



# Environmental Impact Report for the Rancho Viejo Solar Project in Santa Fe County, New Mexico

JANUARY 2023

PREPARED FOR

**Rancho Viejo Solar, LLC**

PREPARED BY

**SWCA Environmental Consultants**

**ENVIRONMENTAL IMPACT REPORT FOR  
THE RANCHO VIEJO SOLAR PROJECT  
IN SANTA FE COUNTY, NEW MEXICO**

Prepared for

**Rancho Viejo Solar, LLC**  
1120 Pearl Street, No. 200  
Boulder, Colorado 80302

Prepared by

**SWCA Environmental Consultants**  
Albuquerque, New Mexico  
(505) 254-1115  
[www.swca.com](http://www.swca.com)

SWCA Project No. 71537

January 2023

# CONTENTS

<b>Executive Summary</b> .....	<b>1</b>
<b>1 Introduction</b> .....	<b>1-1</b>
1.1 Project Location.....	1-1
1.2 Decision to be Made .....	1-1
<b>2 Proposed Action and Alternatives</b> .....	<b>2-1</b>
2.1 Proposed Action .....	2-1
2.1.1 Facilities.....	2-1
2.1.2 Construction.....	2-3
2.1.3 Operations and Maintenance.....	2-5
2.1.4 Decommissioning .....	2-6
2.2 No Action Alternative .....	2-6
2.3 Alternatives Considered but Eliminated from Further Analysis.....	2-6
<b>3 Environmental Setting and Environmental effects</b> .....	<b>3-1</b>
3.1 Scope of Analysis .....	3-1
3.2 Past, Present, and Probable Future Development Projects .....	3-1
3.3 Air Resources .....	3-2
3.3.1 Environmental Setting .....	3-2
3.3.2 Environmental Effects .....	3-3
3.3.3 Environmental Protection Measures .....	3-3
3.3.4 Conclusion .....	3-4
3.4 Biological Resources .....	3-4
3.4.1 Environmental Setting .....	3-4
3.4.2 Environmental Effects .....	3-17
3.4.3 Environmental Protection Measures .....	3-20
3.4.4 Conclusion .....	3-21
3.5 Cultural, Historic, Archaeological, and Religious Resources.....	3-21
3.5.1 Environmental Setting .....	3-22
3.5.2 Environmental Effects .....	3-23
3.5.3 Environmental Protection Measures .....	3-25
3.5.4 Conclusion .....	3-25
3.6 Geologic, Paleontological, and Soil Resources .....	3-25
3.6.1 Environmental Setting .....	3-25
3.6.2 Environmental Effects .....	3-28
3.6.3 Environmental Protection Measures .....	3-29
3.6.4 Conclusion .....	3-29
3.7 Geographic Resources .....	3-30
3.7.1 Environmental Setting .....	3-30
3.7.2 Environmental Effects .....	3-33
3.7.3 Environmental Protection Measures .....	3-33
3.7.4 Conclusion .....	3-34
3.8 Health and Safety.....	3-34
3.8.1 Environmental Setting .....	3-34
3.8.2 Environmental Effects .....	3-35
3.8.3 Environmental Protection Measures .....	3-35
3.8.4 Conclusion .....	3-37

3.9	Land Use.....	3-37
3.9.1	Environmental Setting .....	3-38
3.9.2	Environmental Effects .....	3-42
3.9.3	Environmental Protection Measures .....	3-45
3.9.4	Conclusion .....	3-45
3.10	Minerals and Mining Resources .....	3-45
3.10.1	Environmental Setting .....	3-46
3.10.2	Environmental Effects .....	3-48
3.10.3	Environmental Protection Measures .....	3-48
3.10.4	Conclusion .....	3-48
3.11	Noise Resources .....	3-48
3.11.1	Environmental Setting .....	3-48
3.11.2	Environmental Effects .....	3-51
3.11.3	Environmental Protection Measures .....	3-55
3.11.4	Conclusion .....	3-55
3.12	Socioeconomics.....	3-55
3.12.1	Environmental Setting .....	3-55
3.12.2	Environmental Effects .....	3-57
3.12.3	Environmental Protection Measures .....	3-58
3.12.4	Conclusion .....	3-58
3.13	Traffic and Roads .....	3-58
3.13.1	Environmental Setting .....	3-58
3.13.2	Environmental Effects .....	3-60
3.13.3	Environmental Protection Measures .....	3-61
3.13.4	Conclusion .....	3-61
3.14	Water Resources.....	3-62
3.14.1	Environmental Setting .....	3-62
3.14.2	Environmental Effects .....	3-65
3.14.3	Environmental Protection Measures .....	3-66
3.14.4	Conclusion .....	3-67
3.15	Visual Resources .....	3-67
3.15.1	Environmental Setting .....	3-68
3.15.2	Environmental Effects .....	3-72
3.15.3	Environmental Protection Measures .....	3-72
3.15.4	Conclusion .....	3-73
<b>4</b>	<b>List of Preparers.....</b>	<b>4-1</b>
<b>5</b>	<b>List of Agencies, Organizations, and Persons to Whom Copies of the Environmental Report Are Sent.....</b>	<b>5-1</b>
<b>6</b>	<b>Literature Cited.....</b>	<b>6-1</b>

## Figures

Figure 1.1.	Vicinity map.....	1-2
Figure 1.2.	Analysis area. ....	1-3
Figure 3.1.	View of Habitat 1 (grasslands) within the analysis area, facing north. ....	3-6
Figure 3.2.	View of Habitat 1 (grasslands) within the analysis area, facing east.....	3-7

Figure 3.3. View of Habitat 2 (pinyon-juniper savanna) within the analysis area, facing north. .... 3-7

Figure 3.4. View of Habitat 2 (pinyon-juniper savanna) within the analysis area, facing west. .... 3-8

Figure 3.5. Burrow complex suitable for burrowing owls, facing north..... 3-15

Figure 3.6. Biological resources within the analysis area. .... 3-16

Figure 3.7. Religious resources within the vicinity of the analysis area. .... 3-24

Figure 3.8. Geographic resources. .... 3-32

Figure 3.9. Analysis area and surrounding land uses..... 3-40

Figure 3.10. Analysis area and aviation resources..... 3-41

Figure 3.11. Analysis area and grazing allotments in the vicinity. .... 3-44

Figure 3.12. Analysis area and mines in the Project area vicinity. .... 3-47

Figure 3.13. Analysis area and noise sensitive receptors, map 1..... 3-53

Figure 3.14. Analysis area and noise sensitive receptors, map 2..... 3-54

Figure 3.15. Regional road network and Project access routes..... 3-59

Figure 3.16. Aquatic resources in the analysis area vicinity..... 3-64

Figure 3.17. Viewshed analysis within the region. .... 3-70

Figure 3.18. Scenic byways near the analysis area. .... 3-71

## Tables

Table 2.1. Facility Components ..... 2-1

Table 2.2. Construction Workforce and Equipment ..... 2-3

Table 3.1. Plant Species Observed during Biological Survey ..... 3-5

Table 3.2. Wildlife Detected during Biological Survey..... 3-8

Table 3.3. Special-Status Species Listed for Santa Fe County, New Mexico..... 3-11

Table 3.4. Soils in the Analysis Area..... 3-27

Table 3.5. Local and Regional Geographic Resources ..... 3-30

Table 3.6. Typical Sound Levels Measured in the Environment and Industry ..... 3-49

Table 3.7. Summary of Predicted Noise Generation from the Proposed Construction Equipment by  
Distance ..... 3-51

Table 3.8. Population (2010 to 2020) ..... 3-56

Table 3.9. Housing and Occupancy (2020)..... 3-56

Table 3.10. Santa Fe County Employment by Industry (2020) ..... 3-56

Table 3.11. Transportation Route Characteristics..... 3-60

Table 3.12. SWCA-Mapped Surface Water Features within the Proposed Project Area ..... 3-62

## **EXECUTIVE SUMMARY**

Rancho Viejo Solar, LLC, is proposing to build the Rancho Viejo Solar Project (Project), which will include a 96-megawatt solar facility, a 48-megawatt battery energy storage system (BESS), a substation, a generation tie-in line, and an access road on private land in Santa Fe County, New Mexico. The Project will be located approximately 1 mile south of Santa Fe city limits and approximately 4.2 miles east of La Cienega.

This environmental impact report (EIR) was prepared to support Rancho Viejo's application to Santa Fe County in compliance with Santa Fe County's Sustainable Land Development Code, which was adopted in Ordinance 2016-9 on December 13, 2016.

The resources addressed in this EIR include air resources; biological resources; cultural, historic, archaeological, and religious resources; geological, paleontological, and soil resources; geographic resources; health and safety; land use; minerals and mining resources; noise resources; socioeconomic resources; roads; water resources; and visual resources. The analysis evaluates impacts to these resources associated with the construction, operations and maintenance, and decommissioning of the Rancho Viejo Solar Project within an approximately 1,100-acre analysis area. This EIR also identifies environmental protection measures (EPMs) that will be implemented to avoid and minimize significant impacts. Based on the analysis presented below, the Rancho Viejo Solar Project is not expected to unduly impair important environmental values.

# **1 INTRODUCTION**

Rancho Viejo Solar, LLC (Rancho Viejo), is proposing to build the Rancho Viejo Solar Project (Project), which will include a 800-acre solar facility, a 2-acre collector substation, a 4 acre BESS, a 2.3-mile generation tie-in line (gen- tie), and a 1.4-mile access road, on private land in Santa Fe County, New Mexico (analysis area) (Figure 1.1). The Project will be approximately 1 mile south of Santa Fe city limits and approximately 4.2 miles east of La Cienega. The Project will generate 96 megawatts (MW), and will include 48 MW BESS, for storage and delivery of renewable solar energy to customers throughout New Mexico. The energy supplied by the solar facility is intended to replace part of PNM Public Service Company of New Mexico (PNM) fossil-based assets.

This environmental impact report (EIR) was prepared to support Rancho Viejo’s application to Santa Fe County for compliance with Santa Fe County’s Sustainable Land Development Code (SLDC), which was adopted in Ordinance 2016-9 on December 13, 2016. The 2016 SLDC governs land use and development throughout the unincorporated areas of the county. The 2016 SLDC contains the regulations that a property owner must follow when building or remodeling a structure. It also explains the process by which land use and development can occur. Section 6.3 of Ordinance 2016-9 outlines the requirements for an EIR, which “shall inform the County, the public and the applicant of the significant environmental effects or impacts and describe reasonable alternatives to the project.”

Because the solar facility’s capacity will be less than 300 MW, this Project is not subject to location approval from the New Mexico Public Regulation Commission (Commission). Location approval is required when a transmission line has a capacity of 230 or more kilovolts and is associated with a power plant that requires the Commission’s location approval for new generation of 300 or more MW (6293.B New Mexico Statutes Annotated [NMSA] 1978). In addition, the right-of-way width for the generation tie line, once fully designed, will not exceed the 100-foot-wide threshold for transmission line oversight by the Commission.

## **1.1 Project Location**

The Project will be located entirely on private land to be leased by Rancho Viejo and located in Sections 2–9, Township 15 North, Range 9 East (Figure 1.2). Note that a portion of the proposed access road is an unplatted area not covered by the Public Land Survey System.

## **1.2 Decision to be Made**

Rancho Viejo will apply to Santa Fe County for approval of the proposed Project as is required under the 2016 SLDC. This EIR will facilitate Santa Fe County Planning Commission’s review of the application. Under the 2016 SLDC, the Santa Fe County Planning Commission shall approve application for the location of the proposed Project unless it finds the location will unduly impair important environmental values.

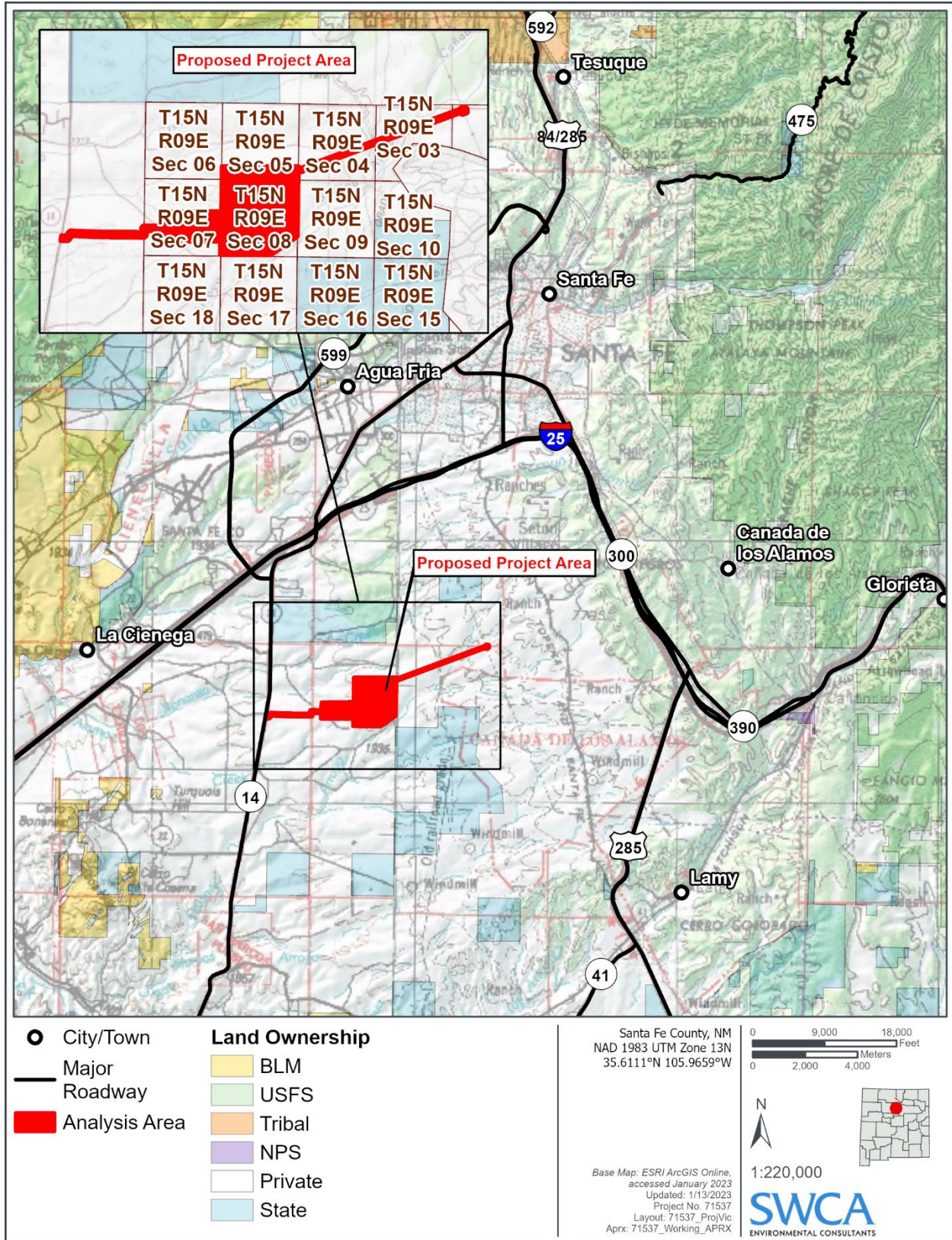


Figure 1.1. Vicinity map.



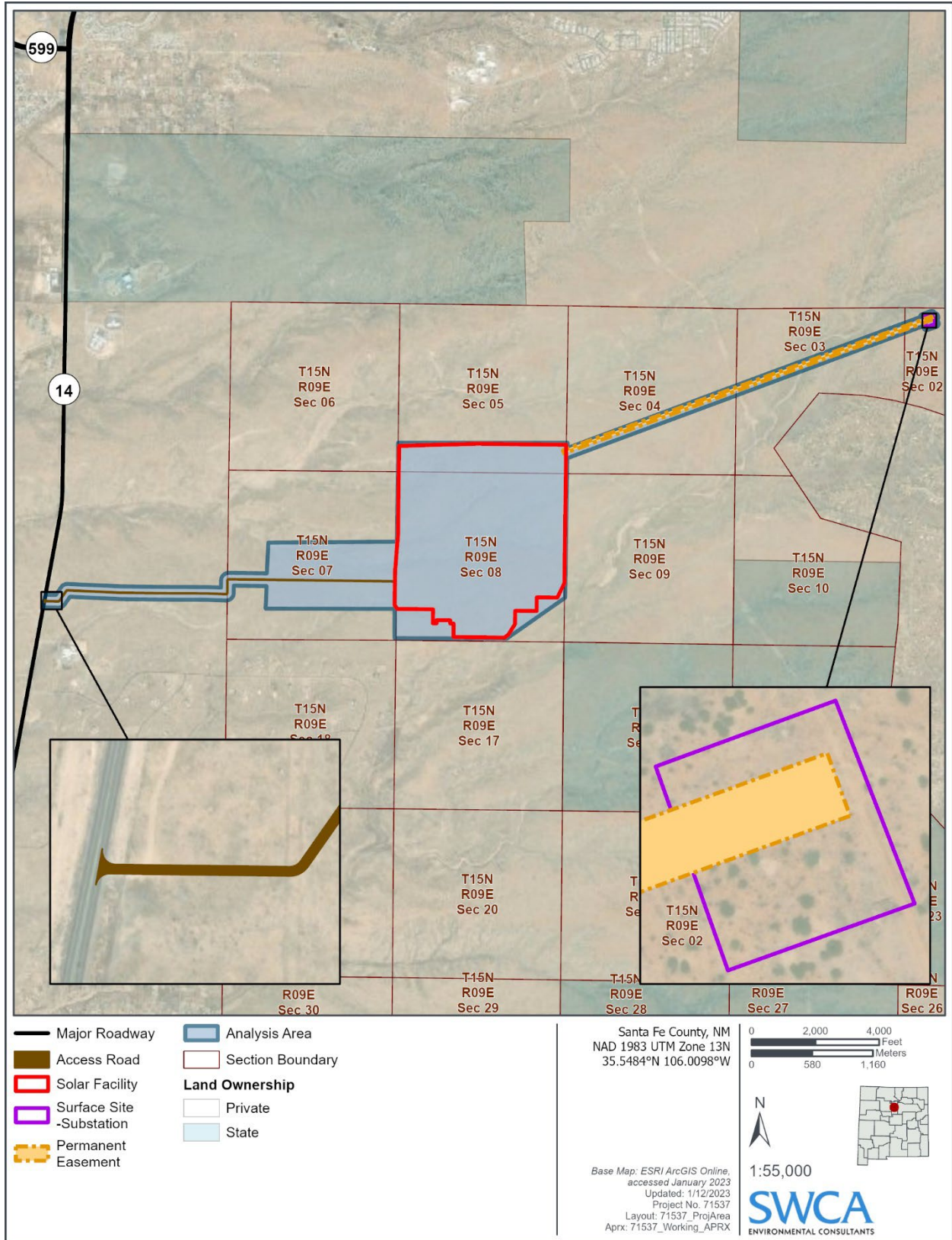


Figure 1.2. Analysis area.

## 2 PROPOSED ACTION AND ALTERNATIVES

### 2.1 Proposed Action

The proposed Project includes the construction of the 96-MW generation facility, 48-MW BESS, a Project Collector substation, a generation-tie transmission line, and an associated access road (Table 2.1). The scope of this EIR covers an approximately 1,100-acre area in which the Project components will be located (i.e., the analysis area) (see Figure 1.2).

**Table 2.1. Facility Components**

Component	Description
Generation facility	800 acres in size.
Battery energy storage system	Located within the analysis area in the northeast portion of the generation facility, the Project's battery energy storage system (BESS) will have a capacity of 48 MW on a 4-hour duration, with 192 MWh of storage capacity. The BESS system will consist of lithium ion batteries, racked in engineered battery enclosures and controlled through a proprietary energy management system provided by a leading storage integration firm. The BESS will occupy approximately 4 acres of land area.
Collector substation	Located in the analysis area within the northeast part of the Project site. Approximately 2 acres in size, fenced facility with ground grid, gravel, concrete foundations, steel structures, transformers, breakers, metering, and other associated structures and equipment. Structures within the substation will generally have a height of less than 15 feet; there may be an H-Frame structure within the collector substation having a maximum height of 40 to 50 feet.
Gen-tie	Extending between the collector substation and the PNM-operated 115-kV transmission line that runs between Zia Substation and El Dorado Substation, approximately 2.5 miles northeast of the Project site. The gen-tie line will be 2.3 miles in length within a right-of-way less than 100-foot-wide. Up to 28.8 acres of disturbance, inclusive of the area under the conductors. The transmission structures are modeled as a single-circuit H-Frames, maximum height of 40 to 50 feet, with structure spans of up to 250 feet.
Access road	Located in the analysis area and extending east from State Route 14 to the Project site. Internal access roads will traverse the perimeter and internal solar panel layout.

#### 2.1.1 Facilities

##### 2.1.1.1 SOLAR FACILITY

The Project is a 96-MW solar project with optional 48-MW BESS. The Project will utilize high-quality (Tier 1) bifacial monocrystalline modules from an industry-trusted and time-tested brand to absorb sunlight and produce electricity. The Project will consist of 1) solar photovoltaic (PV) modules mounted on single-axis tracking steel structures; 2) an electrical collection system that will aggregate the output from the PV modules and convert the electricity from direct current (DC) to alternating current (AC); 3) an on-site collector substation where all of the facility output will be combined and transformed to PNM's existing 115-kilovolt (kV) transmission line; 4) a 115-kV gen-tie line that will transmit the electrical power generated to the electrical grid; 5) communications infrastructure including fiber optic cable; and 6) civil infrastructure including driveways, drainage management, and fencing.

The perimeter of the solar PV facility will be enclosed by an agricultural style fence. The onsite collector substation and BESS may be enclosed by a chain-link fence. The access points from the access driveway to the site will be controlled access (authorized personnel only) by employing swinging or rolling chain link gates. Interior roads will be determined in the design phase and select roads will include an all-weather fire access surface for on-site access and circulation. All nonpaved temporary or permanent on-site roads and staging areas shall be improved pursuant to Santa Fe County standards or specifications.

The racking system has a range of tilt equal to +/- 60 degrees. At their highest point, the top edges of the PV panels will be approximately 12 to 14 feet above ground level depending on spot topography. There will be 1,000-foot setbacks from the solar facility to surrounding property boundaries. Additional setbacks for the solar panels, if needed, will be determined by Santa Fe County, in conjunction with the applicant, and shall be based on an analysis of the Project's externalities together with the nature of the surrounding uses. The solar field will be laid out in a common PV block design to allow adequate clearance and adequate access for maintenance.

#### **2.1.1.2 BATTERY ENERGY STORAGE SYSTEM**

The Project battery energy storage system (BESS) will consist of up to 48 MW (192 megawatt hours [MWh]) connected to the 115-kV collector substation. The BESS will consist of tier-one lithium-ion batteries that can both absorb and discharge electricity directly onto the power grid. The storage facility design will consist of 1) batteries installed in external-access modular containers; 2) power conversion systems (inverters), which can bi-directionally convert the electricity between DC and AC; 3) electrical collection and fiber-optic communications lines; 4) heating ventilation and air conditioning (HVAC) systems; 5) fire detection and management systems; and 6) civil infrastructure including driveways and fencing.

During operation of the solar facility, the BESS will be used to store surplus energy (charge the batteries) and to bridge intermittency gaps by discharging the stored electricity in the batteries into the grid when electricity demand and pricing is high. This helps to maintain grid balance, lower energy prices, and meet regional electricity demand. The BESS allows the solar facility to store energy generated during the day for use later when solar is not available or when demand for electricity is higher.

The BESS will be constructed and operated in accordance with all applicable guidelines, including the National Fire Protection Association (NFPA) guidelines NFPA 1 Fire Code and NFPA 70 National Electrical Code, NFPA 855, UL9540, and UL9540A.

#### **2.1.1.3 COLLECTOR SUBSTATION**

The Project collector substation will be located on the northeast portion of the Project site. The substation equipment transforms the medium-voltage distribution power from the inverters to high-voltage transmission for efficient transfer from the Project to the 115-kV grid.

#### **2.1.1.4 GEN-TIE LINE**

A 115-kV gen-tie will transmit electricity from the Project's on-site collector substation to the PNM-operated 115-kV transmission line that runs between Zia Substation and El Dorado Substation, approximately 2.5 miles northeast of the Project site. The transmission structures will be single-circuit H-frame with maximum height of 40 to 50 feet, with structure spans of up to 250 feet. The gen-tie will also provide communication paths via optical ground-wire fiber-optic cable and all-dielectric self-supporting fiber-optic cable.

#### **2.1.1.5 ACCESS ROAD**

Construction and operations will require access by service vehicles, construction equipment, cranes, and trucks carrying equipment, components, and other construction materials. A 20-foot-wide gravel surfaced or compacted native soil access road will be constructed from New Mexico State Road 14 to the Project site. The access will be reduced to a width of 16 feet post construction. Internal access roads will traverse the perimeter and internal solar panel layout

## 2.1.2 Construction

### 2.1.2.1 PRECONSTRUCTION SURVEYS

SWCA Environmental Consultants (SWCA) has completed preconstruction biological, cultural, and water resource surveys of the analysis area. Additional engineering, surveying, and site assessments will occur prior to construction as the design process evolves.

Geotechnical investigations will be conducted to determine subsurface conditions, soil properties, and thermal and electric resistivity.

### 2.1.2.2 CONSTRUCTION SCHEDULE AND WORKFORCE

Rancho Viejo is in the process of evaluating and selecting engineering, procurement, and construction (EPC) partners for the Project. The final EPC contractor selections will be made in the months following power purchase agreement execution with PNM. The construction process typically requires 9 to 12 months from start to finish. Project construction will require approximately 100 to 300 workers over the construction period. It is anticipated that 70% to 80% of the Project workforce will be derived from Santa Fe County and neighboring counties. In observance of New Mexico Statutes 62-13-16, the Project has committed to employing apprentices from apprentice programs registered pursuant to the Apprenticeship Assistance Act at a level of at least 10% of the construction workforce.

### 2.1.2.3 TRANSPORTATION AND EQUIPMENT

The Project will require approximately 10 trips per day for materials and equipment over the construction period. Contractors commuting to the Project will generate approximately 115 to 190 trips per day for the duration of the construction period, for a total of 29,900 to 49,400 trips. Most Project-related trips will originate outside of the immediate vicinity of the analysis area. Equipment and materials will use paved roads to access the Project vicinity. Worker commute trips will primarily use paved roads.

Once in the vicinity of the Project, the Project site will be accessed via State Route 14 (paved). Equipment and materials will be stored in laydown areas within the analysis area and moved into the construction area as needed. Equipment used during construction (Table 2.2) will include heavy civil equipment to prepare and clear the access road and to level and compact the switchyard area.

**Table 2.2. Construction Workforce and Equipment**

Activity	Staffing	Equipment
Site preparation, clearing, access roads	1 to 10 laborers/equipment operators	1 motor grader, 6 pickup trucks, 1 bulldozer, 1 backhoe, 1 bobcat, 2 roll off trucks, 1 dump truck, 2 water trucks, 1 paddle scraper if required, 1 water pull if required, 1 roller, 1 front end loader
Materials hauling	2 to 15 laborers/equipment operators	10 tractor trailers for deliveries, 1 tractor-mounted crane, 2 pickup trucks, 4 flatbed trucks, 4 box trucks, 4 telehandler forklifts, 4 offroad forklift
Vegetation clearing	1 to 10 laborers/equipment operators	1 bulldozer, 1 skidder, 1 chopper, 1 chipper, 1 mower, 1 tractor with harrow/disk
Foundation excavation and installation	4 to 20 laborers/equipment operators	1 mounted drill rig or auger truck, 1 backhoe, 1 excavator, 6 pickup trucks, 1 air compressor, 3 to 5 concrete trucks, case/bobcat with auger, 8 pile drivers

Activity	Staffing	Equipment
Component assembly	4 to 30 laborers/equipment operators and 1 crane operator, 3 forklift operator	1 to 3 hydraulic cranes, 6 pickup trucks, 2 flatbed trucks, 1 compressor, 3 telehandler forklifts
Component placement	4 to 30 laborers/equipment operators and 1 crane operator	1 crane (50- to 300-ton capacity), 6 pickup trucks, 1 telehandler forklift
Cleanup	1 to 15 laborers	1 bulldozer with ripper, 1 grader, 1 front-end loader, 1 tractor with harrow/disk/mower, 3 pickup trucks

#### **2.1.2.4 WATER USE**

Water use during construction will be approximately 100 to 150 acre-feet over a 12-month construction period. Water will be sourced from third-party providers and trucked to the site or from permitted groundwater wells. Construction water will be used for equipment washing and dust abatement and to support general construction activities (concrete foundations, etc.).

#### **2.1.2.5 SITE PREPARATION**

The existing vegetation in the analysis area will be protected to the greatest extent possible; however, certain areas will be cleared and graded for movement of vehicles, assembly of components, and necessary crane maneuvers. Grading will be required for the construction of access roads, laydown areas, inverters, and transformer skids, and for the BESS and substation area. Trackers with relatively high slope tolerance will be selected for the Project and arrays will be sited to avoid the most prominent topographic features. Light grading may be needed along the access roads to remove any localized impediments to construction vehicles and equipment.

#### **2.1.2.6 CONSTRUCTION SEQUENCING**

Generally, construction will occur in the following steps, but portions of the Project may be constructed concurrently or sequentially. It anticipated that the duration of construction will be approximately 9 to 12 months. Typical construction work schedules are expected to be from 7:00 a.m. to 7:00 p.m., Monday through Friday, with the potential for work to occur from 7:00 a.m. to 7:00 p.m. on Saturday. Work on the gen-tie may occur at night to minimize outages. In addition, certain activities, such as concrete pours, may occur outside of the specified hours when heat conditions are conducive to the activity.

#### **Clearing, Grubbing, and Grading**

Although the Project will be constructed at existing grade to the greatest extent possible, minor grading and/or grubbing may occur throughout the portions of the solar facility, BESS, foundation pads, and equipment storage and staging areas. Grading will conform to accepted slope stability requirements. Minor grading will include cuts and fills that are not expected to exceed 24 inches. Water or a dust palliative may be needed for dust control. Water will be obtained via nearby available sources.

