United States Department of the Interior
Bureau of Land Management

Battle Mountain District Office
Battle Mountain Nevada
Tonopah Field Office
Tonopah, Nevada

September 3, 2010

DES 10-47

N- 86292
DOI-BLM-NVB020-2009-0104-EIS

Tonopah Solar Energy, LLC
Crescent Dunes Solar Energy Project

Draft
Environmental Impact Statement

BLM Mission Statement

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

BLM/NV/BM/EIS/10/30+1793

DOI No. DES 10-47

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Tonopah Field Office
P.O. Box 911 (1553 S. Main St.)
Tonopah, Nevada 89049
Phone: 775-482-7800; Fax: 775-482-7810
http://www.blm.gov/nv/st/en/fo/battle_mountain_field.html

In Reply Refer To:
N-86292
DOI-BLM-NVB020-2009-0104-EIS
2800 (NVB0200)

Dear Reader:

Enclosed for your review and comment is the Tonopah Solar Energy, LLC, Crescent Dunes Solar Energy Project Draft Environmental Impact Statement (DEIS), prepared by the Bureau of Land Management (BLM), Tonopah Field Office. The DEIS analyzes the direct, indirect, and cumulative impacts associated with the proposed construction and operation of the Crescent Dunes Solar Energy Project.

The public comment period begins September 3, 2010. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to. In addition, information will be posted online at the BLM website: http://www.blm.gov/nv/st/en.html.

Comments on the DEIS can be mailed to the above address, Attn: Tim Coward, Renewable Energy Project Manager, faxed to (775) 482-7810, or e-mailed to crescent_dunes@blm.gov.

Comments should be postmarked or otherwise delivered to the Tonopah Field Office by close of business, October 18, 2010 to ensure full consideration. Comments may also be submitted at public meetings to be held:

- September 22, 2010 (6 pm – 8pm), Southern Nevada District Office, 4701 N. Torrey Pines Drive, Las Vegas, NV
- September 23, 2010 (6 pm – 8 pm), Tonopah Convention Center, 301 Brougher Ave., Tonopah, NV

A Final Environmental Impact Statement (FEIS) will be prepared that will consider the comments received during the public review and comment period. If you would like any additional information, please contact Tim Coward, Renewable Energy Project Manager, at (775) 482-7800.

Sincerely,

Thomas J. Seley

Thomas J. Seley
Field Manager

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
TONOPAH SOLAR ENERGY, LLC
CRESCENT DUNES SOLAR ENERGY PROJECT

Lead Agency:	U. S. Department of the Interior Bureau of Land Management Battle Mountain District Office
Cooperating Agencies:	Department of Defense, Department of Energy, Nevada Department of Wildlife, Esmeralda County, Nye County, Town of Tonopah
Project Location:	Nye County, Nevada
Correspondence on This EIS Should be Directed to:	Tim Coward, Renewable Energy Project Manager Bureau of Land Management P.O. Box 911 Tonopah, NV 89049 (775) 482-7800

ABSTRACT

Tonopah Solar Energy, LLC applied to the BLM for a 7,680-acre right-of-way (ROW) on public lands to construct a concentrated solar thermal power plant facility approximately 13 miles northwest of Tonopah, Nye County, Nevada. The proposed project is not expected to use the total acres applied for in the ROW application. The facility is expected to operate for approximately 30 years. The proposed solar power project would use concentrated solar power technology, using heliostats or mirrors to focus sunlight on a receiver erected in the center of the solar field (the power tower or central receiver). A heat transfer fluid is heated as it passes through the receiver and is then circulated through a series of heat exchangers to generate high-pressure steam. The steam is used to power a conventional Rankine cycle steam turbine, which produces electricity. The exhaust steam from the turbine is condensed and returned via feedwater pumps to the heat exchangers where steam is regenerated. Hybrid cooling processes would be used for this project to minimize water use while continuing to maintain efficient power generation. The plant design would generate a nominal capacity of 110 megawatts.

The project's proposed facility design includes the heliostat fields, a 653-foot central receiver tower, a power block, buildings, a parking area, a laydown area, evaporating ponds, and an access road. A single overhead 230-kilovolt transmission line would connect the plant to the nearby Anaconda Moly substation.

This Draft Environmental Impact Statement analyzes the environmental effects of the Proposed Action, two action alternatives, and the No Action Alternative.

Responsible Official for EIS:	Thomas J. Seley Field Manager Tonopah Field Office

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Acronyms, Abbreviations, and Glossary

AC	alternating current
ACC	air cooled condenser
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AF	acre-feet
AFY	acre-feet per year
ALR	action leakage rate
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
Amsl	above mean sea level
ANSI	American National Standards Institute
APE	area of potential effects
ASTM	American Society of Testing and Materials
AUM	animal unit months
BACP	Nevada Bureau of Air Quality Planning
bgs	below ground surface
BLM	U.S. Bureau of Land Management
BMPs	best management practices
CAS	Chemical Abstract Service number
CCAR	California Climate Action Registry
CERCLA (or superfund)	Comprehensive Environmental Response, Compensation and Liability Act
CESA	cumulative effects study area
CFR	Code of Federal Regulations
CEQ	Council on Environmental Quality
CH_4	methane
CMPs	corrugated metal pipes
CO	carbon monoxide

CO_2	carbon dioxide
CSP	concentrating solar power technology
CVSA	Commercial Vehicle Safety Alliance
CWMA	Cooperative Weed Management Areas
dB	decibel
dBA	A-weighted decibel
DC	direct current
DCS	Distributed Control System
DEIS	Draft Environmental Impact Statement
DHS	U.S. Department of Homeland Security
DOD	U.S. Department of Defense
DOI	U.S. Department of the Interior
EAI	Ecological Area Inventory
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right to Know Act
EPA ID	Environmental Protection Agency Identification number
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Act
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
ft^2	square feet
gal	gallon
GAP	Southwest Regional Gap Analysis Project
GBBO	Great Basin Bird Observatory

GIS	Geographic Information Systems
GLO	General Land Office
GPS	Global Positioning System
GSU	Generator Step-Up
HAP	hazardous air pollutant
HDR	HDR Engineering, Inc.
HFC	hydrofluorocarbon
HMA	Herd Management Area
HMBP	Hazardous Materials Business Plans
HPMP	Historic Property Management Plan
HTF	heat transfer fluid
HUD	U.S. Housing and Urban Development
IEEE	Institute of Electrical and Electronics Engineers Standards
IMACS	Intermountain Archeological Computer System
I/O	Input/Output
JBR	JBR Environmental Consultants, Inc.
KEC	Kautz Environmental Consultants, Inc.
KNO_3	potassium nitrate
KOP	key observation points
kV	kilovolt
L_{dn}	Day-night noise level
L_{eq}	equivalent noise level or average noise level
m^2	square meters
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Areas
MSDS	Material Safety Data Sheets
MW	megawatt
N_2O	nitrous oxide

NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
$NaNO_3$	sodium nitrate
NBMG	Nevada Bureau of Mines and Geology
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Agency
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NO_x	oxides of nitrogen
NO_2	nitrogen dioxide
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NVCRIS	Nevada Cultural Resource Information System
NWAC	Nevada Weed Action Committee
O_3	ozone
OSHA	Occupational Safety and Health Administration
Pb	lead
PFC	perfluorocarbon
PGA	peak ground acceleration
PL	Public Law
PLC	Programmable Logic Controllers

PM_{10}	particulate matter
$PM_{2.5}$	fine particulate matter
POI	point of interconnection
PSD	prevention of significant deterioration
psia	pressure per square inch
PUC	Public Utilities Commission
PWR	Public Water Reserves
PCRA	Resources Conservation and Recovery Act
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RPS	renewable portfolio standard
SCADA	Supervisory Control and Data Acquisition
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service
SF_6	sulfur hexafluoride
SH	State Highway
SHPO	State Historic Preservation Office
SO_x	oxides of sulfur
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure
SRMA	Special Recreation Management Area
STG	steam turbine generator
SWPPP	Stormwater Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Procedure
TCP	traditional cultural property
TDS	total dissolved solids
TFO	Tonopah Field Office

TL	transmission line
TSE	Tonopah Solar Energy, LLC
UAT	unit auxiliary transformer
UPS	uninterruptible power supply
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V	volt
VOC	volatile organic compound
Wh	Watt-hours
Wig	interagency working group on environmental justice
WMP	Weed Management Plan
WSS	web soil survey

Executive Summary

The U.S. Bureau of Land Management (BLM) has prepared this Environmental Impact Statement (EIS) to analyze potential environmental impacts associated with approval of development of the Crescent Dunes Solar Energy Project. Tonopah Solar Energy, LLC (TSE), the Proponent, has proposed construction of this solar power generation facility in Nye County, Nevada. Nevada Department of Wildlife, Nye County, Esmeralda County, U.S. Department of Defense-Air Force, and the Department of Energy (DOE) accepted invitations to be cooperating agencies in the development of this document. The DOE is a cooperating agency on this EIS pursuant to an MOU between DOE and BLM signed in April 2010.

Project Purpose and Need

The BLM Tonopah Field Office (TFO) has received a ROW application from TSE (Proponent) and must consider permitting the solar facility. The Proponent proposes to construct, operate, and decommission a solar power electric generation facility and associated infrastructure on lands managed by the TFO. The TFO's purpose is to respond to the Proponent's ROW grant application under Title V of the Federal Land Policy and Management Act (FLPMA) (43 USC 1761) for completeness and in compliance with the FLPMA, BLM ROW regulations, and other applicable federal and state laws.

The TFO's need is to consider permitting TSE's application under the BLM's CFR 2800 while, based on the BLM's EIS, limiting undue or unnecessary degradation of public lands.

Proponent's Intended Use of the Project

The proposed project would contribute much needed on-peak power to the electrical grid that serves the western United States as demand for power continues to grow in these states. The thermal storage capability of this technology allows renewable electricity to be produced even when the peak demand period extends into the late evening hours. As older technology fossil-fuel plants reach the end of their useful lives, replacing them with clean, reliable energy sources is a net benefit. The Proponent has executed a Power Purchase Agreement with NV Energy for sale of the electricity produced from the facility. The facility is expected to produce approximately 110 MW of power.

Project Description

The proposed solar facility will use Concentrating Solar Power (CSP) technology to generate electricity. This specific technology uses heliostat/reflecting mirrors to redirect sunlight on a receiver erected in the center of the solar field (called the central receiver). The central receiver consists of a series of tubes through which a liquid salt passes and is heated by the concentrated solar energy. The heated salt is then routed to a large insulated tank where it can be stored with minimal energy loss. When electricity is to be generated, the heated salt is circulated through a series of heat exchangers to generate high-pressure, superheated steam that is used to power a conventional Rankine cycle steam turbine/generator to produce electricity. Energy produced from the facility would interconnect to the electrical grid through a new transmission line extending to the existing NV Energy Anaconda Moly Substation, approximately 6 miles north of the site.

Major project components include:

- a solar field consisting of a large area of heliostats
- a central receiving tower
- a conventional steam turbine to generate electricity
- thermal storage tanks to store the hot and cold liquid salt
- a hybrid cooling system (i.e., an air-cooled condenser with a wet cooling augmentation system designed to minimize water consumption by use only during times of high electricity demand)
- a water treatment system and evaporation ponds to remove impurities from the groundwater, thereby protecting the turbine
- associated equipment such as pumps, transformers, heat exchangers, and buildings
- associated linear facilities, including a TL and access road, and
- a borrow pit for aggregate.

This EIS analyzes the environmental effects of the Proposed Action, the No Action Alternative, and two alternatives. The Proposed Action would:

- Approve a right-of-way (ROW) application submitted by TSE to construct and operate a 110-megawatt (MW) solar power generating facility based on concentrating solar power technology (CSP), an approximately 9.5-mile 230 kilovolt (kV) TL, and the temporary use of a 40-acre borrow pit to extract aggregate for construction. The technology uses heliostats (reflecting mirrors) to redirect sunlight onto a receiver erected in the center of a solar field. The solar power facility is proposed to be located on BLM-managed lands in Nye County, Nevada.

Project Location

The proposed project site is located in south-central Nevada, approximately 13.5 miles northwest of Tonopah, in Nye County. The project is located within the southern portion of the Big Smoky Valley, north of US Highway 95/6 along Poleline Road (State Highway 89). The proposed project would be built on lands administered by BLM. BLM's general solar policy is to facilitate environmentally responsible commercial development of solar energy projects on public lands and to use solar energy systems on BLM facilities where feasible (BLM 2007). Given BLM's solar policy and the advantage of the BLM controlling large areas of land in the southwestern United States, the Proponent is proposing this project on BLM-administered lands as opposed to private lands.

Summary of Potential Impacts

Vegetation

Construction activities associated with the Proposed Action Alternative would result in direct effects, including the removal of topsoil and vegetation within the project areas during grading activities. Approximately 1,628-1,673 acres will be graded in order to construct the project facilities (i.e., heliostats, administrative buildings, access road, borrow pit and transmission line poles), and an additional 167-213 acres will be temporarily disturbed during construction. Revegetation and reclamation activities would be implemented on the temporarily disturbed sites at the end of construction. Following decommissioning and removal of the project, revegetation and reclamation of the site would result in eventual reestablishment of the vegetative cover.

Noxious weeds and Invasive Species

No federal or state listed noxious weeds were observed in the study area. However, invasive species such as Russian thistle and halogeton were present in the study area and may further proliferate in localized areas. Implementation of the reclamation plan and BMPs would reduce the potential for noxious weeds and introductions into and invasive species proliferation throughout the area. The Proponent developed a Preliminary Weed Risk Assessment and will develop Weed Management Plan (WMP) for the project. The WMP will prescribe management actions for monitoring and eradicating specified species by BLM-approved methods. The WMP also will describe applicable processes for the use of herbicides on federally managed lands in Nevada, and provide the basis for proper management and use of herbicides in the project area.

Wildlife Resources

Impacts to wildlife are anticipated to include the loss of habitat due to construction of the facility, excavation of aggregate in the borrow pit, and construction of the transmission line, and access road. During these activities, wildlife that is unable to flee the area may be injured or killed by heavy equipment. Additional injuries or deaths may occur because of vehicle collisions by construction and operation vehicles, as well as employees commuting to and from their residences and the project site. Evaporation ponds will be covered by a porous screen so wildlife will not be affected by the brine solution being generated during operation.

Special Status Species (Plants)

Construction activities associated with the proposed project would directly affect Nevada oryctes, a BLM Sensitive Species, by removing plants and suitable habitat within the project areas during grading activities to construct the project facilities (i.e., heliostats, power block, evaporation ponds, and administrative buildings), and a paved access road.

Special Status Species (Wildlife)

<u>Mammals: Pale Kangaroo Mice and Bats</u>: Impacts to pale kangaroo mice would include direct mortality during grading and the removal of suitable habitat. Direct effects to pale kangaroo mice and bats may result from the operation of the facility’s evaporation ponds. The water in the evaporation ponds would be saturated with salt (making a brine solution). If mice or bats ingest water from the pond, they may become ill or die from sodium toxicity. A porous screen will cover the ponds so that mice or bats are excluded from the pond. Additionally, the proposed project would introduce transmission lines into the area providing opportunities for avian predators such as owls and other raptors. The potential presence of these predators may increase predation pressure on the pale kangaroo mouse and sensitive bat species.

Golden eagles and Migratory Birds: Impacts to Golden eagles and other migratory birds would include potential injury or mortality due to the operation of the facility and transmission line and the removal of approximately 1,628-1,673 acres of potential foraging habit. Also, birds may be injured or killed because of collisions with vehicles, colliding with the mirrors and other structures, and flying through the concentrated solar rays near the receiver. Reflections from the heliostat arrays may mimic water potentially attracting migratory birds to the site.

Water Quality and Quantity

Groundwater: Drawdown in excess of 10 feet will not extend beyond the proposed project site; some of the existing wells in the area will experience a drawdown of between 1-foot to 1.5-feet. Potential direct impacts to groundwater include possible contamination entering the groundwater around the wellhead (due to hazardous materials on-site), proposed well pumping causing drawdown affecting wells, and restrictions to existing well access or use.

Surface Water: Potential direct impacts to surface water associated with the project include increased runoff flows, increased sediment transport, increased discharge and transport of contaminants, or possible affects to drainage paths or altered flow.

Wetlands, Riparian Zones, and Waters of the U.S.

No impacts to jurisdictional wetlands or other special aquatic or riparian sites will occur, as these resources were not present in the project area.

Air Quality

Emissions associated with construction activities and the operational phases of the plant are within established federal, state, and regional thresholds. Furthermore, the proposed project is located in a region that EPA has categorized as an attainment area for all regulated pollutants. As such, the proposed project with all its proposed emission control strategies is not expected to cause a violation of established air quality standards and will conform to federal air quality goals and objectives. Through the permit application process with the Nevada Department of Environmental Protection, Bureau of Air Pollution Control, the proposed project will also have conformed to regional air quality requirements and objectives.

Cultural

Development of the Proposed Action Alternative would impact four historic properties. A total of eight historic properties would be impacted by Alternative 2. Only one known historic property would be impacted by Alternative 1. No impacts are anticipated for the Transmission Line and Substation or the borrow pit. Unanticipated discoveries during project construction could result in impacts to yet unidentified historic properties for any of the alternatives as well as the Transmission Line and Substation or borrow pit.

Native American Religious Concerns

At this time, given the known and provided information, there exists some potential (not definitive) to impact project area specific archaeological sites and associated artifacts of concern. Potential impacts could occur because of cultural resources treatment plan implementation and the lack of avoidance of pre-historic and/or ethno-historic archaeological sites. Based on previous consultations, historic sites appear to be of little concern, unless they are associated with specific family histories and ancestral habitations (i.e. homesteads located on turn of the century allotment lands).

Considering some impacts may not be known until after (or during) project development (i.e. inadvertent discovery of previously unidentifiable subsurface deposits) and the fact that consultation is ongoing, specific resource identification and subsequent determinations of impact are not conclusive.

Land Use and Access

Potential impacts on Land Use and Access from the proposed project and its various components are relatively limited. The proposed project and the associated alternatives would not create hazards to air traffic according to determinations reached by the FAA. Alternative 1 encroaches on a right-of-way avoidance area for recreation and a no surface occupancy area for mining, both associated with the Crescent Dunes. Existing rights-of-way, mining claims, and other leases have been identified near or within the proposed project, but none of these has been identified as potentially conflicting with the project.

Soils

The potential for direct impacts, indirect impacts, and cumulative impacts associated with construction of the project are present. These impacts may include increased erosion, increased soil compaction, and diminished potential for revegetation. Direct impacts, indirect impacts, and cumulative impacts associated with operation of the project are not expected. Top soil removed during clear and grub activity and grading and excavation required for construction will be collected and stockpiled on-site. Stockpiles will be protected from wind and water erosion through establishment of native vegetation and temporary or permanent erosion control BMPs including weed-free straw bales or wattles for the duration of facility construction, operation, and decommission. Following decommissioning, the stockpiled topsoil will be replaced across the site where topsoil was previously removed to provide a proper soil substrate for seeding or planting and enhance re-establishment of native vegetation to pre-construction conditions.

Social and Economics

Social and economic impacts may occur as a result of construction and of operation of the proposed project. While some construction workforce is available locally, the majority will be relocating to the surrounding communities temporarily. This could increase local population by 20 percent or more during the peak of construction, resulting in the need for temporary workforce housing, thereby impacting the local infrastructure. Through direct and indirect impact, approximately 1,500 jobs would be created, $140 million of personal income would be added to the State of Nevada annually, and $160 million would be added to the gross state product annually during the peak of construction.

While some operations and maintenance workforce is available locally, the majority will be relocating to the surrounding communities. This could increase local population by 2 percent or more during operation of the facility. However, enough existing residential property exists to accommodate the relocating workforce. Through direct, indirect, and induced impact, during operations and maintenance of the facility, approximately 200 jobs would be created, $30 million of personal income would be added to the State of Nevada annually, and $22.7 million would be added to the gross state product annually.

Noise

Temporary noise impacts may be experienced during the construction of any part of the proposed facility. However, no sensitive receptors were identified in the project area; therefore, no impacts to sensitive receivers are likely to occur.

Visual

The proposed solar energy generating facility and associated components would have an estimated footprint of approximately 1,600 acres that would house the solar field, administration buildings, evaporation pond, generation transmission tie line, substation, and ancillary facilities. Based on evaluations of key observation points and the lack of sensitive receptors in the area, impacts to the visual context of the project is moderate, except for the Crescent Dunes recreational area where the impact is expected to be major.

Hazardous Materials and Other Waste

The construction activities associated with the proposed project will result in an increase risk of accidental hazardous material spills from vehicles and heavy equipment. These risks will be mitigated with the implementation of operational plans and best management practices. Start-up and operation of the facility will involve large volumes of heated molten salt, which if released, could be harmful to the local natural resources within the project footprint. In addition, the water treatment facility will generate effluent that is placed in ponds to allow the water to evaporate, producing a brine material. Spills of these materials are unlikely given the design and management practices to be in place throughout construction and operation of the facility.

Range Resources and Wild Horses

The proposed project will result in the removal of approximately 1,628-1,673 acres of the San Antone allotment from forage production and the associated reduction in grazing potential. The loss of this amount of forage production equates to approximately 52 AUMs of grazing potential. To maintain current ecological condition of the range, the current preference of 13,505 AUMs for the grazing permit in this allotment would be reduced to 13,453 AUMs, a reduction of 0.4%. No Wild Horse Management Areas are near the proposed project, therefore wild horses and burros would not be affected.

Recreation / Wilderness

The proposed project would result in the loss of approximately 1,628-1,673 acres of BLM land that is currently used for recreational activities such as hunting. Alternative 1 will affect approximately 130 acres of the Special Recreation Management Area associated with the Crescent Dunes, which is used primarily as an off-road vehicle use area. No wilderness areas or wilderness study areas are within 25 miles of the project area.

1.0 Introduction and Purpose and Need

The U.S. Bureau of Land Management (BLM) has prepared this Environmental Impact Statement (EIS) to analyze potential environmental impacts associated with the Crescent Dunes Solar Energy Project. Tonopah Solar Energy, LLC (TSE), the Proponent, has proposed construction of this solar power generation facility in Nye County, Nevada. The solar facility would have the following features:

- a large field of heliostats or mirrors to reflect the sun's energy onto a central receiver or tower
- a conventional steam turbine to generate electricity
- thermal storage tanks to store the hot and cold liquid salt
- a hybrid cooling system (i.e., an air cooled condenser [ACC] with a wet cooling augmentation system designed to minimize water consumption by use only during times of high electricity demand)
- associated equipment such as pumps, transformers, heat exchangers, and buildings
- associated linear facilities including a transmission line (TL) and access road

This EIS analyzes the environmental effects of the Proposed Action, the No Action Alternative, and two alternatives. The Proposed Action would:

- Approve a right-of-way (ROW) application submitted by TSE to construct and operate a 100-megawatt (MW) solar power generating facility based on concentrating solar power technology (CSP), an approximately 9.5-mile 230 kilovolt (kV) TL, and the temporary use of a 40-acre borrow pit to extract aggregate for construction. The technology uses heliostats (reflecting mirrors) to redirect sunlight onto a receiver erected in the center of a solar field. The solar power facility is proposed to be located on BLM-managed lands in Nye County, Nevada.

