor, the pinyon jay and gray vireo. Neither species are federally listed but are both listed in New Mexico. Both species also are on the MBTA and are considered Army Species at Risk. Habitat associations within the proposed project do meet the qualifications for both of these species, and both have the potential to occur in the project area.

The Environmental Division of WSMR has developed specific measures for the avoidance and minimization for the gray vireo and pinyon jay. Following the mitigation recommendations provided in Appendix B should ensure that the project will have no effect on either of these species. If the following measures are implemented, the proposed action would not likely adversely affect threatened and endangered species within the project area.

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APPENDIX A: USFWS IPAC RESOURCE LIST

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Sierra County, New Mexico

Local office

New Mexico Ecological Services Field Office

📞 (505) 346-2525
📠 (505) 346-2542

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Mexican Wolf Canis lupus baileyi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3916	EXPN

Birds

NAME	STATUS
Mexican Spotted Owl Strix occidentalis lucida Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/8196	Threatened
Northern Aplomado Falcon Falco femoralis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1923	EXPN
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3911	Threatened

Amphibians

NAME	STATUS

Chiricahua Leopard Frog Rana chiricahuensis Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1516	Threatened

Fishes

NAME	STATUS
Gila Trout Oncorhynchus gilae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/781	Threatened
Rio Grande Cutthroat Trout Oncorhynchus clarkii virginalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/920	Candidate
Rio Grande Silvery Minnow Hybognathus amarus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1391	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Todsen's Pennyroyal Hedeoma todsenii Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1081	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

There are no migratory birds of conservation concern expected to occur at this location.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX B: SPECIES AT RISK: GRAY VIREO AND PINYON JAY AVOIDANCE AND IMPACT MINIMIZATION STANDARDS

Gray Vireo

The following measures will be used to avoid/minimize impacts to the gray vireo on WSMR:

- Conduct pre-treatment and long-term post-treatment monitoring for vireo presence/absence, habitat use, and reproductive success. Treatments that occur immediately prior to vireo nesting season (such as prescribed fires in March or early April) must rely on previous-year survey results to inform planning.
- Evaluate each proposed treatment via the environmental review process to ensure that measures are incorporated to avoid/minimize impacts to gray vireos.
- Conduct prescribed burns prior to April or after July, outside of gray vireo nesting season
- Include a mosaic of treated and untreated habitat, and conduct post-treatment assessments (e.g., number and size of junipers killed) to inform future treatments. Size of untreated habitat should consider gray vireo territory size.
- Target the elimination of small/young junipers and retain a portion of taller junipers preferred for nesting. Consider that vireos also use areas with higher tree densities compared to surrounding habitat.
- Buffer areas around known vireo nest trees from treatments. Buffer distances are determined with input from NMDGF and USFWS.
- Consider vireo densities across the landscape.
- Where treatments negatively affect the vireo population, adjust methods in future projects to avoid and minimize impacts to the species.
- Coordinate review of monitoring and treatment plans with U.S. Fish and Wildlife Service and NMDGF, IAW the Sikes Act, WSMR IPMP, WSMR INRMP, and EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds (Bumgarner and WSMR 2019).

Pinyon Jay

Conservation measures for the Pinyon Jay at WSMR are primarily adapted from the multi-agency Conservation Strategy for the Pinyon jay maintained here: https://partnersinflight.org/resources/conservation-strategy-for-pinyon-jay/ and the New Mexico Bird Conservation Plan Pinyon Jay species account (NMACP 2020). Primary measures include 500m nest site buffers, avoidance of treatments during the nest season (generally March through May), retention of the most productive pinon trees, and the inclusion of a mosaic of untreated and treated areas.

APPENDIX C: SPECIES AT RISK: GOLDEN EAGLE AVOIDANCE AND IMPACT MINIMIZATION STANDARDS

Golden Eagle

Standard Avoidance and Minimization Measures

The Conservation Branch of the Garrison Environmental Division will determine if golden eagles could be affected by the activity. Additional surveys may be required to determine breeding status or the location of active nests in proximity to a specific project. The following standard measures will be implemented in order to avoid or minimize the likelihood of taking golden eagles from disturbance, injury, or death.

If these standard measures and buffers cannot be met without compromising the proposed action, or if take could still occur when these standard measures are implemented, then WSMR will discuss with the U.S. Fish and Wildlife Service to determine if a) a shorter buffer distance can be used for a specific activity, b) if there are other practicable measures that would reduce the possibility of take, or c) if take permit is required.

- For ground-based activities, 800 m (1/2 mi; 2,600 ft) buffer zones will be implemented around any active eagle nest (with eggs, nestlings, or dependent fledglings nearby) during the nesting season (February through July). If it is not known if there is an active nest, or which nest is active, additional surveys will be required or buffer zones will be implemented around all eagle nests (active or inactive) that could be affected by the project. This includes drone operations.
- For jet aircraft activities, 400 m (1/4 mi; 1300 ft) buffer zones will be implemented around any active eagle nest (with eggs, nestlings, or dependent fledglings nearby) during the nesting season (February through July). If it is not known if there is an active nest or which nest is active, additional surveys will be required or buffer zones will be implemented around all eagle nests (active or inactive) that could be affected by these activities.
- For helicopter activities, 200 m (1/8 mi; 600 ft) buffer zones will be implemented around any active eagle nest (with eggs, nestlings, or dependent fledglings nearby) during the nesting season (February through July). If it is not known if there is an active nest or which nest is active, additional surveys will be required or buffer zones will be implemented around all eagle nests (active or inactive) that could be affected by these activities.
- All eagle nests (active or inactive) are protected year-round, therefore targets will not be placed within ½ mile of any eagle nest unless a target is for an activity (such as a non-hazardous laser) that could not modify or destroy an eagle nest. This distance may be reduced to ¼ mile for guided systems where the operators are confident of accuracy.
- Eagle monitoring will be conducted by The Peregrine Fund using methods that avoid or minimize disturbance to eagles.
- The Garrison Environmental Division will provide information to WSMR personnel and contractors working in eagle habitat about golden eagles in order to reduce potential to disturb eagles or their nests.

Golden Eagle Mitigation Measures

The following measures are currently being implemented at WSMR:

- Retrofitting of power poles to prevent eagle electrocutions (2014 APP).
- New construction of power poles is raptor-safe (2014 APP).
- Road warning signs to reduce vehicle collisions with eagles.
- Distribute information to hunters on the use of lead vs. non-lead ammunition.

The following are potential measures that can be implemented at WSMR in the future:

- Additional retrofitting of power poles and new construction that is raptor-safe.
- Maintenance and replacement of raptor-safe coverings on power poles.
- Replace/maintain road warning signs to reduce vehicle collisions with eagles.
- Removal of road-killed animals from roadways where eagles may be struck by vehicles.

APPENDIX D: PROJECT PHOTOGRAPHY

Photo 1. Salinas Peak facing northeast at the EOP.

Photo 2. Ridge line of the project corridor near Salinas Peak. Typical vegetation shown.

Photo 3. Toe of slope with typical rocky rubble and vegetation shown.

Photo 4. Approximate midpoint of proposed line vegetation.

Photo 5. Typical vegetation of the project area for the Pinyon Pine woodland vegetation community.

Photo 6. Looking down the slope of Salinas Peak demonstrates the general steep topography.