#### **Equipment Installation**

Installation of fencing and posts, assembly of the solar PV module tables, and construction of the arrays may occur concurrently. Multiple temporary staging and laydown areas will be located throughout the Project site to support assembly and installation. Rancho Viejo will procure crushed rock and cement from outside vendors during construction.

As construction progresses across the site, equipment will be removed from each temporary staging and laydown area, and solar arrays will be installed. Multiple arrays are combined into a circuit, and then multiple circuits are connected to the electrical collection system. Improved (earthen or gravel) roads will allow access within the arrays.

Construction of the BESS may occur concurrently with construction of the solar PV facility, or it may occur at a later time. Construction will be confined to a small footprint within or adjacent to the on-site collector substation. External-access modular containers will be utilized to house the storage technology. Associated conduit and support infrastructure will also be installed. The BESS will be constructed and operated in accordance with all applicable guidelines, including the National Fire Protection Association (NFPA) guidelines NFPA 1 Fire Code and NFPA 70 National Electrical Code.

Construction of the new poles for the 115-kV gen-tie and stringing lines on the poles may occur concurrently with construction of the solar PV facility. New poles will range between 40 and 50 feet in height. Span lengths will be between approximately 200 feet and 250 feet, with approximately 10 poles per mile. Conductor stringing will occur by stationing stringing equipment at stringing sites along the gen-tie route, with bucket trucks, cranes, line/assist trucks with air compressors, truck- or trailer-mounted tensioner and puller, and various pickup and flatbed trucks stationed along the gen-tie route as the conductor is installed. Stringing will take place within the existing gen-tie right-of-way.

## **Construction Waste Management**

Construction sites, material storage yards, and access roads will be kept in an orderly condition throughout the construction period. During construction, the primary waste generated will be solid nonhazardous waste, such as packing materials (paper, wood, plastics) and vegetation. Solid waste generated during construction will be transported for disposal at a licensed waste management facility.

Most of the hazardous waste generated during construction will consist of liquid waste, such as flushing and cleaning fluids, and solvents. Some hazardous solid waste, such as welding materials, may also be generated during construction. No construction equipment oil or fuel will be drained on the ground. Oils or chemicals will be hauled to an approved site for disposal. Spill cleanup kits will be available on equipment so that spills or leaks of vehicle fluids could be quickly cleaned up for proper disposal.

### **2.1.2.7 INTERIM RECLAMATION**

Postconstruction, areas in the analysis area not required for long-term operations and maintenance will be reclaimed. Reclamation techniques will follow those outlined in the Project's stormwater pollution prevention plan (SWPPP). Reclamation will include light grading, application of a native seed mixture (in areas with pre-existing vegetation), and application of mulch as required to provide additional erosion control.

### **2.1.3 Operations and Maintenance**

The facility will be unmanned with the exception of site visits for routine maintenance and inspection by qualified operations and maintenance personnel. The solar facility will be operational generally in daylight hours. Maintenance of the solar facility may include periodic washing of solar panels, general equipment maintenance, and vegetation trimming. The annual water consumption for operation of the facility will be expected to be approximately 2 to 3 acre-feet. This includes the water required for washing the PV panels as many as four times per year using a manual cleaning system. Water will be trucked to the Project site and will be sourced from local production wells or may include municipal water.

During operation of the solar facility, the BESS system will be used to store surplus energy to bridge intermittency gaps by discharging the stored electricity into the grid when electricity demand is high. This helps to maintain grid balance to meet electricity demand. The BESS storage system allows the solar facility to store energy generated during the day for use later when solar is not available or when demand for electricity is higher.

It is anticipated that batteries will be added and/or replaced as needed to maintain the BESS capacity at 48 MW/192 MWh of capacity. Old batteries will be recycled or disposed of in accordance with relevant federal, state, and local guidelines.

### **2.1.4 Decommissioning**

Decommissioning of the Project will include disassembling the permanent facilities described above. Concrete foundations will be removed to 3 feet below grade. Materials will be salvaged and/or recycled for future use, as applicable and economically feasible. Unsalvageable materials will be disposed of at authorized locations. Demolition or removal of equipment and facilities will meet applicable environmental and health regulations.

Following the removal of Project facilities, the site will undergo final cleanup and reclamation. Areas disturbed during removal of Project features will be restored and rehabilitated as near as possible to their original condition and will be available for the same uses that existed prior to construction of the Project.

## **2.2 No Action Alternative**

Under the No Action Alternative, the proposed facility and associated infrastructure will not be constructed, and the analysis area will remain in its existing state. This alternative serves as a baseline, allowing decision-makers to compare the magnitude of environmental effects of the Proposed Action.

## **2.3 Alternatives Considered but Eliminated from Further Analysis**

Alternative locations for the solar array were explored within the larger parcel. Specifically, partially siting the Project in Sections 5 and 6 was examined but dismissed due to natural resource constraints along the southern branch of Bonanza Creek and the north-facing slopes. Locating the Project closer to State Road 14 was also considered but discouraged because it is part of the Turquoise Trail National Scenic Byway.

## **3 ENVIRONMENTAL SETTING AND ENVIRONMENTAL EFFECTS**

### **3.1 Scope of Analysis**

The scope of analysis addressed in this EIR includes the environmental setting (existing conditions), the significant environmental effects (impacts) of the proposed Project, impact minimization and environmental protection measures (EPMs), and reasonable alternatives to the Project (SLDC Section 6.3.1). The 1,100-acre analysis area encompasses the combined footprints of the 800-acre solar facility, the 2-acre substation, the 4-acre BESS, the 2.3-mile generation tie-in line (gen-tie), and the 1.4-mile access road plus the survey area buffer, as depicted in Figure 1.2.

To facilitate Project planning, environmental surveys were performed for the entire analysis area, including biological, cultural, and aquatic resources surveys. Atwell, LLC (Atwell), conducted an extensive desktop review of publicly available information from a variety of sources including federal and state agencies, local government offices, geographic information system (GIS) databases, and other relevant databases and technical resources to characterize the analysis area and identify potential constraints associated with wildlife and other sensitive natural resources. The results of this desktop analysis are included in a habitat characterization report (Atwell 2020a). Atwell conducted a special-status species survey in June 2021 to assess the potential for gray vireos (*Vireo vicinior*), burrowing owls (*Athene cunicularia*), and other special-status species to nest within the Project footprint. The results of this survey are included in a special-status species report (Atwell 2021). Atwell also completed a Class I archaeological records search. Following the review of the NMCRIS database and historical records, Atwell conducted a reconnaissance of the analysis area on October 6 and 7, 2020. The results of this survey were incorporated into a Class I cultural resources inventory report (Atwell 2020b). SWCA was contracted to conduct biological surveys and a Class III cultural resources inventory of the analysis area. The results of these surveys are incorporated into standalone biological and cultural survey reports (SWCA 2022a, 2022b). Refer to Sections 3.4 and 3.5 for additional details. SWCA completed an aquatic resources field survey for the Project, inclusive of the analysis area, on April 4 through 11, 2022 (SWCA 2022c). Refer to Section 3.14 for information on resources identified during this study.

This analysis evaluates impacts to resources associated with the entire analysis area. Based on the issues identified in the studies described above and in accordance with Santa Fe County's 2016 SLDC, the resources addressed in this EIR include air resources; biological resources; cultural, historic, archaeological, and religious resources; geological, paleontological, and soil resources; geographic resources; health and safety; land use; minerals and mining resources; noise resources; socioeconomic resources; roads; water resources; and visual resources.

### **3.2 Past, Present, and Probable Future Development Projects**

The analysis area and general vicinity have historically been and are presently used as livestock rangeland. Surrounding areas are experiencing increasing urbanization and development. A charter school and housing subdivision are located just south of the proposed access corridor. The proposed gen-tie corridor abuts another large subdivision to the south. The Santa Fe Studios form a large building complex near the northwest corner of the analysis area. Slightly farther north on State Road 14 are a state penitentiary, armory, and county correction facility. A 115-kV AC transmission line intersects the proposed gen-tie corridor, and there are four additional 115-kV and one 345-kV AC transmission lines that intersect Santa Fe County. Upcoming projects within Santa Fe County include road improvements,



expansion of the Santa Fe Regional Airport, and the Chupadero Water System improvement project. Past and present land use and mineral development within Santa Fe County are detailed in Sections 3.9 and 3.10 below.

### **3.3 Air Resources**

Data sources reviewed to assess air quality conditions include the following:

- U.S. Environmental Protection Agency (EPA)
- New Mexico Environment Department (NMED) Air Quality Bureau

#### **3.3.1 Environmental Setting**

Air quality in the analysis area is generally classified as good to moderate. The primary sources of human-caused air pollution in Santa Fe County are dust from blowing wind on disturbed or exposed soil, exhaust emissions from fuel combustion and motorized equipment, and industrial sources (EPA 2017).

Air quality is determined by the ambient concentrations of pollutants that are known to have detrimental effects. The EPA has classified National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, particulate matter with diameter of 10 microns or less (PM<sub>10</sub>), particulate matter with diameter of 2.5 microns or less (PM<sub>2.5</sub>), ozone, sulfur dioxide, and lead. Areas with air quality that do not meet the standards are designated “non-attainment areas” by the EPA. In May 2020, the EPA published new design values for NAAQS for various counties throughout the United States (EPA 2021a). The EPA has delegated the responsibility of regulation and enforcement of the NAAQS to the state level and has approved the New Mexico State Implementation Plan (SIP), which allows the State to enforce both the New Mexico Ambient Air Quality Standards (NMAAQs) and the NAAQS. Santa Fe County, where the Project is located, is in attainment/unclassifiable for all criteria pollutants, meaning that the air quality meets the NAAQS and Santa Fe County is also in compliance with the more stringent NMAAQs (EPA 2021a).

Air quality in a given region can also be measured by its air quality index (AQI) value (EPA 2021b). The AQI is used to report daily air quality information in an easy-to-understand way by explaining how local air quality relates to human health. The AQI summary report (EPA 2021c) provides annual summary information, including maximum AQI values and count of days in each AQI category. Part of Santa Fe County is located within the NMED Four Corners Interstate Air Quality Control Region, which includes the adjacent counties of Sandoval and San Juan. Recent AQI monitoring data are not available for Santa Fe County, but data are available for Sandoval and San Juan Counties and are likely comparable in terms of overall air quality. The air quality in this region is generally classified as good to moderate in terms of AQI values (EPA 2021c).

Along with criteria pollutant concentrations as measured by air monitors, the EPA provides data on criteria pollutant and hazardous air pollutant (HAP) emissions. The EPA’s National Air Toxics Assessment (NATA) is the EPA’s ongoing review of air toxics in the United States and is intended to be a screening tool for state, local, and tribal air agencies to help determine which pollutants, emission sources, or places may need further study to better understand risks to public health from air toxics. NATA results are published every 4 years and provide estimates of long-term cancer risks and non-cancer health effects of air pollution (EPA 2018). Based on the most recent NATA results, Santa Fe County’s cancer risk and health risks due to air toxics are lower than the state and national average risks.

### **3.3.2 Environmental Effects**

#### **3.3.2.1 PROPOSED ACTION**

Project emissions will be greatest during the construction period, which is estimated to be approximately 9 to 12 months. Project construction will consist of the activities and mobile equipment roster shown in Table 2-1. Equipment use and ground disturbance associated with the facilities will result in a low level of localized emissions of regulated air pollutants during the construction period. During construction, emissions from on-road and non-road equipment exhaust will include carbon monoxide, nitrogen oxides, PM<sub>10</sub>, PM<sub>2.5</sub>, volatile organic compounds, and HAPs. The Project will also cause emissions of PM<sub>10</sub> and PM<sub>2.5</sub> from ground disturbance activities and vehicle traffic over paved and unpaved roads associated with construction.

While an air quality permit is not required for the Project, construction activities are governed by the applicable rules and regulations of the NMED Air Quality Bureau rules for fugitive dust emissions from construction activities and clearing of land. These include reasonable precautions to prevent dust from becoming airborne, including 1) using water or chemicals to control dust where possible, 2) covering open-bodied trucks at all times while transporting materials likely to produce airborne dusts, 3) establishing vehicle speed controls, 4) installing wind fences, and 5) promptly removing earth or material from paved streets. In addition to the dust management strategies listed above, Rancho Viejo will implement protection measures to reduce emissions from construction vehicles and equipment by decreasing idling time and maintaining equipment properly.

Only minimal, short-term emissions will be expected from equipment use and fugitive dust from access road travel during the operations and maintenance phase, which consist of a small crew accessing the site once every 3 to 6 months for visual inspections and routine maintenance actions. Decommissioning emissions will be similar to those emitted during initial construction in character and will be temporary.

#### **3.3.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to air quality within the analysis area or surrounding areas because the Proposed Action will not be implemented.

### **3.3.3 Environmental Protection Measures**

The EPMs related to air resources that will be implemented to avoid and minimize impacts as part of the Project include the following:

- All fossil fuel-fired construction equipment will be maintained in accordance with manufacturer recommendations to minimize construction-related combustion emissions.
- The idling time of fossil fuel-fired construction equipment will be limited, unless idling must be maintained for proper operation (e.g., drilling, hoisting, and trenching).
- The speed of vehicles within construction sites will be limited during construction to help reduce the amount of fugitive dust generated.
- Water trucks or other dust suppression measures as required by the NMED Air Quality Bureau will be used to help reduce fugitive dust from construction activities.

### **3.3.4 Conclusion**

Santa Fe County is in attainment for state and federal ambient air quality requirements and is generally classified as good to moderate with low health and cancer risks from air toxics. The short-term and localized Project construction and operations emissions are not expected to cause an exceedance of the NAAQS or NMAAQs or contribute to a degradation of ambient air quality. No direct long-term impacts to air quality will occur from the Project. Temporary impacts from fugitive dust and construction equipment will be negligible in scale and will be short-term. The EPMs listed above will be implemented to reduce fugitive dust from the construction phase. Therefore, there is minimal potential for the Project, in conjunction with other potential project development in the immediate area (i.e., residential developments, road maintenance, utility projects), to cumulatively affect air quality. The Project is not expected to unduly impair important environmental values regarding air quality.

## **3.4 Biological Resources**

SWCA completed a biological survey of the analysis area April 4 through 11, 2022, to assess habitat suitability for U.S. Fish and Wildlife Service (USFWS) and state classified threatened and endangered plant and animal species (SWCA 2022a). Additional data sources reviewed include the following:

- U.S. Geological Survey (USGS) topographic maps and Natural Resources Conservation Service (NRCS) soil maps (NRCS 2022a)
- New Mexico Crucial Habitat Assessment Tool data (New Mexico Crucial Habitat Data Set 2013)
- USFWS Information for Planning and Consultation (IPaC) system data (USFWS 2022a) and the USFWS Critical Habitat Portal (USFWS 2022b)
- NRCS Plants Database (NRCS 2022b)
- New Mexico Department of Game and Fish Biota Information System of New Mexico (BISON-M) data (BISON-M 2022), the New Mexico Rare Plants website (New Mexico Rare Plants Technical Council 1999), and the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) state endangered plant species list (EMNRD 2022a).
- SWCA's biological resources inventory report (SWCA 2022a)

### **3.4.1 Environmental Setting**

The biological resources in the analysis area, including vegetation, wildlife species, and habitat, are typical of the grassland/pinyon-juniper savanna dominated ecoregion that is common throughout northern New Mexico. The analysis area and surrounding landscape have been previously disturbed by two-track roads, cattle grazing, State Route 14, and transmission lines. No unique vegetation, wildlife, or habitat features were identified during the biological survey (April 4–11, 2022) of the analysis area (SWCA 2022a).

The analysis area is located in the North-Central New Mexico Valleys and Mesas ecoregion, which encompasses central New Mexico. The elevation in the analysis area is approximately 6,420 feet above mean sea level (amsl). The climate for this area, based on the climatic records for the Santa Fe 2 station in Santa Fe County, New Mexico (COOP Station No. 298085), has an average annual maximum temperature of 64.9 degrees Fahrenheit (°F) and an average annual minimum temperature of 36.0°F. The average annual precipitation is 13.68 inches, with the majority occurring between May and October, while the average annual total snowfall is 21.0 inches, which largely occurs between November and March (Western Regional Climate Center 2022). Weather during the biological survey was approximately

41°F to 71°F, sunny to cloudy with western, northwestern, and eastern winds of approximately 0 to 35 miles per hour.

### 3.4.1.1 VEGETATION

The analysis area is located within the Arizona/New Mexico Plateau: North-Central New Mexico Valleys and Mesas Level IV ecoregion (Griffith et al. 2006). During the biological survey, SWCA biologists identified two distinct habitat types within the analysis area. Habitat 1 is grasslands dominated by blue grama (*Bouteloua gracilis*), prickly Russian thistle (*Salsola tragus*), and rubber rabbitbrush (*Ericameria nauseosa*) (Figure 3.1 and Figure 3.2) and features approximately 61% vegetative cover composed of approximately 0% tree cover, 1% shrub cover, 60% herb/grass cover, and approximately 39% bare ground. Habitat 2 is pinyon-juniper savanna dominated by blue grama, twoneedle pinyon (*Pinus edulis*), oneseed juniper (*Juniperus monosperma*), and rubber rabbitbrush (Figure 3.3 and Figure 3.4) and features approximately 21% vegetative cover composed of approximately 15% tree cover, 20% shrub cover, 40% herb/grass cover, and 25% bare ground. These habitats are typical of vegetative communities of the North-Central New Mexico Valleys and Mesas ecoregion. Plant species recorded during the biological survey are listed in Table 3.1.

During the biological survey, no U.S. Department of Agriculture (USDA)-listed noxious weed species or New Mexico Department of Agriculture (NMDA)-listed invasive or nonnative plant species were observed within or around the analysis area (NMDA 2020; USDA 2010). Prickly Russian thistle was observed during the biological survey. Prickly Russian thistle is not a designated noxious weed but is a nonnative species found throughout New Mexico (NRCS 2022b). Protection measures, such as noxious weed washing stations, can be utilized to reduce the introduction of noxious, invasive, and nonnative plants. A weed management plan for this Project will be prepared by SWCA or Rancho Viejo according to Santa Fe County’s recommendations.

**Table 3.1. Plant Species Observed during Biological Survey**

Common Name	Scientific Name	Habitat 1 (grasslands)	Habitat 2 (pinyon-juniper savanna)
Bigelow sage	<i>Artemisia bigelovii</i>	x	x
Blue grama	<i>Bouteloua gracilis</i>	x*	x*
Broom snakeweed	<i>Gutierrezia sarothrae</i>	x	x
Club cholla	<i>Grusonia clavata</i>	x	–
Curly dock	<i>Rumex crispus</i>	x	–
Hairy crinklemat	<i>Tiquilia hispidissima</i>	x	–
Hairy grama	<i>Bouteloua hirsuta</i>	–	x
Jimsonweed	<i>Datura sp.</i>	x	–
Kingcup cactus	<i>Echinocereus triglochidiatus</i>	x	–
Mock vervain	<i>Glandularia sp.</i>	x	–
Narrowleaf yucca	<i>Yucca angustissima</i>	x	x
Oneseed juniper	<i>Juniperus monosperma</i>	x	x*
Plains pricklypear	<i>Opuntia polyacantha</i>	x	–
Prickly Russian thistle	<i>Salsola tragus</i>	x*	–
Pricklypear	<i>Opuntia sp.</i>	–	x
Rubber rabbitbrush	<i>Ericameria nauseosa</i>	x*	x*

Common Name	Scientific Name	Habitat 1 (grasslands)	Habitat 2 (pinyon-juniper savanna)
Spinystar	<i>Escobaria vivipara</i>	x	–
Springparsley	<i>Cymopterus</i> sp.	x	–
Tree cholla	<i>Cylindropuntia imbricata</i>	x	x
Twoneedle pinyon	<i>Pinus edulis</i>	x	x*

Note: Nomenclature follows the PLANTS Database (NRCS 2022b).

\* Refers to dominant species



Figure 3.1. View of Habitat 1 (grasslands) within the analysis area, facing north.



**Figure 3.2. View of Habitat 1 (grasslands) within the analysis area, facing east.**



**Figure 3.3. View of Habitat 2 (pinyon-juniper savanna) within the analysis area, facing north.**



**Figure 3.4. View of Habitat 2 (pinyon-juniper savanna) within the analysis area, facing west.**

## Wildlife

The Arizona/New Mexico Plateau: North-Central New Mexico Valleys and Mesas ecoregion provides habitat for a variety of wildlife species. The most common animals found in the area include black-tailed jackrabbit (*Lepus californicus*), cottontail rabbit (*Sylvilagus* sp.), mule deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), badger (*Meles meles*), coyote (*Canis latrans*), and skunk (*Mephitis mephitis*). Also typical to the area are vole (*Microtus* sp.), woodrat (*Neotoma* sp.), various species of mice (*Muridae* spp.), porcupine (*Erethizon dorsatum*), and squirrel (*Sciuridae* sp.). There are a variety of birds, including raptors, woodpeckers, various species of songbirds, ravens (*Corvus* sp.), doves (*Columbidae* spp.), and quail (*Coturnix* sp.). Numerous lizards and snakes are also found in the area, such as horned lizards (*Phrynosoma* sp.) and the western diamond-backed snake (*Crotalus atrox*). SWCA biologists detected 15 bird and six mammal species during the April 2022 biological survey (Table 3.2). One of the mammal species detected is domestic. In addition, a Gunnison’s prairie dog (*Cynomys gunnisoni*) colony was detected. Prairie dog colonies provide habitat for burrowing owls, which were also observed during the April 2022 biological survey. Both burrowing owls and Gunnison’s prairie dog are special-status species.

**Table 3.2. Wildlife Detected during Biological Survey**

Common Name	Scientific Name
<b>Birds</b>	
American kestrel	<i>Falco sparverius</i>
Black-throated sparrow	<i>Amphispiza bilineata</i>
Burrowing owl	<i>Athene cucularia</i>
Bushtit	<i>Psaltriparus minimus</i>

Common Name	Scientific Name
Common raven	<i>Corvus corax</i>
Curve-bill thrasher	<i>Toxostoma curvirostre</i>
Eastern meadowlark	<i>Sturnella magna</i>
Horned lark	<i>Eremophila alpestris</i>
House finch	<i>Haemorhous mexicanus</i>
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Say's phoebe	<i>Sayornis saya</i>
Scaled quail	<i>Callipepla squamata</i>
Turkey vulture	<i>Cathartes aura</i>
Western meadowlark	<i>Sturnella neglecta</i>
<b>Mammals</b>	
Black-tailed jackrabbit	<i>Lepus californicus</i>
Coyote (scat)	<i>Canis latrans</i>
Domestic cattle (scat)	<i>Bos taurus</i>
Gunnison's prairie dog (colony, scat)	<i>Cynomys gunnisoni</i>
Northern grasshopper mouse (dead)	<i>Onychomys leucogaster</i>
Pronghorn	<i>Antilocapra americana</i>

Individuals of each species were observed unless otherwise noted.

### **Migratory Birds**

Most bird species are protected by the Migratory Bird Treaty Act (MBTA). The MBTA implements various treaties and conventions between the United States and other countries for the protection of migratory birds. Under the MBTA, unless permitted by regulations, it is unlawful to 1) pursue, hunt, take, capture, or kill; 2) attempt to take, capture, or kill; and 3) possess, offer to sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. USFWS regulations broadly define “take” under the MBTA to mean “pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.” Under the MBTA, take does not include habitat loss or alteration. The Project is expected to comply with the MBTA.

Suitable nesting habitat for migratory birds, such as oneseed juniper and twoneedle pinyon, is present throughout the analysis area for species that nest in pinyon-juniper savanna. In addition, the biologist also observed one active curve-billed thrasher (*Toxostoma curvirostre*) nest, 14 inactive passerine nests in fair to poor condition, and two undetectable activity passerine nests during the biological survey. Various species of songbirds, including sparrows and thrushes, as well as dove and quail, are common to the area and could utilize this habitat for nesting. Other species like raptors and ravens are common to the area but are unlikely to utilize the analysis area for nesting due to the lack of tall vegetation, such as trees, and suitable perching structures. During the biological survey, 15 bird species were detected (see Table 3.2).

### **Bald and Golden Eagles**

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the MBTA and the Bald and Golden Eagle Protection Act. Bald eagles are found typically in association with



water, and nest and breed from October to July throughout the state of New Mexico. Golden eagles nest primarily on rock ledges or cliffs and occasionally in large trees at elevations ranging from 4,000 to 10,000 feet amsl. Golden eagles are typically found in mountainous regions of open country, prairies, arctic and alpine tundra, open wooded areas, and barren areas.

Both bald and golden eagles are carnivores. Bald eagles prey on fish but also on mammals, especially prairie dogs (*Cynomys* sp.). Golden eagles feed mainly on small mammals, as well as invertebrates, carrion, and other wildlife (BISON-M 2022; Stahlecker and Walker 2010).

No bald or golden eagle individuals were observed during the biological survey of the analysis area. The habitat in and surrounding the analysis area is not ideal foraging habitat for golden eagles because of the lack of available perching locations and lack of nearby mountains and is not ideal foraging habitat for bald eagles because of the lack of riparian habitat. It is unlikely that bald or golden eagles inhabit the analysis area.

### **Special-Status Species**

The special-status species evaluated in this report consist of 1) federally protected (endangered and threatened) species (USFWS 2022a); 2) additional species listed by the USFWS as candidate and proposed species, and species under review (USFWS 2022a); and 3) state-listed endangered and threatened species (BISON-M 2022; EMNRD 2022a). The potential for local species occurrence was based on 1) existing information on distribution and 2) qualitative comparisons of the habitat requirements of each species with vegetation communities, landscape features, and/or water quality conditions in the analysis area. The potential for occurrence of a species was identified using the following categories:

- *Known to occur*: The species was documented in the analysis area either during or prior to the biological survey by a reliable observer.
- *May occur*: The analysis area is within the species' currently known range, and vegetation communities, soils, and water quality conditions, among other factors, resemble those known to be used by the species.
- *Unlikely to occur*: The analysis area is within the species' currently known range, but vegetation communities, soils, and water quality conditions, among other factors, do not resemble those known to be used by the species, or the analysis area is clearly outside the species' currently known range.

One USFWS candidate species—monarch butterfly (*Danaus plexippus plexippus*)—has the potential to occur within the analysis area during the migratory period (April–October). However, neither this species nor larval host plants were observed during the biological survey. In addition, SWCA observed burrowing owls, which are protected by the MBTA, and Gunnison's prairie dog colonies, which could provide habitat for this species, within the analysis area. The remaining special-status species are unlikely to occur in the analysis area due to lack of suitable habitat for each species and the Project being outside of some of the species' known range. Table 3.3 describes the special-status species with the potential to occur in Santa Fe County, New Mexico, their habitat, and their potential to occur in the analysis area. No USFWS-designated critical habitat is located in or around the analysis area, with the closest critical habitat (Mexican spotted owl [*Strix occidentalis*]) located approximately 12.1 miles northeast of the analysis area.

**Table 3.3. Special-Status Species Listed for Santa Fe County, New Mexico**

Common Name (scientific name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area
<b>Plants</b>			
Holy Ghost ipomopsis ( <i>Ipomopsis sancti- spiritus</i> )	USFWS E NM E	This species grows on relatively dry, steep, west- to southwest-facing slopes in open ponderosa pine or mixed-conifer forest at 2,400 to 2,500 meters (m) (7,730–8,220 feet) amsl in San Miguel County and is found only in one canyon in the upper Pecos River drainage of the southern Sangre de Cristo Mountains. The geologic substrate is partly weathered Tererro limestone. This plant appears to grow best in bare mineral soils and is highest in density on disturbed sites such as road cuts. Flowers from July to September.	Unlikely to occur within the analysis area, as the only known population is restricted to one canyon in the Sangre de Cristo Mountains.
Santa Fe cholla ( <i>Cylindropuntia viridiflora</i> )	NM E	The Santa Fe cholla is known from only three areas between Santa Fe and Chimayo and occurs in gravelly rolling hills in pinyon-juniper woodland at 1,770 to 2,200 m (5,800–7,200 feet) amsl. Flowers in July.	Unlikely to occur within the analysis area, as the closest known population is approximately 6 miles north of the analysis area (Natural Heritage New Mexico 2022).
Wood lily ( <i>Lilium philadelphicum</i> var. <i>andinum</i> )	NM E	This species occurs in moist woodlands and meadows in mixed conifer forests and canyon bottoms between 7,550 and 10,000 feet in Sandoval, Otero, Santa Fe, San Miguel, Los Alamos, and Colfax Counties. The plant is widespread in Canada and the United States. Flowers late spring through summer (late May–August).	Unlikely to occur within the analysis area because of the lack of mixed-conifer forests and canyon bottoms there. The analysis area is also below the elevation range of the species.
Great Plains lady's tresses ( <i>Spiranthes magnicamporum</i> )	NM E	This species is widely distributed in the Great Plains and Great Lakes regions north to Ontario, Canada, and is rare in New Mexico. The plant occurs in wetlands, ciénegas, and stream sides in New Mexico from 4,560 to 6,500 feet amsl. Flowers from mid-July to August.	Unlikely to occur within the analysis area because of the lack of wetlands, ciénegas, and streams.
<b>Arthropods</b>			
Monarch butterfly ( <i>Danaus plexippus plexippus</i> )	USFWS C	In New Mexico, this species' migration peaks in April and subsides by mid-May. Breeding occurs within the state, and a new generation matures in New Mexico by each July. In-state population numbers peak in August and September. The southward migration back to Mexico begins in late August and September. During the breeding season in New Mexico, young monarch butterfly caterpillars require milkweed species ( <i>Asclepias</i> sp.) as a food source (Cary and DeLay 2016). Overall, monarch butterflies seem to be most abundant in southeastern New Mexico. There is currently no evidence that monarchs overwinter in New Mexico.	May occur within the analysis area for foraging if the area contains herbaceous flowering plants, including milkweed species, during breeding periods. Neither this species nor milkweed vegetation was observed during the April 2022 biological survey.
<b>Mollusks</b>			
Lilljeborg peaclam ( <i>Pisidium lilljeborgi</i> )	NM T	In New Mexico, this species occurs in cold, alpine Nambe Lake, which is surrounded by rocky talus, stands of Engelmann spruce ( <i>Picea engelmannii</i> ) and subalpine fir ( <i>Abies lasiocarpa</i> ), and grass-sedge-forb communities at approximately 11,350 m amsl.	Unlikely to occur in analysis area because of the lack of wetlands and the species restriction to Nambe Lake, which is approximately 17 miles northeast of the Project area.
<b>Fish</b>			
Rio Grande cutthroat trout ( <i>Oncorhynchus clarkii virginalis</i> )	USFWS C	This subspecies of cutthroat trout is endemic to the Rio Grande, Pecos, and possibly the Canadian River Basins in New Mexico and Colorado. The species' historical range included Colorado, New Mexico, and Texas.	Unlikely to occur in the analysis area because of the lack of major rivers.