1.1 Authority and Jurisdiction

This EIS addresses project-related impacts pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA), 42 United States Code (USC) §§ 4321 et seq., and subsequent implementing regulations issued by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500–1508). This EIS was also prepared in conformance with the BLM's NEPA Handbook H-1790-1 (BLM 2008a). The BLM Handbook provides instructions for compliance with the CEQ regulations for implementing the procedural provisions of NEPA and the U.S. Department of the Interior's (DOI) Manual on NEPA (516 DM 1-7).

BLM is the lead federal agency responsible for reviewing TSE's application. The Proposed Action would occur on public lands managed by BLM in the Tonopah Resource Management Plan (RMP) planning area. BLM has prepared a RMP to manage resources on these lands. The Proposed Action would conform to the current land use plan; no amendment of the plan would be needed in connection with implementation of the Proposed Action.

1.1.1 DOE Authority and Jurisdiction

Title XVII of Energy Policy Act (EPAct) authorizes the Secretary of Energy to make loan guarantees for eligible projects, including those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." Tonopah Solar Energy, LLC has applied to the U.S. Department of Energy (DOE) for a loan guarantee pursuant to Title XVII of the EPAct. DOE is participating in the review of this NEPA document as a cooperating agency (40 CFR §1508.5) to ensure that analyses needed to support its decision making on whether to provide a loan guarantee to Tonopah Solar Energy, LLC are provided in the EIS.

1.2 Project Overview

The proposed solar facility will use CSP. This specific technology uses heliostat/reflecting mirrors to redirect sunlight on a receiver erected in the center of the solar field (called the central receiver). The facility is expected to produce approximately 110 MW of power.

The central receiver consists of a series of tubes. Liquid salt—which has the viscosity and appearance of water when heated—is routed to the receiver when solar energy is to be collected. The liquid salt passes through the receiver, where it is heated by the concentrated solar energy, and then is routed to a large insulated tank, where it can be stored with minimal energy loss. When electricity is to be generated, the heated salt is circulated through a series of heat exchangers to generate high-pressure superheated steam. The steam is then used to power a conventional Rankine cycle steam turbine/generator, which produces electricity. The exhaust steam from the turbine is condensed and returned via feedwater pumps to the heat exchangers, where the high-pressure superheated steam is generated again. The energy in the heated salt is depleted after generating steam and routed to the cold salt tank for reuse the next day.

Energy produced from the facility would interconnect through a new TL to the existing NV Energy Anaconda Moly Substation (ROW 033242), approximately 6 miles north of the site. The length of the proposed new TL would be approximately 9.5 miles.

Major project components include:

- a solar field consisting of a large area of heliostats (reflective mirrors that reflect the sun's energy into a central receiver or tower)
- a conventional steam turbine to generate electricity
- thermal storage tanks to store the hot and cold liquid salt
- a hybrid cooling system (i.e., an air-cooled condenser with a wet cooling augmentation system designed to minimize water consumption by use only during times of high electricity demand)
- a water treatment system and evaporation ponds to remove impurities from the groundwater, thereby protecting the turbine
- associated equipment such as pumps, transformers, heat exchangers, and buildings
- associated linear facilities, including a TL and access road
- a borrow pit for aggregate

1.3 Project Location

The proposed project would be built on lands administered by BLM. According to the National Renewable Energy Laboratory United States Solar Atlas, the proposed project site maintains high insolation levels on a year-round basis, creating ideal conditions for solar energy generation (Figure 1-1). While many undeveloped parcels of land exist in Nevada, it can be difficult to acquire parcels from private parties and assemble the acreage needed for a CSP plant. If enough private land were acquired, permitting issues at a local level within a jurisdiction with no policy on solar development can be difficult. BLM's general solar policy is to facilitate environmentally responsible commercial development of solar energy projects on public lands and to use solar energy systems on BLM facilities where feasible (BLM 2007). Given BLM's solar policy and the advantage of the BLM controlling large areas of land in the southwestern United States, the Proponent is proposing this project on BLM-administered lands as opposed to private lands.

The proposed project site, transmission line (TL), and borrow pit (temporary during construction) are located in south-central Nevada, west of Tonopah, in Nye County. The proposed project encompasses approximately 2,950 acres (Figure 1-2), as located in the following lands when described by aliquot parts:

Proposed Project Site (N-86292)

- in Township 4 North, Range 41 East:
    - western half of Sections 12 and 13
    - Sections 11 and 14
    - northwestern, northeastern, and southeastern quarters of Section 15
    - southwestern, northeastern, and southeastern quarters of Section 10
    - southern half of the northwestern quarter of Section 10
    - eastern half of the southwestern quarter of Section 15

TL and Substation (N-87933)

- in Township 4 North, Range 41 East:
    - eastern half of Section 9
    - northwestern, southwestern, and southeastern quarters of Section 4
- in Township 5 North, Range 41 East:
    - northwestern, southwestern, and northeastern quarters of Section 33
    - eastern half of Section 28
    - Section 22
    - southeastern quarter of Section 15
    - western half of Section 14
    - southwestern, southeastern, and northeastern quarters of Section 11
    - eastern half of Section 2
    - northwestern quarter of Section 27

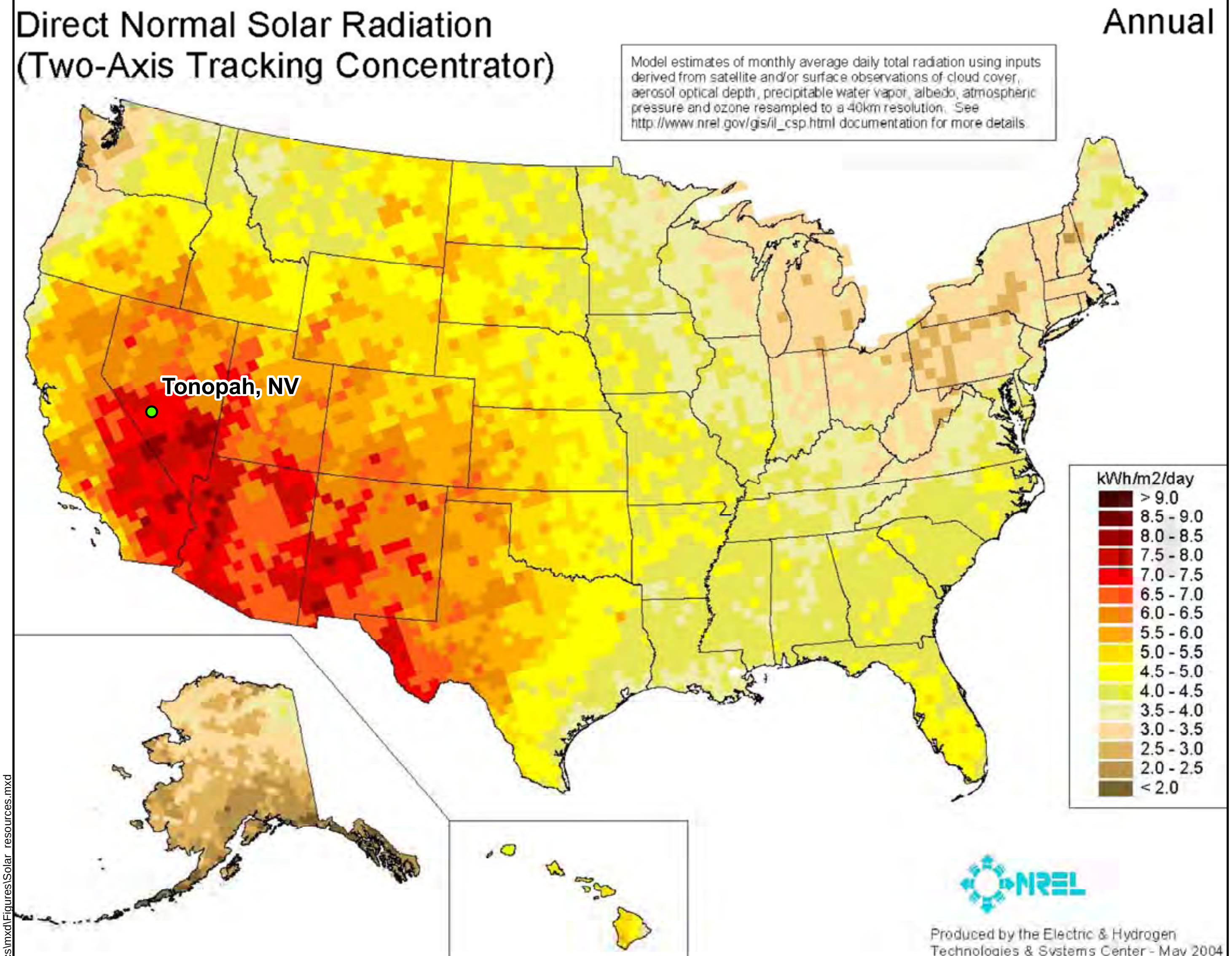

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Figure 1-1 Solar Resources Map
Crescent Dunes Solar Energy Project

Source: National Renewable Energy Laboratory, May 2004

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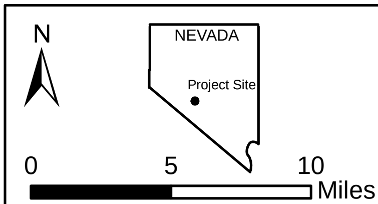


Legend

Transmission line

Proposed Site

Borrow Pit

Figure 1-2 Site Vicinity Map

Crescent Dunes Solar Energy Project

Aerial Source: ESRI 2010

Potential Borrow/Gravel Pit

- in Township 5 North, Range 41 East:
    - northeastern quarter of Section 19
    - western half of the northwestern quarter of Section 20
    - southern half of the southeastern quarter of Section 18

The areas for the project site, TL, and substation are shown in more detail in Chapter 2.0, Alternatives Including the Proposed Action. The solar field, administration building areas, evaporation pond areas, TL, substation, and other ancillary facilities would be located within the approximately 2,950 acres identified above; temporary and permanent construction impacts would not affect this entire area. The estimated area of permanent disturbance and temporary disturbance within the proposed final ROW boundary is approximately 1,673 acres (permanent) and 213 acres (temporary), the remainder of the 2,950 acres would remain undisturbed.

During the scoping phase for this EIS, two alternative site locations were identified (see Figure 2-1). Alternative 1 is located approximately 1.85 miles north of the proposed project site, and Alternative 2 is located approximately 2.4 miles northwest of the proposed project site. The two alternatives would use the same technology as described in Section 1.2, Project Overview, and occupy approximately the same acreage on lands administered by BLM.

1.4 Purpose and Need for the Proposed Project

1.4.1 Purpose

The BLM Tonopah Field Office (TFO) has received a ROW application from TSE (Proponent) and must consider permitting the solar facility. The Proponent proposes to construct, operate, and decommission a solar power electric generation facility and associated infrastructure on lands managed by the TFO. The TFO's purpose is to respond to the Proponent's ROW grant application under Title V of the Federal Land Policy and Management Act (FLPMA) (43 USC 1761) for completeness and in compliance with the FLPMA, BLM ROW regulations, and other applicable federal and state laws.

1.4.2 Need

The TFO's need is to consider permitting TSE's application under the BLM's CFR 2800 while, based on the BLM's EIS, limiting undue or unnecessary degradation of public lands.

1.4.3 DOE Purpose and Need

The purpose and need for DOE action is to comply with DOE's mandate under EPAct 2005 by selecting eligible projects that meet the goals of the Act. DOE is using the NEPA process to assist in determining whether to issue a loan guarantee to Tonopah Solar Energy, LLC to support the proposed project.

1.4.4 Proponent Purpose and Need

The Proponent has filed a ROW application for consideration to construct, operate, and decommission a solar power generation facility and associated infrastructure.

The State of Nevada has enacted a renewable portfolio standard (RPS) as part of its 1997 restructuring legislation. Under the standard, the state's investor-owned utilities must use eligible renewable energy resources to supply a minimum percentage of the total electricity they sell. Nevada's RPS increased July 1, 2009, to 25 percent of retail sales in 2025. In its most recent Integrated Resource Plan filed with and approved by the Public Utilities Commission (PUC) of Nevada, NV Energy will spend approximately $2 billion to purchase and invest in new renewable energy by 2015. The Proponent's construction and operation of the proposed project would contribute to achieving Nevada's RPS goals.

The proposed project would contribute much needed on-peak power to the electrical grid that serves the western United States as demand for power continues to grow in these states. The thermal storage capability of this technology allows renewable electricity to be produced even when the peak demand period extends into the late evening hours. As older technology fossil-fuel plants reach the end of their useful lives, replacing them with clean, reliable energy sources is a net benefit. The proposed project would respond to this need, as the Proponent has executed a Power Purchase Agreement with NV Energy as of November 4, 2009, for sale of the electricity produced from the facility.

The purpose of the facility is to:

- provide solar-generated electricity to the national electric grid
- help reduce both Nevada's and the nation's reliance on fossil-fuel generated electricity
- expand Nevada's and the nation's use of non-fossil, renewable energy
- expand Nevada's renewable energy portfolio

The Proponent's need for the project is to:

- deliver approximately 485,000 MW hour (MWh) of cost-effective renewable energy annually to the Nevada electricity grid
- develop a solar energy project that provides a stable source of renewable energy to the grid through the use of thermal storage
- develop a renewable energy project that can produce renewable energy during Nevada's peak electricity demand periods, including evenings in summer, when solar projects without storage can no longer generate solar energy

1.5 Relationship to Bureau of Land Management and Non-Bureau of Land Management Policies, Plans, and Programs

This EIS addresses project-related impacts pursuant to the requirements of NEPA, 42 USC §§ 4321 et seq., and subsequent implementing regulations issued by the CEQ (40 CFR 1500–1508). The EIS was also prepared in conformance with the BLM's NEPA Handbook (BLM 2008a). The BLM Handbook provides instructions for compliance with the CEQ regulations for implementing the procedural provisions of NEPA and the DOI Manual on NEPA (516 DM 1-7).

The BLM NEPA Handbook also provides guidance on monitoring. Three distinct types of monitoring are identified and, if the Proposed Action were approved, would be applicable:

- Compliance Monitoring: As part of the Record of Decision (ROD) on the proposed project, committed mitigation measures and related monitoring and enforcement activities, if any, for the selected alternative will be identified. Stipulations that will become part of BLM's authorization will be attached to the ROD or incorporated by reference from this EIS or other applicable requirements. Any measures to avoid or reduce environmental harm identified in this EIS that are not adopted will also be identified with an explanation of why the measures were not adopted. NEPA requires that decisions on a project be implemented in accordance with the ROD. BLM will perform compliance monitoring to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the ROD.
- Effectiveness or Success Monitoring: Determining whether decisions made in the ROD are achieving intended environmental objectives may require monitoring the effectiveness or success of the actions or decisions. Effectiveness monitoring is not required by NEPA unless specified in the ROD. However, monitoring requirements specified in this EIS will be incorporated into the ROD. Effectiveness monitoring will typically be required to determine the effectiveness or success of identified mitigation measures.
- Evaluation of Validity Monitoring: Determining if a decision continues to be correct or appropriate over time is another purpose of monitoring. Evaluation of decision validity monitoring is not required by NEPA, and it is usually not routinely needed for all decisions covered by an EIS. Evaluation monitoring goes beyond effectiveness monitoring and focuses on examining the validity of the environmental objectives. Evaluation monitoring would be used to determine whether the terms, conditions, and mitigation measures prescribed by the ROD are still needed to achieve environmental objectives or if they are greater or less than necessary to achieve environmental objectives.

In Executive Order (EO) 13212 of May 18, 2001 (Actions to Expedite Energy-related Projects), President George W. Bush ordered that executive departments and agencies take appropriate actions "to expedite projects that will increase the production, transmission, or conservation of energy." Section 211, of the Energy Policy Act of 2005 (EPAct), (Public Law [PL] 109-58) states "…that the Secretary of the Interior should, before the end of the 10-year period beginning on enactment of this Act, seek to have approved non-hydropower renewable energy projects located on public land with a generation capacity of at least 10,000 MW of electricity."

DOI manages approximately 520 million acres of land, one-fifth of the land mass of the United States. On March 11, 2009, Secretary of the Interior Ken Salazar issued a Secretarial Order that made facilitating the production, development, and delivery of renewable energy on public land a top priority for DOI. Within DOI, BLM administers approximately 253 million surface acres of public land in the United States. BLM has identified approximately 23 million acres in the Southwest as containing high solar energy potential.

The BLM Solar Energy Development Policy establishes a framework to process applications for rights-of-way, and directs BLM to be responsive to solar energy project applicants, while maintaining its commitment to resource protection. In 2007, BLM issued Instructional Memorandum Number 2007-097, which established policy for processing of ROW applications for solar energy development projects on public land administered by BLM. BLM would strive to balance the financial and social benefits from this Proposed Action while minimizing impacts to other resources.

Table 1-1 provides a representative list of federal, state, and local laws, statutes, and EOs that may apply to the Proposed Action.

Table 1-1. Federal, state, and local laws, statutes, and EOs applicable to the Proposed Project and Alternatives

Federal Laws and Statutes
Archaeological and Historic Data Preservation Act of 1974 (Public Law [PL] 86-253, as amended by PL 93291; 16 United States Code [USC] 469)
Bald and Golden Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) as amended (PL 95-616 [92 Stat. 3114]) November 8, 1978
Archaeological Resources Protection Act of 1979 (PL 96-95; 16 USC 470aa-mm)
Clean Air Act of 1990 (as amended by PL 92-574; 42 USC 4901)
Department of Transportation Act of 1966 (PL 89-670; 49 USC Section 303)
Endangered Species Act of 1973 (PL 85-624; 16 USC 661, 664 1008)
Energy Policy Act of 2005 (PL 109-58)
Federal Land Policy and Management Act of 1976, Section 201(a) (PL 94-579; 43 USC 1701 et seq.)
Federal Water Pollution Control Act of 1972, Section 404 (PL 92-500; 33 USC 1344, as amended)
Historic Sites Act of 1935 (PL 292-74; 16 USC 461-467)
Land and Water Conservation Fund Act of 1965 (PL 88-578)
Migratory Bird Treaty Act of 1918 (16 USC 703-712, as amended)
National Environmental Policy Act of 1969 (PL 91-190; 42 USC 4321)
National Historic Preservation Act of 1966, Section 106 [PL 89-665; 16 USC 407(f)]
Paleontological Resources Preservation Act 2009
Executive Orders
Executive Order (EO) 11296 Flood Hazard Evaluation Guidelines
EO 11514 Protection and Enhancement of Environmental Quality
EO 11593 Protection and Enhancement of the Cultural Environment
EO 11988 Floodplain Management (43 Code of Federal Regulations [CFR] 6030)
EO 11990 Protection of Wetlands
EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
EO 13007 Indian Sacred Sites
EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds
EO 13212 Actions to Expedite Energy-related Projects
EO 13287 Preserve America
EO 123772 Intergovernmental Review of Federal Programs
Federal Regulations
10 CFR Parts 1022-1022, Department of Energy NEPA Implementing Procedures
40 CFR Parts 1500-1508, Council on Environmental Quality implementation of NEPA
33 CFR 320-331 and 40 CFR Part 230, Section 404 of the Clean Water Act and its Implementing Regulations
36 CFR Part 800, as amended, Protection of Historic Properties
43 CFR Part 2800, as amended, Right-of-Way Principles and Procedures

Table 1-1. Federal, state, and local laws, statutes, and EOs applicable to the Proposed Project and Alternatives

State Laws and Statutes
Nevada Revised Statue (NRS) 502.390 Permit required to develop or maintain certain bodies of water, fees and assessments; penalties.
NRS 527.060-120 Protection and Preservation of Timbered Lands, Trees, and Flora – Definitions Cactus and Yucca
NRS 527.270 List of species declared to be threatened with extinction; special permit required for removal or destruction
NRS 533.030 Adjudication of Vested Water Rights; Appropriation of Public Waters – Appropriation for beneficial use; use for recreational purpose declared beneficial; limitations and exceptions
NRS 533.035 Adjudication of Vested Water Rights; Appropriation of Public Waters – Beneficial use: Basis, measure and limit of right to use
NRS 534.020 Underground waters that belong to the public and are subject to appropriation for beneficial use; declaration of legislative intent
NRS 555.005 Agriculture – Control of Insects, Pests, and Noxious Weeds

1.6 Authorizing Actions and Permits

In addition to the EIS, implementing the Proposed Action would require authorizing actions from other federal, state, and local agencies with jurisdiction over certain aspects of the proposed project. Table 1-2 lists potential permits or approvals that may be required before and during construction, and during operations. The Proponent or contractor would be responsible for amending existing permits, applying for, and acquiring additional permits, as needed.

Table 1-2. Potential authorizations and permits

Agency	Permit or Approval	Regulated Activity
Federal Permits and Approvals		
U.S. Bureau of Land Management (BLM)	National Environmental Policy Act Record of Decision	Major federal action significantly affecting the quality of the human environment
BLM	Right of Way Permit and/or Temporary Use Permit (BLM SF 299 application)	Required for permanent and temporary (example construction) use of BLM administered lands (facilities, water pipelines, transmission, access roads, gas pipeline, and other ancillary items)
U.S. Fish and Wildlife Service	Endangered Species Act Section 7 Consultation and Biological Opinion	Required for potential direct or indirect impacts to federally listed species and/or associated habitats
U.S. Environmental Protection Agency (EPA)	Section 402 National Pollutant Discharge Elimination System (NPDES) Notification	Required for stormwater management during construction
Tribal Authorities		
Nevada Tribal Councils	Section 106 Review and Native American Consultation	Required to address impacts on Native American or cultural resources

Table 1-2. Potential authorizations and permits

Agency	Permit or Approval	Regulated Activity
Nevada State Permits and Approvals		
Nevada State Historic Preservation Office	Section 106 Review and Concurrence	Federally funded projects are to take into account potential impacts on cultural and historical resources
Nevada Department of Wildlife (NDOW)	Southern Region Project Review	Wildlife and habitat consultation for disturbance on BLM-managed land
NDOW	Implementation of terms and conditions of the Biological Opinion	Potential impacts on common and special-status wildlife species (document compliance with the terms and conditions of the Biological Opinion)
NDOW	Industrial Artificial Pond Permit	Potential injuries and mortalities to wildlife caused by ponds
NDOW	Consent for Alteration of Protected Species	Required for taking any wildlife classified as protected
Nevada Division of Environmental Protection (NDEP)	Prevention of Significant Deterioration Program Major Source Permit	Required to consolidate potential air quality impacts of a proposed major project
NDEP	General Stormwater Permit for Construction Activities (Notice of Intent and General Permit)	Construction activities disturbing more than 1 acre
NDEP Bureau of Air Pollution Control	Operating Permit to Construct	Nevada Administrative Code 445B.22037 requires fugitive dust to be controlled
NDEP Bureau of Air Pollution Control	Surface Area Disturbance/Dust Mitigation Control Plan	Required for a surface area disturbance is greater then 20 acres
NDEP Bureau of Air Pollution Control	Sand and Gravel Processing Plant	Required for construction/operation of new asphaltic concrete plants, concrete batch plants, and sand and gravel processing plants (Nevada Revised Statute [NRS] 445B.155)
NDEP Bureau of Safe Drinking Water	Concurrence Letter or Letter of Approval to Construct	Need permit to operate the water system upon satisfaction of the requirements set forth in NRS 445A.885 to 445A.915, inclusive, and the requirements set forth in the regulations adopted by the Commission
NDEP Bureau of Water Pollution Control	Temporary Discharge Permit	Required for discharge to surface waters, for all purposes except working in waterways, maximum of 180 days
NDEP Bureau of Water Quality Pollution Control	Section 401 Water Quality Certification	Required for impacts on water quality caused by discharges to a water body by construction activities
NDEP Bureau of Water Pollution Control	General Stormwater Discharge Permit	Required for stormwater discharge associated with construction activities disturbing at least 1 acre
Nevada Department of Water Resources	Water Right Permit	Required for the issuance of water rights
Nevada Public Utilities Commission	Utility Environmental Protection Act	Required for the construction of a utility facility

Table 1-2. Potential authorizations and permits

Agency	Permit or Approval	Regulated Activity
Nevada Division of Forestry	Native Cacti and Yucca Commercial Salvaging and Transportation Permit	Required for the salvage and removal, transport or sale of five or more native cacti or yucca from private or federal land
Nevada Division of Forestry	Permit for the Take of Critically Endangered Flora	Required for the disturbance of plant species listed as Critically Endangered (NRS 527.260 to 527.300)
Nevada Department of Motor Vehicles and Public Safety	Nevada State Hazardous Materials Permit or Roving Permit	Required for storage of flammable and combustible liquids (includes fuel storage areas and fuel depot used more than 30 days)
Nye County Permits and Approvals		
Nye County Bureau of Fire Prevention	Fire Safety Compliance Certification	Building and operation fire safety
Nye County Planning Department	Flood Damage Prevention Permit	Certification of flood zone location
Building Permit	County Building Division	Construction of facilities
Other Permits and Approvals		
NV Energy Interconnection	Approval for Interconnection	Proposed project connection to an existing NV Energy transmission line

1.7 Agency Coordination

1.7.1 Agency Communication

After the publication of the Notice of Intent (NOI) for the Proposed Action, BLM contacted relevant federal, state, and local government agencies to initiate coordination. Because of this coordination effort, the following agencies and officials were identified as having an interest in the project and were asked to submit comments:

Federal

- U.S. Bureau of Reclamation
- U.S. Army Corps of Engineers
- U.S. Air Force
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (EPA)
- National Park Service
- U.S. Senator Harry Reid
- U.S. Senator John Ensign
- U.S. Congressman Dean Heller

State

- Nevada Department of Transportation
- NV Energy Lands Service Department
- Nevada State Office Planning and Environmental
- Nevada Department of Wildlife (NDOW) – Southern Region Office

Local

- Southern Nevada Water Authority
- Esmeralda County Commissioners
- Nye County Commissioners
- Town of Tonopah

1.7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency that has jurisdiction either by law or special expertise regarding environmental impacts of a proposed action or a reasonable alternative for a federal action. The benefits of cooperating agency participation in the analysis for and preparation of an EIS include:

- disclosure of relevant information early in the analytical process
- application of available technological expertise and staff support
- avoidance of duplication of other federal, state, local, or tribal procedures
- establishment of a formal process for addressing intergovernmental issues

The following is the list of federal, state, and local agencies that were invited to be a cooperating agency for the project. Please see Appendix E in the Scoping Report for copies of the invitation letters.