Common Name (scientific name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area
<b>Birds</b>			
Baird's sparrow ( <i>Ammodramus bairdii</i> )	NM T	A winter resident in New Mexico, this species has been found on Otero Mesa and in the Animas Valley and may occur in other areas of suitable winter habitat, particularly in the southern portion of state. Generally, this species prefers dense, extensive grasslands with few shrubs and avoids heavily grazed areas.	Not known to occur in this area, although marginally suitable grassland habitat is present. The species is known to occur only in the southern portion of New Mexico.
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	NM T	This species occurs in New Mexico year-round. Bald eagle breeding is restricted to a few areas mainly in the northern part of the state or near lakes. During migration and winter months, the species is found chiefly along or near rivers and streams and in grasslands associated with large prairie dog ( <i>Cynomys</i> sp.) colonies. Bald eagles typically perch in trees.	This species is unlikely to occur in the analysis area because of lack suitable habitat and water features. In addition, no suitable perching trees were observed during the biological survey.
Boreal owl ( <i>Aegolius funereus</i> )	NM T	This species is found predominantly in spruce-fir forests. Populations are thought to be unviable in New Mexico because the state lacks adequate spruce-fir habitat in isolated mountain ranges, but small populations have been found in in spruce-fir and similar habitats in the San Juan, Sangre de Cristo, and Jemez Mountains (Stahlecker and Duncan 1996).	Unlikely to occur within the analysis area because of the lack of spruce-fir forests. The Project area is approximately 9 miles southwest of the closest known population.
Gray vireo ( <i>Vireo vicinior</i> )	NM T	This species is strongly associated with pinyon-juniper ( <i>Pinus</i> and <i>Juniperus</i> spp.) and scrub oak ( <i>Quercus</i> spp.) habitats and is distributed mainly across the western two-thirds of the state. The gray vireo prefers gently sloped canyons, rock outcrops, ridgetops, and moderate scrub cover.	Unlikely to occur within the analysis area because of lack of canyon habitat and exposed rock outcropping.
Least tern ( <i>Sterna antillarum</i> )	NM E	This migratory species occurs in North America during the breeding season and is associated with water (e.g., lakes, reservoirs, and rivers). In New Mexico, the species' breeding is restricted to the Pecos River Basin, primarily at Bitter Lake National Wildlife Refuge in Chaves County. The least tern may occur in the Bureau of Land Management Farmington Field Office planning area during migration but has not been recorded there. Suitable least tern habitat along rivers consists of bare sandy shorelines and salt flats.	Unlikely to occur in the analysis area because of the lack of perennial river bodies. The Project area is also more than 150 miles north of the species' known breeding range within the state.
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	USFWS T	This species occupies mountainous areas and deep canyons incised within flat plateaus. The owl's habitat consists typically of mixed-conifer, ponderosa pine, and ponderosa pine–Gambel oak forest. The species prefers shaded mesic environments such as canyon bottoms and mountainous riparian areas.	Unlikely to occur within the analysis area because of the lack of mountainous habitat, old-growth mixed-conifer forest, and deep canyons preferred by the species.
Peregrine falcon ( <i>Falco peregrinus</i> )	NM T	This species occurs in New Mexico year-round. All peregrine falcon nests in New Mexico are found on cliffs. During migration and winter, New Mexico's peregrine falcons are typically associated with water and large wetlands.	Unlikely to occur in the analysis area because of the lack of water, dense riparian habitat, large wetlands, and cliff roosting habitat.

Common Name (scientific name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area
Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	USFWS E NM E	This species breeds and migrates through relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes and reservoirs. The southwestern willow flycatcher historically nested in native vegetation such as willow ( <i>Salix</i> spp.), seepwillow ( <i>Baccharis salicifolia</i> ), boxelder ( <i>Acer negundo</i> ), buttonbush ( <i>Cephalanthus</i> spp.), and cottonwood ( <i>Populus</i> spp.). This subspecies nests in native vegetation but also uses thickets dominated by nonnative tamarisk ( <i>Tamarix</i> spp.) and Russian olive ( <i>Elaeagnus angustifolia</i> ) and mixed native and nonnative stands of vegetation. In New Mexico, the southwestern willow flycatcher is known to breed along the Gila River and the Rio Grande.	Unlikely to occur in the analysis area due to the lack of dense riparian habitat.
Violet-crowned hummingbird ( <i>Leucolia violiceps</i> )	NM T	In New Mexico, this species is found primarily in riparian woodlands at low to moderate elevations (Baltosser 1986) and seeks only well-developed riparian areas of Guadalupe Canyon in the summer (New Mexico Department of Game and Fish 1994).	Unlikely to occur in the analysis area due to a lack of riparian woodlands. In addition, the analysis area is not near the Guadalupe Canyon.
White-tailed ptarmigan ( <i>Lagopus leucura</i> )	NM E	This species inhabits alpine tundra and timberline habitat in New Mexico above about 10,500 feet (Hubbard and Eley 1985). Associated with sedges ( <i>Carex</i> ) and grass-like plants ( <i>Heleocharis</i> , <i>Scirpus</i> ) above the treeline.	Unlikely to occur in the analysis area due to a lack of suitable tundra habitat and elevation.
Yellow-billed cuckoo ( <i>Coccyzus americanus occidentalis</i> )	USFWS T	Only the western population of this species beyond the Pecos River drainage has been listed as threatened under the Endangered Species Act. The yellow-billed cuckoo breeds and migrates through riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; and deciduous woodlands with cottonwoods and willows. Dense understory foliage is important for nest site selection. The species nests in willow, mesquite ( <i>Prosopis</i> spp.), cottonwood, and hackberry ( <i>Celtis occidentalis</i> ); forages in similar riparian woodlands; and requires patches of at least 25 acres for breeding and nesting.	Unlikely to occur. The analysis area lacks riparian and deciduous woodland habitat.
<b>Mammals</b>			
Spotted bat ( <i>Euderma maculatum</i> )	NM T	This species is found in open habitats, ponderosa pine forests, and marshlands. Distribution is limited to areas within flying distance of cliffs and stony outcrops, which provide suitable roosting sites. Spotted bats have been documented at numerous localities throughout the western two-thirds of New Mexico, and in 2014 through 2016, the species was detected by its distinct audible calls at multiple sites along the Gila River in Grant County.	Unlikely to occur because the analysis area lacks suitable roosting habitat, such as cliffs and limestone outcroppings, dense forests, and marshes.
Pacific marten ( <i>Martes caurina</i> )	NM T	This species has been observed in the San Juan and Sangre de Cristo Mountains. The Pacific marten prefers late successional stands of conifer-dominated mesic forest of spruce ( <i>Picea</i> spp.), fir ( <i>Abies</i> spp.), Douglas fir ( <i>Pseudotsuga menziesii</i> ), and associated trees. Optimal habitat likely consists of mature old-growth spruce-fir communities with more than 30% canopy cover, a well-established understory of fallen logs and stumps, and lush shrub and forb vegetation. The species avoids large openings.	Unlikely to occur in the analysis area due to the lack of mature conifer habitat of spruce, fir, or Douglas fir.

Common Name (scientific name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area
Meadow jumping mouse ( <i>Zapus luteus luteus</i> )	NM E	In New Mexico, this species is primarily associated with riparian habitats with short vegetation, high herbaceous vegetation cover, and species including common three-square ( <i>Schoenoplectus pungens</i> ), coyote willow ( <i>Salix exigua</i> ), dogbane ( <i>Apocynum cannabinum</i> ), foxtail barley ( <i>Hordeum jubatum</i> ), and Japanese brome ( <i>Bromus japonicus</i> ).	Unlikely to occur in the analysis area due to lack of associated species and lack of riparian habitat.

Sources: Except where otherwise noted, range or habitat information for wildlife species comes from the BISON-M (2022) website, IPaC (USFWS 2022a), EMNRD (2022a), and NatureServe (2022).

\* Federal (USFWS) status: E = Endangered, T = Threatened, C = Candidate

State of New Mexico status: NM E = Endangered, NM T = Threatened.

## Monarch Butterfly

The monarch butterfly is designated as a federally listed candidate species. This species was listed due to the decline in populations across North America as a result of habitat reduction and fragmentation. This species is important ecologically for plant population stability as it is an opportunistic pollinator. This species is known to occur throughout New Mexico during seasonal migration, its breeding season, and the warmer months of April to October but is not known to overwinter within the state (Cary and DeLay 2016).

The species was not observed during the April 2022 biological survey of the analysis area. Adult butterflies may occur based on the annual migratory path. The analysis area provides suitable foraging habitat for this species due to the presence of flowering plants. At the time of the April 2022 survey, no suitable milkweed (*Asclepias* spp.) habitat was observed; however, revisiting the Project area during their flowering period (June–August) would confirm whether the Project area provides suitable milkweed habitat required for breeding.

## Burrowing Owl

The burrowing owl is protected under the MBTA and State of New Mexico Statute 17-2-14. Populations of burrowing owls are declining across much of North America, particularly in the northern portion of the continent, chiefly because of prairie grassland habitat loss and fragmentation, human-caused mortality on wintering grounds and during migration, and the loss of colonial sciurids such as prairie dogs (Desmond 2010). During the 2022 biological survey, SWCA observed one active burrowing owl burrow with two adults in addition to a prairie dog colony during the 2022 biological survey (Figures 3.5 and 3.6).



**Figure 3.5. Burrow complex suitable for burrowing owls, facing north.**

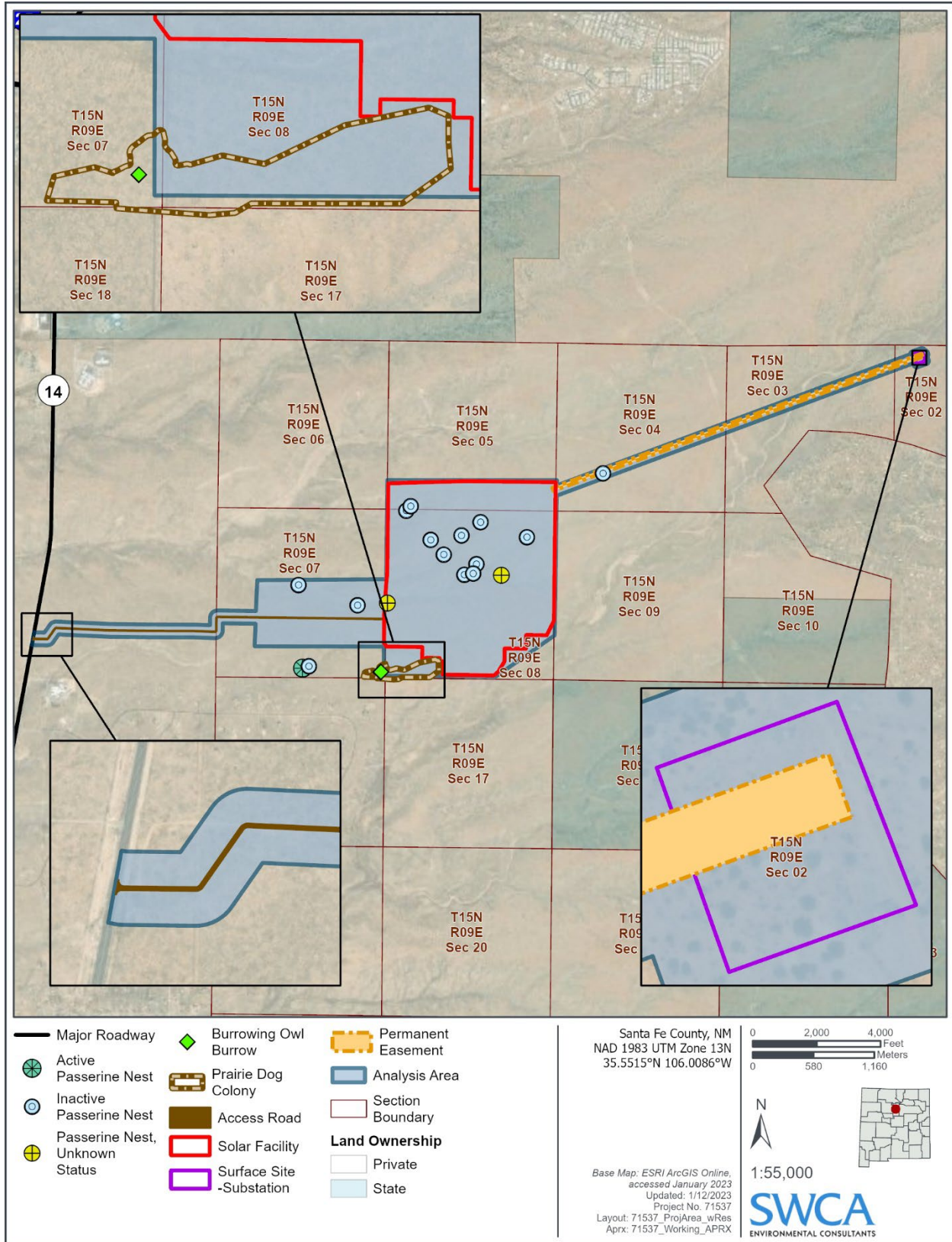


Figure 3.6. Biological resources within the analysis area.

## **Gunnison's Prairie Dog**

Gunnison's prairie dog is native only to North America, inhabiting montane shrublands and high mountain valleys and plateaus in the southern Rocky Mountains at 6,000 to 12,000 feet amsl east of the continental divide. As a fossorial mammal, this species inhabits burrow complexes within sagebrush shrubland and pinyon-juniper habitats (BISON-M 2022). This species lives in colonies that can contain thousands of individuals within a complex (Miller and Cully 2001). These colonies provide an important food source for many predators within grassland habitats, and their burrows provide suitable burrows for burrowing owls.

SWCA observed an extensive prairie dog colony during the 2022 biological survey (see Figure 3.6). Although Gunnison's prairie dog is not listed in Santa Fe County, burrows can be a concern in regard to construction safety, and their destruction can affect burrowing owl habitat. If construction begins during the burrowing owl nesting season (March 1–October 31), occupied nesting burrow surveys could be conducted to verify the presence/absence of prairie dogs prior to construction.

### **3.4.2 Environmental Effects**

#### **3.4.2.1 PROPOSED ACTION**

Impacts to wildlife and vegetation will result from actions that alter wildlife habitats, including changes to vegetation, surface disturbance, and the presence of humans and equipment during construction. Altering wildlife habitat in ways that would be considered adverse may occur directly (through habitat loss from surface disturbance) or indirectly (through the reduction in habitat quality caused by increased noise levels, increased human activity, and the presence of fugitive dust).

#### **Vegetation**

Certain areas within the analysis area will be cleared of vegetation during construction, where necessary. Further impacts to vegetation may occur as a result of deposition of fugitive dust generated during clearing and grading activities, the use of access roads, and from wind erosion of exposed soils; however, water trucks or other dust suppression measures as required by the NMED Air Quality Bureau will be used to help reduce fugitive dust from construction activities. This could reduce photosynthesis and productivity, increase water loss (Eveling and Bataille 1984), and result in injury to leaves in plants near the proposed analysis area. Localized fugitive dust could be generated from the areas of disturbed soil from blading associated with construction. Plant community composition could subsequently be altered resulting in habitat degradation. Localized impacts to plant populations and communities could occur if seed production in some plant species is reduced. Construction traffic and equipment brought to the site also represent a pathway for the introduction and spread of noxious weeds and invasive species. Rancho Viejo will prepare a weed management plan for the Project, which includes preventative and control measures to reduce the introduction of noxious, invasive, and nonnative plants, such as noxious weed washing stations. Rancho Viejo could coordinate with the Santa Fe – Pojoaque Soil and Water Conservation District to develop an invasive and noxious plant management plan; however, there are no land use ordinances requiring this coordination. Rancho Viejo's weed management plan will align with the control methods for the listed invasive and noxious plant species outlined within the New Mexico State's Troublesome Weeds of New Mexico booklet (Ashigh et al. 2010).

Postconstruction, interim reclamation will occur in areas not needed for long-term operations and maintenance. Impacts to vegetation from decommissioning activities would be similar to impacts from construction. Once decommissioning is complete, final reclamation of the Project area will aim to completely reestablish vegetation.



## **General Wildlife**

Portions of the analysis area will be disturbed to facilitate construction of the Rancho Viejo Solar Project. Direct impacts to wildlife from construction would include the removal of existing vegetation, risk of direct mortality of species during construction, loss or degradation of native habitat, and displacement of wildlife species from habitat due to development. Additional potential indirect impacts may include disruption or displacement of species from nesting/birthing and foraging areas, changes in activity patterns due to construction, increased human activity, and noise disturbance. Noise disturbance from construction vehicles and equipment could impact wildlife by interfering with animals' abilities to detect important sounds or by posing an artificial threat to animals (Clinton and Barber 2013). While the biological survey of the analysis area showed a relatively high diversity of wildlife, the area has also been previously disturbed by cattle grazing, two-track roads, and transmission lines; therefore, the abundance of long-term desirable habitat is likely to be low. Short-term disturbances associated with construction light and noise could cause individuals to move from the analysis area to similar suitable habitat within the surrounding landscape. However, these impacts would be temporary and would not result in population-level effects.

The Rancho Viejo Solar Project will be fenced, limiting the types of wildlife that may utilize the analysis area postconstruction to reptiles, birds, and small mammals. Operations activities will occasionally include noise disturbances that could temporarily displace wildlife in the analysis area and vicinity.

Impacts to wildlife species will be minimized through the implementation of protection measures such as allowing wildlife to leave the work area, checking trenches or excavation for wildlife, complying with speed limits, and following a worker environmental awareness training (see Section 3.4.3).

Impacts to wildlife from decommissioning activities will be similar to impacts from construction. Once decommissioning is complete, final reclamation of the analysis area will include the removal of Project fencing to promote the reintroduction of wildlife to the area.

## **Migratory Birds**

No major or long-term effects on migratory birds are anticipated from the Rancho Viejo Project. The Project would implement measures to avoid construction-related impacts to active nests during the migratory breeding season (March 15–September 15), including training construction crews on actions to take in the event active nests are found in the analysis area, establishing nest buffers, and avoiding nests until birds have fledged (see Section 3.4.3). As burrowing owls are known to occur within the analysis area, preconstruction nest surveys will be utilized to determine whether active burrows are present. Adult burrowing owls can avoid active construction.

Incidental mortality or displacement of migratory bird species is possible on a local scale due to short-term construction activities and long-term ground disturbance. However, many birds occurring locally will likely move into adjacent habitat in response to disturbance. Adult migratory birds will not likely be directly harmed by the Rancho Viejo Solar Project because of their mobility and ability to avoid areas of human activity. Additionally, based on the abundance of similar habitat in the surrounding area, the impacts on bird populations that utilize this habitat type within the analysis area will be negligible.

Operation of the Rancho Viejo Solar Project, inclusive of transmission poles within the analysis area and PNM lines outside of the analysis area, could also present electrocution risk to avian wildlife; however, this risk is very low because the facilities are designed to discourage their use as perching or nesting substrates by birds, including designing aboveground transmission to follow established Avian Power Line Interaction Committee (APLIC) guidelines to minimize bird collisions and avoid electrocution of raptors (see Section 3.4.3). Some examples of commonly used protections include providing adequate

separation between energized components, grounded components, and structural members. Rancho Viejo will determine appropriate measures once the final design of the Project is complete.

## **Bald and Golden Eagles**

Construction activities and the long-term presence of the Project in the analysis area are not expected to impact bald or golden eagles. Because the analysis area lacks suitable nesting and foraging habitat for these two species in and surrounding the analysis area, the Rancho Viejo Solar Project is not anticipated to cause take of individual bald or golden eagles, their nests, or their eggs. Adult eagles will not likely be directly harmed by the Rancho Viejo Solar Project because of their mobility and ability to avoid areas of human activity.

## **Special-Status Species**

One federally listed candidate species, the monarch butterfly, has the potential to occur in the analysis area (see Table 3.3). Due to the early season biological survey in April 2022, the presence of milkweed species in the analysis area could not be confirmed. A lack of milkweed vegetation would confirm that the analysis area does not contain the plants required for egg laying, and therefore breeding efforts of the species would not likely be impacted by the proposed Project. Also, due to their ability to move out of areas of human activity, adult butterflies are not likely to be directly harmed if present during Project construction. Lastly, if construction occurs prior to milkweed emergence, eggs and larvae would likely not be directly harmed. Removal of vegetation within the project footprint will reduce the availability of flowering plants and thus possibly impact the species' food sources. The proposed Project could impact individuals but is not likely to contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Burrows of Gunnison's prairie dog were observed during the April 2022 biological survey within the analysis area. Burrowing owls, as well as burrowing owl signs, were also observed during the 2022 biological survey. Although Gunnison's prairie dog is not listed in Santa Fe County, burrows can be a concern in regard to construction safety, and their destruction can affect burrowing owl habitat. If construction begins during the burrowing owl nesting season (March 1–October 31), occupied nesting burrow surveys could be conducted to verify species presence/absence. The proposed Project will not directly impact the prairie dog colony and therefore will not directly impact burrowing owl nesting habitat (see Figure 3.6). Potential indirect impacts to burrowing owls could range from temporary habitat disturbance due to human presence/noise to loss of foraging habitat; however, the habitat within the analysis area is not unique to its surroundings; therefore, adult burrowing owls could relocate. Overall, the proposed Project may indirectly impact individuals or localized foraging habitat but is not likely contribute to a trend toward federal listing or cause a loss of population or species viability.

### **3.4.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to biological resources within the analysis area or surrounding areas because the Proposed Action will not be implemented.

### **3.4.3 Environmental Protection Measures**

EPMs that will be implemented to avoid and minimize impacts to biological resources include the following:

- Temporarily disturbed areas will be revegetated to the extent practicable in order to meet SWPPP requirements for runoff and erosion control. Seed mixture and seeding rates will be developed through consultation with the local agency, experts, or landowner preference.
- Compacted soils will be restored as closely as possible to preconstruction conditions as required for ground stabilization and erosion control.
- Trash and food debris will be disposed of properly.
- Wildlife that have entered the work area will be allowed to leave the area on their own.
- Environmental awareness training will be provided to all construction personnel working on the Project.
- Trenches, excavations, and uncapped pipe segments will be checked for wildlife entrapment (New Mexico Department of Game and Fish 2022).
- Personnel will comply with all posted and established Project speed limits.
- Vegetation will be cleared outside the nesting season (March 15–September 15) where feasible to discourage birds from establishing nests in Project work areas.
- The worker environmental awareness program will include training specific to avoidance of migratory birds and active migratory bird nests during the nesting season from March 15 to September 15. If active nests are found in the analysis area during construction, a biologist will be contacted to evaluate the activity status of the nest. The nest will be avoided until determined inactive by a biologist.
- Vegetation removal during the breeding season (March 1–August 31) could be preceded by a preconstruction nesting survey up to 2 weeks to establish the occupancy status of any potentially suitable nesting burrows detected within the analysis area. Occupied nesting burrows will be avoided until the young have fledged.
- Facilities will be designed to discourage their use as perching or nesting substrates by birds, including designing aboveground transmission and facilities to follow established APLIC guidelines to minimize bird collisions and avoid electrocution of raptors.
- Micrositing will be completed during engineering design to minimize impacts to sensitive biological resources to the extent practicable.
- Species-specific surveys could be conducted to determine the presence of milkweed vegetation in the analysis area. If milkweed vegetation is present, the revegetation seed mixture will include pollinator species such as milkweed. Milkweed vegetation removal will be minimized to the greatest extent possible.
- Rancho Viejo will develop and implement a noxious weed and control management plan for the control of noxious weeds and invasive species that could occur as a result of new surface disturbance activities at the site.
- If required as part of the SWPPP, a native seed mixture will be applied to all temporary disturbance areas, followed by applications of mulch as required to provide additional erosion control.

- Construction activities will generally be limited to the least noise-sensitive times of day (i.e., daytime between 6 a.m. and 8 p.m.), unless necessary due to weather, safety, or schedule constraints. Construction equipment will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).
- A worker environmental awareness program will be implemented to train facility personnel regarding their responsibilities to conserve protected resources that are located on-site and associated treatment measures.

### **3.4.4 Conclusion**

One federally listed candidate species, the monarch butterfly, has the potential to occur in the analysis area. Due to the early season biological survey, the presence of milkweed species in the analysis area could not be confirmed. However, the habitat within the analysis area is not unique to the surroundings, and due to their ability to move out of areas of human activity, adult butterflies are not likely to be directly harmed during construction or operation. Additional surveys could confirm the presence of milkweed vegetation and determine if this species should be included in the seed mixture for revegetation. The Rancho Viejo Solar Project could impact individuals if milkweed vegetation and larvae/eggs are present but is not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. If milkweed vegetation is present, minimizing impacts to the monarch breeding habitat is recommended.

The analysis area and general vicinity have historically been and are presently used as livestock rangeland. However, the area is experiencing increasing urbanization and development, including a charter school and housing developments directly adjacent to the Project area. The loss of approximately 800 acres of wildlife habitat will not cause undue degradation to general wildlife and vegetation as this habitat type is common across the regional landscape and is readily available on land adjacent to the analysis area. No direct impacts to vegetation, wildlife, migratory birds, bald and golden eagles, or listed threatened and endangered species will occur from the Proposed Action. There are no foreseeable actions near the Project area that would significantly affect biological resources. Therefore, there is minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively affect biological resources.

## **3.5 Cultural, Historic, Archaeological, and Religious Resources**

Data sources reviewed to assess the cultural, historic, archaeological, and religious conditions within and surrounding the analysis area include:

- New Mexico Historic Preservation Division (HPD) Tribal County Consulting List (HPD 2022)
- New Mexico Cultural Resource Information System (NMCRIS) online database managed by the Archaeological Records Management Section (ARMS) of the New Mexico HPD (2022).
- State Register of Cultural Properties (SRCP) and National Register of Historic Places (NRHP) records found online through the NM HPD website (HPD 2022).
- Google Earth imagery for religious resources (Google Earth 2017).
- Historic aerial photographs (EarthExplorer 2022).
- USGS Historical Topographic Maps (USGS 2022).

- National Park Service: El Camino Real de Tierra Adentro (NPS 2022).
- Atwell’s Class I Cultural Resources Inventory for the Rancho Viejo Solar Project, Santa Fe County, New Mexico (Atwell 2020b).
  - Included review of the New Mexico HPD or State Historic Preservation Office (SHPO) Archaeological Records Management Section (ARMS) database, New Mexico State Register of Cultural Resources (SRCP), National Register of Historic Places (NRHP) and BLM GLO records.

### **3.5.1 Environmental Setting**

#### **Cultural and Historic Archaeological Resources**

Santa Fe County is rich in archaeological and cultural resources. The analysis area is located on private land, within Santa Fe County limits.

#### ***Tribal Coordination***

Although the analysis area is not in the vicinity of any Tribal land, Rancho Viejo has reached out to several Native American Tribes for input concerning the project, including Tribal representatives from Tesuque Pueblo, Pojoaque Pueblo, Cochiti Pueblo, San Ildefonso Pueblo, Santa Clara Pueblo. The New Mexico State Tribal Liaison, Santa Fe County Tribal Liaison, and New Mexico State Director of Cultural Affairs were also contacted.

Rancho Viejo hosted a site visit with Jerome Samuel from the Tesuque Pueblo. The leader of the San Ildefonso Pueblo indicated that he would like for a Tribal monitor to be on the project site during construction. Emails to other representatives did not receive a response. Rancho Viejo has contracted with a Tribal Consultant to engage with the eight Northern New Mexico Pueblos and the Tribal leaders, inform them of potential activity on the site, and collaborate with leaders during construction. Rancho Viejo plans to host a meeting in January 2023 with all state Pueblo leaders to discuss the details of each proposed project, allowing them to ask questions, provide cultural insight, and identify who amongst the Pueblos would want to participate in site monitoring during the construction phase. Rancho Viejo’s contracted Tribal consultant would lead and continue with scheduled engagement and consultation with all Pueblo representatives.

#### ***Cultural Resource Survey and Results***

The Class I Cultural Resource Inventory completed by Atwell, LLC in 2020 did not identify any previous cultural resource surveys within the analysis area. A brief review of the records by SWCA prior to survey identified one previous survey parallel to current NM 14 where access to the solar facility is proposed. SWCA research identified nine previous surveys within 500 m of the current survey area. One known archaeological site, LA 108488, is intersected by the proposed gen-tie line. LA 108488, a segment of the El Paso Rock Island Railroad Line was determined not eligible by SHPO in 2007 (HPD Log No. 82133). Review of the NRHP, SRCP, and SHPO records indicate that no listed cultural resources are within the analysis area (Atwell 2020). The review by Atwell, as well as SWCA, did identify a location identified by the National Park Service as a “speculative location” of a portion of one of the many routes of the El Camino Real de Tierra Adentro National Historic Trail (NPS 2022).

SWCA completed an intensive pedestrian cultural resource inventory survey of the analysis area, on April 4-7, 13-14, 18, and 25-29; May 3; and June 30, 2022 (NMCRIS No. 150271), in accordance with current SHPO guidance and NMAC 4.10.15 (Byers et al. 2022). SWCA’s intensive cultural resources inventory of the analysis area found one previously recorded site and recorded 14 newly identified sites, as well as

74 isolated occurrences (IOs). Of the 15 sites recorded, 10 consist of prehistoric artifact scatters without features, three consist of historic artifact scatters with features, and two consist of historic artifact scatters without features. The portion of El Camino Real de Tierra Adentro National Historic Trail identified as a “speculative location” and plotted north-south through the existing dirt road proposed for access to the facility, was thoroughly examined. No evidence of the trail’s presence was found. It is possible that the trail has been destroyed by erosion or was misplotted during the original identification of the trail by aerial imagery and historic maps. This portion of the trail has never been ground truthed.

No evidence of El Camino Real de Tierra Adentro was identified within the analysis area; therefore, the trail was not recorded as a part of this survey. However, if at a later date this alignment is confirmed as part of El Camino Real de Tierra Adentro, impacts to the setting of the trail from the current project would need to be reevaluated. The previously recorded archaeological site had been determined not eligible in 2007. Thirteen sites are recommended not eligible for listing to the NRHP under any of the four criteria. Two sites, LA 200751 and LA 200755, have been recommended undetermined for listing to the NRHP by SHPO (HPD Log No. 118484). The 74 IOs do not qualify as sites and are not eligible for inclusion on the NRHP; no further management of these IOs is recommended.

## **Religious Resources**

There are no churches or other religious resources within the analysis area. No NRHP-listed Native American religious sites or sacred areas are known to occur within the vicinity of the analysis area. The nearest religious resource is located approximately 2.5 miles north of the analysis area (see Figure 3.7).

### **3.5.2 Environmental Effects**

#### **3.5.2.1 PROPOSED ACTION**

##### **3.5.2.1.1 CULTURAL AND ARCHAEOLOGICAL RESOURCES**

Fifteen archaeological sites were identified within the proposed analysis area during the cultural resources survey. Consultation with SHPO after the cultural resource survey determined that 13 of these sites are not eligible to the NRHP and two (LA 200751 and LA 200755) are of undetermined eligibility. Sites of undetermined eligibility should be treated as eligible pending further testing and investigation. Rather than proceed with testing of these sites, Rancho Viejo has designed the project to avoid these resources by at least 100 feet.

The potential for subsurface cultural material within the analysis area is low; however, in the event that a previously undocumented burial site is discovered during Project construction, the appropriate authorities would be notified, which includes notifying HPD (SHPO) of an unanticipated discovery, ceasing work within the discovery footprint, and following an Unanticipated Discoveries Plan. With the avoidance of the two undetermined resources, there will be *no effect* to any historic properties.

##### **3.5.2.1.1 RELIGIOUS RESOURCES**

There are no religious resources or churches in the vicinity of the analysis area and therefore there are no concerns of these types of resources being impacted.

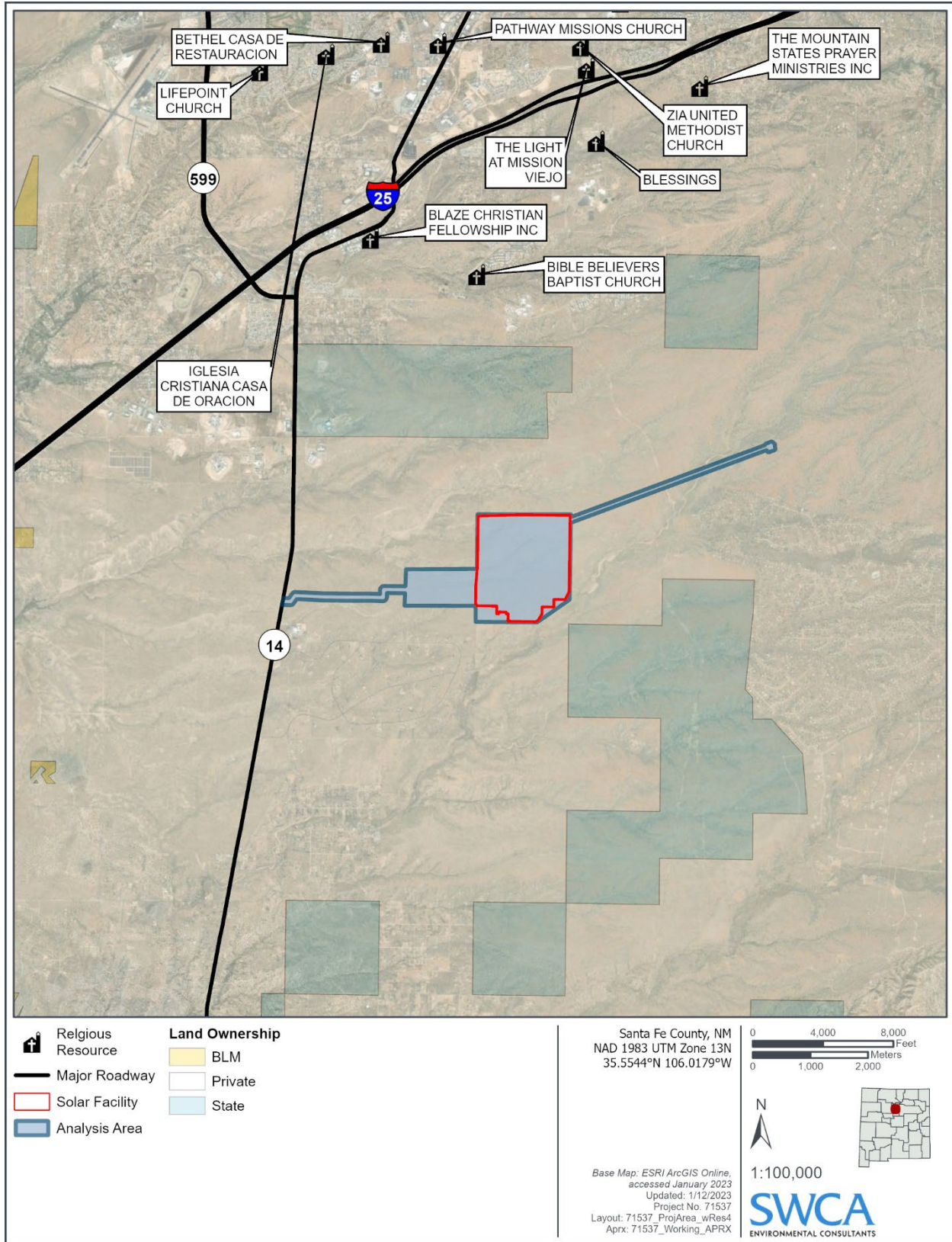


Figure 3.7. Religious resources within the vicinity of the analysis area.

### **3.5.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to cultural or religious resources within the analysis area or surrounding areas because the Project will not be implemented.

### **3.5.3 Environmental Protection Measures**

EPMs that will be implemented to protect undetermined or eligible cultural resources include the following:

- Avoidance of LA 200751 by at least 100 feet will occur as a result of a revised site plan by Rancho Viejo.
- Avoidance of LA 200751 will be achieved by constructing a new alignment of the access road to the project. The site will be avoided by at least 100 feet.

No further mitigations are recommended for the remaining 13 sites within the analysis area as they are listed not eligible for the NRHP (HPD Log No. 118484).

### **3.5.4 Conclusion**

Two undetermined cultural resources and 13 not eligible cultural resources were identified within the analysis area during the cultural resources survey. Consultation with SHPO on the eligibility and potential mitigation of the two undetermined resources has resulted in a revision to the site plan in order to achieve avoidance of both resources by at least 100 feet. Therefore, there will be *no effect* to any historic properties.

If any unanticipated resources including subsurface burial sites are discovered, primarily during ground-disturbing construction activities all construction activities should cease, and a qualified archaeologist notified.

## **3.6 Geologic, Paleontological, and Soil Resources**

Data sources reviewed to assess geologic and paleontological conditions, as well as existing soil resources, include the following:

- USGS topographic maps
- Digital 24K geologic map of the Turquoise Hill quadrangle (Koning and Hallett 2002)
- Digital 48K Geologic map of the southern Espanola Basin (Koning and Read 2010)
- BLM New Mexico's Potential Fossil Yield Classification GIS data (BLM 2022b)
- NRCS soil maps (NRCS 2022a)
- SWCA's biological survey report (SWCA 2022a)

### **3.6.1 Environmental Setting**

Santa Fe County, New Mexico, contains abundant geologic and paleontological resources, including economically important minerals and scientifically important vertebrate fossils. Santa Fe County also contains sensitive soils that support the unique ecosystems of the greater Colorado Plateau high desert.



## **Geologic Resources**

The Rio Grande Rift dominates the geologic framework for this portion of New Mexico. The rift system's late Neogene crustal extensions formed a series of tilted half grabens and adjacent discontinuous mountain ranges resulting in the formation of multiple structural basins. The analysis area is located within the Española Basin, one of the northernmost basins of the rift zone. The west-dipping Española basin is bounded to the east by the Santa Fe and Sangre de Cristo Mountains and the west by the Pajarito fault zone; and connected to the east-dipping San Luis and Santo Domingo basins to the north and south at the Embudo and La Bajada constrictions, respectively. The approximately 50 mile-long and 18- to 40-mile-wide basin is filled with over 10,000 feet of sedimentary deposits (Koning and Read 2010; Land 2016). The northwest–southeast-trending Embudo fault zone extends across the basin, which tectonically separated the main Española Basin to the south from the northern and northwestern parts of the basin. More recent faulting after deposition displaced or offset the basin-fill units. Multiple fault zones and igneous intrusions were active multiple times over the past several million years within the basin (Koning and Read 2010).

The geologic units of this area, including the analysis area, are characterized by Quaternary and Tertiary sedimentary deposits of the Santa Fe Group (Koning and Hallett 2002; Koning and Read 2010). A younger unit of the Santa Fe Group, the Ancha Formation, is the only formation of the group mapped within the analysis area. The Ancha Formation is composed mostly of granitic alluvium derived from the southeastern flank of the Sangre de Cristo Mountains. The Plains surface, a relatively flat but complex and diachronous physiographic surface, generally approximates the top of the Ancha Formation (Koning et al. 2002). This surface represents a former piedmont slope that has been subsequently incised by numerous streams draining the Sangre de Cristo Mountains. Soils of the Plains surface are typically modified by erosion and consist of calcic clay and siliceous carbonates. Exposures of the Ancha Formation are often limited to roadcuts and arroyos due to consistent thin covering of sheetwash or colluvium deposits. Depth to Miocene and older geologic units has not been determined within the analysis area, but from previous geologic studies and mapping, these units are estimated to be 10 to 76 m below the surface (Koning and Read 2010).

## **Paleontological Resources**

The Española Basin is rich in paleontological resources including diverse Pliocene and Pleistocene mammalian faunas; some of these fossils are in museum displays and many more are critical to historical and ongoing scientific studies (Lucas and Sullivan 2015; Tedford 1981; Tedford and Barghoorn 1993).

Although the analysis area is not on BLM land, the BLM's Potential Fossil Yield Classification (PFYC) System data values are used to analyze the potential impacts of the Project to paleontological resources. The PFYC system provides baseline guidance for predicting, assessing, and mitigating paleontological resources in areas of development. The PFYC is a ranking (1 [very low] to 5 [very high] or unknown [U]) of geologic units (formation, member, or other distinguishable units) based on the taxonomic diversity and abundance of previously recorded, scientifically important paleontological resources, including vertebrate, invertebrate, and plant fossils (BLM 2016). These values were previously assigned by the BLM to mapped geologic units throughout New Mexico regardless of surface ownership. For geologic units designated as PFYC U, sufficient information was not available to make an informed determination on paleontological potential, and these units are typically treated as units having higher or very high potential until more information is available.

The entire analysis area (1,100 acres) is mapped on the New Mexico state geologic map as the Santa Fe Group (Anderson 1997). While these units are ranked as having very high potential to contain important paleontological resources (PFYC 5) (BLM 2022b), more detailed geologic mapping indicates that the

Project is immediately underlain by one of the youngest members of the Santa Fe Group, the Pliocene to late-Pleistocene Ancha Formation. The Ancha Formation is covered along the creeks in the analysis area by up to 5 m of Holocene alluvium valley fill, which has low potential (PFYC 2) to contain important paleontological resources (Koning and Hallett 2002). Sand and gravel of the Ancha Formation (Santa Fe Group) were deposited on pediments and contact the older Miocene-age Santa Fe Group Formations (e.g., Tesuque and Espinosa Formations) in the subsurface along an angular unconformity (Koning and Hallett 2002; Koning and Read 2010). While the Ancha Formation is part of the Santa Fe Group, the unit is not well known for containing abundant paleontological resources like some of the other formations within the group. The nearest known locality consists of a mammoth skull and tusk that was observed in similar gravel deposits resting on the pediment surface approximately 12 miles south of the analysis area, near Galisteo, New Mexico (Disbrow and Stoll 1957). Aerial image review indicates that the analysis area is vegetated, which obscures fresh exposures of the mapped Plio-Pleistocene geologic units.

A surface paleontological survey was not completed for the Project because the analysis area is vegetated and there are no surface exposures of the geological units with moderate to very high paleontological potential, and based on previous geologic mapping, Santa Fe Group Formations with very high potential to contain scientifically important fossils are between 10 to 76 m below the surface (Koning and Hallett 2002; Koning and Read 2010). If there are paleontological resources present in the analysis area, they are most likely buried below the younger mapped units.

## Soil Resources

According to the NRCS (2022a), 12 soil map units are mapped within the approximately 1,100-acre analysis area (Table 3.4). These soils are considered well drained to excessively drained and non-hydric. None of the soils are considered prime farmland of statewide importance (NRCS 2022a). The soil complex parent material is predominantly alluvium derived from granite, gneiss, schist, loess, and volcanic ash. The soil is comprised mostly of loam, clay loam, and ranges from a clay loam, with smaller amounts of sandy loam and various other loam mixes.

**Table 3.4. Soils in the Analysis Area**

Soil Type Name	Soil Map Unit Symbol	Acres in Analysis Area	Percent of Analysis Area
Panky loam, 1 to 4 percent slopes	100	702.6	65.5
Khapo sandy loam, 3 to 8 percent slopes	102	235.1	21.9
Zozobra-Jaconita complex, 5 to 25 percent slopes	101	51.7	4.8
Zepol silt loam, 0 to 2 percent slopes, flooded	103	36.5	3.4
Tanoan-Encantado complex, 5 to 25 percent slopes	201	14.8	1.4
Buckhorse-Altazano complex, 2 to 8 percent slopes, flooded	203	11.4	1.1
Alire loam, 2 to 6 percent slopes	202	8.9	0.8
Dondiego loam, 1 to 3 percent slopes	216	5.8	0.5
Ohke sandy loam, 1 to 3 percent slopes	217	2.9	0.3
Predawn loam, 1 to 4 percent slopes	200	2.1	0.2
Levante-Riverwash complex, 1 to 3 percent slopes, flooded	213	0.9	0.1
Arents-Urban land-Orthents complex, 1 to 60 percent slopes	116	0.6	<0.1
<b>Total</b>		<b>1,073.3</b>	<b>100.0</b>

Source: NRCS (2022a).

## **3.6.2 Environmental Effects**

### **3.6.2.1 PROPOSED ACTION**

Construction activities are detailed within Section 2.1.2 and include installation of single-axis tracking steel structures and a chain-link perimeter fence. Grading and/or grubbing may occur throughout portions of the solar facility, BESS, foundation pads, and equipment storage and staging areas and include cuts and fill locations. Grading and/or grubbing ground disturbance is not expected to exceed 24 inches in depth. Additionally, a 20-foot-wide gravel surface or compacted native soil access road will be constructed between State Road 14 and the Project site, as well as internal access roads traversing the perimeter and internal solar panel layout. These roads will cause compaction of the native soil beneath.

### **Geologic Resources**

Ground-disturbing activities, grading and boring, associated with the generation facility, substation, gen-tie line, and access roads will directly impact up to 800 acres of Holocene valley fill deposits and the Ancha Formation. The gen-tie structure foundations will be the deepest excavations within the analysis area, but even at a depth of 2 to 6 m, they are unlikely to directly impact older geologic bedrock units such as the pre-Pliocene Tesuque and Espinaso Formations (Koning and Hallett 2002; Koning and Read 2010). Additional geotechnical investigation may be completed to determine the final design for the Project, including the exact depth of the transmission pole structures.

### **Paleontological Resources**

Based on review of the geological, paleontological, and soil data sources, there is low potential for the Project to encounter any surface or subsurface paleontological resources due to lack of exposed geological units at the surface within the analysis area and the depth (10 to 76 m) to a geologic unit with known high paleontological potential, and because subsurface disturbances of 2 m or more will likely be limited to gen-tie pole foundation borings. If any paleontological resources are discovered during any phase of the proposed Project, these resources are considered property of the private landowner.

### **Soil Resources**

The disturbance of up to 800 acres within the solar facility footprint during construction will directly impact the soils listed in Table 3.4. All construction occurring below the surface, including trench digging and structure foundation installation, as well as additional soil removal, will also directly impact these soils. Heavy equipment operations resulting in soil compaction and increased erosion from stormwater events from the loss of vegetative cover could cause the loss of soil structure and porosity. There is a potential for wind and water erosion due to the erosive nature of these soils. There is always the potential for soil contamination due to spills or leaks from construction or maintenance equipment; however, the risk of soil contamination is low when protection measures are applied, such as preparing a spill prevention, control, and countermeasures (SPCC) plan. Soil contamination from spills or leaks can result in decreased soil fertility, less vegetative cover, and increased soil erosion.

Disruption of the soil crust can result in decreased soil organism diversity, soil nutrient levels, soil stability, and organic matter. These impacts are expected to be limited to the proposed analysis area. Although no sensitive soils, including biological soil crusts, were observed during the biological survey, the proposed Project could impact subsurface biological soil crusts if they are present. Indirect impacts to soil resources could include a change in soil productivity due to accidental mixing of topsoil with subsoil during construction. Protection measures are proposed to avoid and minimize these impacts, including minimizing surface disturbances and minimizing topsoil mixing through proper excavation techniques.

Decommissioning activities will have similar impacts to those described for construction as similar activities will occur.

### **3.6.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to geologic, paleontological, and soil resources within the analysis area or surrounding areas because the Project will not be implemented.

### **3.6.3 Environmental Protection Measures**

EPMs that will be implemented to avoid and minimize impacts to geologic, paleontological, and soil resources include the following:

- Construction will not be conducted during wet conditions when soils are saturated.
- To the extent possible, topsoil will be placed separately from subsoils/bedrock during excavation and not comingled and will be replaced in reverse order of excavation.
- Erosion will be reduced by applying and maintaining standard erosion and sediment control methods. These may include using certified weed-free straw wattles and bale barriers and silt fencing. Specific erosion and sediment control measures will be specified in a SWPPP.
- A SPCC plan will be prepared by Rancho Viejo.
- Hazardous materials will not be drained onto the ground or into streams or drainage areas.
- Construction waste including trash, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
- Contractors will implement a hazard communication program for any on-site hazardous materials to include training, labeling, and posting of Safety Data Sheets (SDSs). Fuels and petroleum-based products will be stored in approved containers and away from excavated areas. Waste motor oil, hydraulic fluid, and liquid gear lube will be stored in approved containers in isolated areas and removed to an authorized disposal facility monthly and in accordance with the regulations of NMED. All equipment using hydraulic hoses and cylinders will be inspected for leaks. Any equipment found to have petroleum leaks that cannot be repaired immediately will be removed from service and replaced.
- Contractors will have proper training, there will be spill kits on-site, and any leaking equipment will be repaired immediately. In the event contaminants are released, in addition to the requirements outlined in the environmental report, Rancho Viejo will adhere to the notification policies contained in 20.6.2.1203 NMAC.

### **3.6.4 Conclusion**

The proposed Project could directly impact soils and geologic units through grading for the generation facility, substation, and access roads, as well as grading and boring for the gen-tie pole installation. There is a low likelihood of the Project encountering paleontological resources during Project activities, thus limiting the potential for direct impacts. The area immediately surrounding the analysis area has a similar geological history, topography, and lack of surface exposures. Ground-disturbing activities associated with the Project and other existing and potential project development in the area are not likely to cumulatively impact geological or paleontological resources. The Project is not expected to unduly impair important environmental values regarding geologic, paleontological, and soils resources.

### 3.7 Geographic Resources

Data sources reviewed to determine the nearest geographic resources include the following:

- NPS physiographic provinces (NPS 2021a)
- BLM special designations GIS data
- BLM areas of critical environmental concern (ACEC) list (BLM 2022a)
- USGS topographic maps
- Digital 24K geologic map of the Turquoise Hill quadrangle (Koning and Hallett 2002)
- Digital 48K Geologic map of the southern Espanola Basin (Koning and Read 2010)
- BLM New Mexico’s Potential Fossil Yield Classification GIS data (BLM 2022b)
- NRCS soil maps (NRCS 2022a)
- SWCA’s biological survey report (SWCA 2022a)

#### 3.7.1 Environmental Setting

Geographic resources are rooted in cultural values and are typically places or earthly physical material that people treasure. Santa Fe County is situated at the base of the southern Rocky Mountains, nestled between the Sangre de Cristo Mountains to the east and the Jemez Mountains to the west. The county is in the Rio Grande Rift. The analysis area is located within the NPS’s Basin and Range physiographic province (NPS 2021a). The analysis of impacts to geographic resources is limited to a 5-mile radius from the Project because, beyond this distance, direct impacts, including noise and visual disturbance associated with construction, operation and maintenance, and decommissioning activities will not occur.

Two BLM-managed ACECs, La Cienega ACEC and Galisteo Basin ACEC, are within approximately 4 miles of the analysis area. Information including their human value and use is listed in Table 3.5 and shown on Figure 3.8. Two speculative alignments of the El Camino Real de Tierra Adentro National Historic Trail (NHT) intersect the project access road. The alignments are approximately 0.10 mile from the western edge of the surface site boundary. Neither of these alignments have been ground-truthed for positive identification. Additionally, other construction projects have successfully been completed along other intersections of speculative alignments. Definitive alignments of the trail are located approximately 4 miles west of the analysis area. Other geographic resources within 5 miles of the analysis area, such as preserves, national monuments, and NHTs, are also listed in Table 3.5.

**Table 3.5. Local and Regional Geographic Resources**

Geographic Resource	New Mexico County	Proximity to analysis area	Geographic Resource Use
El Camino Real de Tierra Adentro NHT	Santa Fe	0 miles to speculative alignments; 4 miles west to definitive alignments	This trail began in Mexico City and was important economically, socially, and politically. Exploration and trade expanded the route north, ending at Ohkay Owingeh Pueblo, New Mexico (NPS 2021b).
La Cienega ACEC	Santa Fe	4 miles west	This ACEC has cultural value, including pueblo ruins, and provides habitat for special-status species (BLM 2012).

<b>Geographic Resource</b>	<b>New Mexico County</b>	<b>Proximity to analysis area</b>	<b>Geographic Resource Use</b>
Galisteo Basin ACEC	Santa Fe	4 miles south*	This ACEC is composed of multiple archaeological sites; the location for sites closest to the analysis area is provided here (BLM 2012).
Galisteo Basin Preserve	Santa Fe	5 miles south	A conservation-based community development with over 41 miles of publicly accessible trails and thousands of preserved acres (Galisteo Basin Preserve 2021).

\*Due to confidentiality of the archaeological sites contained within this ACEC, the exact location is not disclosed.

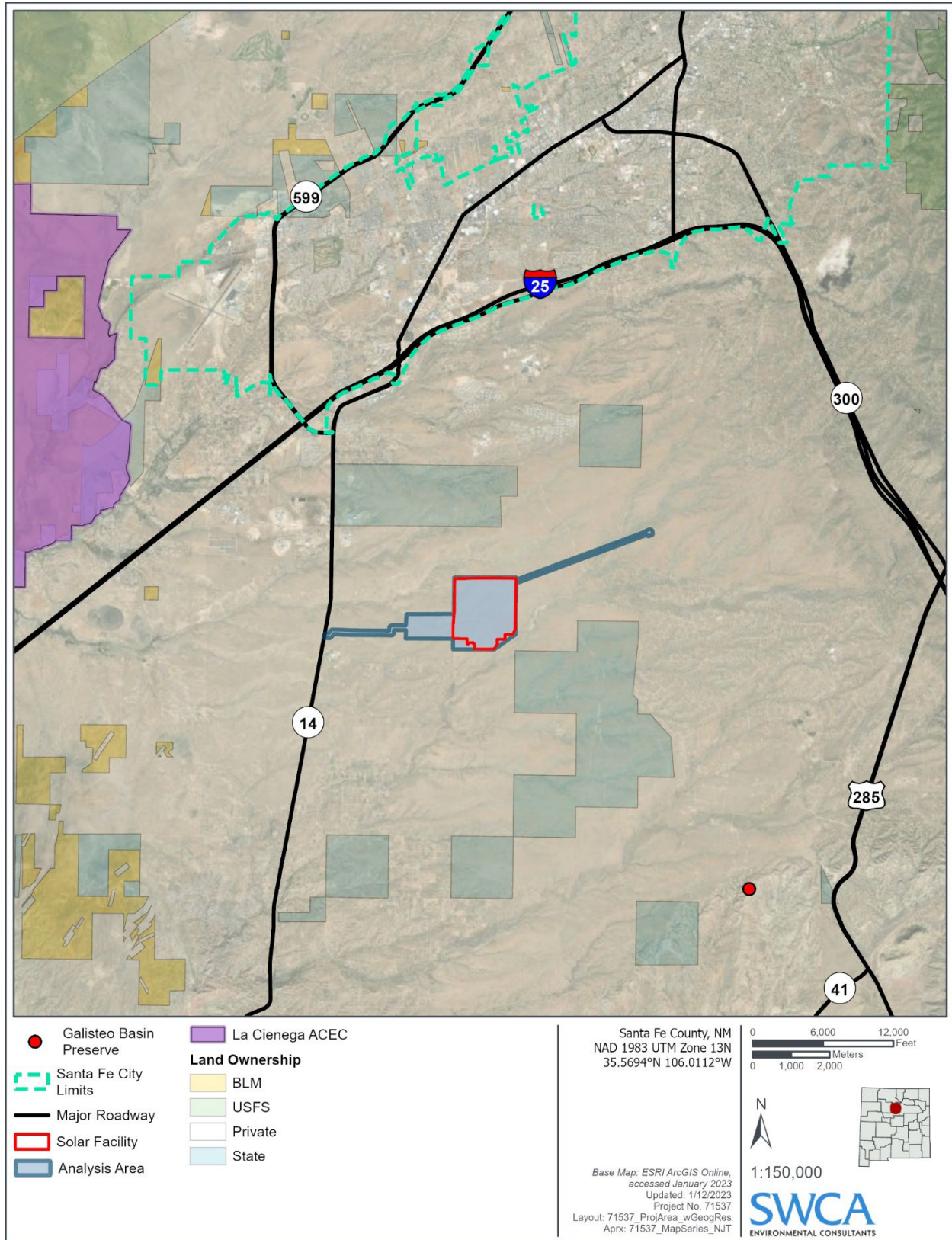


Figure 3.8. Geographic resources.

## **3.7.2 Environmental Effects**

### **3.7.2.1 PROPOSED ACTION**

Air resources impacts, including emissions from construction and decommissioning equipment and vehicles, are analyzed in Section 3.3. Emissions will be minor and will not impact the overall air quality of the region, including the geographic resources. EPMs will minimize effects to air resources as specified in Section 3.3 and below in Section 3.7.3.

Indirect impacts to the NHT, ACECs, and Galisteo Preserve could include visual resource, but viewers within the designated areas are not likely to notice the Project infrastructure. If the structures are noticed by a casual observer, the Project will appear to be similar in nature and lesser in intensity compared with the visual resource impacts resulting from the adjacent residential development, major roadways, existing transmission lines, and other scattered developments that occur in the vicinity of the analysis area. No indirect impacts to the Galisteo Basin Preserve are anticipated due to their distance from the analysis area (5 miles south). Visual impacts associated with the Project facilities are analyzed in Section 3.15. Section 3.13 analyzes impacts to traffic associated with construction vehicles in detail. However, the EPMs below were developed to minimize traffic safety risks to the public through obtaining required permits for access road improvements and implementing proper construction techniques and best management practices.

### **3.7.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to geographical resources within the analysis area or surrounding areas because the Proposed Action will not be implemented.

## **3.7.3 Environmental Protection Measures**

EPMs that will be implemented to avoid and minimize impacts to geographical resources include the following:

- All fossil fuel-fired construction equipment will be maintained in accordance with manufacturer recommendations to minimize construction related combustion emissions.
- The idling time of fossil fuel-fired construction equipment will be limited, unless idling must be maintained for proper operation (e.g., drilling, hoisting, and trenching).
- The speed of vehicles within construction sites during construction will be limited to help reduce the amount of fugitive dust generated.
- Water trucks or other dust suppression measures as required by the NMED Air Quality Bureau will be used to help reduce fugitive dust from construction activities.
- The applicable permits needed to transport equipment and materials will be obtained from Santa Fe County.
- Proper construction techniques and best management practices will be employed to minimize impacts to local roads.
- Visual impacts during construction will be reduced by minimizing areas of surface disturbance as practical, controlling erosion, using dust suppression techniques as practical, and, if applicable, restoring exposed soils as closely as possible to their original contour and vegetation.



- Construction activities will primarily be limited to daytime hours. If night work is required during construction, lighting will be the minimum necessary for safety, and lighting will not be left on when not in use.

### **3.7.4 Conclusion**

The Rancho Viejo Solar Project is located 4 to 5 miles from the geographic resources within the vicinity (El Camino NHT, La Cienega ACEC, Galisteo ACEC, and Galisteo Basin Preserve). No direct impacts to these resources are expected. Any visual or noise disturbance will occur in the distance and/or will attenuate with distance. The air emissions associated with the construction and operations period will not contribute to a degradation of the regional ambient air quality standard, including the air quality within and surrounding the geographic resources. No direct long-term impacts to air quality will occur from the Project. Temporary impacts from fugitive dust will be negligible in scale, short term, and mitigated by the measures listed above. The indirect impacts associated with construction and decommissioning vehicle traffic to local area roads for travelers visiting the geographic resources will be short term, and the EPMs will alleviate the short-term impacts. Therefore, there is minimal potential for the Project to cumulatively affect geographical resources. The Project is not expected to unduly impair important environmental values regarding geographic resources.