Federal

- U.S. Department of Transportation
- USFWS
- U.S. Forrest Service
- National Park Service
- National Park Service: Death Valley National Park
- U.S. Department of Defense (DOD)
- U.S. Department of Energy (DOE)
- U.S. Department of Transportation Federal Aviation Administration
- EPA

State

- State of Nevada
- Nevada Department of Transportation
- NDOW
- Nevada Division of Environmental Protection (NDEP)
- State of Nevada Department of Conservation and Natural Resources
- PUC of Nevada
- Nevada State Historic Preservation Office (SHPO)
- State of Nevada Commission on Mineral Resources

Local

- Nye County Board of Commissioners
- Esmeralda County Board of Commissioners
- Town of Tonopah

Upon receipt of the invitation letter, each agency had 45 days to accept or decline the opportunity to become a cooperating agency. Cooperating agencies may contribute baseline information and/or provide input into the environmental document, as well as review the draft and final versions of the EIS.

The following agencies accepted the invitation to become a cooperating agency:

- NDOW
- National Park Service – Death Valley National Park
- Nye County, Esmeralda County, Town of Tonopah
- DOD, U.S. Air Force

On September 14, 2009, the Proponent submitted a Part I application to the DOE Loan Guarantee Program seeking a guarantee for the Proposed Project in response to the Loan Guarantee Solicitation Announcement (DE-FOA-0000140) issued on July 29, 2009. The Proponent then submitted a Part II application in December 2009. The DOE invited the Proponent to enter into the due diligence process on June 25, 2010 and initiated NEPA review for the Proposed Project. In July 2010, The DOE requested to participate as a cooperating agency pursuant to an MOU between DOE and BLM signed in April 2010.

In July 2010 the National Park Service – Death Valley National Park opted out of being a cooperating agency.

1.8 Summary of Public Scoping and Issue Identification

Scoping is an integral part of the NEPA process and provides "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). During this scoping process, BLM solicited comments from pertinent agencies and the public. These comments will be organized and analyzed so that the relevant issues can be addressed during the environmental analysis and the preparation of the EIS. Comments will help BLM define the scope of analysis for the EIS.

1.8.1 Federal Register

The *Federal Register* NOI was published on November 24, 2009, marking the beginning of the scoping period for the project. The scoping period ended on December 24, 2009. This period fulfills the BLM minimum requirement of a 30-day scoping period.

1.8.2 Announcements, and Media Releases

Announcements for the public scoping meetings were published in a variety of local and regional newspapers (see Table 1-3). Additionally, scoping meeting dates, times, and locations were posted on the BLM TFO Web site (www.BLM.gov/nc/st/en/fo/Battle_Mountain_Field.html). A public service announcement was also made on News 88.9 KNPR Nevada Public Radio on November 24, 2009.

Table 1-3. Publications for the proposed Crescent Dunes Solar Energy Project

Newspaper	Dates Published
Pahrump Mirror	December 2, 9, and 16, 2009
Pahrump Valley Times	December 3, 10 and 17, 2010
Las Vegas Review-Journal	December 2, 9, and 16, 2010
Reno Gazette-Journal	December 2, 9, and 16, 2010

Copies of these announcements can be found in the Scoping Report in the Administrative Record.

1.8.3 Public Meetings

Public meetings are required where "there may be substantial environmental controversy concerning the environmental effects of the proposed action, a substantial interested in holding the meeting, or a request for a meeting by another agency with jurisdiction over the action" (40 CFR 1506.6). Public scoping meetings locations, dates, and number of attendees are provided in Table 1-4. In accordance with BLM requirements, sign-in sheets were provided and attendees were encouraged to sign in. Copies of the sign-in sheets are provided in the Administrative Records.

Table 1-4. Public meeting information

Meeting Location	Date	Number of Attendees
Tonopah Convention Center 301 Brougher Ave, Tonopah, Nevada	Thursday, December 17, 2009	42
BLM Southern Nevada District Office 4701 N. Torrey Pines Drive, Las Vegas, Nevada	Friday, December 18, 2009	6

Note: All meetings were held from 6 to 8 p.m.

Both meetings began with a brief presentation of the project and an overview of the NEPA process. Additionally, posters summarizing the proposed project location, proposed technology, and an overview of the NEPA process were displayed for public review (Appendix D). BLM, TSE, and HDR Engineering, Inc. (HDR, the EIS consultant), representatives were available to answer questions. Project fact sheets and comment cards were provided at each meeting. Comment cards were provided so members of the public could submit comments regarding issues or concerns, reasonable changes or additions to the proposed project, or any other comments or questions. Comment cards could be submitted at the meeting, mailed, or faxed to the BLM TFO. Additionally, any written comments could be submitted by fax, mail, or e-mail to the BLM TFO.

1.8.4 Summary of Public and Agency Comments

Twenty-four comments on the proposed project were submitted (Table 1-5). Comments included concerns and questions regarding public lands, threatened and endangered species, water resources, cultural resources, dark skies, socioeconomic impacts, and cumulative impacts and connected actions.

Table 1-5. Summary of public and agency comments received

Organization/Name	Comment	Comment Type
U.S. Environmental Protection Agency Tom Plenys	DEIS should clearly identify the underlying purpose and need to which BLM is responding in proposing the alternatives. The DEIS should describe how each alternative was developed, how it addresses each project objective, and how it would be implemented. The DEIS should estimate the quantity of water the project will require and describe the source of this water and potential effects on other water users and natural resources in the project's area of influence. The DEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area. EO 13112, mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. The cumulative impacts analysis should provide context for understanding the magnitude of the impacts of the alternatives by analyzing the impacts of other past, present, and reasonably foreseeable projects or actions and then considering those cumulative impacts in their entirety. The DEIS should consider how climate change could potentially influence the proposed project, specifically within sensitive areas, and assess how the projected impacts could be exacerbated by climate change. The DEIS should provide a detailed discussion of ambient air conditions (baseline or existing conditions), NAAQS, criteria pollutant nonattainment areas, and potential air quality impacts of the proposed project. Consultation for tribal cultural resources is required under Section 106 of the NHPA. EO 12898 directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations. The DEIS should address potential direct, indirect, and cumulative impacts of hazardous waste from construction and operation of the proposed project. The DEIS should discuss how the proposed action would support or conflict with the objectives of federal, state, tribal or local land use plans, policies and controls in the project area.	General Water resources Land use Threatened and endangered species Cumulative impacts Climate change Air quality Hazardous materials

Table 1-5. Summary of public and agency comments received

Organization/Name	Comment	Comment Type
U.S. Fish and Wildlife Service Nevada Fish and Wildlife Office Kathleen Erwin	The Nevada Fish and Wildlife Office has received your November 24, 2009 scoping notice for this project. Based on our workload we are unable to provide you with comments at this time. However, we would appreciate remaining on your mailing list to review the draft EIS when complete. Please contact our office if you have any questions regarding listed or proposed species or migratory birds.	General
U.S. Geological Survey Brenda Johnson	Has reviewed plan and has no comment.	General
Duckwater Shoshone Tribe Virginia M. Sanche	At the present time, Duckwater Shoshone Tribe has no concerns with the project. However, the Tribe recommends that the Tonopah Field Office contact the Yomba Shoshone Tribe, as the project is closer to their traditional homelands.	Native American concerns
Timbisha Shoshone Tribe Barbara Durha	Concern that their tribe has not seen cultural reports, have not had opportunity to provide input and would like extension of deadline for comment.	Cultural resources
Nevada State Clearinghouse Robert K. Martinez, P.E.	All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of Chapters 533 and 534 of the Nevada Revised Statutes (NRS) and not otherwise. No use of surface water or groundwater is to occur unless a permit is issued.	Water resources
Nevada State Clearinghouse Skip Canfield	Regarding dark sky attributes, solar facilities should have shields placed on all lights; a comprehensive look at visual impacts should be considered when the BLM reviews any development plans on public lands in Nevada and nationally.	Dark skies
Nevada Department of Wildlife D. Bradford Hardenbrook	Concern for wildlife and birds under the migratory bird treaty act, desert kangaroo rat, pale kangaroo mouse, kit fox, pronghorn antelope, scarab beetle, etc.	Wildlife

Table 1-5. Summary of public and agency comments received

Organization/Name	Comment	Comment Type
Nevada Division of Mines Alan Coye	The EIS should consider the following: 1. The proposed project will apparently withdraw 1,600 acres of land from the operation of the mining law and the staking of mining claims. 2. The proposed project is located in an area of pediment adjacent to two highly mineralized mountain ranges, the Royston Hills to the west and the San Antonio Mountains to the east. Many new mineral deposits in Nevada are being discovered beneath the pediment adjacent to mineralized mountain ranges. 3. The San Antonio Mining District which contains the significant molybdenum deposit (Liberty Deposit) controlled by General Moly occurs approximately six miles from the proposed location. 4. The proposed project may occur in an area prospective for lithium-bearing brines, which are being actively explored for in nearby areas. 5. The area of the proposed project may be prospective for geothermal energy. The EIS needs to analyze and carefully consider the impacts from the proposed project to the development of other possible natural resources in the area.	Land use Cumulative effects Mineral rights
Nye County Nuclear Waste Repository Office Lewis Darrell Lacy, Jr.	One of the main issues is the availability of water for current and future use, given that the local basins have limited recharge and existing water supplies are over allocated based on the current amount of water rights issued, any transfers of water rights for this project will be adjudicated by the Nevada State Engineer; however, the cumulative impact of water use technologies should be comprehensively addressed during the EIS process. Nye County requests that the BLM and Solar Reserve cooperate with our staff and local communities during the EIS process to identify all impacts-direct, indirect, and cumulative-from the construction and operation of this facility. Once the impacts from the plant are identified, we desire to consult within the EIS process to help develop appropriate mitigation measures as well as ensure that appropriate buffers and equipment designs are incorporated to minimize disturbance to the area.	Water resources Cumulative impacts

Table 1-5. Summary of public and agency comments received

Organization/Name	Comment	Comment Type
Town of Tonopah Terry Rivero, Chairman	Any comments or concerns that the Town of Tonopah staff had in regard to the site location for this project were addressed directly with Solar Reserve or are being addressed by Nye County's renewable energy team. Resource or service deficiencies are being identified in the areas of: housing, schools, water, waste water, and emergency services. Solar Reserve also seriously considered our area's most precious and finite resource, water, by deciding to implement a dry, rather than wet, cooling process.	Community resources Water resources
Tonopah Town Board Horace Carlyle	Strong supporter with attached letter! Would like to be added to mailing list.	General
Tonopah Astronomical Society Thomas W. Cohen	Concern for the Dark Sky – please conform to lighting recommendations.	Dark skies
Nevada Wilderness Project John C. Tull	Concerns for wildlife – scarab beetle, milkvetch, pale kangaroo mouse.	Wildlife
Center for Biological Diversity Rob Mrowka	Concern for impact on rare species and habitats, off-road vehicle use impacts, cumulative and connected actions (consider other projects and cumulative impact of this project in conjunction), conflicting land uses (area is an ORV park, which could lead to dirty solar panels and a lot of extra water to clean them!), privatization of site, decommissioning and restoration. Also, want to be an active stakeholder.	Threatened and endangered species Off-highway vehicle impacts Cumulative effects Water resources
Tonopah Sand and Gravel Carl Wright	We would like to be permitted to become a preferred vendor and participate in the initial bidding process so that we may be allotted the opportunity to provide our local services to this well-founded energy project	General
Western Lithium Corporation Dennis P. Bryan	Could a geothermal well fit on the property too? What about underground metal deposits? Would like to see multiple uses for property.	Land use
Individual John Mudge	My sense is that we should not "break our pick" on this one. 1,600 acres is pretty small and, of course, we don't want to be seen as opposing renewables. I do endorse keeping our eyes and ears open to land use proposals as they come along so that we can comment appropriately. The updated RMPs that are going on in Winnemucca and that are scheduled for Battle Mountain and then Elko are key examples.	Land use
Individual Richard Delong	I think it is good to make sure that the BLM continues to consider all resources when making discretionary decisions.	General

Table 1-5. Summary of public and agency comments received

Organization/Name	Comment	Comment Type
Individual Brad Mamer	How do I obtain specific information on the government lease of these public lands?	Public lands
Individual David Haig	I attended the public forum in Tonopah for the Crescent Dunes project and was quite impressed by the presentation. Being in a desert region, there were concerns about water supply and they seem to have that planned for. There were also concerns about night-time lighting affecting Tonopah's dark sky environment and they have planned for that with minimal lighting needed and with the use of shielded light fixtures. I think this is an excellent project to help diversify Nevada's energy supply with minimal impact to the environment. This project will also bring much needed jobs to the area and will also help diversify the local tax base and may even be a boost to local tourism.	General Water resources Dark skies Socioeconomic conditions
Individual Dan Lingelbach	I am in favor of this project as it is large enough to produce some realistic data regarding the feasibility of concentrating solar thermal electric power production. Hopefully, they will account for the energy that must be used to produce such a facility including the site preparation, faulting all the equipment to the site, installation, man-hours, checkout costs, etc. I assume that those costs will be available soon after completion and then later on the total power production for at least a year of operation. I would appreciate being kept informed.	General
Individual John E. Hiatt	Lack of ground water, rare plants, drainage plan, concern about size of tower and whether this is going to be successful or experimental, mitigation for impact to lost resources, wildlife migration routes, bird attraction to panels and the results of this cumulative impact to the dunes, socioeconomic impact of influx of construction workers, reclamation bonding.	Water resources Wildlife Cumulative effects Socioeconomic conditions
Individual John Snow	Would the current pre-existing mineral rights policies cover the mining and geothermal concerns if the withdrawal is apparent and not prescribed in the EIS?	Mineral rights

Note: Full versions of comments are included in Appendix F of the Public Scoping Report.

Because reasonably foreseeable future actions contribute to the cumulative effects of the proposed project, these actions are discussed in Chapter 4.0.

1.9 Organization of the Environmental Impact Statement

This EIS follows the CEQ recommended organization, in accordance with 40 CFR 1502.10, and BLM guidelines described in the BLM Handbook H-1790-1. The Chapters and their content are described in Table 1-6.

Table 1-6. Description of EIS chapters

Chapter	Description
Chapter 1 – Introduction and Purpose and Need	This chapter provides a description of the purpose of, and need for, the Proposed Action, the role of the U.S. Bureau of Land Management in the Environmental Impact Statement (EIS) process, required regulatory actions for the proposed project, and the public and agency scoping summary.
Chapter 2 – Alternatives Including the Proposed Action	This chapter describes the Proposed Action and alternatives analyzed in the EIS, including the No Action Alternative. Alternatives that were considered but eliminated from further analysis are described, with a discussion of why they were not considered further.
Chapter 3 – Affected Environment	This chapter describes the existing environment that could be affected by granting the rights-of-way requested by the Proponent.
Chapter 4 – Environmental Consequences	This chapter describes possible environmental consequences of the Proposed Action and alternatives analyzed in the EIS. Direct, indirect, and cumulative effects of the Proposed Action and alternatives are assessed and described in order to allow for comparative impact evaluation. Impacts are compared to the social and natural environment that would be expected to exist if no action were taken (the No Action Alternative).
Chapter 5 – Consultation and Coordination	This chapter describes public participation undertaken to date. It also lists agencies and organizations that will receive copies of the Draft EIS for review and lists the preparers of the document.
Chapter 6 – References	This chapter includes a list of references used in the preparation of the EIS.
Chapter 7 – Glossary	This chapter includes a glossary of technical terms used in the EIS.
Chapter 8 – Index	This chapter includes an index listing of key words used in the EIS.

2.0 Alternatives Including the Proposed Action

2.1 Introduction

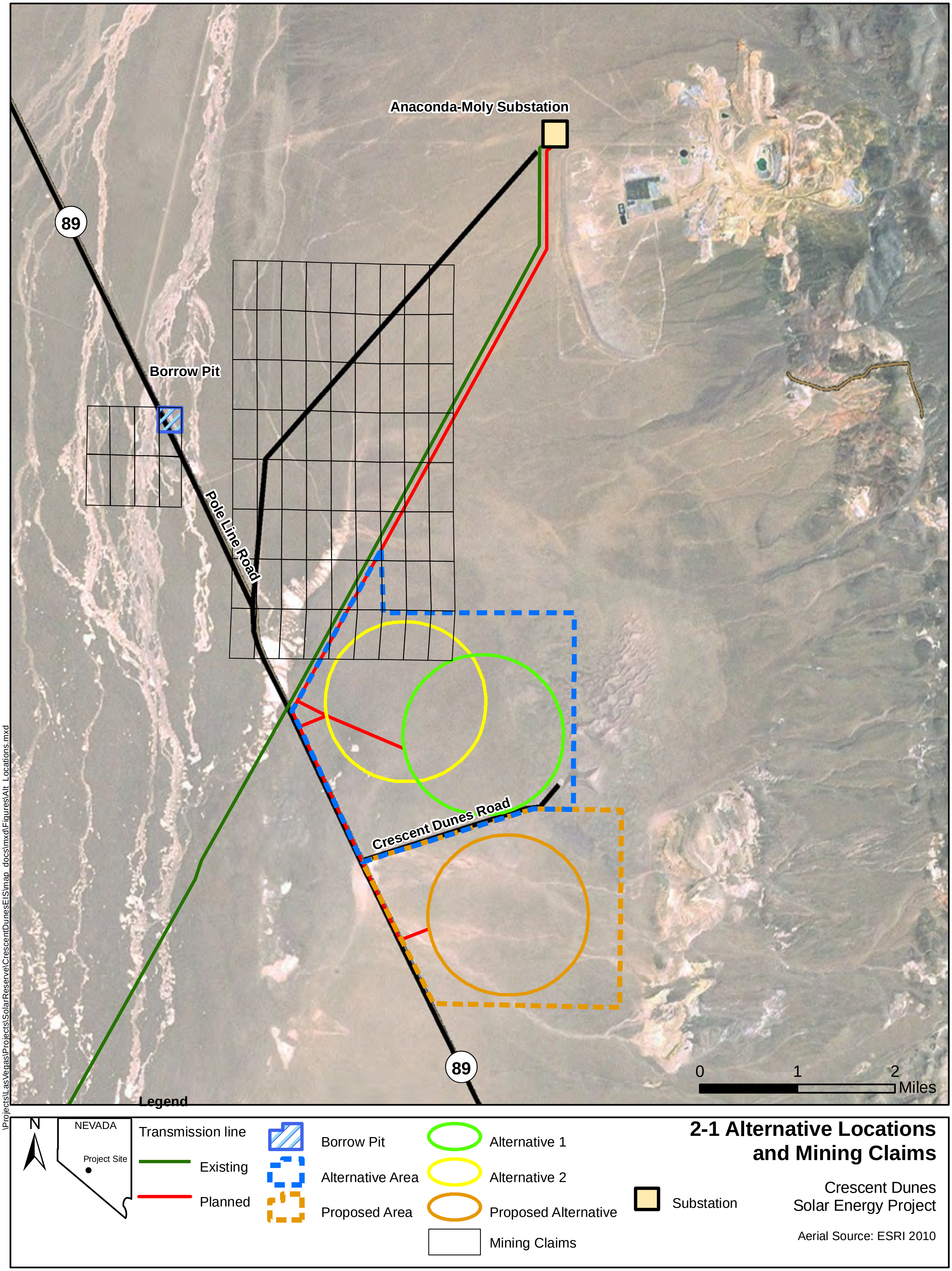
The Proposed Action for BLM is to evaluate a ROW application submitted by TSE to construct and operate a 110 MW solar power generating facility (proposed project) based on CSP. This technology uses heliostats (reflecting mirrors) to redirect sunlight on a receiver erected in the center of a solar field. The solar power facility is proposed to be located on BLM property located in Nye County, Nevada. The BLM ROW grant would be for a term of 30 years and would be renewable. Additionally, two alternative sites are being considered as possible locations for the proposed solar power facility, and these are shown in Figure 2-1 and described in detail in Section 2.6, Alternatives to the Proposed Action. This chapter provides a description of the alternatives analyzed in this EIS and includes the Proposed Action, the No Action Alternative, and the two alternative sites. This chapter also includes a comparative analysis of alternatives studied in detail; other alternatives considered but eliminated from further evaluation; and the identification of the BLM-preferred alternative. Under the No Action Alternative, no solar facility would be constructed, and the environmental and social setting would continue to be consistent with the current conditions.

2.2 Project Background

SolarReserve, doing business as TSE, is a Santa Monica, California, based energy company formed by US Renewables Group, a private equity firm focused exclusively on renewable energy. SolarReserve now holds the exclusive worldwide license to build solar plants that use equipment manufactured by United Technology Corporation's subsidiary, Pratt & Whitney, through its Rocketdyne division.