## **3.8 Health and Safety**

Data sources reviewed include the following:

- Google Earth aerial imagery of the analysis area (Google Earth 2022)
- EPA's online environmental review databases (EPA 2021d)

### **3.8.1 Environmental Setting**

Health and safety issues addressed in this document include an evaluation of environmental impairment, and safety hazards and risks to occupational workers and the public associated with construction and operation of the Rancho Viejo Solar Project. Risks to Project workers include those associated with construction techniques and equipment, including accidental release of hazardous materials or exposure to radioactive wastes or radiation hazards. Similar risks to the public would occur if access to the Project area is gained during construction or operations.

The Project area and surrounding land are mostly vacant rangeland and housing developments. Developments in proximity to the Project area include the Turquoise Trail Charter School, the Penitentiary of New Mexico, the Santa Fe County Adult Correctional Facility, and various housing developments. The nearest community is Santa Fe, approximately 1 mile north of the Project area. The Project area can be access accessed via State Road 14, a paved two-lane highway, to the proposed access road. State Road 14 is located west of the Project area.

Based on a review of the EPA's spills and cleanup data, there are no documented spills; contaminated sites; or dangerous waste treatment, storage, disposal, recycling, or used oil facilities within or near the analysis area (EPA 2021d).

The nearest fire response unit to the Project area is associated with Santa Fe County and is located less than 3 miles away. There are also several medical facilities, including hospitals, in Santa Fe, less than a 10-mile drive away from the Project area.

### **3.8.2 Environmental Effects**

#### **3.8.2.1 PROPOSED ACTION**

Clearing and grading of areas within the 800-acre solar facility, a 2-acre substation, a 4-acre BESS, a 2.3-mile gen-tie, and a 1.4-mile access road for the Rancho Viejo Solar Project will not impact any recognized health and safety environmental conditions or known radioactive wastes or radiation hazards because none are present in the Project area.

Construction and operation of the Project will occur in accordance with all applicable laws and regulations governing health and safety, including the Occupational Safety and Health Act of 1970 as administered by the Occupational Health and Safety Administration (OSHA). Solid and hazardous wastes that are generated by Project construction will be disposed of off-site at permitted landfill(s). EPMs will be implemented to minimize potential exposure to individuals from accidental releases of hazardous materials to soils and waters of the U.S. (WOTUS) during construction. Any accidental releases will be appropriately cleaned and discarded in accordance with the site SPCC plan. A safety and hazardous materials management plan will also be developed as part of the Rancho Viejo Solar Project. Additional EPMs will be implemented to reduce fire risks, including banning smoking and non-construction flame sources outside of vehicles, establishing safety guidelines for construction flame and spark sources, and equipping vehicles with fire suppression tools and equipment. Implementation of these standard practices will reduce the potential occupational health and safety risks of the Project.

The nearest public access road to the Project area is State Road 14, located west of the Project area, connecting to the proposed access road. During construction, public access to the Project area will be restricted, thereby minimizing the potential for public exposure to construction related risks.

The Rancho Viejo Solar Project's permanent facilities will be operated and maintained in accordance with industry standards for safety and site security and will be fully fenced facilities that will preclude public access. The Project has been designed to comply and conform with the New Mexico Fire Code (or other applicable fire code as established by NMAC 10.25.5.8), and the Santa Fe County Fire Code. Workers accessing the site for routine operations and maintenance will be trained in the proper maintenance of the facilities. Additionally, the potential for accidental releases of hazardous materials from operations equipment is minimized by the small number of operations equipment operating on-site, and there are no radioactive wastes or radiation hazards associated with the operations of the facilities.

Impacts to health and safety during Project decommissioning will be similar to those described above for construction. Postconstruction, Project facilities will be removed from the analysis area and the area restored as described in Section 2.1.4. There will be no long-term health and safety impacts after decommissioning.

#### **3.8.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to health and safety within the Project area or surrounding areas because the Proposed Action will not be implemented.

### **3.8.3 Environmental Protection Measures**

The following EPMs will be implemented to avoid and minimize impacts as part of the Rancho Viejo Solar Project:

- A SPCC plan will be prepared by Rancho Viejo.

- Rancho Viejo, or its contractors, will be responsible for fencing the site during construction to restrict access to the public for safety.
- Hazardous materials will not be drained onto the ground or into streams or drainage areas.
- Construction waste including trash, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
- Contractors shall implement a hazard communication program for any on-site hazardous materials to include training, labeling, and posting of SDSs. Fuels and petroleum-based products will be stored in approved containers and away from excavated areas. Waste motor oil, hydraulic fluid, and liquid gear lube will be stored in approved containers in isolated areas and removed to an authorized disposal facility monthly and in accordance with regulations of NMED. All equipment using hydraulic hoses and cylinders will be inspected for leaks. Any equipment found to have petroleum leaks that cannot be repaired immediately will be removed from service and replaced.
- Contractors will have proper training, there will be spill kits on-site, and any leaking equipment will be repaired immediately. In the event contaminants are released, in addition to the requirements outlined in the environmental report, Rancho Viejo will adhere to the notification policies contained in 20.6.2.1203 NMAC.
- A Hazard Mitigation Analysis (HMA) will be performed as part of the detailed engineering process. This HMA will include site and product specific fire risk assessment and a first responder plan. Local first responders will have access to these reports. Rancho Viejo will provide on-site and in-person training to the local responders prior to commercial operation of the system. There are no special materials required to respond to a fire event for the containerized BESS units. Only standard water application to the adjacent BESS containers is required and this is only in the case where all internal fire suppression systems may fail. All information required by the first responders will be included in the first responder plan part of the HMA.
- If a battery fire is initiated, the enclosures planned for this site will release fire suppressant in large concentrations directly into the initiating cell, removing heat and preventing thermal runaway throughout the enclosure. UL 9540 certification addresses safety and requires UL 9540a test results to be available for review. The UL 9540a tests of this system indicate adequate prevention of thermal runaway. The Rancho Viejo Energy Storage solution will achieve UL 9540 certification prior to site commercial operation.
- Wildland fire prevention measures will be used during construction, including limiting vehicle travel to and within construction areas to only essential vehicles, establishing parking guidelines in remote areas, banning smoking and non-construction flame sources outside of vehicles, and establishing safety guidelines for construction flame and spark sources.
- Rancho Viejo and its contractors, as appropriate, will initiate discussions with local fire districts and regional fire prevention staff prior to construction to discuss emergency procedures.
- As appropriate, vehicles will be equipped with fire suppression tools and equipment. Fire suppression equipment may include, but will not be limited to, shovels, buckets, and fire extinguishers.
- Smoking and equipment parking will be restricted to approved areas.
- Rancho Viejo and/or its contractors will fuel all highway-authorized vehicles off-site or in approved areas to minimize the risk of fire. Fueling of construction equipment that is transported to the site and is not highway authorized will be done in accordance with regulated construction practices and applicable federal, state, and local laws.

- Federal and state occupational health and safety standards will be established for the Project, such as OSHA's Occupational Health and Safety Standards. Additionally, a hazardous materials management plan will be developed for the management of hazardous materials, in coordination with those requirements under the Project's SPCC plan and SWPPP.
- A safety plan will be developed prior to construction for contractors working at the site. The plan will include items such as location of nearest medical emergency facilities, agency contacts and procedures, and inclement weather procedures.
- Construction is unlikely but could lead to the inadvertent excavation of pipes containing asbestos, or soils contaminated with asbestos fines/fragments. In the event such fragments/soils are excavated, Rancho Viejo shall analyze such fragments/soils, and if the fragments/soils exceed more than 1% asbestos, the asbestos waste will be disposed of by an approved commercial hauler in accordance with New Mexico Solid Waste Rules.

### **3.8.4 Conclusion**

The analysis area and general vicinity have historically been and are presently used as livestock rangeland. However, the area is experiencing increasing urbanization and development, including a charter school and housing developments directly adjacent to the Project area. There are no known recognized health or safety environmental conditions currently existing within the Project area and the immediate vicinity that could present a health and safety risk during development of the Rancho Viejo Solar Project. The EPMS listed above will be implemented to avoid and minimize occupational and public health and safety risks during construction, operations and maintenance, or decommissioning. No direct impacts to health and safety will occur from the Proposed Action. Foreseeable actions near the Project area have not been identified that would be expected to significantly affect health and safety. Therefore, there is minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively affect health and safety for occupational workers or the public.

## **3.9 Land Use**

Data sources reviewed to determine the current land use conditions include the following:

- BLM Taos Field Office grazing allotment GIS spatial data
- Summary of the Mineral Resources of Bernalillo, Sandoval, and Santa Fe Counties, New Mexico (Elston 1967)
- Google Earth aerial imagery for land uses (Google Earth 2020)
- New Mexico Department of Transportation airport information (New Mexico Department of Transportation 2017)
- Federal Communications Commission information on communication sites and signals (Cavell Mertz & Associates 2022)
- Santa Fe County Sustainable Growth Management Plan (Santa Fe County 2015)
- Aeronautical Information Services Open Data Military Training Routes (Federal Aviation Administration 2022)

### **3.9.1 Environmental Setting**

The region surrounding the Project contains lands managed by the BLM Taos Field Office, New Mexico State Land Office, the U.S. Forest Service, and privately managed lands (Figure 3.9). The lands within the Project area are privately managed. State Land Office–managed lands are located north (0.8 mile) and southwest (0.2 mile) (see Figure 3.9) of the Project area. The Project is located in a rural setting with predominantly undeveloped rangelands; however, regionally, there are several existing residential and commercial developments and industrial uses. The proposed Project will contain a transmission line approximately 2.4 miles in length that will connect to PNM’s existing 115-kV transmission line to northeast of the generation facility. Although no other high-voltage transmission lines intersect or are within the immediate vicinity of the Project area, numerous other transmission lines are located in the region (see Figure 3.9).

Casual observers or sensitive viewers will include residents or other drivers passing by the Project using local roads, and users of adjacent land such as ranchers, hunters, or industry workers. The closest rural residential parcel is located approximately 0.2 mile south of the Project’s generation facility. The nearest community is Eldorado at Santa Fe, approximately 0.3 mile southeast of the Project’s proposed transmission line. These dwellings are high-capacity single-family homes. The nearest major highway is State Road 14 (also known as Turquoise Trail) located approximately 1.3 miles west of the Project’s generation facility. The proposed access for this Project connects to State Road 14.

Land use resources in the region of the analysis area include historic resources such as coal, sand, and gravel mining, as well as modern-day livestock grazing, residential development, and oil and gas and mining activities, including sand and gravel. While mining and oil and gas mineral extraction exists in the region, there are no mines or other subsurface mineral extraction projects, including oil and gas, in the immediate vicinity of the Project (Figure 3.9). Past and present coal, sand, and gravel mining exploration within Santa Fe County is detailed in Section 3.10.

The City of Santa Fe, New Mexico, located approximately 3.7 miles north of the Project area, is a renowned center of southwest cultural and art. In 2005, Santa Fe was designated as a United Nations Educational, Scientific and Cultural Organization (UNESCO) as a creative city of crafts and folk arts (UNESCO 2005). Recreation uses center around tourism within and around Santa Fe from art and cultural museums to camping and hiking in the nearby National Forests and BLM lands. There are three NHTs in northern New Mexico. These NHT byways include the El Camino Real, Turquoise Trail, and Route 66 pre-1937 alignment (see Figure 3.9). The Route 66 pre-1937 alignment is approximately 5.7 miles northwest from the analysis area. The El Camino Real is located within the Interstate 25 corridor approximately 3.6 miles northwest of the proposed Project. The Turquoise Trail occurs on State Highway 14, which is adjacent to the access road for the proposed facility and is the closest NHT to the Project. Since the analysis area is located on private land, there are no other known official existing and established recreation uses within this area. However, the private landowner may have unestablished recreational activities.

According to the Santa Fe County Comprehensive Plan, the analysis area is located in an unincorporated portion of the county (Santa Fe County 2015). There are approximately 4,948.3 acres of land in the unincorporated portions of Santa Fe County that are developed for public, institutional, and utilities uses. Land uses in this category consist mainly of federal, state, and county offices; community centers; schools; and places of worship. The largest developed sites in this category include the state prison and the National Guard Amory, both of which are also located along State Road 14. Other sites include the Glorieta Conference Center, the landfill managed by the Solid Waste Management Authority, and the Caja del Rio unit of Santa Fe National Forest. Other major public/institutional land uses in the

unincorporated portions of the county include the Santa Fe Opera, the Santa Fe Community College campus, and the Institute of American Indian Arts (Santa Fe County 2015).

The County's existing zoning allows public, institutional, and utilities in a broad range of zoning districts, mainly designated as "community service facilities," so the adequacy of the supply of land for such uses is not a concern. The main challenges with the location of these uses are to encourage the location of schools, community centers, government offices, places of worship, and other institutional uses within communities; serve as a focal point for the community and afford easy access to residents; encourage development of joint agreements to provide access to school land and recreational facilities after hours; and ensure that potential land use compatibility and environmental conflicts are taken into consideration in the location of utility uses, such as landfills, solid waste transfer stations, wastewater treatment plants, power lines and substations, and solar or wind power generation sites.

Communication facilities located in the region of the Project include microwave towers and AM/FM radio towers (Cavell Mertz & Associates 2022). The closest tower to the Project area, a cellular communication microwave tower, is located approximately 3.4 miles north (Cavell Mertz & Associates 2022).

One airport, the Santa Fe Regional Airport, is located approximately 5.3 miles northwest of the Project area. There are several military aviation training routes in northcentral New Mexico; however, all of these routes are separated by distances of 25 miles or greater from the Project generation facility and more than 23 miles from the transmission line, as shown on Figure 3.10 (FAA 2022a).

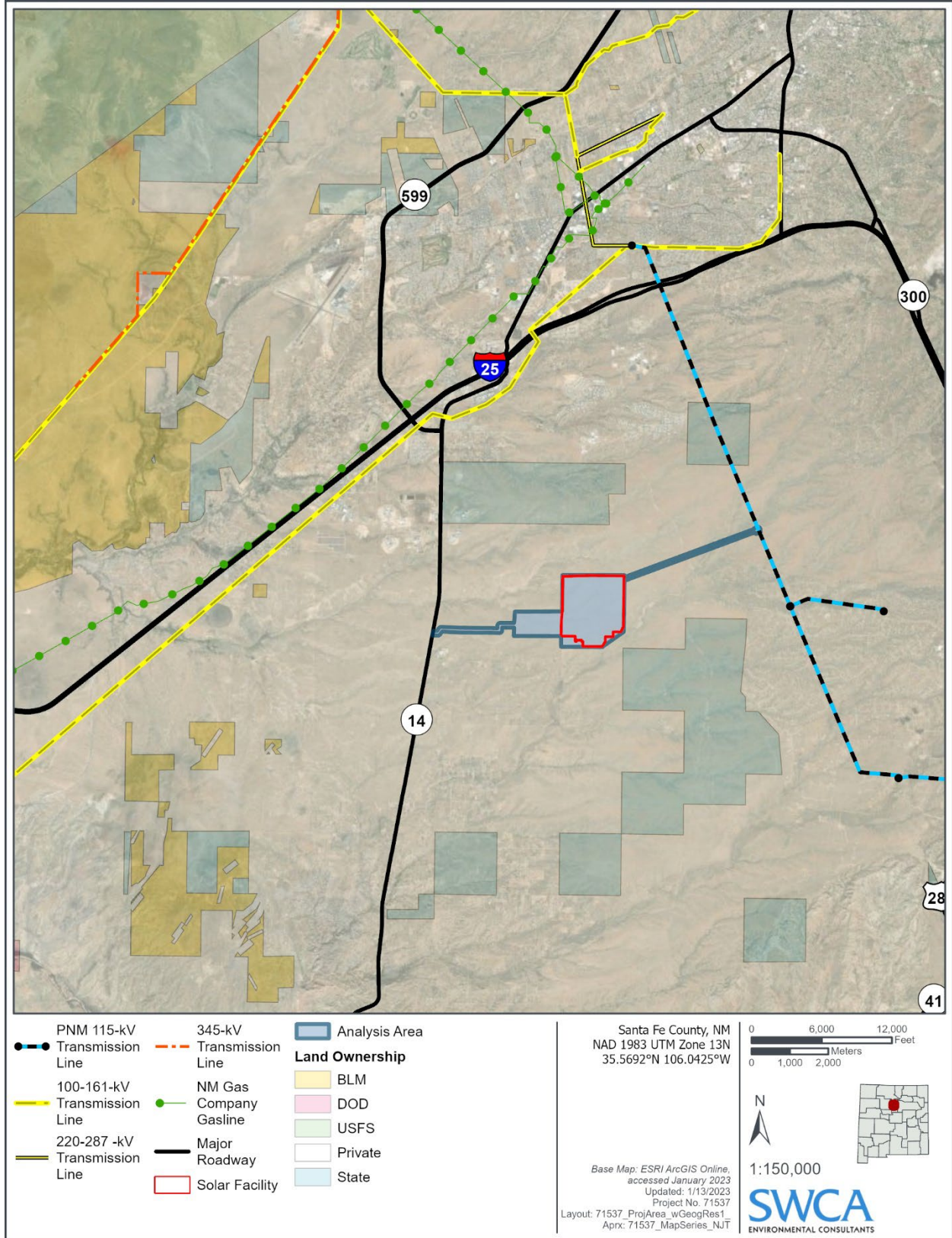


Figure 3.9. Analysis area and surrounding land uses.

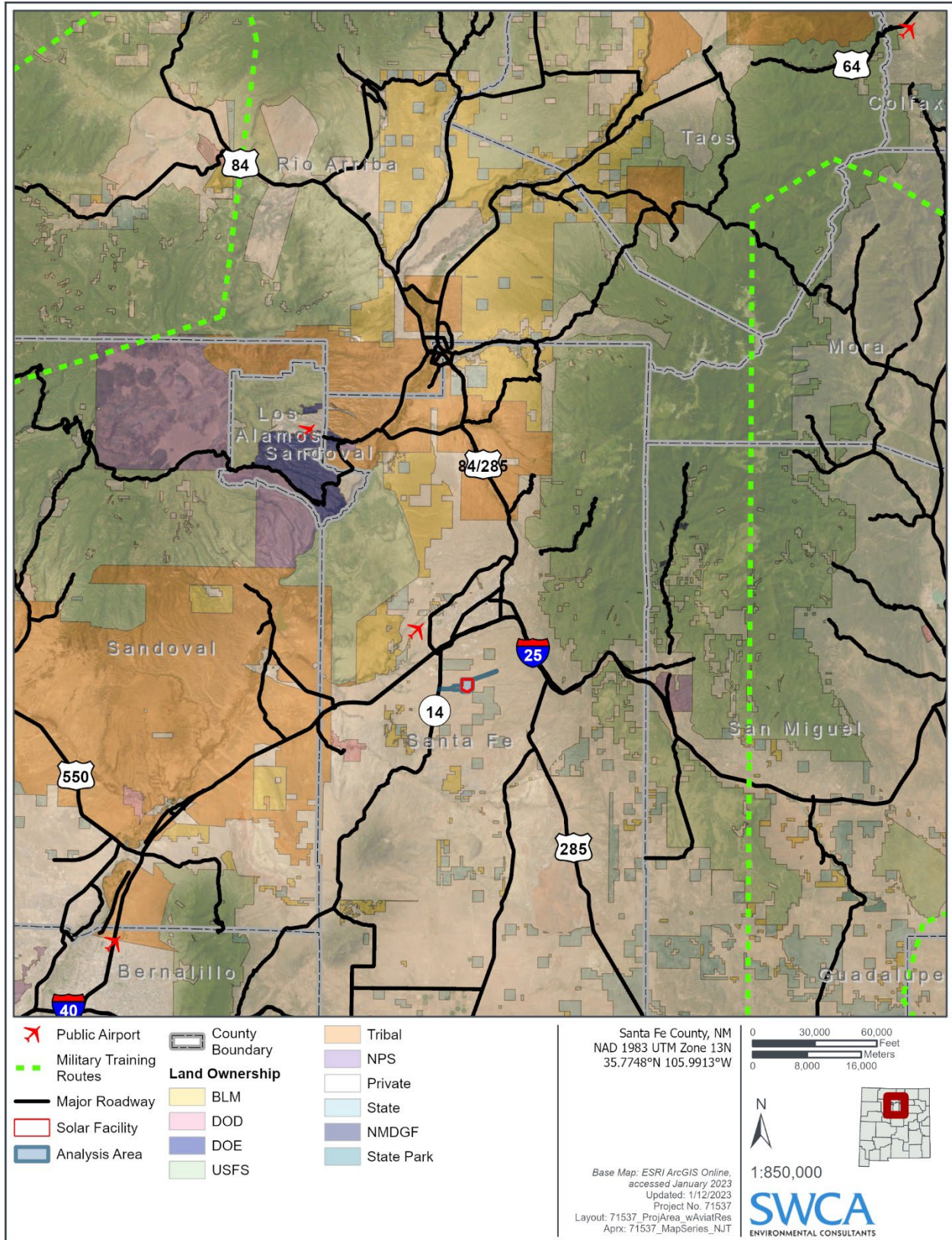


Figure 3.10. Analysis area and aviation resources.



## **3.9.2 Environmental Effects**

### **3.9.2.1 PROPOSED ACTION**

Impacts to mining and mineral extraction activities, including oil and gas development, are detailed in Section 3.10. PNM's existing 115-kV transmission line will facilitate energy transmission associated with the Project to connections at the Zia Substation and El Dorado Substation to PNM's customers. The Zia Substation and El Dorado Substations will facilitate the movement of solar power through the existing transmission line; thus, the Zia Substation and El Dorado Substations will support this current land use.

Direct impacts, including noise and visual disturbance associated with construction, operation and maintenance, and decommissioning activities, to people visiting the Old Spanish and Santa Fe NHTs, Santa Fe National Forest, Pecos National Historic Park, Cerillos Hills and Hyde Memorial State Parks, Santa Fe Ranch ACEC, and Bandelier and Kasha-Katuwe Tent Rocks National Monuments will not occur due to their distance from the analysis area (over 5 miles away). EPMs will minimize effects to air resources as specified in Section 3.3 and include the measures listed below in Section 3.9.3.

Specific visual effects for visitors traveling El Camino Real are analyzed in Sections 3.15.

Two alignments of the El Camino Real de Tierra Adentro NHT intersect the Project access road. The alignments are approximately 0.10 mile from the western edge of the surface site boundary. Additionally, other construction projects have successfully been completed along other intersections of speculative alignments. Definitive alignments of the NHT are located approximately 4 miles west of the analysis area.

The analysis area is located off the Turquoise Trail National Scenic Byway (State Road 14). Travelers use this section of the byway to enjoy the scenery and to access Cerillos Hills State Park. Additionally, Interstate 25 is approximately 3 miles east and 4 miles west from the analysis area; this interstate will likely be used by visitors of the geographic resources described above. Indirect impacts to travelers, particularly those on the Byway, will include temporary visibility of construction activities while passing the Project site. Indirect impacts will be the greatest during the 9–12-month construction period. Section 3.14 analyzes impacts to traffic associated with construction vehicles in detail. However, the EPMs below were developed to minimize traffic safety risks to the public through obtaining required permits for access road improvements and implementing proper construction techniques and best management practices.

The Project will be consistent with the Santa Fe County Comprehensive Plan (Santa Fe County 2015). A conditional use permit is required from the County for the Project. Rancho Viejo has coordinated with the County regarding the proposed development. As the County of Santa Fe's residential development is largely undeveloped, minimal impacts from construction will occur, though potential noise and visual impacts to the existing residents are described in Sections 3.11 and 3.15, respectively.

The analysis area and general vicinity have historically been and are presently used as livestock rangeland. No impacts to public grazing allotments will occur as the analysis area is located approximately 3.1 miles west of the nearest allotment (BLM Allotment Number 00828) (Figure 3.11) (BLM 2012). The private grazing that currently occurs in the analysis area will terminate prior to construction of the transmission facilities; therefore, no impacts to the available foraging habitat for grazing are considered.

Additionally, the area is experiencing increasing urbanization and development, including a charter school and housing developments directly adjacent to the Project area. The loss of 800 acres of wildlife habitat will not cause undue degradation to general wildlife and vegetation as this habitat type is common across the regional landscape and is readily available on land adjacent to the analysis area.

The portion of project footprint that is not needed for long-term operation and maintenance activities will be reclaimed following construction. According to the protection measures related to reclamation, a native seed mixture will be applied to all temporary disturbance areas. Additionally, Rancho Viejo will ensure the invasive and noxious plant management objectives within the land use plan are applied in the analysis area, including the implementation of control methods for the listed invasive and noxious plant species outlined within New Mexico State's Troublesome Weeds of New Mexico booklet (Ashigh et al 2010).

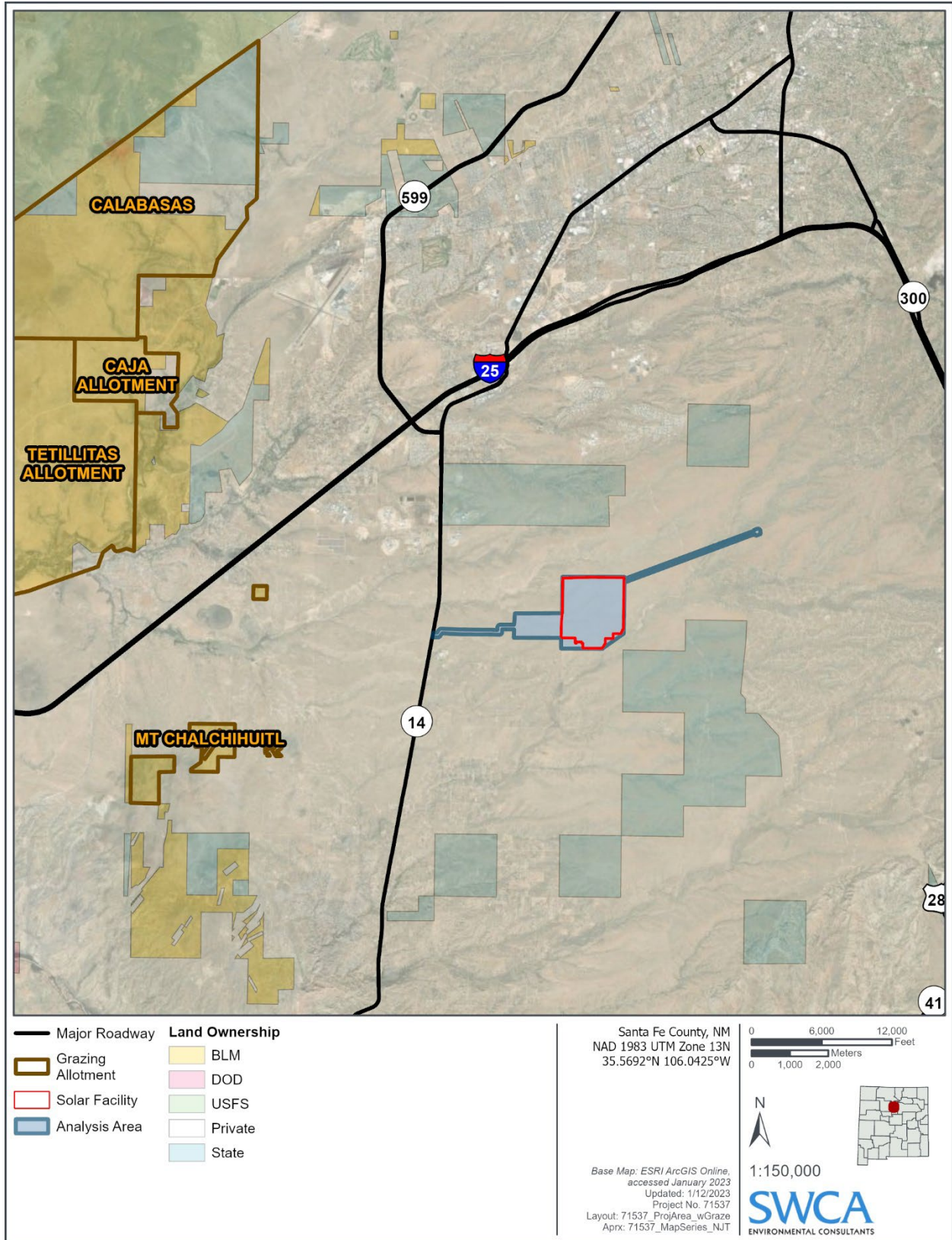


Figure 3.11. Analysis area and grazing allotments in the vicinity.

### **3.9.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to land use within the Project area or surrounding areas because the Proposed Action will not be implemented.

### **3.9.3 Environmental Protection Measures**

EPMs related to land use that will be implemented to avoid and minimize impacts to land use include:

- Compacted soils will be restored as closely as possible to preconstruction conditions as required for ground stabilization and erosion control.
- Rancho Viejo will develop and implement a noxious weed and control management plan for the control of noxious weeds and invasive species that could occur as a result of new surface-disturbing activities at the site.
- If required as part of the SWPPP, a native seed mixture will be applied to all temporary disturbance areas, followed by applications of mulch as required to provide additional erosion control.
- Rancho Viejo will coordinate with military bases and aviation facilities as needed.
- Construction activities will generally be limited to the least noise-sensitive times of day (i.e., daytime between 6 a.m. and 8 p.m.), unless necessary due to weather, safety, or schedule constraints. Construction equipment will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).