As illustrated in Figure 1-2, the nearest community to the proposed project site is the town of Tonopah, Nevada, which is located approximately 13 miles to the southeast of the site (from the proposed project site, 8.5 miles south along Pole Line Road [State Route 89] to State Highway [SH] 95/6, and then 4.5 miles east along SH 95/6 to Tonopah). The project overlaps or bisects several existing mining claims in the region (Figure 2-1) The land necessary for construction of the proposed solar power plant, including the heliostat array, power block, and associated facilities, consists of 1,673 acres located within the land boundaries described in Section 1.3, Project Location, and shown on Figure 2-2. The proposed boundaries as filed in the SF-299 application are currently in excess of the minimum needed to site the physical equipment. The project is in the preliminary project design stage, and the additional land will allow the Proponent the flexibility to (1) adjust the location of the central tower based on the results of soils/geotechnical, cultural, and biological baseline studies and (2) determine an adequate buffer between plant facilities and any adjacent uses before finalizing the equipment location within the ROW and finalizing the plant boundaries.

TSE performed preliminary screening on additional BLM land near NV Energy's Anaconda Moly Substation. TSE's technology has specific siting requirements, including a large open space of approximately 4 square miles, minimal slope, transmission access, water availability, road access, and high solar incidence. TSE is also limited to sites not already claimed by other developers.



2-1 Alternative Locations and Mining Claims

Crescent Dunes
Solar Energy Project

Aerial Source: ESRI 2010

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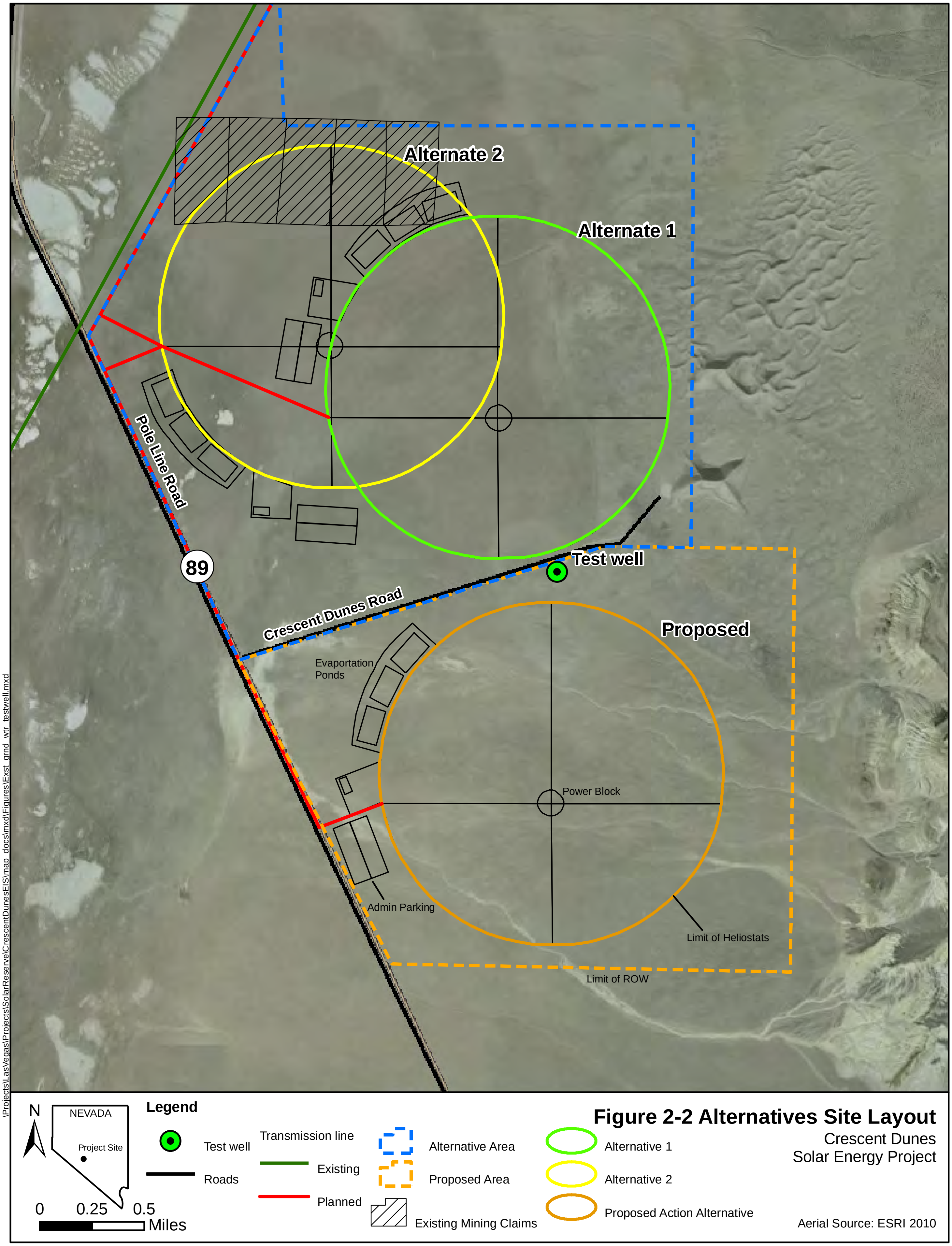

Figure 2-2 Alternatives Site Layout

Crescent Dunes
Solar Energy Project

Aerial Source: ESRI 2010

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The site selection process for the proposed project involved screening sites based on the following parameters:

- siting area with minimum area of 4 square miles, contiguous in configuration
- solar resource
- distance from TLs and substations
- land ownership
- water data
- topography
- wind data
- airport locations
- highways/roads
- faults
- population centers
- military bases
- BLM SF-299 applications pending
- various environmental constraints

Based on these criteria and BLM land available, the proposed project site was identified. The proposed project site is situated on a relatively flat piece of BLM-managed land covering approximately 2,950 acres. The annual average direct normal solar resource for this site averages 7.4 Watt-hours (Wh) per square meter (m^2) per day. NV Energy's Anaconda Moly Substation is located to the north of the proposed project site. Additionally, the proposed project site is not located in Areas of Critical Environmental Concern (ACECs) or areas of potential impact to military operations based on the DOD online screening tool. Other regional sites had the requisite minimum 4 square miles of contiguous BLM lands but were farther away from transmission substations of interest compared to the proposed project site. These other regional sites are discussed in more detail in Section 2.6.2, Alternatives Considered but Eliminated from Detailed Analysis.

The project is proposed on lands administered by BLM for several reasons. According to the National Renewable Energy Laboratory United States Solar Atlas, the proposed project site maintains high insolation levels on a year-round basis, creating ideal conditions for solar energy generation. While undeveloped parcels of land exist in Nevada, it can be difficult to acquire parcels from private parties and assemble the acreage needed for a CSP plant. If enough private land were acquired, permitting issues at a local level within a jurisdiction with no policy on solar development can be difficult. The BLM's general solar policy is to facilitate environmentally responsible commercial development of solar energy projects on public lands and to use solar energy systems on BLM facilities where feasible (BLM 2007). Given the BLM's solar policy and the advantage of the BLM controlling large areas of land in the Southwest, the Proponent is proposing this project on BLM-administered lands as opposed to on private lands.

2.3 Regulatory Framework of Alternatives

BLM is required by NEPA to evaluate not only the Proposed Action, but reasonable alternatives including the No Action Alternative (40 CFR § 1502.14). Section 1502.14(a) requires federal agencies to explore a reasonable range of alternatives, "and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." The CEQ guidance concerning NEPA regulations adds that reasonable alternatives include those that are "practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" (CEQ 1981).

When granting a ROW, FLPMA Title V requires BLM to include in the ROW terms and conditions that minimize environmental impacts. Specifically, such terms shall "minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment… require compliance with applicable air and water quality standards established by or pursuant to applicable federal or state law; and … require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation and maintenance of" the ROW (43 U.S.C. § 176(a)) Consideration of such terms and conditions will be part of the alternatives analyzed in this Draft EIS.

2.4 Existing Facilities

The only existing facility in the area associated with this proposed project is a groundwater well (BLM No. 88177, expires 12/31/2013) that was established in 2010 to substantiate the presence and quantity of groundwater in the area in support of permit requests for use of the water and to support evaluating environmental impacts (Figure 2-2). The well is approximately 500 feet deep and 6 inches in diameter. The well would be used as a water source during construction of the facility. Development of the project would include establishing a pump house and associated infrastructure as described later in this chapter. Upon completion of construction the well will be plugged and abandoned in accordance with provisions contained in Nevada Administrative Code (NAC) 534.4365 (WorleyParsons 2010a). The project proposes to construct a new well closer to the center of the project (the power block) as the source of water for the proposed operation of the facility.

2.5 Proposed Action

2.5.1 Project Overview

The proposed solar power project uses CSP technology, which uses heliostats/reflecting mirrors to redirect sunlight on a receiver erected in the center of the solar field (the power tower or central receiver). A heat transfer fluid (HTF) is heated as it passes through the receiver and then is circulated through a series of heat exchangers to generate high-pressure superheated steam. The steam is then used to power a conventional Rankine cycle steam turbine/generator, which produces electricity. The exhaust steam from the turbine is condensed and returned via feedwater pumps to the heat exchangers, where the high-pressure superheated steam is generated again. Hybrid cooling processes are to be used for this project to minimize water use while continuing to maintain efficient power generation. Figure 2-3 presents a conceptual diagram of the process.

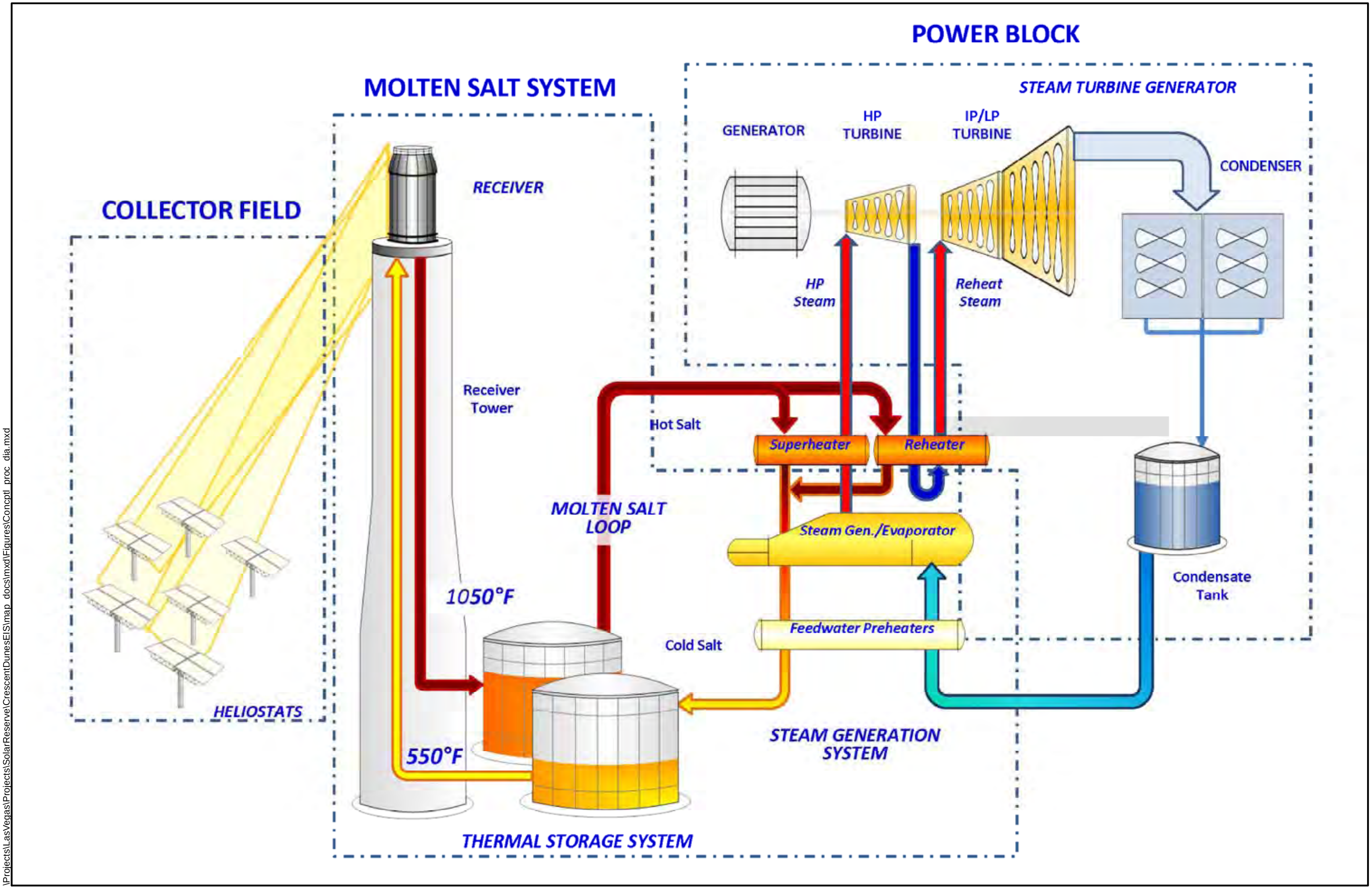

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Figure 2-3 Conceptual Process Diagram

Crescent Dunes Solar Energy Project

Source: Solar Reserve

Both the central receiver and type of HTF used in the cycle distinguish TSE technology from other CSP technologies. The salt is a combination of sodium and potassium nitrate ($NaNO_3$ and KNO_3) (similar to commercial fertilizer), with a melting temperature of approximately 460°F. It is melted to a liquid form and circulated through the tubes in the central receiver, collecting the energy gathered from the sun. The heated salt is then routed to an insulated storage tank (hot thermal storage tank) where the energy can be stored with minimal energy loss. When electricity is to be generated, the hot salt is routed to the heat exchanger (or steam generator) and used to produce steam at high temperature. After exiting the steam generator, the salt is sent to a “cold” salt thermal storage tank and the cycle is repeated.

The other key characteristic of the TSE’s technology is a central tower. The approximately 653-foot-tall tower and the size of the solar array or heliostat field have been optimized by TSE in conjunction with Rocketdyne to operate at a commercial scale and produce renewable energy at a competitive price.

A brief summary of the various components and aspects of the proposed project is provided below in Section 2.5.2, Project Component Summary, and additional detail on each is provided in Section 2.5.3, Project Component Additional Detail.

2.5.2 Project Component Summary

Generating Facility Components

- Solar Collecting Tower (Figure 2-4) – The concrete tower would be approximately 538 feet tall and would house a 100-foot-tall cylindrical solar receiver and a 15-foot maintenance crane. The total height would be approximately 653 feet, and would have appropriate lighting for aviation safety and lightning protection.
- Solar Array (Figure 2-5) – The array would consist of a circular field encompassing an area with a radius of 4,300 feet (approximately 330 acres) where the heliostats (or mirrors) would be located.
- Power Block (Figure 2-6) - The power block, in a circular area with a radius of about 400 feet, would house the central receiver tower, storage tanks, steam turbine, ACC, transformers, heat exchangers, power block buildings, and other ancillary equipment.
- Osmosis Water Treatment System and Evaporation Ponds – These facilities would purify the groundwater to be used in the production of electricity.
- Hybrid Cooling System – The system would include an evaporative cooling tower and ACC.
- Thermal Storage System – The storage system would include two large, insulated storage tanks and associated piping for the liquefied salt, one “hot” tank for the storage of the materials prior to use in generating the steam, and a “cool” tank for storing salt prior to resending it to the central tower for heating.

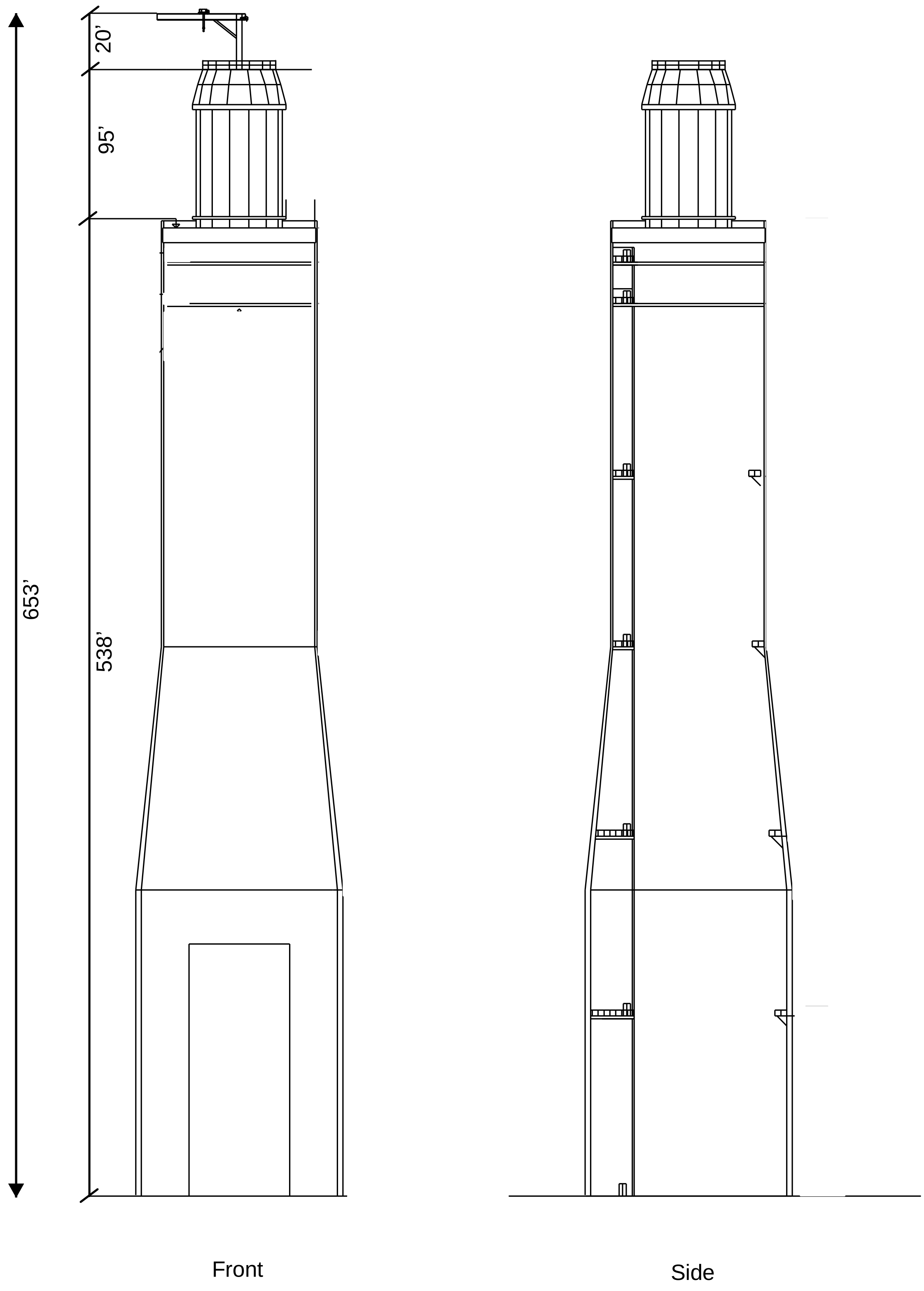

Figure 2-4 Central Receiving Tower
Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

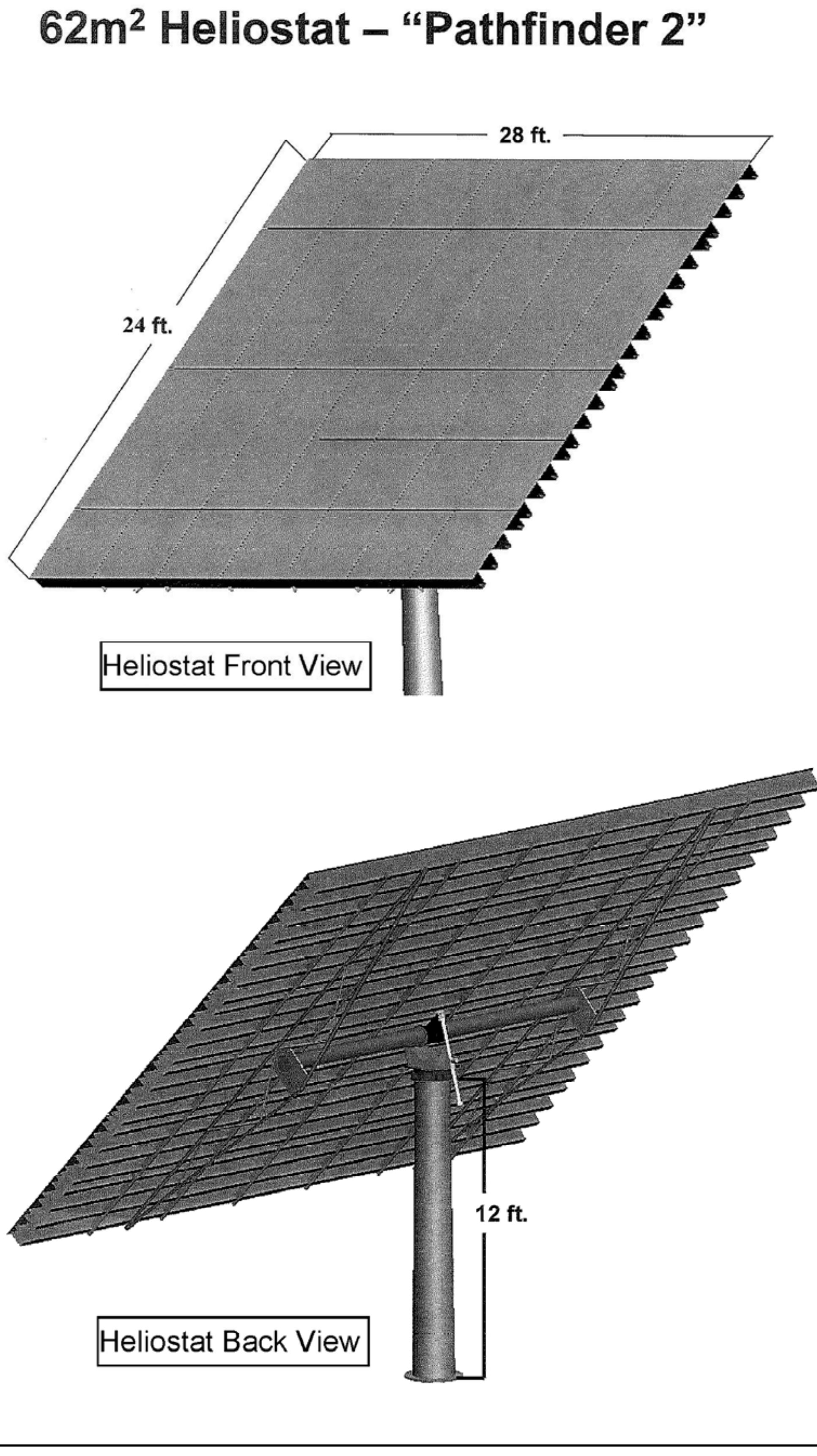

Figure 2-5 Heliostat
Crescent Dunes
Solar Energy Project

Source: TSE Plan of Development

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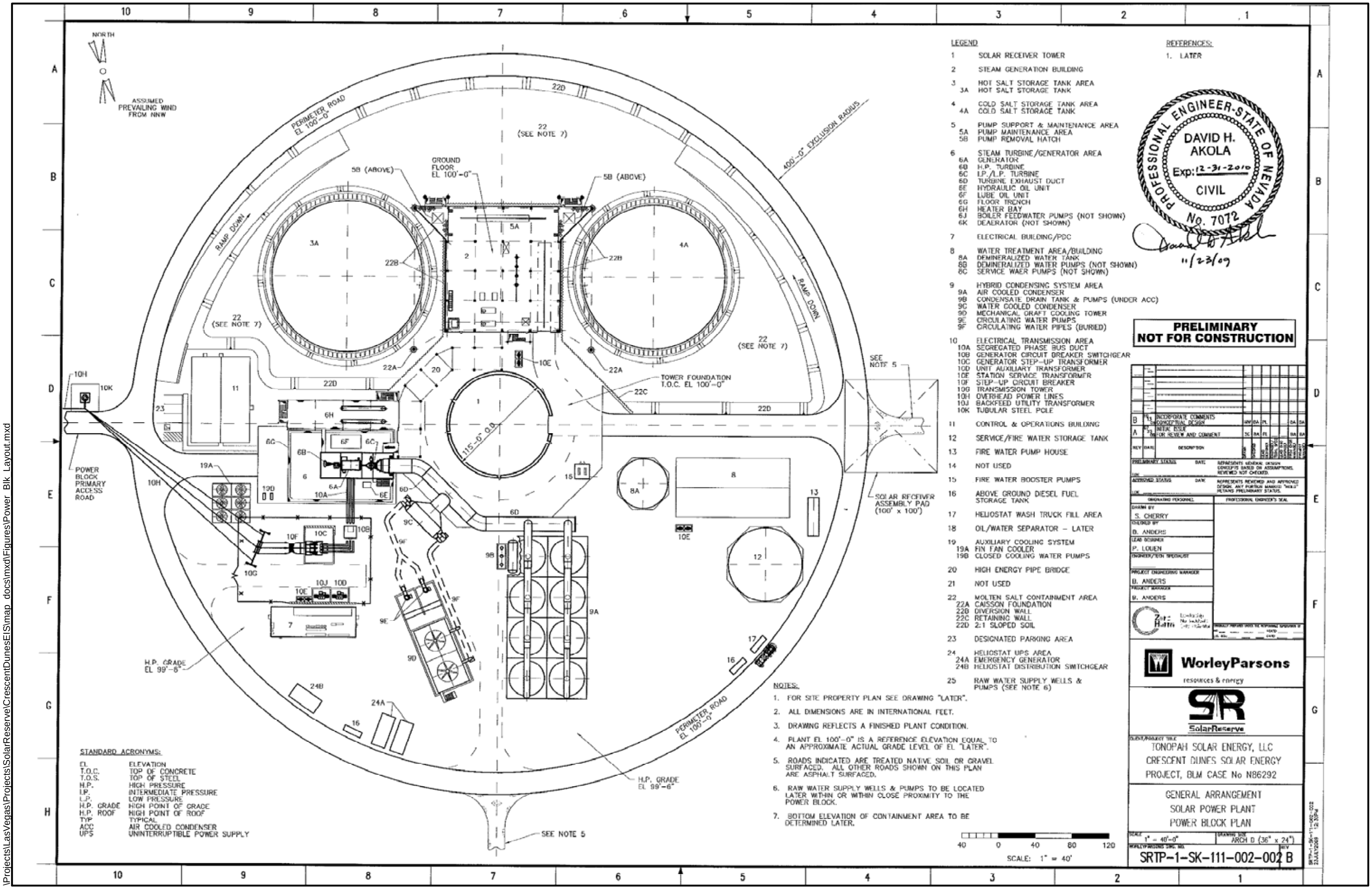

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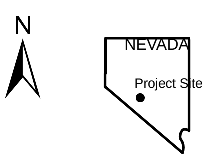


Figure 2-6 Power Block Layout
Crescent Dunes
Solar Energy Project

Source: TSE Plan of Development

Major Electrical Systems and Equipment

- Generator Step-Up (GSU) Transformer – A GSU Transformer would be designed and installed in accordance with current standards and guidelines for a project of this size. The GSU steps up the voltage to 230 kV for delivery to the electrical grid.
- Unit Auxiliary Transformers (UATs) – UATs would be used to convert electricity to a lower voltage for use in the plant auxiliary systems.
- Electrical Building – A small building would be constructed in the power block to house switchgears, motor controllers, control panels, power and lighting panels, control equipment, a battery back-up system, and other similar items.
- Emergency Power Generator(s) – Diesel-powered generator(s) would be used to provide emergency power in addition to the battery back-up system.
- Lighting Systems – The lighting system for the facility would be limited to those areas required for safe operation of the facility. Where lighting is required, it would be designed and installed to minimize visual impacts in the region.
- Communication Systems – The Supervisory Control and Data Acquisition (SCADA) system, which controls power generation and transmission processes, would use fiber-optic or copper lines in the facility. Other communications during construction and operation would occur through new fiber-optic or copper lines installed in the TL corridors, or through a satellite (dish) system.

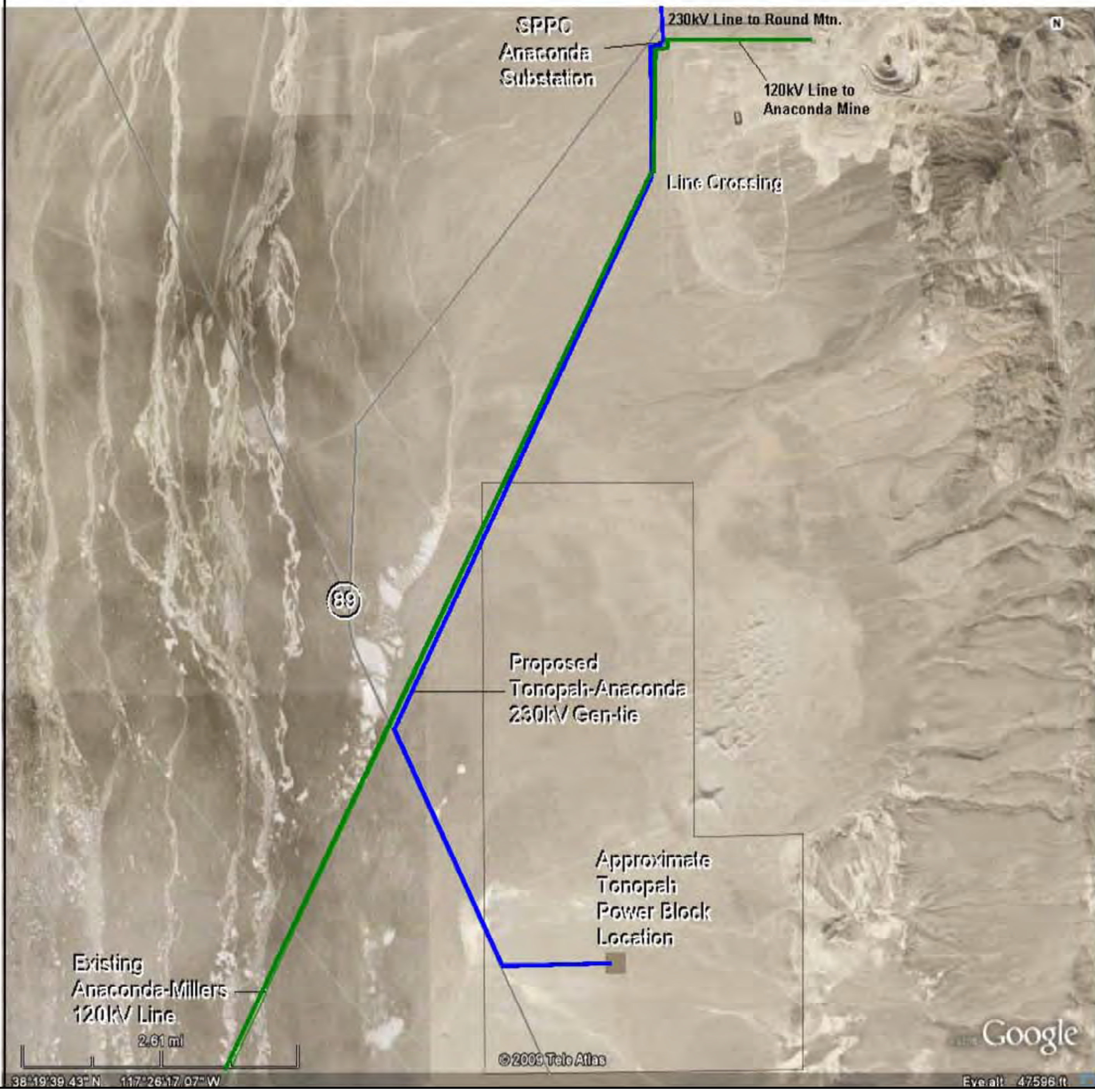
Transmission Systems and Interconnections

- Transmission Route (Figure 2-7) – The outgoing TL would follow the proposed project site access road to Pole Line Road, head north along Pole Line Road to where the Millers to Anaconda TL is located, and then parallel the Millers to Anaconda TL to the Anaconda Moly Substation, for a distance of approximately 9.5 miles.
- Interconnections (Figures 2-8, 2-9, and 2-10) – The project would interconnect to the Anaconda Moly Substation located approximately 6 miles due north of the generating facility location.
- A temporary 60 kV transmission line for construction power, to be located within the permanent ROW.

Civil/Structural Features

- Access Roads (Figures 2-11 and 2-12) – A paved, two-lane access road would extend approximately 1,500 feet from Pole Line Road to the facility. An existing access road that follows the Millers to Anaconda TL, would be used for access during construction and for maintenance of the TL. Pole Line Road would also be used for access to the TL where the TL would follow Pole Line Road.
- Building and Enclosures – A control building, a warehouse, and other buildings would be developed within the project area to support operations of the facility.
- Storage Tanks – Tanks would be constructed to store demineralized water, non-demineralized water, salt or HTF, lube oil, and other materials for the power block.

- Site Drainage (Figures 2-13 and 2-14) – The heliostat array would be graded such that existing drainage patterns will be maintained, but the area in the power block will graded to divert stormwater to ditches.



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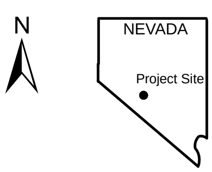

Figure 2-7 Transmission Route
Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

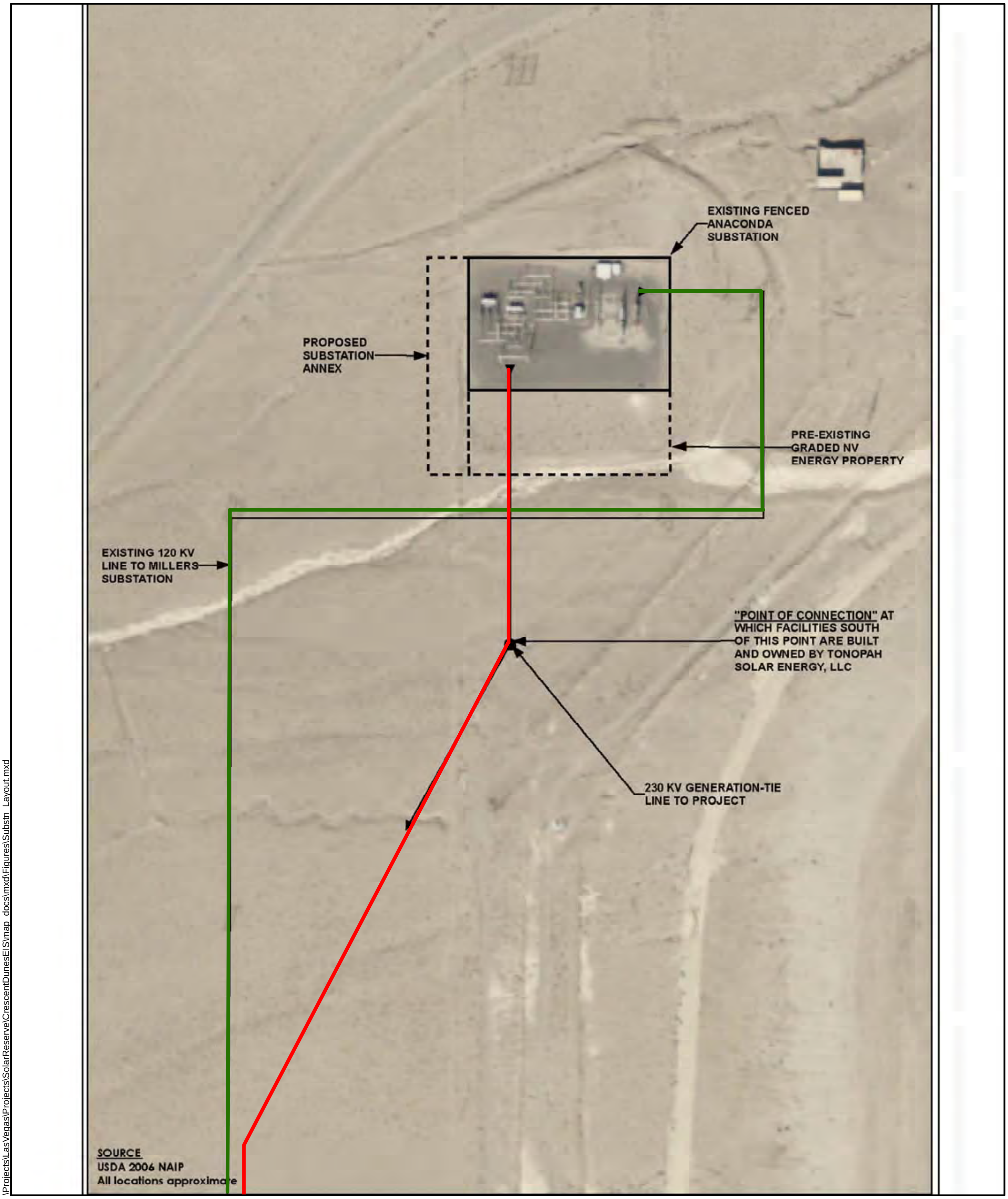

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Figure 2-8 Substation Layout

Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

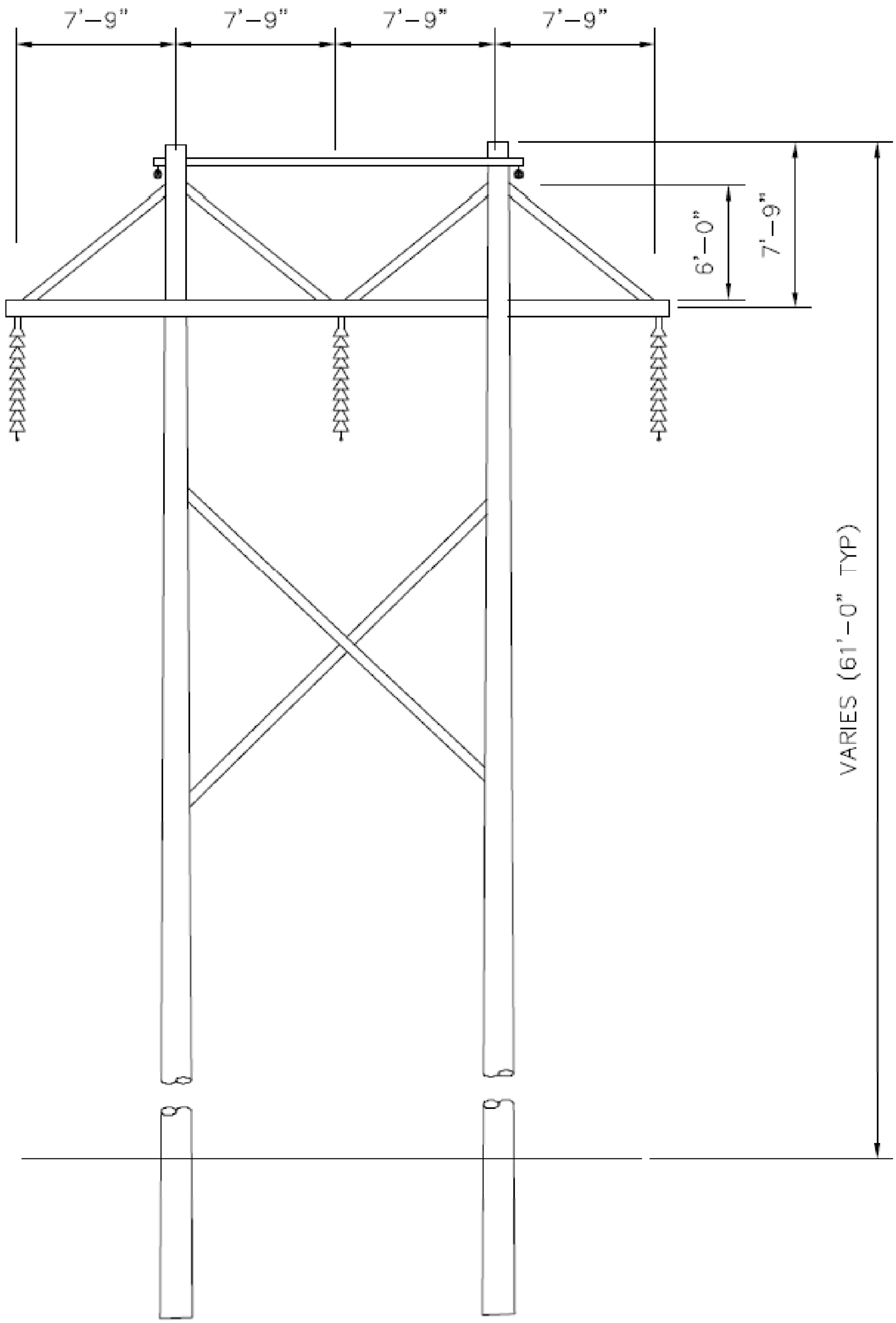

Figure 2-9 Pole Elevation
Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

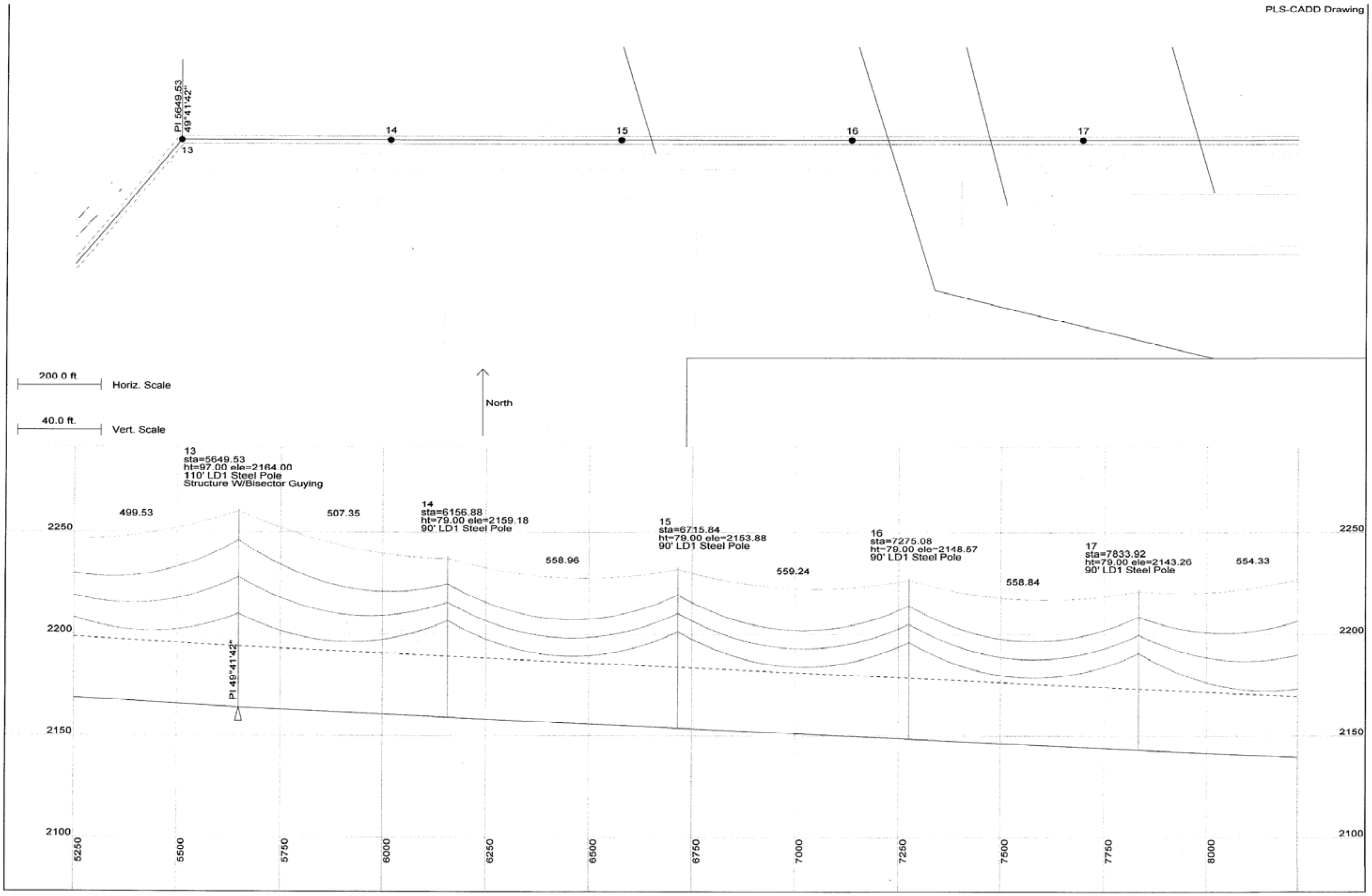

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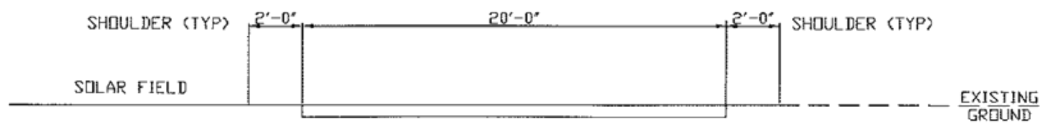
Figure 2-10 Transmission Line Profile