### **3.9.4 Conclusion**

Livestock grazing within the analysis area will be terminated as a result of the Project. The surface disturbance associated with the Project could also influence the spread of noxious, nonnative, and invasive plant species, but these effects will be avoided or minimized by use of a noxious weed and control management plan. Livestock grazing on the available vegetation within the surrounding rangeland that remains or is reclaimed after construction of the Project, is anticipated, subject to landowner approval. The EPMs will minimize impacts to vegetation used for foraging. There will be minimal impacts to recreation. The nearest recreation resources, El Camino Real de Tierra Adentro NHT and Turquoise Trail National Scenic Byway, are approximately 0.1 mile west of the analysis area and will not be impacted by the location of the Project beyond construction. Additionally, the Project is located near other existing land uses. The Project will not impact communication signals, transmission lines, or civilian or military aviation facilities. The Project is not expected to unduly impair important environmental values regarding land use. No foreseeable actions near the Project area have been identified that would significantly affect land use. Therefore, there is minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively affect land use for a long-term duration.

## **3.10 Minerals and Mining Resources**

Data sources reviewed include the following:

- New Mexico Mining and Minerals Division Mine Registrations and Permits (EMNRD 2022b)
- New Mexico Mining and Minerals Divisions Registered Mines in New Mexico (EMNRD 2022c)

- Summary of the Mineral Resources of Bernalillo, Sandoval, and Santa Fe Counties, New Mexico (Elston 1967)
- New Mexico Bureau of Geology and Mineral Resources (2022).

### **3.10.1 Environmental Setting**

Minerals and mining resources analyzed in this environmental document are surface and subsurface mineral resources, including aggregate, as well as gold, scoria, and pumice. Impacts to mineral resources may occur from surface and subsurface disturbance and the presence of permanent surface facilities in the analysis area.

The operations and maintenance of the Rancho Viejo Solar Project will not change or limit access to the existing mines within the region as they are all located over 10 miles from the analysis area (EMNRD 2022b) (Figure 3.12). The analysis area lies within the southern Espanola Basin. Historically, there have been economically important deposits of copper-gold-silver-tungsten, as well as iron veins, in the general area. Economically important industrial nonmetals in the general area have included pumice, scoria, gravel and sand, coal, aggregate, and turquoise. Regional mining activities and subsurface mineral extraction are more currently limited to aggregate, scoria, and pumice; however, there is no mineral extraction happening within an approximate 10-mile radius of the analysis area therefore the Project will not impact the ability to access surface and subsurface mineral deposits (such as aggregates or scoria) (EMNRD 2022c) (see Figure 3.12). There are no oil and gas activities that exist in the immediate Project vicinity. Mineral resources in the general area that are adjacent to the analysis area are owned by separate entities.

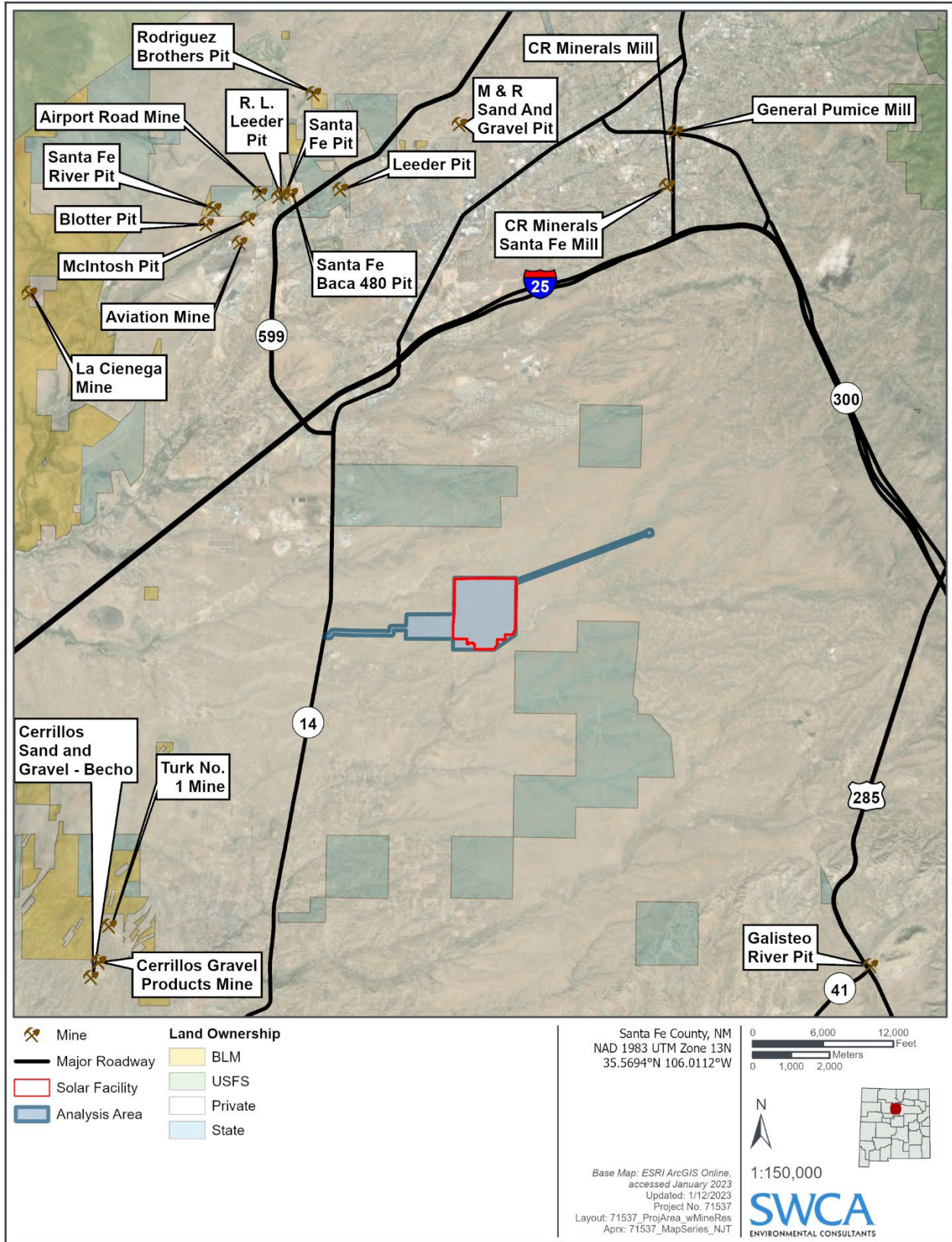


Figure 3.12. Analysis area and mines in the Project area vicinity.

### **3.10.2 Environmental Effects**

#### **3.10.2.1 PROPOSED ACTION**

Certain areas of the analysis area will be cleared and graded for movement of vehicles, assembly of components, and necessary crane maneuvers. Grading will conform to accepted slope stability requirements. Minor grading will include cuts and fills that are not expected to exceed 24 inches. Access roads will be constructed to facilitate access to the construction areas.

The operations and maintenance of the Rancho Viejo Solar Project will not change or limit access to the existing mines within the region as they are all located over 10 miles from the analysis area (EMNRD 2022c) (see Figure 3.12). The location of the Rancho Viejo Solar Project will impact the ability to access surface and subsurface mineral deposits (such as aggregates, and scoria) via open-pit mining techniques from within the area of permanent disturbance; however, there are no plans for aggregate or gypsum mining in the analysis area (EMNRD 2022b; New Mexico Bureau of Geology and Mineral Resources 2022). Impacts to subsurface oil and gas resources are not anticipated as there are no known existing subsurface oil and gas resources and there are no plans for oil and gas drilling within the analysis area.

Rancho Viejo will coordinate with any pertinent existing mineral and oil and gas rights holders regarding their resources. Once the Rancho Viejo Solar Project has been decommissioned, the area will be reclaimed, and mineral extraction could occur on this land.

#### **3.10.2.2 NO ACTION**

### **3.10.3 Environmental Protection Measures**

No EPMS are proposed for this resource. Rancho Viejo will coordinate with any pertinent mineral and oil and gas rights holders, and there are no plans for mining in the analysis area.

### **3.10.4 Conclusion**

Prior to construction, Rancho Viejo will coordinate with any pertinent mineral and oil and gas rights holders. Currently, there are no known mines or planned mines for the analysis area; therefore, there is minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively affect the important environmental values regarding mines and mineral resources.

## **3.11 Noise Resources**

Data sources reviewed include the following:

- Google Earth aerial imagery for evaluation of surrounding land uses (Google Earth 2022)
- U.S. Census Bureau data for population characteristics (Headwaters Economics 2022a)

### **3.11.1 Environmental Setting**

Santa Fe County is a semi-rural, semi-urban county in central New Mexico. The acoustical setting in the Project area and its immediate vicinity generally has relatively low ambient noise levels due to the rural setting. Noise in the region typically ranges from very quiet with natural sounds such as birds and wind

dominating, to noisy in localized areas near towns, cities, highway crossings, and oil and gas gathering activities. Small ranches and rural residences are spread throughout the area.

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities (EPA 1978). Prolonged exposure to high noise levels has been demonstrated to cause hearing loss (Center for Hearing and Communication 2020). The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual.

Noise could also disrupt wildlife life-cycle activities of foraging, resting, migrating, and other patterns of behavior. Wildlife already existing in proximity to human development may be habituated to noise from land use and human disturbance; however, changes to these baseline activities may still result in wildlife disruption. Additionally, sensitivity to noise varies from species to species, making it difficult to identify how a noise source could affect all flora and fauna in an area.

Community sound levels are generally presented in terms of A-weighted decibels (dBA). The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving a strong correlation with how people perceive acceptable and unacceptable sound levels. Table 3.6 presents A-weighted sound levels and the general subjective responses associated with common sources of noise in the physical environment.

The American National Standards Institute (ANSI) has published a standard (Acoustical Society of America S12.9-1993/Part 3) (ANSI 1993) with estimates of general ambient noise levels based on detailed descriptions of land use categories. The ANSI document organizes land use based on six categories. The analysis area and vicinity fits ANSI's Category 6 – very quiet, sparse suburban or rural areas with an ambient daytime noise level of approximately 43 dBA. Existing noise typically ranges from very quiet with natural sounds to occasional vehicles passing through analysis area or on rural roads directly adjacent to the analysis area.

**Table 3.6. Typical Sound Levels Measured in the Environment and Industry**

Noise Source at a Given Distance	Sound Level (dBA)	Qualitative Description
Carrier deck jet operation	140	–
Civil defense siren (100 feet)	130	Pain threshold
Jet takeoff (200 feet)	120	Deafening
Auto horn (3 feet) Pile driver (50 feet) Rock music concert environment	110	Maximum vocal effort
Jet takeoff (100 feet) Shout (0.5 foot) Ambulance siren (100 feet) Newspaper press (5 feet) Power lawnmower (3 feet)	100	–
Heavy truck (50 feet) Power mower Motorcycle (25 feet) Propeller plane flyover (1,000 feet)	90	Very loud/Annoying; Hearing damage (8-hour, continuous exposure)
Pneumatic drill (50 feet) Garbage disposal (3 feet) High urban environment	80	Very loud



Noise Source at a Given Distance	Sound Level (dBA)	Qualitative Description
Passenger car, 65 mph (25 feet) Living room stereo (15 feet) Vacuum cleaner (3 feet)	70	Loud/Intrusive (telephone use difficult)
Air conditioning unit (20 feet) Human voice (3 feet) Department store environment	60	–
Light auto traffic (50 feet) Residential air conditioner (50 feet) Private business office environment	50	Moderate/Quiet
Living room/Bedroom Bird calls (distant) Quiet office or library Quiet residential area (Ldn)	40	–
Estimated existing nighttime sound level for land use category 6: very quiet, sparse suburban or rural areas	37	–
Library soft whisper (5 feet) Quiet bedroom environment	30	Very quiet
Broadcasting/Recording studio	20	Faint
	10	Just audible
	0	Threshold of human audibility

Sources: Adapted from Table E, "Assessing and Mitigating Noise Impacts" (New York Department of Environmental Conservation 2001) and *Handbook of Environmental Acoustics* (Cowan 1993) and EPA (1978).

Sensitive noise receptors generally are defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, noise-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature and wildlife preserves, recreational areas, and parks.

### 3.11.2 Environmental Effects

#### 3.11.2.1 PROPOSED ACTION

The use of heavy equipment such as hoist cranes, excavators, dozers, and backhoes during construction will elevate ambient noise levels. The type of standard construction equipment proposed typically operate in range of 68 to 90 dBA above ambient noise levels at the source. In outdoor settings, the rate at which noise decreases is influenced by the distance separating noise sources and noise receptors, as well as local conditions such as traffic, topography, and weather. Generally, when noise is emitted from a point source, the noise is decreased an average of 6 dBA each time the separating distance is doubled (Berger et al. 2003; Radtke 2016). Noise impact calculations are determined by using the rate of noise attenuation and rule for reducing sound levels by dBA subtraction for heavy equipment operations based on maximum noise levels using a reference distance beginning 50 feet from the proposed conveyor’s sound generation source (Thalheimer 2000). The solar facility Project area will be located a minimum of 1,000 feet from adjacent property.

Based on noise attenuation and these assumptions and estimated equipment noise levels (Federal Highway Administration 2006), noise generation from equipment operating in the ranges of 68 dBA (light trucks), 85 dBA (backhoe, excavator), and 90 dBA (heavy truck, concrete saw) at increasing distances is captured in Table 3.7. The majority of equipment will operate in the range of 80 dBA. Worker commutes and material delivery vehicles will cause noise that will be short term and have little effect on the hourly average noise level.

**Table 3.7. Summary of Predicted Noise Generation from the Proposed Construction Equipment by Distance**

Equipment Operating at 68 dBA		Equipment Operating at 85 dBA		Equipment Operating at 90 dBA	
Distance in Feet from the Source (miles [approximate])	Noise Level (dBA)	Distance in Feet from the Source (miles [approximate])	Noise Level (dBA)	Distance in Feet from the Source (miles [approximate])	Noise Level (dBA)
0	68	0	85	0	90
50 (0.01)	62	50 (0.01)	79	50 (0.01)	84
100 (0.02)	56	100 (0.02)	73	100 (0.02)	78
200 (0.04)	50	200 (0.04)	67	200 (0.04)	72
400 (0.08)	44	400 (0.08)	61	400 (0.08)	66
800 (0.15)	38	800 (0.15)	55	800 (0.15)	60
-	-	1,600 (0.30)	49	1,600 (0.30)	54
-	-	3,200 (0.60)	43	3,200 (0.60)	48
-	-	6,400 (1.20)	37	6,400 (1.20)	42

Based on noise attenuation, construction equipment noise levels will be expected to dissipate to below background levels (assumed to be 42 dBA) within approximately 0.15 mile to 1.2 miles of the Project area. The closest sensitive noise receptors, 16 residences located approximately 800 feet (0.15 mile) to 1,600 feet (0.3 mile) away, will experience a temporary increase in ambient outdoor noise levels during the 9- to 12-month construction period. Given the distance from the construction equipment, the increase in ambient noise levels at these sensitive noise receptors will attenuate to approximately 60 dBA, or the noise level of an air conditioning unit at 20 feet or normal human speech at 3 feet of distance. Sensitive noise receptors between 1,600 feet (0.3 mile) and 3,200 feet (0.6 mile) away consist of 114 residences and

the Turquoise Trail Charter School and will experience a temporary increase in ambient outdoor noise levels, which will attenuate to approximately 48 dBA, or the noise level of light automotive traffic or a quiet office environment. Sensitive noise receptors between 3,200 feet (0.6 mile) and 6,400 feet (1.2 miles) away consist of 262 residences and will experience a temporary increase in ambient outdoor noise levels, which will attenuate to low levels comparable to existing background noise levels.

During construction, protection measures will be implemented to minimize noise impacts, including limiting construction activities to the least noise-sensitive times of day (i.e., daytime between 6 a.m. and 8 p.m.) on weekdays and operating equipment manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures). Construction effects on wildlife are discussed in Section 3.4.2.

Once the Rancho Viejo Solar Project is constructed, noise associated with the Project will have a negligible increase in ambient noise levels beyond the immediate Project area and is not anticipated to impact the nearest sensitive receptor.

Decommissioning will require the same equipment as that used during the construction phase. Ambient noise levels will be elevated for a short and temporary period while the facility is broken down.

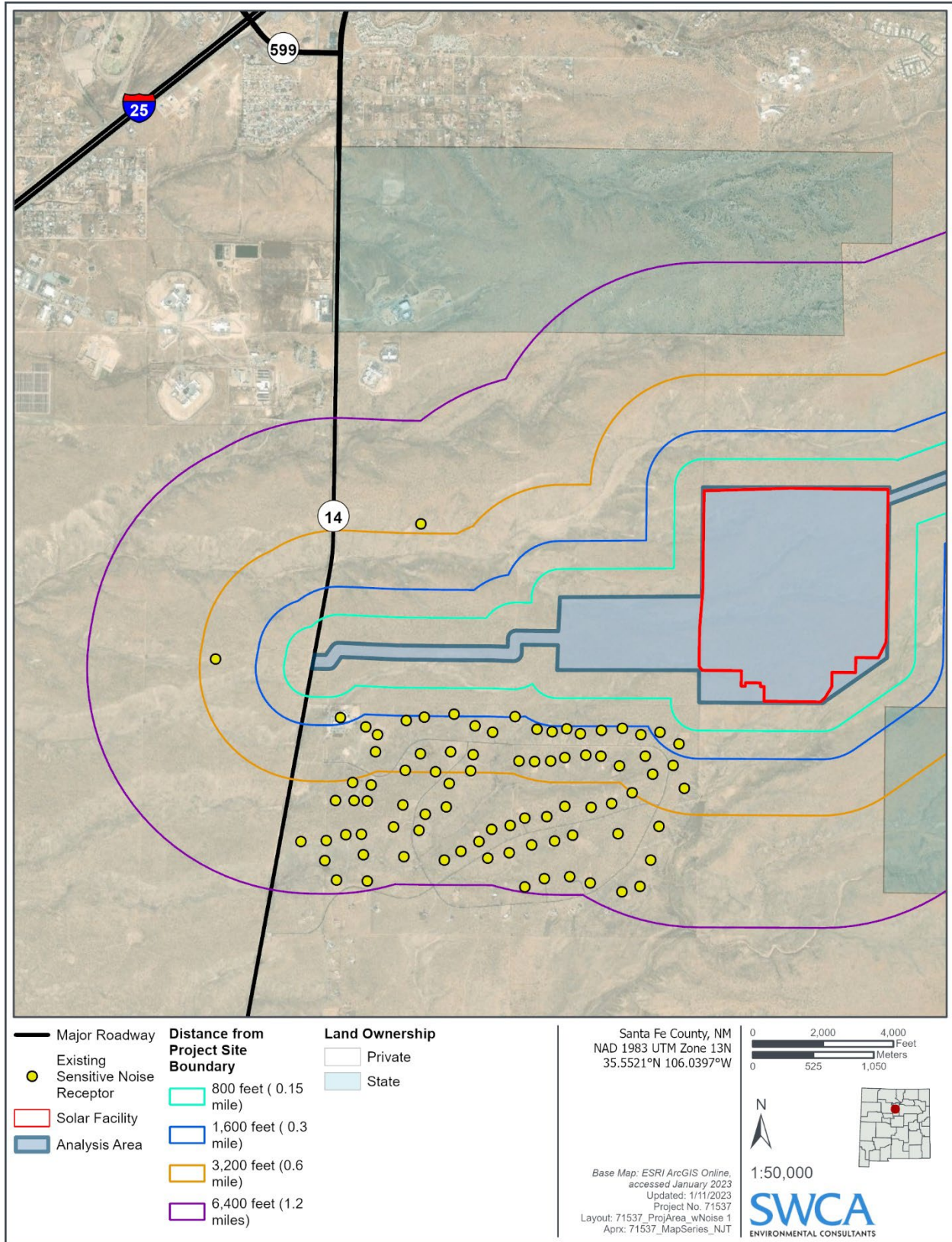


Figure 3.13. Analysis area and noise sensitive receptors, map 1.

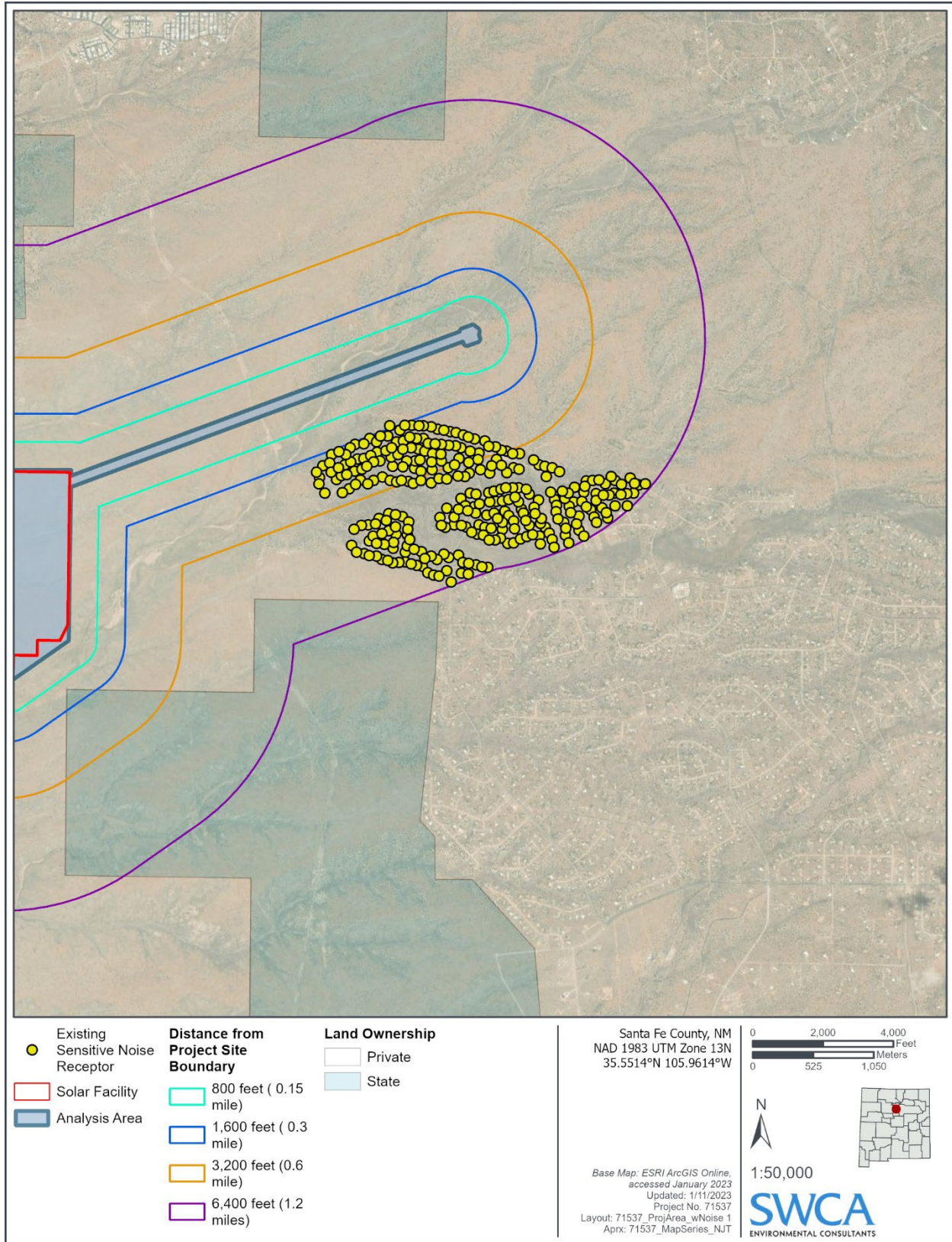


Figure 3.14. Analysis area and noise sensitive receptors, map 2.

### **3.11.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to noise resources within the Project area or surrounding areas because the Proposed Action will not be implemented.

### **3.11.3 Environmental Protection Measures**

EPMs related to noise resources that will be implemented to avoid and minimize impacts as part of the Rancho Viejo Solar Project are described above and include:

- Construction activities will generally be limited to the least noise-sensitive times of day (i.e., daytime between 6 a.m. and 8 p.m.), unless necessary due to weather, safety, or schedule constraints.
- Construction equipment will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).

### **3.11.4 Conclusion**

The Rancho Viejo Solar Project is located in a semi-rural area with low existing noise levels. The construction of the Rancho Viejo Solar Project will result in a temporary increase in ambient noise levels during the construction period. Short-term impacts to the closest sensitive receptor may occur during the construction period; however, protection measures are proposed to minimize these impacts. Once in operation, the Rancho Viejo Solar Project will have a negligible effect on ambient noise levels beyond the immediate vicinity of the Project area. Direct impacts to ambient noise will occur from the Proposed Action by increasing background noise levels from approximately 42 to 60 dBA for a short period of time, 9 to 12 months. Foreseeable actions near the Project area have not been identified that will be expected to significantly affect ambient noise levels. Therefore, there is minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively affect ambient noise levels for a long-term duration.

## **3.12 Socioeconomics**

Socioeconomic data were obtained from:

- Headwaters Economics (2022a, 2022b, 2022c)

### **3.12.1 Environmental Setting**

The socioeconomic factors relevant to the Rancho Viejo Solar Project potential socioeconomic impacts evaluated in this analysis include population, housing and occupancy, income, poverty, and industry employment. Socioeconomic data are presented for the geographic area of the city of Santa Fe and Santa Fe County where the Project is located. The state of New Mexico is also presented as a reference population. Land uses and the existing setting of the Project area and vicinity are described above under Section 3.9.

The Project area is located in rural Santa Fe County, New Mexico, and the setting includes some areas of existing industrial developments. The total population of Santa Fe County was 150,319 in 2020 (Headwaters Economics 2022a). The population of Santa Fe County and New Mexico increased marginally from 2010 to 2020 (Table 3.8). In 2020, the total population of the city of Santa Fe was 84,418, which shows a significant growth from the 2010 population (Table 3.9).

Housing and occupancy characteristics for 2020 are shown in Table 3.9. There are approximately 6,046 vacant units in the city of Santa Fe and 10,344 vacant units in Santa Fe County. The median household income in Santa Fe County was \$60,668 in 2020, with 9.0% of families below the poverty line. In New Mexico as a whole, the median household income was \$51,243, with 14.2% of families below the poverty line (Headwaters Economics 2022a). Unemployment in 2020 was 8.3% in Santa Fe County and 8.4% in New Mexico (Headwaters Economics 2022b, 2022c). The top employment industries in in Santa Fe County are government, retail trade, healthcare, accommodation and food service, and professional and technical services (Table 3.10) (Headwaters Economics 2022b).

**Table 3.8. Population (2010 to 2020)**

Area	Population 2010	Population 2020	Percent Change 2010 to 2020
Santa Fe County	141,702	150,319	+6.1
City of Santa Fe	67,588	84,418	+24.9
New Mexico	2,013,122	2,097,021	+4.2

Source: Headwaters Economics (2022a)

**Table 3.9. Housing and Occupancy (2020)**

Area	Total Housing Units	Occupied Units	Vacant Units
Santa Fe County	73,496	63,152	10,344
City of Santa Fe	42,142	36,096	6,046
New Mexico	943,568	792,755	150,813

Source: Headwaters Economics (2022a)

**Table 3.10. Santa Fe County Employment by Industry (2020)**

Industry	Employment (Number of Jobs)
<b>Non-services related</b>	<b>7,875</b>
Farm	734
Forestry, fishing, and agricultural services	167
Mining (including fossil fuels)	578
Construction	5,323
Manufacturing	1,073
<b>Services related</b>	<b>63,205</b>
Utilities	150
Wholesale trade	1,070
Retail trade	9,480
Transportation and warehousing	1,285
Information	1,406
Finance and insurance	3,132
Real estate and rental and leasing	4,553
Professional and technical services	7,551
Management of companies	407
Administrative and waste services	3,781

<b>Industry</b>	<b>Employment (Number of Jobs)</b>
Educational services	2,404
Health care and social assistance	10,281
Arts, entertainment, and recreation	4,037
Accommodation and food services	7,704
Other services, except public administration	5,964
<b>Government</b>	<b>15,412</b>
<b>Total Employment (Number of Jobs)</b>	<b>86,492</b>

Source: Headwaters Economics (2022b)

### **3.12.2 Environmental Effects**

#### **3.12.2.1 PROPOSED ACTION**

The Rancho Viejo Solar Project’s construction, operations and maintenance, and decommissioning are unlikely to adversely impact social, economic, or population aspects of the area. The addition of the Rancho Viejo Solar Project will not alter the area’s rural setting as the Project will be located near other existing developments.

The economic output associated with construction employment (100–300 workers) and economic multipliers from local spending (including sales tax revenue) during the 9- to 12-month construction period will have a minor beneficial, short-term economic impact to the local region. Construction workers are expected to be drawn from the local area, including Santa Fe, and from crews traveling with the contractor to various job sites. It is anticipated that construction workers who do not live in the nearby area will either stay in hotels or campsites in population centers and commute to the Project area daily. There are vacant housing units in Santa Fe and Santa Fe County that construction workers could use if desired; however, it is anticipated that most construction workers will commute from Santa Fe and the neighboring counties. Given the number of construction workers (100–300 workers) and the short duration of the construction period (9–12 months), any changes to the area’s population or housing occupancy will be negligible relative to existing conditions.

Indirect spending associated with the presence of construction works in and around Santa Fe or other communities in Santa Fe County will be a short-term increase in revenue for these areas.

Operation and maintenance of the Rancho Viejo Solar Project will require one or two employees visiting the site approximately four times per year. This level of employment and any associated equipment and materials spending will have a negligible effect on socioeconomics over the operations phase. There will also be a minor increase in property taxes assessed on the Project area parcel as a result of the Rancho Viejo Solar Project improvements. Decommissioning impacts will be similar to those described for construction as similar methods are proposed.

#### **3.12.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to socioeconomics within the Project area or surrounding areas because the Proposed Action will not be implemented.



### **3.12.3 Environmental Protection Measures**

The Rancho Viejo Solar Project socioeconomic impacts will be incremental and short term; therefore, no EPMs are proposed.