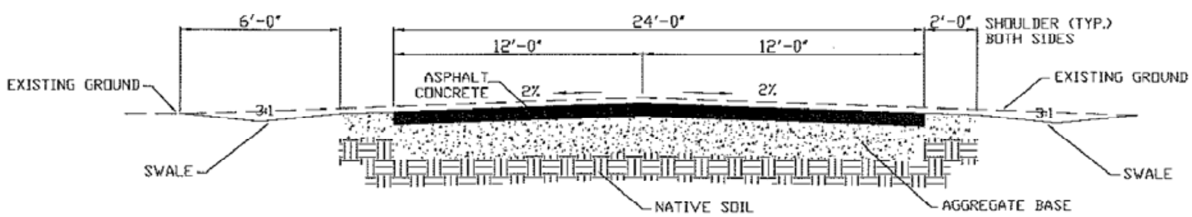
Crescent Dunes Solar Energy Project

Source: TSE Plan of Development



1 PERIMETER ROAD- AGGREGATE SURFACE DETAIL

NOT TO SCALE



2 ACCESS ROAD SECTION (TYP.)

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Figure 2-11 Road Sections

Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

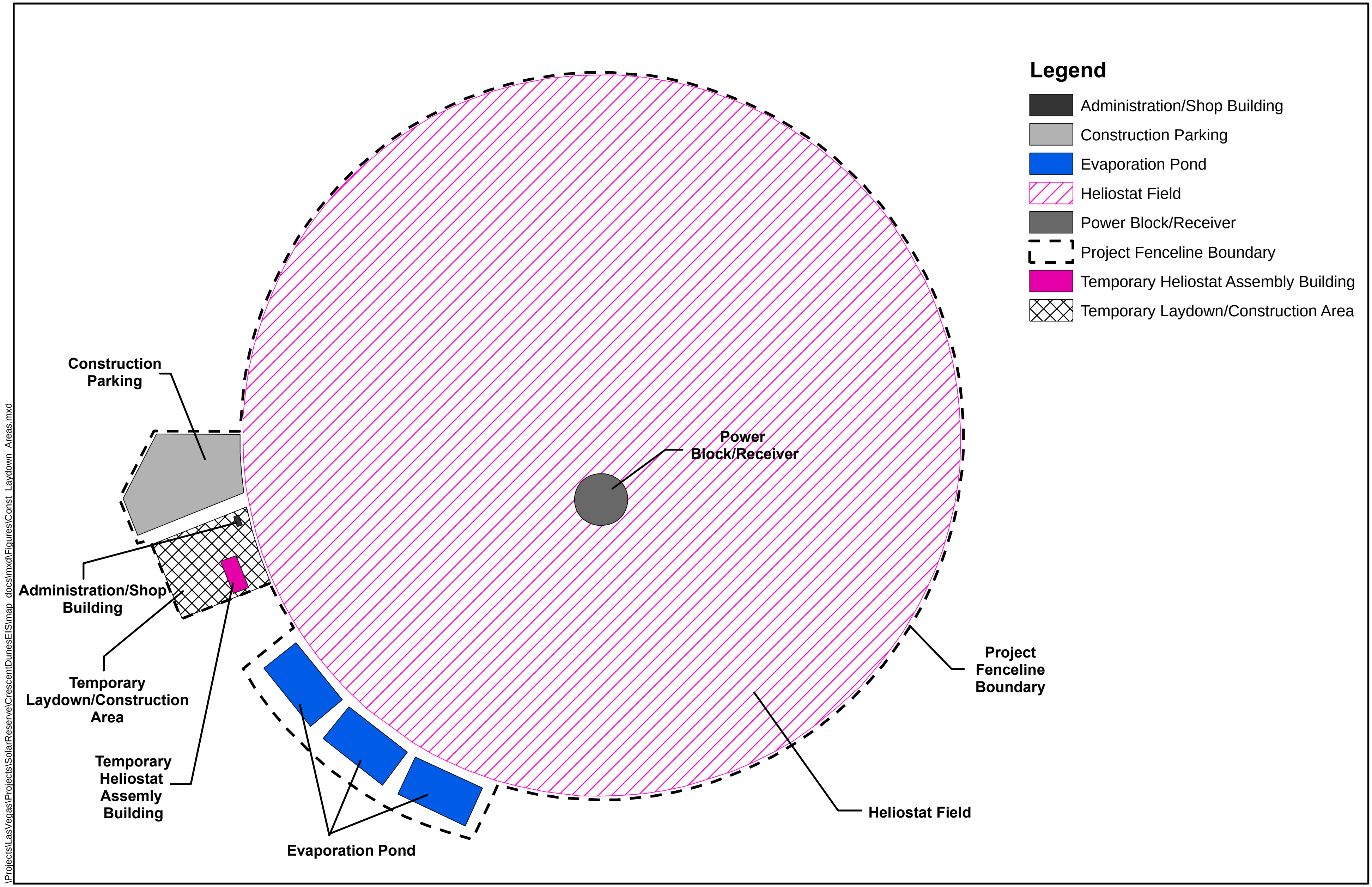
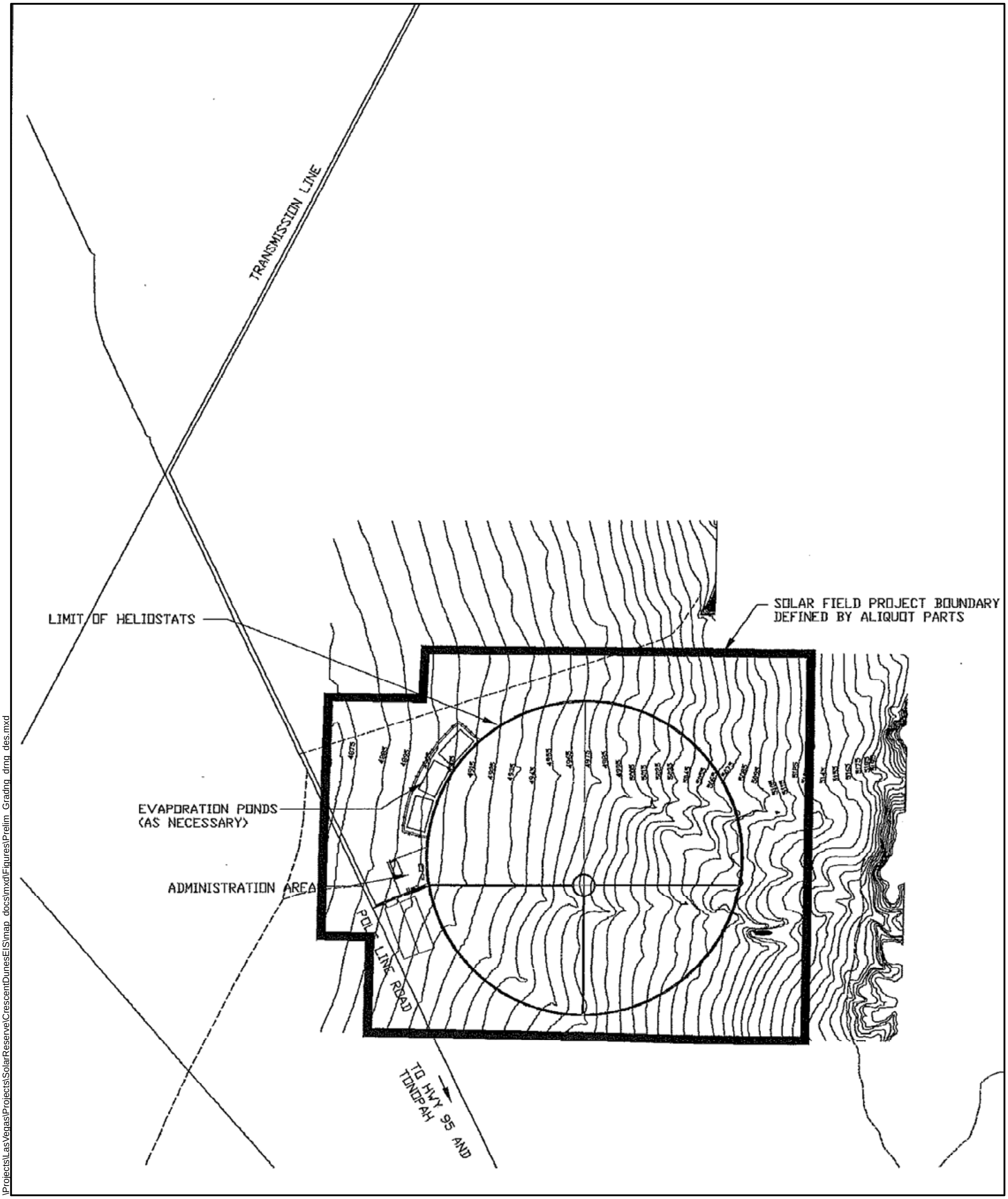


Figure 2-12 Example Temporary Constuction Areas
Crescent Dunes
Solar Energy Project

Source: Solar Reserve



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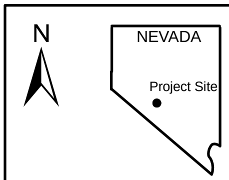
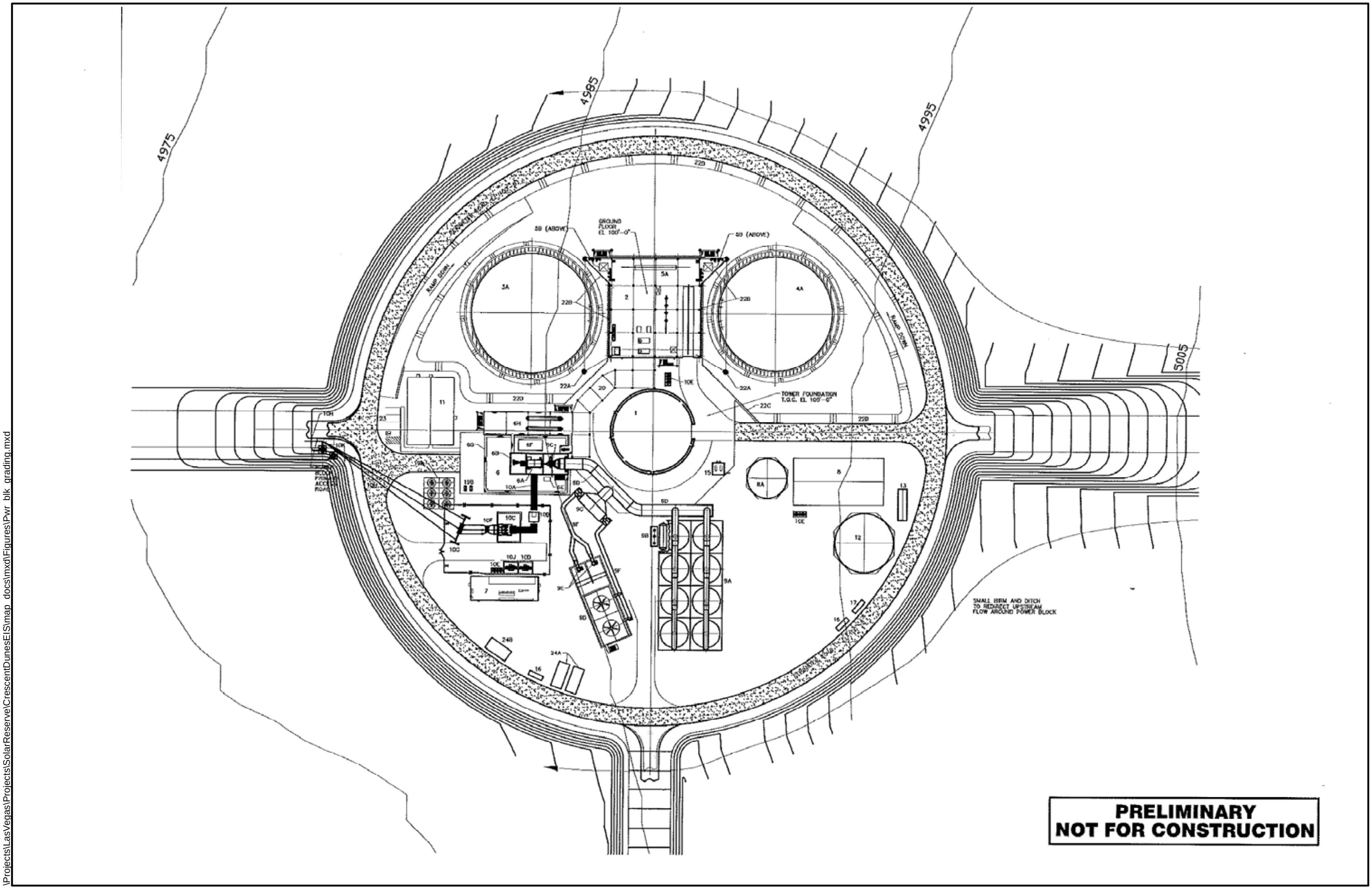


Figure 2-13 Preliminary Grading & Drainage Design for Proposed Project

Crescent Dunes Solar Energy Project

Source: TSE Plan of Development



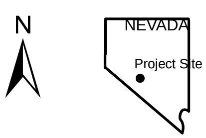


Figure 2-14 Power Block Grading and Drainage
Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

Construction Activities

- Construction Facilities – Facilities would include an office trailer, material lay down areas (Figure 2-12), rock processing equipment, portable concrete batch plant, temporary aboveground storage tank for diesel fuel, portable sanitary toilets, and a temporary septic system.
- Borrow Site – A material borrow site would be required for extracting aggregate for the construction of the access road and the base of the proposed facility. This material would come from a borrow site located next to an existing pit used by Nye County Public Works.
- Construction Process and Conceptual Schedule – Construction is scheduled to last 30 months, with teams expected to work 10 hours per day, 5 days per week. Work activities may be up to 24 hours per day and up to 7 days per week to make up on schedule, perform certain tasks at night, and to prepare for specific activities for the next day.
- Construction Work Force and Equipment – The work force would vary throughout the construction process, with a maximum expected to reach 400–500 workers.

Operations and Maintenance

- Operation – The plant would be operated 7 days per week for 10 or more hours per day using a workforce of 40–45 full-time employees. The plant would be staffed 24 hours per day.
- Maintenance – Routine inspection and maintenance would be implemented on all components of the project.

Water Sources and Water Demand

- Water Demand – During construction, water requirements are estimated at 500 acre-feet per year (AFY) for the first year and 150 AFY in the remaining construction years. During operation, water demand is not expected to exceed more than 600 AFY.
- Water Sources – Approximately 854 AFY of existing water rights in the basin would be acquired and used for this project, subject to approval from the Nevada Division of Water Resources (NDWR).

Other Components

- Hazardous Materials/Waste Management – Various hazardous materials that are relatively standard for industrial facilities would be used during construction and operation of the facility. All materials and the resulting wastes (hazardous and non-hazardous) would be stored, used, and managed in accordance with local, state, and federal regulations, guidelines, and Best Management Practices.
- Wastewater – Two types of wastewater will be generated, industrial and domestic. The industrial wastewater will be generated from the cooling tower blow down and from the first pass reverse osmosis system. The wastewater from this process will be piped to three 10-acre lined evaporation ponds. Domestic wastewater will be generated from toilets, showers, kitchens and sinks, and will be directed to an onsite sanitary septic system and onsite leach field.
- Fire Protection and Security – A Fire Protection and Prevention Plan will be prepared for construction and operation of the facility. The plans will include measures relating to

safeguarding human life, preventing personnel injury, preservation of property and minimizing downtime due to fire or explosion. Fire protection measures will include fire prevention methods to prevent the inception of fires. Of concern are adequate exits, fire-safe construction, reduction of ignition sources, control of fuel sources, and proper maintenance of fire water supply and sprinkler systems.

Decommissioning and Reclamation

- Decommissioning – The project would likely operate for 30 to 50 years, after which time the facilities and materials would be removed from the site using Best Management Practices and be made available for reuse elsewhere or disposed of in accordance with appropriate regulations.
- Reclamation – The area would be recontoured to reflect the preconstruction condition, topsoils would be redistributed, and disturbed areas would be revegetated according to a reclamation plan established in coordination with BLM (being developed by the proponent).

2.5.3 Project Component Additional Detail

The overall site layout for the proposed facility is shown on Figure 2-2. Additional details on the project components may be found in the project Plan of Development (TSE 2009).

2.5.3.1 Generating Facility Components

2.5.3.1.1 Solar Collecting Tower

The solar power tower would be a concrete or steel structure, approximately 538 feet high, which would support a cylindrical receiver, approximately 100 feet tall, mounted on the top of the tower (Figure 2-4). The receiver would consist of tube panels through which the liquid salt or HTF would flow. Therefore, the top of the receiver would be at a height of approximately 638 feet. A maintenance crane would also be mounted on top of the receiver, which is expected to be 15 feet tall. Structures in excess of 200 feet would require a filing with the Federal Aviation Administration (FAA) to obtain a determination of no hazard prior to construction.

2.5.3.1.2 Heliostat (Mirror) Array

The solar collecting tower/central receiver system would generate electric power from sunlight by focusing concentrated solar radiation on a tower-mounted receiver. The system would use thousands of sun-tracking mirrors called heliostats, which would be arranged concentrically around the central receiver tower and reflect the incident sunlight onto the receiver.

The proposed facility would consist of up to approximately 17,500 heliostats occupying approximately 1,400 acres. Each heliostat would be approximately 670 square feet (ft^2) in size, yielding a total reflecting surface of about 12,000,000 ft^2 (1,100,000 m^2). The size and shape of the heliostats are shown in Figure 2-5.

The arrangement of the heliostats within the array would be optimized to maximize the amount of solar energy that could be collected by the field, and would be arranged to avoid interference among heliostats as they track the sun during the day. The heliostats would be arranged in arcs around the solar receiver asymmetrically:

- The first row or line of heliostats would have a radius of approximately 420 feet.
- The longest arc/line of heliostats, with a radius of approximately 5,100 feet, would be in the northern section of the heliostat array. This is due to the greater collection efficiency of heliostats located north of the receiver tower for sites in the northern hemisphere of the world. With the sun predominantly in the southern sky, the cosine effect of incidence and reflection angles would be less in the northern heliostats than in the southern ones. The converse—lower collection efficiency in the southern section—is also true; therefore, the maximum southern arc radius would be the shortest (3,580 feet), and the southern heliostat field would be the smallest.
- The eastern sector of the heliostat would be more valuable than the western sector for energy collection because afternoon energy collection, during on-peak utility hours, is more valuable than morning energy collection, during part-peak or off-peak hours. Therefore, the maximum eastern row arc radius may be greater than the maximum western row arc radius.

2.5.3.1.3 Power Block

The power block would include a steam turbine generator (STG), multiple feedwater heaters, steam superheaters, lubricating oil system, hydraulic control system, valving, and feedwater pumps. Steam would be generated at a temperature of 1,050°F and a pressure of 1,685 absolute pounds per square inch (psia) before entering the high-pressure section of the turbine. Steam exiting the high-pressure section of the turbine would be reheated to increase its temperature before entering the immediate-pressure section of the turbine. Exhaust steam from the turbine would be directed to the cooling system. The turbine would drive a generator, which would deliver electrical power via a main step-up transformer in the on-site substation to the utility grid. Extraction steam from the steam turbine would be used to preheat the feedwater and for deaerating the feedwater.

This high-efficiency turbine would be designed for reliable operation under conditions of daily start up and shutdown over the life of the plant. The solar field and power generation equipment may be started each morning after sunrise and insolation build-up. The solar field would be shut down in the evening as the sun sets, although the integral thermal energy storage system would allow the steam turbine to continue operating if there is demand for electricity.

The primary components of the power block include (see Figure 2-6):

- Solar Steam Generator System – The steam generator would be the core of the steam supply system for the power block. The steam generator system would include a preheater, evaporator, superheater, reheater, and steam drum. High-pressure feedwater would enter the steam generator from the preheaters and would leave as saturated steam that subsequently flows to the superheaters.

- Solar Preheater – The solar preheaters would have a shell and tube design. High-pressure feedwater would enter the preheaters from the low-pressure feedwater heaters and would leave as high-pressure feedwater.
- Evaporator – The evaporator would receive heated, high-pressure water from the preheater and would evaporate the water into saturated steam. The evaporator would have a shell and tube design.
- Solar Superheaters/Reheaters – The saturated steam would flow to a shell and tube superheater to reach the desired steam-turbine temperature and pressure-operating conditions. The reheater would receive "cold" outlet steam from the high-pressure turbine stage and reheat the steam before being reintroduced into the intermediate-pressure stage of the turbine.
- Steam Turbine – Once the pressurized steam had reached the optimum temperature in the superheater, it would flow to the steam turbine, which would extract thermal energy from the steam.
- Feedwater Heaters – The feedwater would be heated to the required conditions using conventional turbine extraction steam in low-pressure feedwater heaters.
- Deaerator – A direct contact steam deaerator would be included to eliminate dissolved oxygen in the condensate and steam.

2.5.3.1.4 Cooling System (Hybrid)

Heat rejection in the facility would use a hybrid cooling system (wet cooling combined with dry cooling). The cooling system would consist of a steam turbine, exhaust transfer duct exiting the steam turbine, air-cooled condenser, small evaporative cooler, condensate tank, and condensate pump. The system would receive saturated turbine exhaust from the steam turbine, where it would be piped through a transfer duct to a finned-tube air-cooled condenser. The air-cooled condenser would blow ambient air across a heat-transfer surface area, which cools and condenses steam. The finned tubes are usually arranged in the form of an "A-frame" over forced draft fans to reduce land area requirements. The evaporative cooling system would take the form of a small cooling tower to augment the heat rejection system of the air-cooled condenser. The evaporative cooling system would operate only during periods of high electrical demand and would increase the electricity generated and cycle efficiency during periods. The condensed steam would be gathered in a condensate tank and be provided to the feedwater circuit through a condensate pump. A typical air-cooled condenser can condense steam within 30°F to 50°F of the ambient dry-bulb temperature.

2.5.3.1.5 Thermal Storage System

The thermal storage system would use hot and cold liquid salt tanks to store solar heat energy for later steam generation as well as associated pumps and piping. Thermal storage would provide the facility with several enhancements. The solar field would be nominally sized to provide excess solar energy to the system during summer months, and such sizing would intentionally result in collection of excess heat that could not be used instantly by the power block. The thermal storage capability would allow the excess heat to be stored until used for power generation. Thermal storage can also extend the generation day of TSE power plants. The heated salt can be stored in insulated tanks to provide a steam heating source after the sun sets, allowing the facility to more closely satisfy the load demands of the electricity grid system, which typically peak in the late afternoon and evening hours. The thermal storage system would include an auxiliary electric heat source to keep the salt in a molten state through protracted maintenance outages.

The thermal storage system would contain two storage tanks—one “cold” tank storing liquid salt at 550°F and one “hot” tank storing liquid salt at 1,050°F. As the sun rose, cold liquid salt (or HTF) would be pumped from the cold liquid salt tank through the tubes inside the receiver. After absorbing energy from the concentrated sunlight, the temperature of the HTF would be increased to the design outlet temperature of 1,050°F. Part of the heated HTF would then be pumped to a hot liquid salt tank for storage and part to a steam generating system that would produce superheated steam for use in the conventional Rankine cycle turbine/generator system. After exiting the steam generator, the HTF would be returned to the cold tank where it would be stored and eventually reheated in the receiver. This arrangement would allow excess heat to be stored for power generation outside of the direct solar-heating period of the day. The system would also include piping, valves, pumps, expansion tanks, and heaters.

The HTF would consist of $NaNO_3$ and KNO_3 in a “eutectic” mixture designed to remain liquid or molten over a wide temperature range. The HTF mixture has a melting point of 460°F and must be preheated and maintained above this minimum temperature in order to remain in liquid form.

2.5.3.2 Major Electrical Systems and Equipment

The bulk of the electric power produced by the facility would be transmitted to the electric grid under the control of Sierra Pacific Power Company, doing business as NV Energy. During operation, a small amount of electric power would be used to power station auxiliary loads such as pumps and fans, control systems, and general facility loads including lighting, heating, air conditioning, heliostat movement, and other uses. Additionally, electric power would be used for heat tracing, which would provide energy to maintain the salt in a fluid state during protracted maintenance outages. Some power would be converted from alternating current (AC) to direct current (DC), which would be used as backup power for control systems.

2.5.3.2.1 Electrical Components

Power would be generated by the STG and stepped up through the GSU transformer to the utility high voltage system. The generator would be connected to the step-up transformer by isolated phase bus duct. A low-side generator breaker would be provided between the generator and the GSU transformer.

2.5.3.2.2 Generator Step-Up Transformers

A two winding, delta-wye GSU transformer would be designed according to the Institute of Electrical and Electronics Engineers Standards (IEEE) C57.12.00-2000 and supplied for the STG. The neutral point of each high voltage winding would be solidly grounded. The GSU transformer would have metal oxide surge arresters adjacent to the high-voltage terminals.

Accessories would include a local visual annunciator, magnetic liquid-level gauge, pressure-relief device, sudden pressure relay, oil preservation device, valves for top and bottom filter press connections, drain/sampling valves, grounding pads, bushing-mounted current transformers, combustible gas detector, on-line dissolved gas/water monitor with 4–20 milliamp signal out to the controller, and hot spot winding temperature elements.

The GSU would include manual de-energized tap changers located in the high-voltage windings with taps ranging from 5 percent above normal to 5 percent below normal in 2.5 percent increments. GSU transformer auxiliaries would be powered from two 480-volt (V), three-phase, three-wire sources for each transformer. Each power supply would be fed from separate sources and routed in separate conduits.

2.5.3.2.3 Unit Auxiliary Transformers

One or more two winding, delta-wye UATs would be designed according to the IEEE Standards C57.12.00-2000 and supplied for 4,160 V service. The UAT would be rated to supply facility startup and maximum operating power requirements. A system calculation showing all connected equipment loads for the UAT would be used to determine the requirements prior to procurement of the UAT. The neutral point of the UAT low voltage winding would be 1,000-amp, low-resistance grounded.

2.5.3.2.4 Electrical Building

A plant electrical building would house the 4,160 V switchgear, 4,160 V motor controllers, low voltage switchgear, low voltage motor control centers, control panels, power and lighting panels, uninterruptible power supply (UPS), DC station batteries, DC switchboard, other miscellaneous equipment, steam turbine control equipment, and the control Input/Output (I/O) cabinets. The electrical building would be a single-story facility, approximately 4,000 ft^2 in size, 94 feet long and 34 feet wide.

2.5.3.2.5 Medium Voltage Switchgear

The medium voltage switchgear would be single-ended, rated 4,160 V nominal, three-phase, three-wire with ratings not to exceed 3,000 amps, continuous, and the calculated fault current duty. The medium voltage switchgear would receive power from the UAT through non-segregated phase bus duct.

The medium voltage switchgear lineups would be located indoors, would use vacuum interrupters, and would be rated to allow continuous distribution of the full auxiliary load. Each lineup would contain auxiliary power metering and voltage transformers, a main incoming breaker, and feeder breakers as necessary to distribute the load. All medium voltage breakers would be electrically operated from the control system and equipped with a stored energy mechanism. Breakers would be provided with remote racking mechanisms.

2.5.3.2.6 Emergency Power Systems

The emergency power for the facility switchyard and many other plant critical loads would be supplied by the 125-V DC station battery system. Additionally, emergency generator(s) (diesel) would be employed to provide emergency power to the facility.

2.5.3.2.7 Lighting Systems

The facility's lighting system would provide operation and maintenance personnel with illumination for both normal and emergency conditions. Lighting would be designed to minimize light pollution by using sensor lights and directional lighting in cases where this would not compromise safety or security. Although the proposed project site is in a remote area, lighting on-site would be limited to areas required for safety and would be shielded from public view to the extent possible. Outdoor lighting would be photocell controlled through contacts that control the outdoor lighting.

Lighting will not be provided for the solar field, but is expected to be provided in the following areas:

- building interior equipment, office, control, maintenance, and warehouse
- tower
- building exterior entrances
- outdoor equipment within the power block and tank area
- power transformers
- power block roadway
- parking areas within the power block area
- tank area
- entrance gate
- water treatment area
- ACC

2.5.3.2.8 Communication Systems

Mirror tracking and plant process control would be accomplished by a Distributed Control System (DCS), which would interface Programmable Logic Controllers (PLC), field instrumentation, a meteorological station, and communications devices designed for site monitoring, control, and historical trending of the solar power plant.

All data collected from the field would be transmitted to the site control room via a fiber or copper communications infrastructure. The control room would also contain a router for the point of connection to a T1 line or equivalent as well as phone lines for communication to the outside.

During construction, communication systems would be either hard wire or satellite communication system (dish). For the plant operations, it is expected that a hardwired communication source would be designed and installed to support the project. The hardwired communication line would be routed along the existing TL near the plant, and the new transmission corridor along Pole Line Road. This line would be designed and installed in cooperation with the applicable communications provider.

Communications would be provided by satellite if a hardwired communication line cannot be brought to the site along existing overhead power line structures. Additionally, a communication line would be constructed on the generation-tie line transmission poles between the proposed project site and the Anaconda Moly Substation. The purpose of this fiber optics line would be to provide NV Energy the ability to "communicate" between the Anaconda Moly Substation and the facilities on-site. Additionally, it is anticipated that a new communications dish would need to be installed on an existing tower at the Millers Substation, located southwest of the proposed project site. The purpose of this new dish would be to provide a second means of communication between the Anaconda Moly Substation and the proposed project site.

2.5.3.3 Construction Power Supply

A 60 kV power line is located adjacent to and west of the existing Millers to Anaconda TL. This power line is owned and operated by NV Energy and would be used to provide a source of temporary power for construction and for a backup to auxiliary plant/house power load requirements. A separate overhead power line would be installed adjacent to the project TL to deliver power from this 60 kV line to the plant site. Transformers would be installed to step down the power to the voltage necessary for use.

2.5.3.4 Transmission Systems and Interconnection

2.5.3.4.1 Interconnection

The proposed project is planned to interconnect to the existing NV Energy Anaconda Moly Substation (ROW 033242) that is located north of the proposed project site. In this case, a new TL would be constructed between the proposed project site and the substation. The proposed route for the new TL would follow the site access road to Pole Line Road, head north along Pole Line Road to where the existing Millers to Anaconda TL is located, and then parallel the Millers to Anaconda TL to the Anaconda Moly Substation, to interconnect with the electricity grid (see Figures 2-7 and 2-8).

Therefore, for a majority of the distance between the proposed project site and the Anaconda Moly Substation, the new TL would parallel the existing TL (ROW 033242) (see Figure 2-7).

The facility switchyard and the TL between the facility switchyard and electrical system interconnection would be engineered, procured, and constructed as part of this project. The high voltage interconnect from the facility to the electric utility would be made via an SF6-insulated, high-voltage breaker with a single-circuit, overhead line from the facility switchyard to the utility substation.

The anticipated pole configuration used for the new TL would be a steel “mono” pole or H-frame; a monopole structure is shown on Figure 2-9. The point of interconnection (POI) is at a “termination pole structure” located approximately 500 feet south of the existing Anaconda Moly Substation at N38^{o} 19' 20.281" and W117^{o} 20' 10.143". A preliminary layout representing the location and components involved in the interconnection is shown in Figure 2-8.

The Proponent is in discussions with NV Energy regarding construction and ownership of the new TL. At this time, it is expected that the new TL would be owned by the Proponent up to the POI, and NV Energy would own interconnection facilities between the POI and the substation.

2.5.3.4.2 Potential Transmission Route

The TL route to the NV Energy Anaconda Moly Substation is shown in Figure 2-7. The interconnection line would exit the power block and follow the access road to Pole Line Road. At this location, it would parallel Pole Line Road to the point where the existing Millers to Anaconda TL is located. The line would then turn northeast and follow the existing TL to the existing Anaconda Moly Substation. A typical TL profile is illustrated on Figure 2-10.

2.5.3.5 Civil/Structural Features

2.5.3.5.1 Access Roads

Access to the proposed project site would be provided from Pole Line Road. Pole Line Road is a Nye County owned and maintained road and is asphalt surfaced from its intersection with SH 6/95 to north of the proposed project site. A short section of Pole Line Road from its intersection with SH 95 to a location south of the site is in Esmeralda County. This section of Pole Line Road, although located in Esmeralda County, is maintained by Nye County through the terms of a formal agreement. Pole Line Road is anticipated to continue to be maintained by Nye County.

The access road to the proposed project site would be connected directly to Pole Line Road near the southwestern corner of the site (see Figure 2-2). The paved surface of this road would be a two-lane road, constructed with adequate width for two directions of travel with a minimum of 2-foot shoulders on each side of the road. This paved road would be extended to provide access to the power block. All roads within the power block would be surfaced with asphalt. The entry gate location would be located a short distance east of Pole Line Road in order to eliminate a backup queue on Pole Line Road. The proposed minimum road width is 24 feet for the main access road and 20 feet for the internal (within fenced area) perimeter road—see Figure 2-11.

The predominant traffic to/from the proposed project site would occur during construction and would primarily be construction crew commuter traffic. Vehicle trips to and from the site would use SH 95 to access the site from the north (Reno) and south (Las Vegas), and SH 6 to SH 95 may be used for traffic coming from east of the town of Tonopah. The traffic associated with the project is not expected to produce permanent traffic impacts to SH 95 because the peak traffic is expected to be approximately 90 trucks per day and 400 cars per day and would be temporary. The proposed project site would receive deliveries of materials from local, regional, and possibly international points of origin including bulk commodity materials, engineered equipment and machinery, and general materials of construction. The proposed project site is not currently served by rail, so materials would be transported to the site by truck, including those materials brought in to the region by rail or ship. These materials would be loaded onto trucks at various ports and depots for delivery to site.

Heavy and oversize loads would be delivered using trucks and trailers equipped to handle specialized loads. Oversized loads would be individually permitted to transport each such load to the site. Heavy and oversized loads for the project are typical of a common power plant or process facility and may include items such as the step-up transformer, the solar receiver panels, steam turbine, generator, and tanks.

Additionally, unpaved roads would be constructed from the power block to the eastern and southern edges of the solar field. The unpaved solar field perimeter road would be constructed around the solar field, and would be surfaced with rock or treated native soil. A typical section of this road is shown on Figure 2-11.

2.5.3.5.2 Building and Enclosures

The following buildings and enclosures are planned as part of the project, and their locations are described below:

- Steam Generator Area Building (approximately 30,000 ft^2). This structure would be located between the HTF storage tanks within the power block. The building would provide structural support and protection for the equipment associated with the heat exchange process.
- Steam Turbine Area/Enclosure (not considered a building). This structure would house the STG and associated equipment, and would be located within the power block. The STG may be enclosed in a building for protection, or it may be located outdoors.
- Electrical Building (approximately 2,500 ft^2). This structure would be located within the power block area and would house the switchgear, motor control centers, battery power supply, and other primary plant electrical components.
- Administration/Maintenance Building (approximately 10,000 ft^2). This building would serve as the center for support staff for the project during operations. This facility is planned to be located outside the heliostat field, near the access road.
- Heliostat Assembly Building (approximately 80,000 ft^2). This building would be used as a protected environment for the assembly/construction of heliostats during construction of the plant. It would be converted to other uses upon completion of project construction.
- Permanent Warehouse (approximately 6,000 ft^2). This building would provide permanent warehouse space for the facility and would be located near the administrative/maintenance building.
- Control Room Building (approximately 6,000 ft^2). This building would be located within the power block and would provide the control room functions for the project. It would be located west of the Steam Turbine Area.
- Building Sanitation Facilities. The administrative/maintenance building located on the perimeter of the heliostat field and the control building located within the power block would each be served by a permanent septic system (tank and leach field).
- Water Treatment Building (approximately 12,000 ft^2). The building would house the water treatment facilities.

2.5.3.5.3 Material Storage

On-site storage for spare field and power block components would be required for maintenance uses. In addition, on-site storage facilities for water pretreatment chemicals, cooling water treatment chemicals, and boiler water treatment chemicals would be necessary. The HTF material (salt) would be delivered to the project as dry, solid pellets. The material would be delivered in 1-ton “super sacks,” which can be stored on-site until melted for use in the plant process. The salt must be heated until fluid for use in the system, and would be stored within the lay down area of the site until it were heated, liquefied, and sent to the storage tanks.

Potentially polluting substances would be managed in accordance with all applicable laws, ordinances, regulations, and standards to protect worker health, prevent leaks and spills, and protect stormwater quality as discussed further in Section 2.5.8, Hazardous Materials Management.

Construction lay down and storage would occur throughout the permanently disturbed areas. The power block and the heliostat field immediately adjacent to the power block would be used for lay down and storage of the power block components. Equipment would be stored within the power block, and would include cranes, loaders, fork lifts, generators, boom trucks, water trucks, etc. The earthmoving equipment would be stored in a central location each night near the area where the work is being undertaken, or near the western side of the heliostat field, where all the equipment can be most easily fueled. All these locations would be within the perimeter of the permanent project facilities. Additionally, a small temporary lay down area, worker parking area, and construction trailer area would be used during facility construction. The areas are shown in Figure 2-12. The features shown may be relocated during final project planning but would remain within the total area identified. The heliostat assembly building may be constructed permanently to be used during the life of the project, or may be removed after construction. Areas along the TL corridor and near the substation (less than 5 acres) may be used for storage of power poles during construction. These areas would remain within the area identified for temporary disturbance.

2.5.3.5.4 Storage Tanks

The following storage tanks would be located on-site:

- Demineralized Water Storage Tank: One demineralized water storage tank would be constructed to store demineralized water for use as mirror wash water, steam cycle make up, and for use in the hybrid cooling system.
- Fire/Service Water Storage Tank: One fire/service water tank would be constructed to store water for fire protection, service water needs, and for raw water storage prior to treatment.
- HTF Storage Tanks: Two tanks would be constructed to contain the HTF. One would house the hot HTF (1,050°F), and the other would house the cold HTF (550°F).
- Lube oil and hydraulic oil storage tanks would be associated with the STG.
- Additional ancillary tanks, including aboveground diesel tanks, would be on-site for a variety of liquids within the power block area.

2.5.3.5.5 Pipelines

Project operational water would be obtained from on-site wells; therefore, an off-site pipeline would not be required. The CSP technology proposed for the project would not require a natural gas source. During construction of the project, there would be a high water demand for soil moisture conditioning and dust control, and on-site wells would provide construction water. Water demand and sources are further discussed in Section 2.5.6, Water Demand and Source.

2.5.3.5.6 Site Drainage

The proposed project site is located on a portion of the Smoky Valley that slopes to the west at approximately 2 percent. The stormwater drainage system would be designed to allow the storm flow to follow its preexisting drainage paths. Currently, storm flows drain from the San Antonio Mountains to the east and infiltrate across the nearly flat site on their way to Peavine Creek. Within the proposed project site, the storm flows broaden out and do not follow individual drainage courses. This allows increased infiltration as the flows move to the west toward Peavine Creek. Near the eastern end of the facility, two gentle drainage paths are visible in the topographic survey of the site. These would be maintained, and the flows would be allowed to continue to fan out across the heliostat field or may be routed around the exterior of the heliostat field.

The grading plan within the heliostat field would be such that storm flows follow preexisting paths. The majority of the proposed project site, within the perimeter fence, would not be graded but would be smoothed to allow truck access throughout heliostat field.

Preliminary storm drainage for the overall facility can be seen on the grading plan included as Figure 2-13. More details of the power block are shown in Figure 2-14. Small ditches would be constructed along roadways, as necessary, to provide a path of travel for water and to allow infiltration of rainfall.

Grading near the power block, to the east side or uphill side of the power block, would include a small berm and ditch to divert upstream flows around the power block. Additionally, the finished floor elevations of buildings and other structures subject to damage from stormwater would be built a minimum of 12 inches above anticipated 100-year storm levels in accordance with all applicable laws, ordinances, regulations, and standards.

Preliminary hydrology calculations were performed using the TR-55 (SCS Method). It is proposed that the stormwater drainage system be designed using the Natural Resource Conservation Service (NRCS) method (TR-55) to determine the amount of rainfall during a specific rainfall event, and in accordance with the Nye County stormwater design requirements. A detailed technical drainage study may have to be submitted for approval to Nye County's Tonopah Public Works Office for construction of the facility.

All surface water runoff during and after construction would be controlled in accordance with the requirements of the National Pollutant Discharge Elimination System (NPDES) stormwater runoff permit and all other applicable laws, ordinances, regulations, and standards.

The power island would be graded such that all rainfall within the power island would be directed to the containment ponds adjacent to the on-site salt tanks or to the western heliostat field and would be allowed to infiltrate. Pipe culverts would be used, as required, where storm channels cross roads.

2.5.3.5.7 Evaporation Ponds

There are two types of wastewater generated at the Project; industrial and domestic. In the industrial process, wastewater is generated from the cooling tower blow down, and occasionally from the first pass reverse osmosis system (pre-treatment of groundwater) and the steam cycle blow down (in summer months, these streams are diverted into the cooling tower and evaporated). Wastewater from these industrial processes will be piped to three 10-acre evaporation ponds (total combined pond top area of up to 30 acres) for disposal. Evaporations ponds would be adaptively managed to minimize risks to wildlife near the site. When ponds are filled with water, a porous screen would cover the entire pond so that wildlife would not be attracted to the water surface. Additional information on the design and operation of the evaporation ponds is provided in the Wastewater Plan (WorleyParsons 2010b).

The expected chemistry of the wastewater discharge is provided in Chapter 4. The concentrations of chemical constituents in the wastewater discharge are compared to Toxicity Characteristic Leaching Procedure (TCLP) values as reported in the Code of Federal Regulations 40 CFR 261 (Title 40, Part 261). None of the predicted chemical constituents in the wastewater has TCLP limits, and therefore the wastewater is not considered a hazardous waste under Federal regulations.

In the domestic process, all wastewater generated from toilets, showers, kitchens and sinks will be directed into an onsite sanitary septic system and on-site leach field.

2.5.4 Construction Activities

2.5.4.1 Temporary Construction Facilities

The project construction contractor would mobilize and develop temporary construction facilities and lay down areas adjacent to the power block and outside the heliostat field (see Figure 2-12). Once a final design has been established, the contractor would prepare site maps showing the construction project in detail. Temporary construction facilities would include construction staging areas; employee parking areas; temporary shop buildings; an office trailer with electrical, telephone, and Internet service; temporary sanitary facilities; a temporary guard shack; and on-site dumpsters. Additionally, rock processing equipment and a portable batch plant would be mobilized for site development. A temporary concrete batch plant would be mobilized for use during project execution. The temporary batch plant would include cement storage and a batching operation where the cement, water, and aggregate could be proportioned and mixed. This facility would be located in the temporary lay down area or in the heliostat field, just east of the temporary lay down area. The majority of these temporary facilities would be located within the construction logistics/lay down/parking areas and/or within the heliostat field (see Figure 2-12).

Construction equipment would be staged near the location of active work, primarily within the power block near the center of the heliostat field. Additionally, temporary sanitary facilities would be located throughout the proposed project site for use by construction personnel; they would be sized and located in accordance with Occupational Safety and Health Administration (OSHA) requirements. Several areas internal to the solar field would also be set up to temporarily store materials for construction of the power block facilities, for construction of the heliostats, and for temporary storage and heat conditioning of solid HTF. This would locate material closer to the point of installation.

A geotechnical investigation was performed in April 2010 of an area located next to an existing borrow site located along Pole Line Road, near Peavine Creek. The existing pit is used by Nye County Public Works. The investigation found that the aggregate is suitable for use for project construction. The total area needed to supply an adequate amount of material is 40 acres. A Mineral Materials Negotiated Sale (BLM Form 3600-9) has been submitted to BLM for the 40-acre site, located immediately north of the Nye County pit.

All on-site construction operations can be completed within the limits of the SF-299 filed for the proposed project, and within the two additional SF-299 applications previously discussed (one for transmission and one for gravel/aggregate).

A temporary 10,000 gallon (gal) aboveground storage tank would be used to supply diesel fuel during facility construction. This would be located in the temporary lay down area and would be double walled, or located within a containment area in accordance with applicable regulations.

The sanitary needs of the construction work force within the heliostats and power block area would be met with the use of portable toilets. The temporary construction trailers would use a temporary septic system that would be abandoned upon completion of construction.

2.5.4.2 Construction Process and Conceptual Schedule

Construction of the generating facility, from site preparation and grading to commercial operation, would be expected to take approximately 30 months. Typically, construction would be scheduled to occur between 5 a.m. and 7 p.m. on weekdays and Saturdays (approximately 14 hours per day, 6 days per week). Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities (e.g., pouring of concrete at night during hot weather, working around time-critical shutdowns and constraints). During some construction periods and during the startup phase of the project, some activities would continue 24 hours per day, 7 days per week. The items of work that may occur 24 hours per day would include, but are not limited to, placing and finishing concrete (because of cooler nighttime temperatures), welding on critical pipe systems (these may be critical path items and need to be expedited), radiation testing of the welds on certain pipes (completed when staff is vacated from the area), electrical terminations, DCS wiring and programming, heliostat assembly (if this seems to be falling behind schedule), and preparation for start-up testing. Because this is a solar plant, testing of the facility requires adequate energy supply (i.e., the sun). Therefore, preparations may take place overnight to ready the facility for start-up tests the following day, when the sun would provide the energy to power the start-up testing.

Table 2-1. Conceptual project schedule, with activities representative of typical TSE projects

Activity	Time Frame
Start construction.	Month 1
Begin mobilization.	Month 1
Delineate and mark the boundaries of the construction zone.	Month 1
Stabilize construction entrance/exit and roadway. Install tire wash.	Month 1
Establish parking and staging areas for vehicle and equipment storage and maintenance.	Month 1
Establish lay down area(s) for materials storage and staging.	Month 1
Establish concrete washout area.	Month 1
Clear and grub, strip topsoil.	Months 1–2
Install certified weed-free fiber rolls or silt fence at the base of slopes adjacent to delineated sensitive areas (e.g., wetlands), if any.	Months 1–2
Construct stormwater infiltration/evaporation area.	Months 3–6
Assemble and erect heliostats.	Months 10–20
Power block construction.	Months 6–24
Construct reinforced concrete foundations.	Months 6–24
Construction administrative/warehouse building.	Months 20–22
Final stabilization of site.	Month 27
Commission and testing.	Months 27–30

2.5.4.3 Construction Work Force and Equipment

The construction work force would consist of approximately 400 to 500 personnel at peak for construction, including supervisors and management personnel, with an average of approximately 250 crewmembers on-site at any given time. Project construction would require additional support staff, including construction inspectors, surveyors, project managers, and environmental inspectors.

Prior to commencing construction, crews would mobilize to the site. During this time, equipment and construction materials would be transported to the designated construction staging areas, and trailers and temporary shop buildings would be established. In addition, personnel would receive appropriate safety and environmental training. Also, signs may be erected at this time to designate approved access, fueling, smoking, concrete washout, and exclusion areas. Table 2-2 outlines the construction process.