### **3.12.4 Conclusion**

The Rancho Viejo Solar Project could contribute to short-term revenue increases for the surrounding county and businesses therein from construction employment and local spending. No long-term changes to the area's population or housing characteristics are anticipated as the construction work force is anticipated to commute from larger population centers. In the long term, there will be negligible beneficial impacts from operations employment and the proposed maintenance activities and a minor increase in assessed property taxes. Impacts during decommissioning will be similar to those described for construction. Foreseeable actions near the Project area have not been identified that will be expected to significantly affect socioeconomics. Therefore, there is minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively the socioeconomics of the county.

## **3.13 Traffic and Roads**

The following data sources were reviewed for this analysis:

- New Mexico Department of Transportation (2017)

### **3.13.1 Environmental Setting**

Roads in this analysis refers to the public and private roads that may be impacted by the vehicle and equipment trips generated during Project construction, operations, and decommissioning. The analysis area will be primarily accessed via New Mexico State Road 14 (Turquoise Trail). To access New Mexico Highway 14, Interstate 25 or Camino Los Abuelos will be used (Figure 3.15). The analysis area and surrounding land are residential and rural areas. The main transportation use in this area includes residential and cultural/recreation traffic.

Other regional road networks on which equipment, materials, or construction workers may travel to reach the analysis area include State Route 85, U.S. Route 285, Bonanza Creek Road, Camino Los Abuelos Road, and Interstate 25. Some trips may also include Interstate 25 from the Albuquerque area south of the analysis area. Transportation characteristics for these routes are provided in Table 3.11. The interstates, U.S. routes, and state routes are managed by the New Mexico Department of Transportation (District 5).

In general, traffic is greater in and around the population centers compared with rural areas. The most recent (2017) average annual daily traffic (AADT) count ranges available for U.S. and state routes are provided in Table 3.11 (New Mexico Department of Transportation 2017). Average annual traffic counts for Cam Los Abuelos and Bonanza Creek Road are also included.

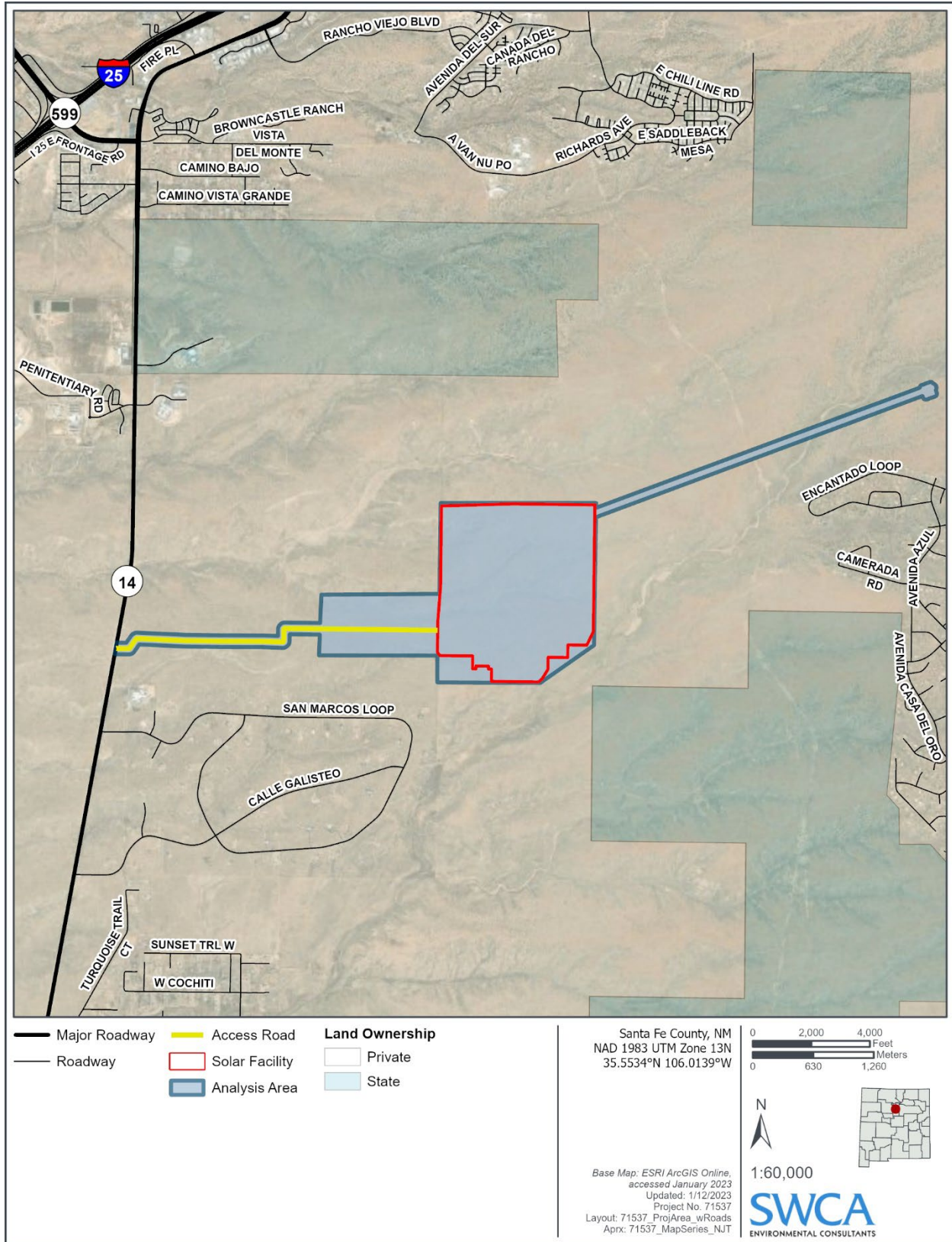


Figure 3.15. Regional road network and Project access routes.

**Table 3.11. Transportation Route Characteristics**

Road	Characteristic
Camino Los Abuelos	Management: Santa Fe County Road Segment: Access to New Mexico Highway 14 from Galisteo. Road Type: Paved, two lanes AADT Range: Unavailable
Bonanza Creek Road	Management: Santa Fe County Road Segment: Access to Interstate 25 from State Highway 599. Road Type: Paved, two lanes AADT Range: Unavailable
New Mexico State Road 14 (Turquoise Trail)	Management: New Mexico Department of Transportation (District 5) Road Segment: Access to the analysis area from Interstate 25, State Highway 599, U.S. Route 85, Camino Los Abuelos Road, and Bonanza Creek Road. Road Type: Paved, two lanes AADT Range: 151 to 2,000
State Highway 599	Management: New Mexico Department of Transportation (District 5) Road Segment: Access to New Mexico Highway 14 from Albuquerque or Santa Fe. Road Type: Paved with minimum of four lanes. AADT Range: 601 to 5,500
U.S. Route 85	Management: New Mexico Department of Transportation (District 5) Road Segment: Access to Interstate 25 from Galisteo. Road Type: Paved, two lanes AADT Range: 151 to 2,000
U.S. Route 285	Management: New Mexico Department of Transportation (District 5) Road Segment: Access to Interstate 25 from Galisteo. Road Type: Paved, two lanes AADT Range: 151 to 2,000
Interstate 25	Management: New Mexico Department of Transportation (District 5) Road Segment: In and around Albuquerque to State Road 14 in Santa Fe County. Road Type: Major interstate. Paved with minimum of four lanes. AADT Range: Major interstate, counts vary

### 3.13.2 Environmental Effects

#### 3.13.2.1 PROPOSED ACTION

Project construction, operations, and decommissioning will increase traffic temporarily on local and regional transportation routes. Construction is anticipated to last approximately 12 months beginning at the end of 2023. The Project will require approximately 10 trips per day for materials and equipment over the construction period. Contractors commuting to the Project will generate approximately 115 to up to 190 trips per day for the duration of the construction period, for a total of 29,900 to 49,400 trips. Similar to the construction of solar facilities in other locations, the number of employees for the first two months and the last two months of construction will be lower with peak on-site employment occurring for the eight months in the middle of the project schedule. Most Project-related trips will originate outside of the immediate vicinity of the analysis area. Worker commute trips will primarily use paved roads; however, depending on their origination point, some unpaved roads may be used. The number and type of vehicles planned to be involved during peak construction are described as follows:

- 10 heavy haul trucks (e.g., 18-wheeler deliveries, water trucks, garbage trucks) per day
- 75 to 150 work trucks (e.g., crew, foreman, superintendents) per day
- 40 work trucks specifically for the BESS install per day

An increase in daily construction traffic from material and equipment delivery and worker commutes will result in a short-term increase in traffic on the local routes around the analysis area. Construction traffic will be most notable on New Mexico Highway 14, closest to the analysis area. This route is estimated to have low existing traffic levels in the range of 151 to 2,000 AADT. A proposed access point for the Project currently has a gated entry on New Mexico Highway 14 just to the north of the existing Turquoise Trail Charter School. Rancho Viejo intends to improve and realign this access point to facilitate traffic for the construction of the solar facility, which will require a new permit from New Mexico Department of Transportation.

Depending on where construction trips originate, similar construction traffic increases may also occur on Interstate 25, U.S. Route 285, and State Highway 599. Local users may experience short-term delays as a result of the increased construction traffic on these routes. The daily increase in construction traffic will not impact the regional transportation routes farther from the analysis area with higher existing AADT counts.

Once operational, the site will be primarily self-sustaining with no permanent employees on-site; however, employees will visit the site monthly to conduct operations and maintenance activities. No more than four workers will be on-site at any given time. During operations, routine preventative maintenance will occur on an approximately 6-month basis and for unplanned maintenance as required. These activities will primarily consist of one or two technicians visiting the site. The small increase in operations-related trips to the site will be imperceptible on the local and regional transportation routes.

Impacts of decommissioning on traffic will be similar to those described for construction because similar activities are proposed. There will be no traffic associated with Project post-decommissioning.

### **3.13.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to roads or traffic within the analysis area because the Project will not be implemented.

### **3.13.3 Environmental Protection Measures**

EPMs related to roads that will be implemented to avoid and minimize impacts as part of the Project are described above and include the following:

- The applicable permits needed to transport equipment and materials will be obtained from the County.
- Construction speed limits will be established.
- Proper construction techniques and best management practices will be employed to minimize impacts to local roads.

### **3.13.4 Conclusion**

The Project is located in an area with low existing traffic levels. The Project will result in a short-term increase in traffic on the local roads during the construction and decommissioning phases, with a negligible increase during operations and maintenance. EPMs are proposed during construction to minimize impacts to the routes that will be utilized. Direct impacts to existing traffic levels will occur from the Proposed Action for a temporary period of 9 to 12 months. No foreseeable actions near the Project area have been identified that would significantly increase traffic levels. Therefore, there is

minimal potential for the Proposed Action, in conjunction with other identified development in the immediate Project area, to cumulatively affect traffic levels for the area.

### 3.14 Water Resources

SWCA completed a biological survey of the analysis area April 4 through 11, 2022, to identify and map the boundaries of any aquatic and wetland resources that have the potential to be WOTUS. SWCA also surveyed for sensitive habitats and plant communities that are supported by the aquatic resources in the region. Additional data sources reviewed include:

- USGS quadrangles
- National Wetlands Inventory (NWI) maps (USFWS 2022c), National Hydrology set (NHD) data (USGS 2016), and NRCS soils data (NRCS 2022a)
- Federal Emergency Management Agency (FEMA) maps (FEMA 2022)
- Aerial photographs of the analysis area, accessed using Google Earth (Google Earth 2022)
- SWCA’s aquatic resources inventory report (SWCA 2022b)

#### 3.14.1 Environmental Setting

The analysis area is located in the Rio Grande Groundwater Basin, which includes portions of southern Colorado and western Texas. The average elevation of the analysis area is approximately 6,420 feet amsl. The topography in the analysis area is relatively flat, gently sloping to the west. Approximately 88.2% of the analysis area occurs within the Santa Fe River watershed (Hydrologic Unit Code 1302020101), and approximately 11.8% occurs within the Outlet Galisteo Creek watershed (Hydrologic Unit Code 1302020104) (USGS 2016).

Existing water use in Santa Fe County was estimated at approximately 26,919 acre-feet of groundwater and 9,734 acre-feet of surface water (36,653 acre-feet total) in 2015 (New Mexico Office of the State Engineer 2015). The dominant water uses were for irrigated agriculture, public water supply, domestic (self-supplied), and commercial (self-supplied). There are 327 groundwater wells within Township 15 North, Range 9 East. The average depth of wells within the township and range of the Project area is 169 feet with depths ranging from 18 to 535 feet. Depths to groundwater for wells within the indicate a shallow water table (New Mexico Office of the State Engineer 2010). There are no groundwater wells within the analysis area.

According to the NWI and NHD, there is one NWI-mapped riverine wetland one NHD-mapped surface water feature and within the study area (Gallina Arroyo); these two features overlap and intersect the permanent easement for the gen-tie (USFWS 2022c; USGS 2016). During the aquatic resources delineation conducted by SWCA on April 8, 2022 (SWCA 2022b), it was determined that this feature contained an ordinary high-water mark (OHWM) but did not contain wetland criteria (Table 3.12; Figure 3.16). In addition, approximately 0.5 acre of the proposed gen-tie overlaps with a Zone A floodplain. Zone A floodplains are defined as areas with a 1% annual chance flood event (FEMA 2022).

**Table 3.12. SWCA-Mapped Surface Water Features within the Proposed Project Area**

Feature ID	Corresponding NHD/NWI	Jurisdictional Determination	Average OHWM Width (feet)	Length (feet)	Potentially Jurisdictional Waters within the Proposed Project Area (acres)
------------	-----------------------	------------------------------	---------------------------	---------------	--

---

Gallina Arroyo (DR01)	Ephemeral drainage	Potentially jurisdictional	43.0	38.4	0.05
-----------------------	--------------------	----------------------------	------	------	------

---

Source: USGS (2016)

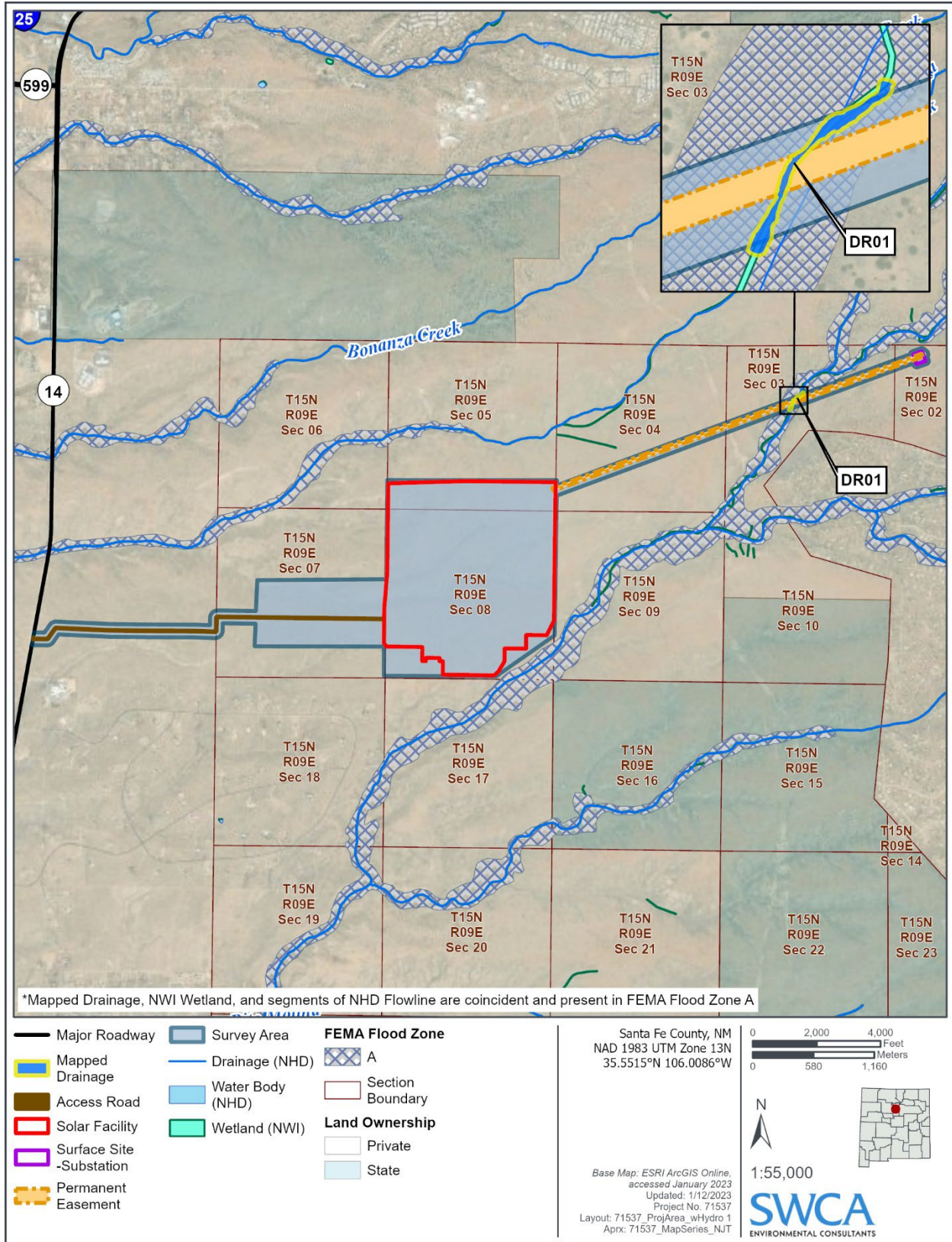


Figure 3.16. Aquatic resources in the analysis area vicinity.

### **3.14.2 Environmental Effects**

#### **3.14.2.1 PROPOSED ACTION**

One ephemeral drainage (Gallina Arroyo) containing an OHWM was observed during the April 2022 aquatic delineation survey. Impacts to this drainage are estimated to be less than 0.1 acre. If permanent impacts to any WOTUS are determined to be less than 0.5 acre per individual crossing, the Project will likely qualify for coverage under Nationwide Permit (NWP) 57 (Electric Utility Line and Telecommunications Activities) and NWP 14 (Linear Transportation Projects) per Section 404 of the Clean Water Act. Both NWP 57 and NWP 14 have a 0.5-acre permanent impact threshold per individual crossing. If permanent impacts to any surface water feature are greater than the 0.1-acre threshold, the applicant will need to notify the U.S. Army Corps of Engineers (USACE) through submittal of a preconstruction notification. Additional notification triggers, including but not limited to effects to biological or cultural resources, also apply. If impacts to WOTUS are greater than 0.5 acre at each individual crossing, the Project will require an individual permit with a USACE-compliant alternatives analysis.

The potential to impact water resources primarily lies with the indirect impacts that could occur due to stormwater runoff from construction activities into downstream aquatic resources. EPMs, including a SWPPP and a SPCC plan will be implemented to minimize these effects. A SWPPP will be developed and implemented for construction, which will meet the construction stormwater discharge permit requirements of the NMED Surface Water Quality Bureau. The SWPPP will include several measures to control runoff and to reduce erosion and sedimentation at construction sites. Similarly, a SPCC plan will be developed to minimize the potential for adverse impacts to surface waters or groundwater resulting from accidental spills or releases of hazardous materials. Stormwater best management practices included in the SWPPP will be used during construction to reduce potential impacts from erosion, sedimentation, and turbidity in surface waters during construction.

Water for construction uses, such as equipment washing, dust suppression, and structure foundations, will be obtained from a third-party water delivery service. If drilling permitted wells associated with the Project is necessary, Rancho Viejo will adhere to specific well EPMs listed in Section 3.14.3. Construction water use will be approximately 100 to 150 acre-feet over a 12-month construction period. Long term water use will be approximately 2 to 3 acre-feet per year and will be associated with periodic panel washing.

Postconstruction, temporary disturbed areas not needed for operations and maintenance will be reclaimed as described in Section 2.1.4. Reclamation of disturbed areas will minimize the potential for long-term erosion and stormwater runoff.

No water quality impacts will occur from the routine operations and maintenance activities described in Section 2.1.3. Impacts during decommissioning will be similar to those described during construction related to stormwater runoff and accidental spills or releases of hazardous materials.

#### **3.14.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to water resources within the analysis area or surrounding areas because the Proposed Action will not be implemented.



### **3.14.3 Environmental Protection Measures**

EPMs related to water resources that will be implemented to avoid and minimize impacts as part of the Rancho Viejo Solar Project are described above and include the following:

- Impacts to any potentially jurisdictional WOTUS could be covered under NWP 14 or NWP 57 as long as impacts are below the 0.5-acre threshold. The use of an NWP will trigger USACE coordination and National Historic Preservation Act Section 106 consultation and coordination with NMED.
- A SWPPP will be developed and implemented as required by the NMED Surface Water Quality Bureau and obtain coverage under a National Pollution Discharge Elimination System Construction General Permit from the EPA pursuant to Section 402 of the Clean Water Act, 33 United States Code 1342. The SWPPP may include measures such as silt barrier fences to control runoff, sediment traps and basins, and minimizing exposed soils by using temporary and permanent seeding and mulching.
- Disturbed areas will be restored to their original condition to the extent practicable in order to meet SWPPP requirements for runoff and erosion control. Seed mixture and seeding rates will be developed through consultation with the local agency, experts, or landowner preference.
- Equipment will be properly maintained for fluid leaks.
- Spills will be cleaned up immediately.
- Matting and other temporary protective measures will be used on jurisdictional wetlands that cannot be avoided.
- An appropriate buffer zone of up to 50 feet around wetlands will be established as necessary to reduce disturbance.
- Rancho Viejo will span and avoid placing structures in ephemeral floodplains and other surface water features, where feasible.
- Collection/lines, cables, and access roads will be designed to minimally intersect the floodplain and will not change the base flood elevation or otherwise affect the floodplain. The placement of poles and structures for overhead collection will minimally intersect the floodplain without affecting the base flood elevation. If practicable, at the end of construction, underground collection cable trenches will be reclaimed to pre-existing contours without affecting the floodplain.
- Rancho Viejo will comply with Sections 401 and 404 of the Clean Water Act and obtain all necessary permits. All impacts to WOTUS will be evaluated against the requirements of the USACE for NWP, as applicable.
- Any new water wells drilled or diversions of existing water rights in the analysis area for the Project will be appropriately permitted with the New Mexico Office of the State Engineer, and with the agreement of the water rights holder.
- Rancho Viejo will implement appropriate erosion control measures in areas with slopes, as provided in the SWPPP. To the extent practicable, temporary access roads will be designed following existing landform contours, where practicable, and revegetated with native or similar grasses, shrubs, or forbs, or as agreed to with the landowner.
- Hazardous materials will not be drained onto the ground or into streams or drainage areas.

- Construction waste including trash, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
- Contractors will implement a hazard communication program for any on-site hazardous materials to include training, labeling, and posting of SDSs. Fuels and petroleum-based products will be stored in approved containers and away from excavated areas. Waste motor oil, hydraulic fluid, and liquid gear lube will be stored in approved containers in isolated areas and removed to an authorized disposal facility monthly and in accordance with regulations of NMED. All equipment using hydraulic hoses and cylinders will be inspected for leaks. Any equipment found to have petroleum leaks that cannot be repaired immediately will be removed from service and replaced.
- Contractors will have proper training, there will be spill kits on-site, and any leaking equipment will be repaired immediately. In the event contaminants are released, in addition to the requirements outlined in the environmental report, Rancho Viejo will adhere to the notification policies contained in 20.6.2.1203 NMAC.
- Compacted soils will be restored as closely as possible to preconstruction conditions as required for ground stabilization and erosion control.
- If required as part of the SWPPP, a native seed mixture will be applied to all temporary disturbance areas, followed by applications of mulch as required to provide additional erosion.
- Erosion will be reduced by applying and maintaining standard erosion and sediment control methods. These may include using certified weed-free straw wattles and bale barriers and silt fencing. Specific erosion and sediment control measures will be specified in a SWPPP.

### **3.14.4 Conclusion**

Direct impacts to surface water features or special aquatic sites consist of less than 0.1-acre impact to one ephemeral drainage (Gallina Arroyo) from the construction of the Rancho Viejo Solar Project. Indirect impacts could occur from stormwater runoff during construction. The EPMs proposed will minimize the direct impacts surface waters or groundwater during construction. Construction water use will be minimal, and there will be minimal long-term water use associated with operations and maintenance. Construction activities related to the Project will be conducted in compliance with a SWPPP that will be implemented to ensure that sediment is retained on-site and does not contribute to the surface flows of drainages and washes within the Project vicinity. Additional reasonably foreseeable developments in the immediate Project area will incorporate similar management plans to prevent potential impacts to surface waters and groundwater resources. Therefore, there is minimal potential for the Proposed Action, in conjunction with other reasonably foreseeable developments in the immediate vicinity, to cumulatively affect water resources.

## **3.15 Visual Resources**

Data sources reviewed include:

- 10-meter resolution bare-earth digital elevation models
- Design parameters for proposed infrastructure
- Field survey site photographs
- Aerial imagery, site field reconnaissance, and elevation data (Google Earth 2022)

### **3.15.1 Environmental Setting**

SWCA completed a viewshed analyses (seen/unseen) to identify and assess potential visibility of the Rancho Viejo Solar Project in Santa Fe, New Mexico, within the visual resource evaluation area (Figure 3.17). The evaluation area was defined based on the design characteristics and locations of the Project components (i.e., on-site substation, and gen-tie), the topography of the landscape, and the potential views from residential areas and highways, from the surrounding area. The visual resource evaluation area is used to disclose potential impacts to NHTs, the Santa Fe Regional Airport, and residential communities around the 1,100-acre analysis area.

All of the viewshed analyses were conducted using a 10-m-resolution bare-earth digital elevation model with a typical viewer height of 6 feet. The bare-earth modeling approach does not account for screening resulting from existing vegetation or structures, resulting in a conservative assessment of potential Project visibility. To identify the areas from which the Project could be visible, the viewshed analyses were conducted from the Project looking outward (see Figure 3.17). By looking outward from the Project, discrete seen and unseen areas were identified for the solar facility and the interconnection gen-tie. Additionally, aerial imagery, site field reconnaissance, and elevation data were used to develop this analysis (Google Earth 2022).

The distance threshold for visual impacts review is 5 miles in all directions from the center of the 1,100-acre analysis area to correspond with the distance in which the Project may be discernable to observers and to capture other sensitive viewing platforms within the area.

The existing visual landscape is characterized by its rural nature dominated by open-range, varied topography, and scattered residential communities. Vegetation within the region is consistent with expansive high-desert grasslands, and varied mountain ranges surrounding the analysis area. The analysis area is undeveloped and is surrounded by residential communities of Santa Fe, which include the San Marcos and Eldorado subdivisions. The existing landscape includes the following development: electric transmission lines, highways, residences, and correctional facilities. The predominant human-made visual features include transmission line, and residential communities.

The analysis area is located on gentle, softly undulating valley bottom approximately 9.8 miles southwest of city center of Santa Fe, New Mexico. The ground consists of tan to khaki-colored sandy soils that are easily eroded. The surrounding vegetation continuous with patchy, low indistinct grasses, and sporadic occurrences of varied cactus and cholla. Between the grass and cactus vegetation the landscape appears jagged and amorphous. Colors of vegetation range from dull tans to dark greens (see Figures 3.1–3.4 in Section 3.4). The Santa Fe Mountains are located approximately 8.9 miles to the northeast of the analysis area and provide an abrupt uplift in terrain with dark uniform vegetation colors contrasting with light khaki rock outcroppings.

In addition, there are three NHTs in northern New Mexico. These NHT byways include the El Camino Real, Turquoise Trail, and Route 66 pre-1937 alignment (Figure 3.18). The Route 66 pre-1937 alignment is approximately 5.7 miles northwest of the analysis area. The El Camino Real is located within the Interstate 25 corridor approximately 3.6 miles northwest of the analysis area. The Turquoise Trail occurs on State Highway 14, which is adjacent to the access road for the proposed facility and is the closest NHT to the Project. The Santa Fe Regional Airport is approximately 5.3 miles northwest of the analysis area (see Figure 3.18).

Casual observers or sensitive viewers could include residents or other drivers passing by the analysis area using local roads, and users of adjacent land such as industry workers. There is a collection of transmission line corridors that are regularly maintained within the area as well as new renewable

generation facilities proximal to the Project. The closest residential community is the San Marcos subdivision, which is adjacent to the proposed facility and encompasses approximately 80 single family homes and the Turquoise Trail Charter School. The Eldorado subdivision is located 1.9 miles east of the main solar facility; however, the gen-tie and substation border the subdivision to the north.

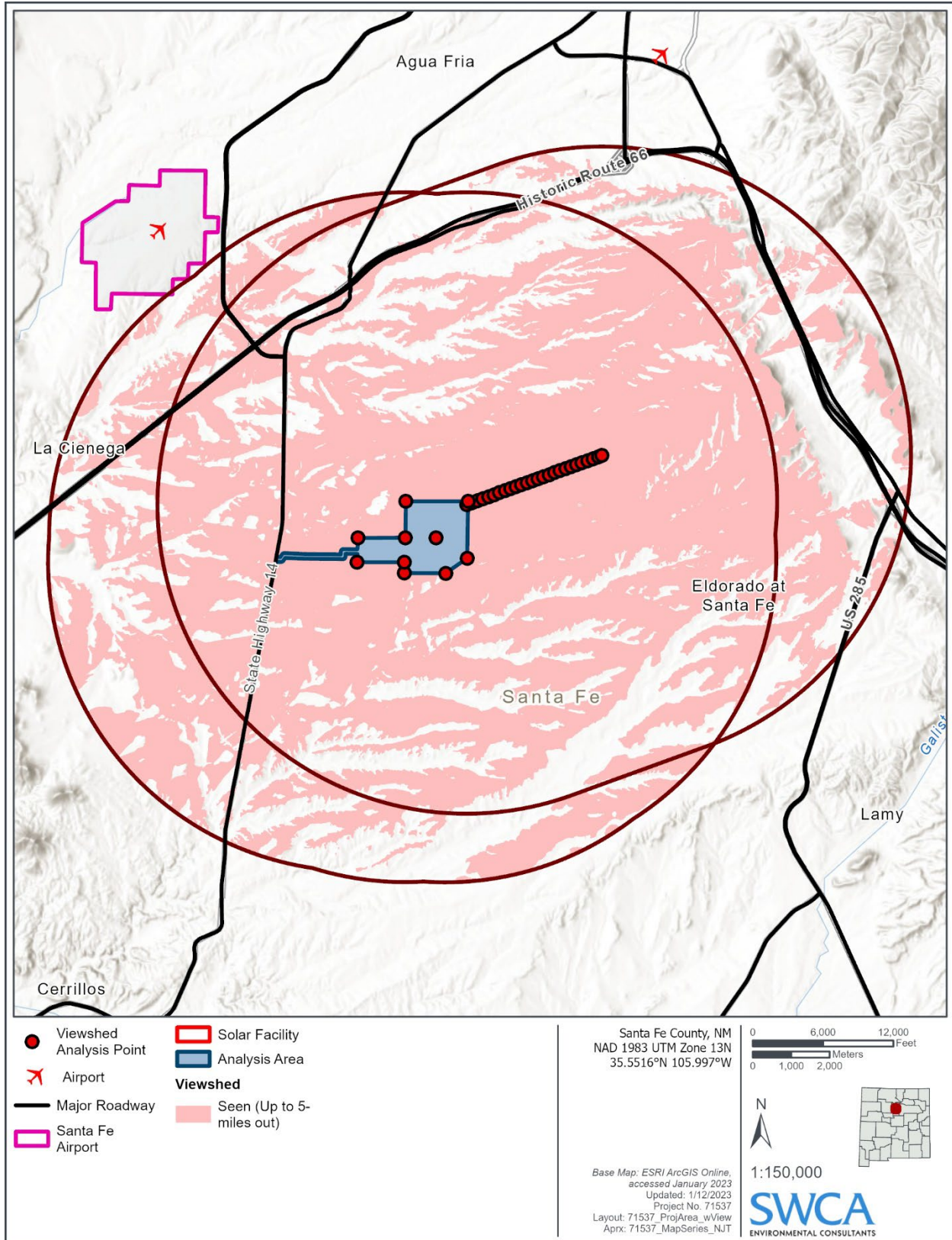


Figure 3.17. Viewshed analysis within the region.

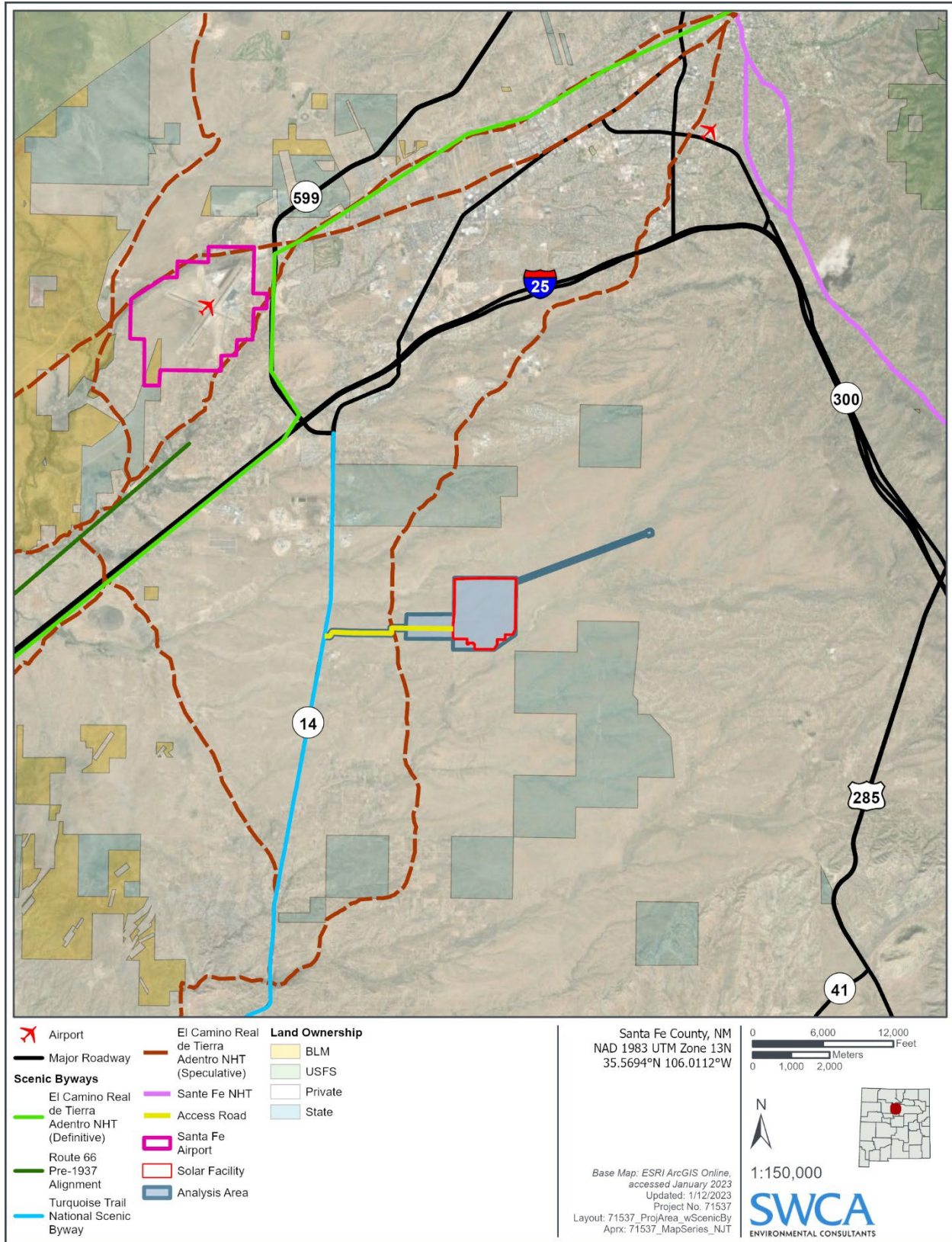


Figure 3.18. Scenic byways near the analysis area.

### **3.15.2 Environmental Effects**

#### **3.15.2.1 PROPOSED ACTION**

Certain areas within the 1,100-acre analysis area will be cleared and graded during construction, where necessary. Vegetation will be removed, creating color contrast with the light, sandy exposed soil. Construction vehicles, equipment, fencing, and an increased human presence will be visible to any casual observer during the 9- to 12-month construction time frame. During construction, protection measures for visual resources will be implemented to minimize visual effects, including minimizing areas of surface disturbance as practical, controlling erosion, using dust suppression techniques, and minimizing the use of night lighting.

Once constructed, the Rancho Viejo Solar Project will consist of a fence yard approximately 800 acres in size, with steel structures, transmission poles, and solar PV panels. The maximum height of the gen-tie structures will be approximately 50 feet. The maximum height of the PV arrays will be 12 to 14 feet. The new structural elements will introduce contrast in color, line, form, and texture. From 1 to 2 miles away, the new structures will be visible and may attract attention from superior viewing areas. From 3 to 5 miles away, the new structures will be visible in the greater distance from superior viewpoints but not anticipated to be visible from neutral viewpoints due to intervening topography and vegetation. Key observation points (KOPs) located in the San Marcos subdivision are expected to include the new structures in the distance; however, Project components will create a weak to moderate contrast to the existing landscape. It is expected that solar arrays will remain subordinate in the existing landscape. Viewers at KOPs in the Eldorado subdivision are not expected to notice the gen-tie, solar arrays, and substation. Due to the area's variable topography, broad vegetation, and similar infrastructure within the area, Project components are expected to have no to weak contrast with the existing landscape. The Turquoise Trail Scenic Byway is located approximately 2 miles west of the analysis area and is the closest NHT to the proposed Project. There is potential for viewers from this location to notice new structures in the distance, but the Project will not attract the attention of the casual observer (Figure 3.17). The primary visual features in the foreground and mid-ground of the viewshed include existing transmission lines, the San Marcos subdivision, the Eldorado subdivision, and roadways. The visual impact of the proposed Project will be minimal and will not degrade the existing landscape from what is already present.

Once the facility has reached the end of its lifespan, Rancho Viejo will decommission the facility. Materials will be recycled; permanent structures and concrete foundations will be removed. Rancho Viejo will reseed the area, and once revegetation is successful, no long-term visual impacts will remain.

#### **3.15.2.2 NO ACTION**

Under the No Action Alternative, there will be no impacts to visual resources within the analysis area. The Proposed Action will not be constructed, and the existing landscape will not be modified.

### **3.15.3 Environmental Protection Measures**

EPMs related to visual resources that will be implemented to avoid and minimize impacts as part of the proposed Project include the following:

- Visual impacts will be reduced during construction by minimizing areas of surface disturbance as practical, controlling erosion, using dust suppression techniques as practical, and, if applicable, restoring exposed soils as closely as possible to their original contour and vegetation.

- Construction activities will primarily be limited to daytime hours. If night work is required during construction, lighting will be the minimum necessary for safety, and lighting will not be left on when not in use.
- Compacted soils will be restored as closely as possible to preconstruction conditions as required for ground stabilization and erosion control.
- If required as part of the SWPPP, a native seed mixture will be applied to all temporary disturbance areas, followed by applications of mulch as required to provide additional erosion control.

### **3.15.4 Conclusion**

The Rancho Viejo Solar Project will add a new structural element to the landscape. The Proposed Action is expected to have both long- and short-term visual impacts. Short-term visual impacts range from low to moderate due to construction crews, potential fugitive dust plumes, and installation of Project components. Long-term visual impacts include operation and maintenance of Project components. Overall, these new elements will remain subordinate to the existing landscape character.

The San Marcos subdivision is expected to have the most unobstructive view of the solar arrays. However, the distance (approximately 0.2 mile) to the proposed Project and intervening topography will help mask Project components. The level of change to the visual character of the area will be low to moderate due to existing transmission infrastructure, proximity of sensitive viewers, and existing vegetation communities in the analysis area. The Project is not expected to unduly impair important environmental values regarding visual resources.

Small-scale solar facilities transmission lines are present within Santa Fe County. Foreseeable actions near the analysis area have not been identified that will be expected to significantly affect visual resources. There is potential for other generation companies to develop renewable energy facilities and transmission line corridors within the vicinity of the analysis area. These potential facilities will incrementally change the landscape character into a more industrialized area compared with its current open rangeland. Cumulative impacts from the proposed Project are not expected to significantly degrade the existing landscape character but are expected to incrementally change visual resources within the area.



## 4 LIST OF PREPARERS

<b>SWCA Environmental Consultants</b>	<b>Title</b>
Kimberly Parker	Project Manager
Adrian Hogel	Environmental Planner
Alexandra Shin	Environmental Planner
Evan Crawford	Environmental Planner/Biologist
Paul Makarewicz	Environmental Planner/Visual Resource Specialist
Michelle Rowe	Air Quality Specialist
Georgia Knauss	Paleontologist
Jen Summers	Environmental Planner
Daniel Spivak	Environmental Planner
Trish Byers	Archaeologist

## **5 LIST OF ORGANIZATIONS AND PERSONS CONSULTED**

- New Mexico Environment Department
- New Mexico Department of Energy, Minerals, and Natural Resources
- New Mexico Public Regulation Commission
- New Mexico Department of Transportation, District 5
- Santa Fe County
- Santa Fe County Fire Department
- New Mexico Historic Preservation Division
- Eldorado Community Improvement Association
- Turquoise Trail Community Association
- San Marcos Association
- El Vadito de Los Cerrillos Water Association
- Cerrillos Hills Park Coalition
- Concerned Citizens of Cerrillos
- Turquoise Trail Regional Alliance
- Stop Hunt Power Line, Inc
- Santa Fe Gateway Alliance
- Santa Fe Association of REALTORS
- Santa Fe Housing Action Coalition

## 6 LITERATURE CITED

- American National Standards Institute (ANSI). 1993. ANSI S12.9-1993/Part 3 - American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 3: Short-Term Measurements with an Observer.
- Anderson, O.J., G.E. Jones, and G.N. Green. 1997. Geologic map of New Mexico. U.S. Geological Survey Open-File Report 97-52.
- Ashigh J., J. Wanstall and F. Sholedice. 2010. Troublesome Weeds of New Mexico. New Mexico State University College of Agricultural, Consumer and Environmental Sciences. Cooperative Extension Services. Las Cruces, NM. Available at: <http://mckinleyswcd.com/troublesome-weeds-report>. Accessed March 2021.
- Atwell, LLC (Atwell). 2020a. Administrative Draft Habitat Characterization Report. Rancho Viejo Solar Project. Santa Fe County, New Mexico. November 13, 2020.
- . 2020b. Administrative Draft Class I Cultural Resources Inventory. Rancho Viejo Solar Project. Santa Fe County, New Mexico. October 26, 2020.
- . 2021. Administrative Draft Special Status Species Report. Rancho Viejo Solar Project. Santa Fe County, New Mexico. July 2021.
- Baltosser, W.H., 1986. Nesting success and productivity of hummingbirds in southwestern New Mexico and southeastern Arizona. *The Wilson Bulletin*, pp.353-367.
- Berger, E., L. Royster, and J. Royster. 2003. Noise Surveys and Data Analysis. In *The Noise Manual*, 5th ed., pp. 186–189. Fairfax, Virginia: American Industrial Hygiene Association.
- Biota Information System of New Mexico (BISON-M). 2022. Biota Information System of New Mexico. Available at: <http://www.bison-m.org/>. Accessed May 2022.
- Bureau of Land Management (BLM). 2012. Taos Resource Management Plan. May 2012. Available at: [https://eplanning.blm.gov/public\\_projects/lup/68121/86167/103325/Approved\\_Taos\\_RMP\\_-\\_5.16.12\\_\(print\\_version\).pdf](https://eplanning.blm.gov/public_projects/lup/68121/86167/103325/Approved_Taos_RMP_-_5.16.12_(print_version).pdf). Accessed June 2022.
- . 2016. *Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands*. Instructional Memorandum No. 2016-124. Washington, D.C.: U.S. Department of the Interior. July 2016.
- . 2022a. Areas of Critical Environmental Concern List. Available at: <https://www.blm.gov/programs/planning-and-nepa/planning-101/special-planning-designations/acec>. Accessed June 2022.
- . 2022b. BLM National PFYC Potential Fossil Yield Classification Geologic Formation 2022 Polygons. Available at: <https://landscape.blm.gov/geoportal/catalog/search/-resource/details.page?uuid=%7B6AA9FB6C-693D-468D-95AB-F7AC8B2C0EE6%7D>. Downloaded: February 17, 2022.
- Cary, S.J., and L.S. DeLay. 2016. *Monarch Butterfly (Danaus plexippus) in New Mexico and a Proposed Framework for Its Conservation*. Santa Fe, New Mexico: Natural Resources Institute.

- Cavell Mertz & Associates. 2022. FCCinfo. Available at: [https://www.fccinfo.com/fccinfo\\_google\\_earth.php](https://www.fccinfo.com/fccinfo_google_earth.php). Accessed May 2022.
- Center for Hearing and Communication. 2020. Common environmental noise levels: How loud is too loud? Available at: <http://chchearing.org/noise/common-environmental-noise-levels/>. Accessed May 2022.
- Clinton, D.F., and J.R. Barber. 2013. A framework for understanding noise impacts on wildlife: an urgent conservation priority. *Frontiers in Ecology and the Environment* 11:305–313.
- Cowan, J.P. 1993. Handbook of Environmental Acoustics. New York, New York: John Wiley + Sons, Inc.
- Desmond, M.J. 2010. The Burrowing Owl (*Athene cunicularia*). In *Raptors of New Mexico*, J-L.E. Cartron (ed.). Albuquerque: University of New Mexico Press.
- Disbrow, A.E., and W.C. Stoll. 1957. Geology of the Cerrillos area, Santa Fe County, New Mexico New Mexico Bureau of Mines and Mineral Resources. Bulletin 48, pp. 73
- Elston, Wolfgang E. 1967. Summary of the Mineral Resources of Bernalillo, Sandoval, and Santa Fe Counties, New Mexico (Exclusive of Oil and Gas). Available at: Summary of the mineral resources of Bernalillo, Sandoval, and Santa Fe Counties, New Mexico (nmt.edu). Accessed June 2022.
- Eveling, D.W., and D.W. Bataille. 1984. The effect of deposits of small particles on the resistance of leaves and petals to water loss. *Environmental Pollution* 36:229–238.
- Federal Aviation Administration. 2022. FAA Aeronautical Information Services Open Data Military Training Routes. Available at: [https://ais-faa.opendata.arcgis.com/datasets/0c6899de28af447c801231ed7ba7baa6\\_0](https://ais-faa.opendata.arcgis.com/datasets/0c6899de28af447c801231ed7ba7baa6_0). Accessed May 2022.
- Federal Emergency Management Agency (FEMA). 2022. National Flood Hazard Layer, Santa Fe County, New Mexico. Available at: <https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS>. Accessed May 2022.
- Federal Highway Administration (FHWA). 2022. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054; DOT-VNTSC-FHWA-05-01. Washington, D.C.: U.S. Department of Transportation. Available at: [https://www.fhwa.dot.gov/environment/noise/construction\\_noise/rcnm/rcnm.pdf](https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf). Accessed May 2021.
- Galisteo Basin Preserve. 2021. Available at: <https://www.galisteobasinpreserve.com>. Accessed June 2022.
- Google Earth. 2022. Imagery date March 2, 2021. Accessed May 2022.
- Griffith, G. E., J. M. Omernik, M. M. McGraw, G. Z. Jacobi, C. M. Canavan, T. S. Schrader, D. Mercer, R. Hill, and B. C. Moran. 2006. Ecoregions of New Mexico (two-sided color poster with map, descriptive text, summary tables, and photographs). Scale 1:1,400,000. Reston, Virginia: U.S. Geological Survey.
- Headwaters Economics. 2022a. A Demographic Profile for the city of Santa Fe, Santa Fe County, NM and New Mexico. Available at: <https://headwaterseconomics.org/apps/economic-profile-system/>. Accessed May 2022.

- \_\_\_\_\_. A Profile of Socioeconomic Trends for Santa Fe County, NM. Available at: <https://headwaterseconomics.org/apps/economic-profile-system/>. Accessed May 2022.
- \_\_\_\_\_. 2022c. A Profile of Socioeconomic Trends for New Mexico. Available at: <https://headwaterseconomics.org/apps/economic-profile-system/>. Accessed April 2022.
- Historic Preservation Division (HPD). 2022. Native American Consultations. Available at: <http://www.nmhistoricpreservation.org/assets/files/tribal/2020%20County%20Tribal%20List.pdf>. Accessed June 2022.
- Hubbard, J.P., and J.W. Eley. 1985. White-tailed Ptarmigan (*Lagopus leucurus*). Handbook of Species Endangered in New Mexico. NM Dept. Game Fish.
- Koning, D.J., and A.S. Read. 2010. Geologic map of the southern Espanola Basin. New Mexico Bureau of Geology and Mineral Resources. Open-File Report 531. Scale 1:48,000. Available at: <https://geoinfo.nmt.edu/publications/openfile/details.cfm?Volume=531>.
- Koning, D.J., and R.B. Hallett. 2002. Geologic map of the Turquoise Hill quadrangle, Santa Fe County, New Mexico. Open-file Geologic Map – 41. Scale 1:24,000. Available at: <https://geoinfo.nmt.edu/publications/maps/geologic/ofgm/details.cfm?volume=41>, updated in 2013.
- Koning, D.J., S.D. Connell, F.J. Pazzaglia, and W.C. McIntosh. 2002. Redefinition of the Ancha Formation and Pliocene–Pleistocene deposition in the Santa Fe embayment, north-central New Mexico. *New Mexico Geology* 24(3)75–87.
- Land, L. 2016. Overview of Fresh and Brackish Water Quality – San Juan Basin. New Mexico Bureau of Geology and Mineral Resources. Available at: <https://geoinfo.nmt.edu/resources/water/projects/bwa/sjb/home.html>. Accessed March 2021.
- Lucas, S.G., and R.M. Sullivan. 2015. Vertebrate Paleontology in New Mexico. New Mexico Museum of Natural History and Science, Bulletin 68, pp. 438.
- Miller, S.D., and J.F. Cully, Jr. 2001. Conservation of Black-Tailed Prairie Dogs (*Cynomys ludovicianus*). *Journal of Mammalogy* 82(4):889–893. Available at: <https://academic.oup.com/jmammal/article/82/4/889/2372868>. Accessed May 2022.
- National Park Service (NPS). 2022. El Camino Real de Tierra Adentro. Available at: Maps - El Camino Real de Tierra Adentro National Historic Trail (U.S. National Park Service) ([nps.gov](https://www.nps.gov)). Accessed March 2022.
- \_\_\_\_\_. 2020a. Old Spanish National Historic Train History and Culture. Available at: <https://www.nps.gov/olsp/learn/historyculture/index.htm>. Accessed June 2022.
- \_\_\_\_\_. 2020b. Santa Fe National Historic Trail History and Culture. Available at: <https://www.nps.gov/safe/learn/historyculture/index.htm>. Accessed June 2022.
- \_\_\_\_\_. 2021a. Physiographic Provinces of New Mexico. Available at: <https://www.nps.gov/media/photo/view.htm?id=F0950317-1DD8-B71B-0B5F3588DE5DCE19>. Accessed June 2022.

- \_\_\_\_\_. 2021b. El Camino Real de Tierra Adentro Trail Brochure. Available at: <https://www.nps.gov/elca/planyourvisit/upload/National-Park-Service-Camino-Real-Brochure-Text-508.pdf>. Accessed June 2022.
- Natural Heritage New Mexico. 2022. More Species Information for Santa Fe Cholla. Available at: [ttps://nhnm.unm.edu/bcd/species/630839](https://nhnm.unm.edu/bcd/species/630839). Accessed May 2022.
- Natural Resources Conservation Service (NRCS). 2022a. Web Soil Survey. Available at: <http://websoilsurvey.nrcs.usda.gov/app/>. Accessed May 2022.
- \_\_\_\_\_. 2022b. The PLANTS Database. Available at: <http://plants.usda.gov>. Accessed May 2022.
- NatureServe. 2022. NatureServe Explorer. Available at: <http://explorer.natureserve.org/>. Accessed April 2022.
- New Mexico Bureau of Geology and Mineral Resources. 2022. Mineral Resources of New Mexico. Available at: <https://geoinfo.nmt.edu/resources/minerals/home.html>. Accessed June 2022.
- New Mexico Crucial Habitat Data Set. 2013. New Mexico Crucial Habitat Assessment Tool: Mapping Fish and Wildlife Habitat in New Mexico. New Mexico Department of Game and Fish and Natural Heritage New Mexico. Available at: <http://nmchat.org/>. Accessed May 2022.
- New Mexico Department of Agriculture (NMDA). 2020. New Mexico noxious weed list update. New Mexico State University. Available at: <https://www.nmda.nmsu.edu/wp-content/uploads/2020/07/Weed-List-memo-and-weed-list-2020.pdf>. Accessed May 2022.
- New Mexico Department of Game and Fish. 1994. *Endangered Species of New Mexico – 1994 Biennial Review and Recommendations*. Authority: New Mexico Wildlife Conservation Act (17-2-37 NMSA 1978).
- \_\_\_\_\_. 2022. Environment Habitat Handbook, Project Guidelines – Trenching Project Guidelines (Updated 3-22-2022). Available at: <https://www.wildlife.state.nm.us/conservation/habitat-handbook/>. Accessed May 2022
- New Mexico Department of Transportation. 2017. 2017 Annual Average Daily traffic (AADT) On State Owned and Maintained Roads. Available at: [https://dot.state.nm.us/content/dam/nmdot/Data\\_Management/TMP\\_AADT\\_Traffic\\_Flow\\_Maps.pdf](https://dot.state.nm.us/content/dam/nmdot/Data_Management/TMP_AADT_Traffic_Flow_Maps.pdf). Accessed May 2022.
- New Mexico Energy, Minerals and Natural Resources Department (EMNRD). 2022a. New Mexico state endangered plant species (19.21.2.8 NMAC). Available at: <https://www.emnrd.nm.gov/sfd/rare-plants/state-rare-plant-list/> Accessed May 2022.
- \_\_\_\_\_. 2022b. New Mexico Mining and Minerals Division: Mine Registrations and Permits. Available at: <https://wwwapps.emnrd.nm.gov/MMD/MMDWebInfo/>. Accessed June 2022.
- \_\_\_\_\_. 2022c. Mining Data and Statistics. Available at: <https://www.emnrd.nm.gov/mmd/mining-data-and-statistics/>. Accessed June 2022.
- New Mexico Office of the State Engineer. 2010. New Mexico Water Rights Reporting System. Available at: <http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html>. Accessed May 2022.
- \_\_\_\_\_. 2015. New Mexico Water Use Data 2015 by County. Available at: <https://www.ose.state.nm.us/WUC/wucTechReports/2015/2015county.php>. Accessed May 2022.

- New Mexico Rare Plant Technical Council. 1999. New Mexico Rare Plants website (Updated April 1, 2021). Available at: <http://nmrareplants.unm.edu>. Accessed May 2022.
- New York Department of Environmental Conservation. 2001. Assessing and Mitigating Noise Impacts. Available at: [https://www.dec.ny.gov/docs/permits\\_ej\\_operations\\_pdf/noise2000.pdf](https://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf).
- Radtke, C. 2016. Noise Characterization of Oil and Gas Operations. M.S. thesis, Department of Environmental and Radiological Health Sciences, Colorado State University, Fort Collins. Available at: [https://mountainscholar.org/bitstream/handle/10217/173508/Radtke\\_colostate\\_0053N\\_13531.pdf?sequence=1](https://mountainscholar.org/bitstream/handle/10217/173508/Radtke_colostate_0053N_13531.pdf?sequence=1). Accessed May 2022.
- Santa Fe County. 2015 Santa Fe County Sustainable Growth Management Plan. 2015. Available at: <https://www.santafecountynm.gov/media/files/SustainableGrowthManagementPlanAdoptedbyResolution2015-155.pdf>. Accessed May 2022.
- Stahlecker, D.W., and R.B. Duncan. 1996. The Boreal Owl at the Southern Terminus of the Rocky Mountains: Undocumented Longtime Resident or Recent Arrival? *The Condor* 98:153–161.
- Stahlecker, D.W., and H.A. Walker. 2010. Bald eagle. In *Raptors of New Mexico*, edited by J.-L. E. Cartron, pp. 131–149. Albuquerque: University of New Mexico Press.
- SWCA Environmental Consultants (SWCA). 2022a. *Biological Resources Inventory Report for the Rancho Viejo Project in Santa Fe County, New Mexico*. SWCA Environmental Consultants, Albuquerque, New Mexico. May 2022.
- . 2022b. A Class III Cultural Resources Survey of the Rancho Viejo Solar Project in Santa Fe County, New Mexico. Prepared for the New Mexico Historic Preservation Division. November 2022.
- . 2022c. *Aquatic Resources Inventory Report for the Rancho Viejo Project in Santa Fe County, New Mexico*. SWCA Environmental Consultants, Albuquerque, New Mexico. May 2022.
- Tedford, R.H. 1981. Mammalian biochronology of the late Cenozoic basins of New Mexico: *Geological Society of America Bulletin* 92(I):008-1022.
- Tedford, R.H., and S.F. Barghoorn. 1993. Neogene stratigraphy and mammalian biochronology of the Española Basin, northern New Mexico; in Lucas, S. G., and Zidek, J. (eds.), *Vertebrate paleontology in New Mexico*: New Mexico Museum of Natural History and Science, Bulletin 2:159–168.
- Thalheimer, E. 2000. *Construction Noise Control Program and Mitigation Strategy at the Central Artery/Tunnel Project*. Boston, Massachusetts: Noise Control Engineering.
- United Nations Educational, Scientific and Cultural Organization (UNESCO) 2005. *Creative Cities Network*. Available at: <https://en.unesco.org/creative-cities/santa-fe>.
- U.S. Department of Agriculture (USDA). 2010. Federal Noxious Weed List. Updated March 21, 2017. Available at: [http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/weeds/downloads/weedlist.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/weedlist.pdf). Accessed May 2022.
- U.S. Environmental Protection Agency (EPA). 1978. Protective Noise Levels: Condense Version of EPA Levels Document. EPA 550/9-79-100 (November 1978). Washington, D.C.: U.S. Environmental Protection Agency, Office of Noise Abatement and Control.

- . 2017. 2017 National Emissions Inventory (NEI) Data. Available online at: <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>. Accessed May 2022.
- . 2018. 2014 NATA Assessment Results. Available at: <https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results>. Accessed May 2022.
- . 2021a. 2019 Air Quality Design Value Reports. Available at: <https://www.epa.gov/air-trends/air-quality-design-values#report>. Accessed May 2022.
- . 2021b. Air Quality Index Basics. Available at: <https://www.airnow.gov/aqi/aqi-basics/>. Accessed May 2022.
- . 2021c. Air Quality Index Report. Available at: <https://www.epa.gov/outdoor-air-quality-data/air-quality-index-report>. Accessed May 2022.
- . 2021d. Environmental Justice Screening and Mapping Tool (Version 2.0). Available at: <https://ejscreen.epa.gov/mapper/>. Accessed April 2022.
- U.S. Fish and Wildlife Service (USFWS). 2022a. Information for Planning and Consultation (IPaC). Available at: <http://ecos.fws.gov/ipac/>. Accessed May 2022.
- . 2022b. U.S. Fish and Wildlife Service Critical Habitat Portal. Available at: <http://criticalhabitat.fws.gov/>. Accessed May 2022.
- . 2022c. National Wetlands Inventory. Available at: <http://www.fws.gov/wetlands>. Accessed May 2022.
- U.S. Geological Survey (USGS). 2016. USGS National Hydrography Dataset (NHD) Downloadable Data Collection. Available at: <https://viewer.nationalmap.gov/basic/#/>. Accessed May 2022.
- . 2022. Historical Topographic Maps – Preserving the Past. Available at: <https://www.usgs.gov/programs/national-geospatial-program/historical-topographic-maps-preserving-past>. Accessed July 2022.
- Western Regional Climate Center. 2022. New Mexico Climate Summaries: Santa Fe 2, New Mexico (COOP Station 298085). Available at: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?nm8085>. Accessed May 2022.