Table 2-2. Conceptual construction process

Construction Phase	Description	Approximate Number and Type of Construction Equipment and Vehicles
Rough Grading	Grubbing, clearing, and bulk grading, including approximately 500,000 cubic yards of cut and compacted fill	Approximately five scrapers, two compactors, three graders, two loaders, four dozers, five water trucks, and three water pulls
Finish Grading	Final grading to finish grade at a rate of approximately 960,000 square feet per day (22 acres)	Approximately two scrapers, three graders, one dozer, four water trucks
Roads, Foundations, Flatwork, and Site Utilities	Construction of roads, excavation and construction of foundations for heliostats and utilities	Approximately 20 to 40 pieces of equipment would be present at any one time, including concrete trucks, concrete pumps, backhoes, excavators, loaders, graders, foundation drills, paving machines, drum rollers, fork lifts, tractors, dump trucks, small cranes, and additional support vehicles
Heliostat Assembly and Deployment	Field assembly of heliostats in temporary shop buildings constructed at the site, installation of assemblies on cast-in-place piers or other foundations	Approximately eight to ten crews, each with one or two pieces of equipment including small cranes, forklifts, welding machines, trucks, and tractors
Power Block Construction	Construction of foundations, structural frames and buildings, installation of utilities and equipment including the steam turbine generator, condenser, pumps, buildings, air cooled condenser cooling structure, TES tanks, and central receiver tower	An average of 12 to 18 pieces of equipment would be used for power block construction over the duration of the project, with more equipment being used during the early stages of foundation construction and frame erection. Equipment would include backhoes, excavators, foundation drills, concrete trucks, concrete pumps, forklifts, boom trucks, lifts, cranes, welders, trucks, and other support vehicles
Liquid Salt Preparation	Melting of the delivered dry salt product	Temporary propane, electric, or gas (propane) fired auxiliary boiler, forklifts, loaders, and trucks

2.5.5 Operations and Maintenance

2.5.5.1 <u>Overview</u>

Management, engineering, administrative, skilled workers, and operators would serve the solar plant. The plant is expected to employ up to 40–50 full-time employees during operation. The facility may be operated up to 7 days per week, and 10 or more hours per day. The facility would be staffed 24 hours per day.

The facility would be expected to have an annual operational availability of up to 92 to 95 percent (of no cloudy, daylight hours). The facility may be operated in one of the following modes:

- The facility could be operated up to its maximum output as dictated by the available solar insolation and the available thermal storage, for as many hours per year as possible.
- The facility would be placed in standby mode every night when the solar insolation or thermal energy storage level drops to a point that results in the STG dropping below its minimum design low-load.

- A full shutdown would occur if required by equipment malfunction, TL disconnect, or scheduled maintenance.

2.5.5.2 Maintenance

Long-term operation of the facility would include periodic maintenance and overhaul of all balance-of-plant and solar facility equipment such as the STG, pumps, piping, etc., in accordance with manufacturer recommended schedules. Periodic cleaning of the heliostats with demineralized water would be necessary to maintain the desired mirror reflectivity.

Routine inspections of the substation and electric TL would be conducted by certified site personnel on a monthly basis or as needed under emergency conditions. All of the substation structures would be inspected from the ground on an annual basis for corrosion, misalignment, and foundation condition. Ground inspection would include the inspection of hardware, insulator keys, and conductors.

Regular inspection of electric lines, support systems, and instrumentation and controls is critical for the safe, efficient, and economical operation of the project. Various inspection processes, including aerial inspection, ground inspection, and climbing may be conducted. Ground inspection includes checking of the hardware, insulators, and conductors for corrosion, breaks, broken insulators, and failing splices. The frequency of inspection may vary depending on factors such as the age of the system, structure type, and vegetation conditions.

2.5.5.3 Work Force and Equipment

It is planned that plant personnel would be on-site in two 12-hour shifts or three 8-hour shifts, 7 days per week to ensure that the facility is staffed at all times. A full-time staff would be required for operations and maintenance of the facility, anticipated to include one operator for every 12-hour rotating shift, four relief operators, four maintenance technicians, four mirror washers, one to two process/performance engineers, one maintenance manager, and five to seven administrative staff members per day. An additional part-time staff of 5 to 15 subcontractor personnel would be on-site daily to conduct occasional maintenance of the facility, including cleaning or repairing equipment; system testing; removing, repairing, and/or installing insulation before and after maintenance; scaffold installation and removal; and personnel facility-related activities.

2.5.6 Water Demand and Sources

2.5.6.1 Water Sources

The proposed source of water would be groundwater, extracted through one of two on-site wells. Two wells, one for primary and one for back-up, would be drilled within the project area. Well data from the NDWR well log database and the U.S. Geological Survey National Water Information System indicate the depth to water in the vicinity of the proposed project site ranges from approximately 55 to 104 feet below ground surface (bgs) and well depths range from approximately 100 to 200 feet bgs. This information was confirmed by a test well drilled adjacent to the proposed project area to substantiate water availability. Wells in the vicinity of the proposed project site were installed in unconsolidated alluvial materials, and similar materials were observed in the test well on-site. Only the test well is within the proposed project site.

The proposed project site is located within the southeastern portion of the Tonopah Flat subarea of the Big Smoky Valley groundwater basin, which is within the Central Hydrologic Region of Nevada (Figure 2-15). The Tonopah Flat subarea is a designated basin, and the southern half of the proposed project site (Township 4 North, Range 41 East, Sections 2, 3, and 10–15) is located in a preferred use area.

Limited data are available on groundwater quality in the basin. The general quality of groundwater in Nye County is suitable to marginally suitable, with total dissolved solids concentrations exceeding the state or federal general drinking water standards in portions of the Big Smoky Valley groundwater basin (Buqo 2004). Testing of water collected from the test wells drilled on-site are consistent with the previous data.

For operational use, water would be pumped into a raw water storage tank. Raw water would be treated through a reverse osmosis water treatment facility and converted to demineralized water for use in the steam cycle, for mirror washing, and for use in the hybrid cooling system. The need for additional pretreatment such as water softening or ion exchange, if any, would be determined based on analytical data obtained during the groundwater investigation.

2.5.6.2 Water Demand

Water would be necessary for both construction and operation of the project. During construction, water would be required for soil moisture conditioning during the earthmoving activities and for dust control. Based on the expected soil conditions (existing moisture content and the optimal moisture of the soil necessary to achieve proper compaction), approximately 500 AF of water likely would be needed the first year of construction, when the major earthwork occurs. Approximately 150 AF of water would be needed each subsequent year of construction for ongoing dust control during construction and moisture conditioning of soils for ongoing backfilling operations.

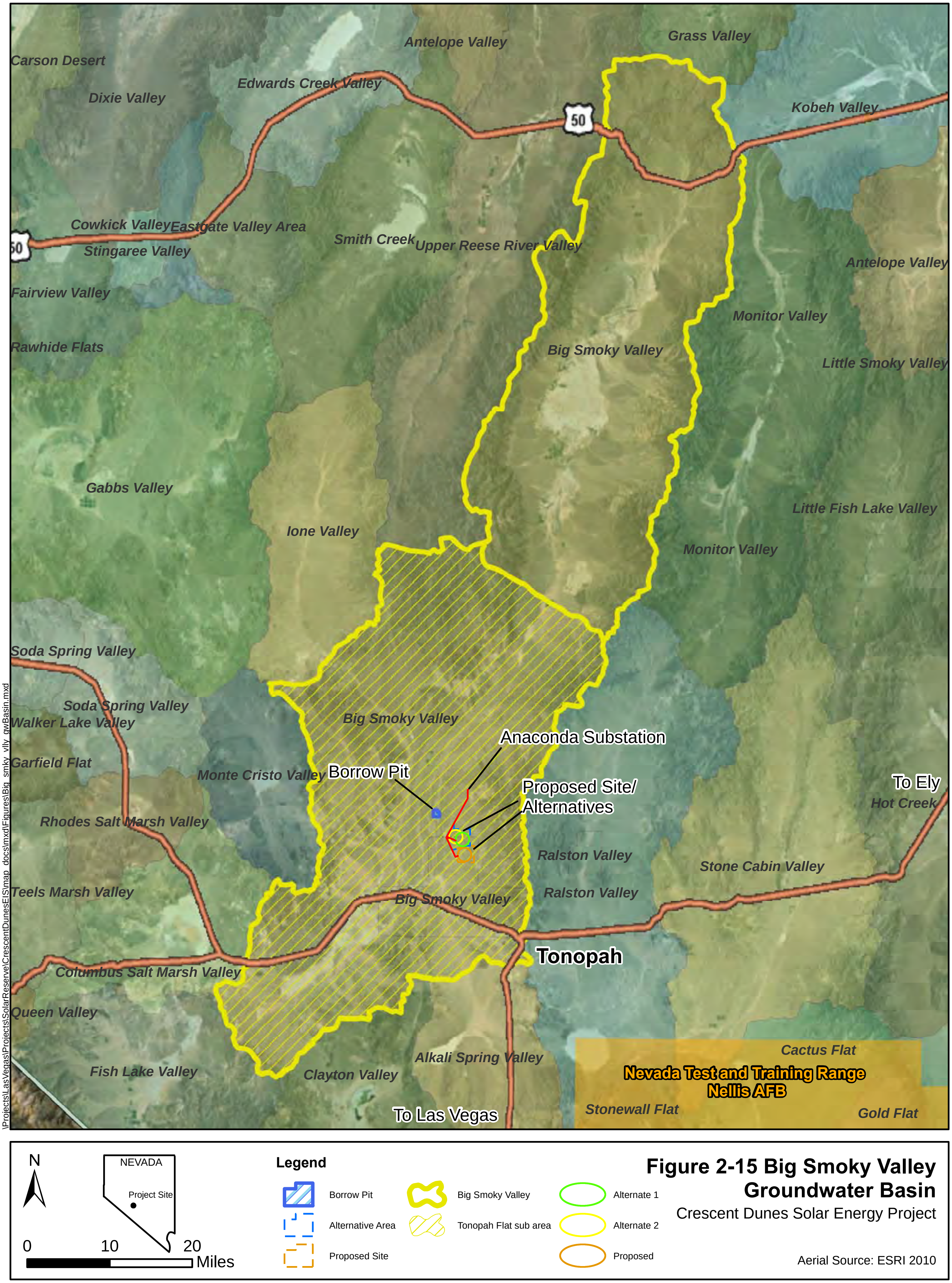


Figure 2-15 Big Smoky Valley Groundwater Basin

Crescent Dunes Solar Energy Project

Aerial Source: ESRI 2010

Water needs of the operating plant would include three primary uses:

- steam cycle makeup water – estimated at 100 AFY
- mirror wash water – estimated at 70 AFY
- hybrid cooling system augmentation – estimated at 430 AFY

Incidental use that would be included in the 600 AF:

- potable water – estimated at less than 3 AFY

Although the steam cycle is a "closed system," some water would be lost during operational steam blow down. The addition of "makeup water" would be required throughout the operating time frame to compensate for this loss.

The heliostat mirrors' reflectivity would decrease in efficiency and, therefore, the ability to generate electricity would decrease as the mirrors collect dust and other particles. A mirror wash program would be implemented to wash the mirrors on a continual basis. This program may run up to 7 days or nights per week.

During periods of high temperatures or electrical demand, the cooling system would be operated in "hybrid" mode. The "hybrid" mode of operation would include heat rejection through the ACC as well as heat rejection through the small evaporative cooler (cooling tower). The hybrid mode of operation would increase the efficiency of the plant and allow for the production of additional electricity during these times when electricity is in highest demand.

Potable water would be used for sanitary purposes in the facilities, as well as drinking water. Water would be stored on-site and used for fire protection.

2.5.7 Land Ownership and Mining Claims

The proposed project site is located on unincorporated lands administered by BLM within Nye County, Nevada, and guided by the Tonopah RMP (BLM 1997). Based on a review of the 1997 RMP and other BLM records, the proposed project site is not within wild horse and burro herd management area boundaries, ROW avoidance areas, land withdrawals, ACECs, fluid mineral potential area, mineral leasing restriction areas, or fire management zones. The area is within the relatively large San Antone Grazing Allotment. During the analysis, three mining claims had been filed (April 2010) in Section 34 of the TSE ROW application area. Several other existing mining exist along the transmission route (Figure 2-1)

2.5.8 Hazardous Materials Management

A variety of chemicals and hazardous substances would be stored and used during construction and operation of the project. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, and regulations (see Table 2-3).

Table 2-3. Hazardous waste laws, ordinances, and regulations

Laws, Ordinances, and Regulations	Applicability
Federal	
Comprehensive Environmental Response, Compensation, and Liability Act, 42 United States Code (USC) § 9601 et seq., 40 Code of Federal Regulations (CFR) Part 302, as amended by the Superfund Amendments and Reauthorization Act of 1986	Requires notification to various agencies when there is a release of hazardous substances from a facility
Emergency Planning and Community Right to Know Act, 42 USC § 11001 et seq., 40 CFR Parts 350, 355, and 370	Requires inventory reporting, planning, and reporting for hazardous and acutely hazardous materials
Occupational Safety and Health Standards, 29 USC Section 65129; 29 CFR 1910 et seq., and Safety and Health Regulations for Construction, 29 CFR 1926 et seq.	Specifies standards for hazardous materials storage, handling, and worker protection in emergencies
Oil Pollution Prevention, 40 CFR 112	Requires the preparation of a Spill Prevention Control and Countermeasures Plan
Chemical Facility Anti-Terrorism Standard, 6 CFR Part 27	Requires facilities that use or store certain hazardous materials to submit information to the Department of Homeland Security so that a vulnerability assessment can be conducted to determine what security measures should be implemented
State	
Stormwater Pollution Prevention, General Permit NVR100000	Requires the preparation of a Stormwater Pollution Prevention Plan for construction and industrial activities
Local	
International Fire Code, Nye County Code Section 15.16.010	Adopts the International Fire Code, 2003 Edition, into Nye County regulations
Industry Codes and Standards	
American Society of Mechanical Engineers, American National Standards Institute, and American Society of Testing Materials	Sets forth standards for power plant design, including mechanical systems, electrical, and piping
Uniform Fire Code, Articles 79, 80, and others	Sets forth requirements for the storage and handling of hazardous materials
National Fire Protection Agency	Establishes fire prevention standards and guidelines

The following project planning documents would specify procedures for the proper storage and management of these substances at the proposed project site.

<u>Health and Safety Requirements</u> – To comply with regulations set forth by OSHA and the Nevada Division of Industrial Relations, health and safety programs would be established for construction and operations at the proposed project site that would document potential hazards and requirements for establishing and maintaining a safe working environment during construction and operation. The programs would include identification of all hazardous substances and chemicals used at the site, including Material Safety Data Sheets (MSDS), a communication and training program, labeling, and identification of hazards and safe work practices. In addition, safety showers and eyewashes would be provided adjacent to, or in the vicinity of, chemical storage and use areas. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures

to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored on-site for spill cleanup.

Construction and Operation Stormwater Pollution Prevention Plan (SWPPP) – The project would comply with the requirements of the NPDES through preparation and implementation of a SWPPP and filing of an NOI to comply with the General Construction and General Industrial Stormwater NPDES permit. The plans would include procedures to be followed during construction to prevent erosion and sedimentation, non-stormwater discharges, and contact between stormwater and potentially polluting substances.

Hazardous Materials Business Plan (HMBP) – HMBPs would be filed with Nye County for the construction and operation of the facility. The HMBPs would inventory the hazardous materials and waste properties, quantities, storage containers and locations, and contingency planning and emergency response procedures.

Spill Prevention Control and Countermeasure (SPCC) Plans – SPCC Plans would be prepared for construction and operation of the facility. The plans would include spill prevention and countermeasures procedures to be implemented, including (but not limited to) a spill record (if applicable), analysis of potential spills, description of containment facilities, fill and overfill prevention facilities, spill response procedures, personnel training, and spill prevention. In addition, all spills would be reported to the BLM Hazardous Materials Coordinator.

The chemicals and hazardous substances that would be used at the site and their storage locations are provided in Table 2-4. This list identifies each chemical by type, intended use, hazardous characteristics, and estimated quantity to be stored on-site.

The solar facility would require the use of large amounts of nitrate salt ($NaNO_3$, CAS 7631-99-4; and KNO_3, CAS 7757-79-1) at the proposed project site as the HTF. The salt would be melted once during project construction and would be used throughout the project life at temperatures between 550°F and 1050°F. To ensure worker safety and environmental protection, the hot and cold HTF tank areas would be designed such that any release would be contained in a basin. The construction SWPPP would specify procedures to prevent contact between HTF and stormwater during processing of this material prior to plant startup. In addition, the processing area would be cleaned to ensure residual HTF is removed from surface soil after processing.

Table 2-4. Potential Project Hazardous Materials

Material	Chemical Abstract Service Number (CAS No.)	Use	Hazardous Characteristics	Estimated Quantity On-Site
Carbon dioxide (gas)	124-38-9	Generator pumping	Asphyxiant, compressed gas	20,000 standard cubic feet (scf)
Carbon dioxide (liquid)	124-38-9	Fire suppression	Asphyxiant, compressed liquid, cryogen	25,000 pounds (lb)
Diesel fuel (No. 2)	68476-34-6	Fuel for emergency generator, fire water pump, and diesel storage for vehicle use	Toxic, combustible	21,500 gallons (gal)
Ferric chloride solution	7705-08-0	Possible use for water pretreatment	Toxic	3,000 gal
Hydrogen	1333-74-0	Generator cooling	Toxic, flammable, explosive	24,000 scf
Hydrated lime	1305-62-0	Possible use for water pretreatment	Toxic, corrosive	2,000 cubic feet (cf)
Lubricating oil	Various	Mechanical equipment, lubrication	Toxic, combustible	25,000 gal
Hydraulic oil	Various	Steam valve actuation	Toxic, combustible	1,000 gal
Mineral oil	Various	Transformer oil	Toxic, combustible	100,000 gal
Nitrogen	7727-37-9	Blanketing	Asphyxiant, compressed gas	400 lb
Sodium carbonate	497-19-8	Water pretreatment	Toxic	2,000 cf
Sulfur hexafluoride	TBD	Contained in switchgear devices	Toxic	200 lb
Sodium hydroxide (50% by weight)	1310-73-2	Possible water demineralizer media regeneration	Toxic, corrosive	3,000 gal
Sulfuric acid (29% by weight)	7664-93-9	Batteries	Toxic, corrosive	2,000 gal
Sulfuric acid (93% by weight)	7664-93-9	Reverse Osmosis (RO) feed pH control, possible water demineralizer media regeneration	Toxic, corrosive	5,000 gal

Domestic wastewater would be treated and disposed of at the proposed project site using a septic disposal system consisting of septic tanks and a leach field permitted by NDEP and Nye County. It is anticipated that separate septic and leach field systems would be constructed for each of the power block and administrative buildings. These would be designed in accordance with local and state regulations by a licensed engineer. A typical/proposed schematic is shown in Figure 2-16.

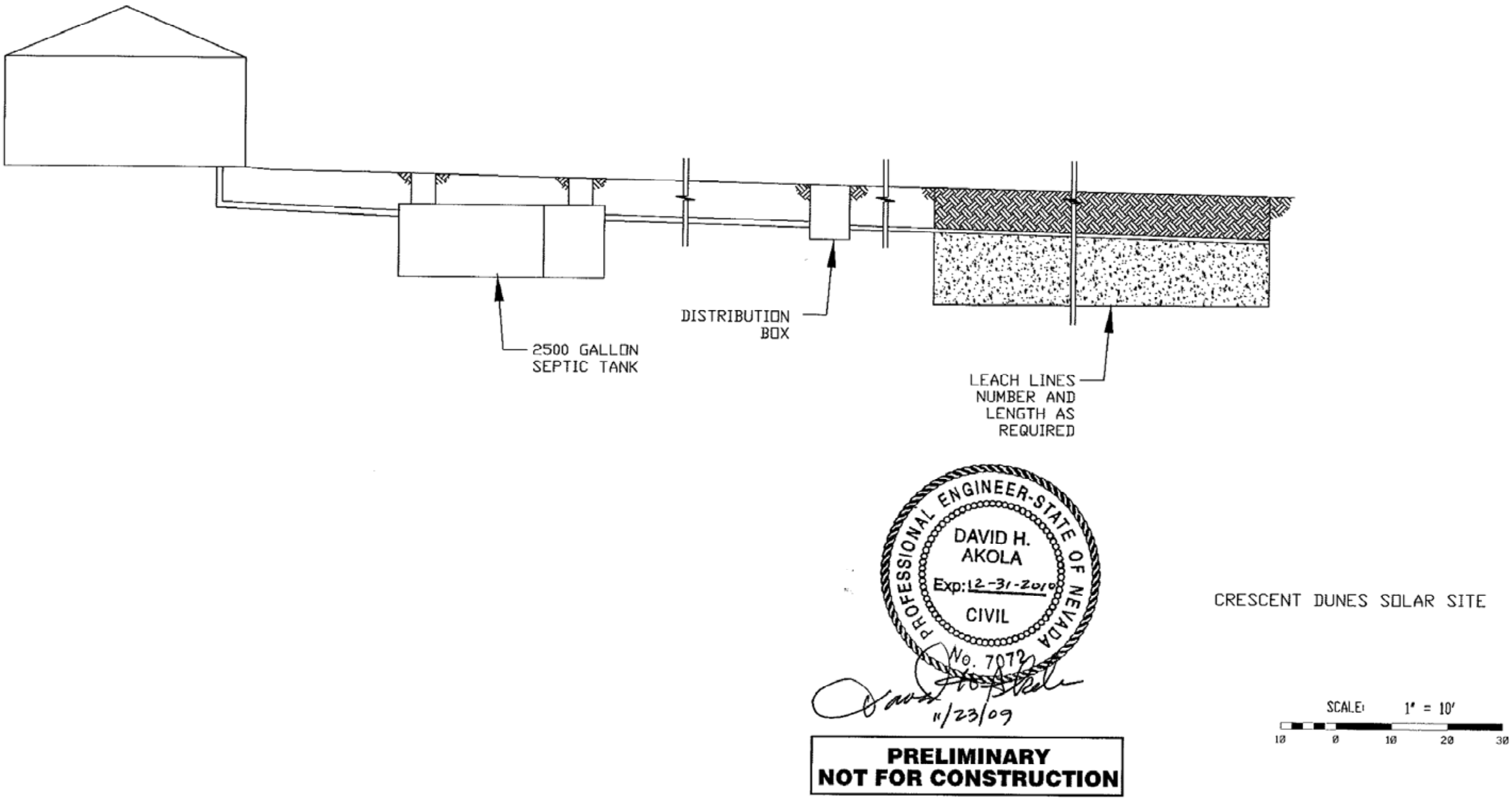


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Figure 2-16 Proposed Septic Systems

Crescent Dunes Solar Energy Project

Source: TSE Plan of Development

The project would produce maintenance and plant wastes typical of a power generation plant. These wastes would be managed in accordance with a Waste Management Plan to be developed before construction and operation of the facility. Wastes may include oily rags, broken and rusted metal and machine parts, defective or broken solar mirrors and electrical materials, empty containers, and other miscellaneous solid wastes including the typical refuse generated by workers. These materials would be collected by a local waste disposal company and disposed of at a landfill permitted to receive these wastes. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects, prevent leaks and spills, and prevent potential contact with stormwater.

Several methods would be used to properly manage and dispose of hazardous wastes generated by the project. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters would be disposed of in a Class I landfill. Workers would be trained to handle hazardous wastes generated at the proposed project site.

Chemical cleaning wastes would consist of alkaline and acid cleaning solutions used during pre-operational chemical cleaning of heat exchangers after the units are installed. These wastes, which can contain elevated metal concentrations, would be temporarily stored on-site in portable tanks and would be disposed of off-site by a chemical cleaning contractor in accordance with applicable regulatory requirements.

2.5.9 Security, Fire Protection and Intentional Destructive Acts

2.5.9.1 Security

Chain link security fencing would be installed around the site perimeter, switchyard, and other areas requiring controlled access prior to beginning construction. The site perimeter fence would be up to 8 feet high and have an overall height of no more than 10 feet from the bottom of the wire mesh to the top barbed wire. The fence would have top rail, bottom tension wire, and three strands of barbed wire mounted on 45-degree extension arms. Posts would be set in concrete.

Controlled access gates would be located at the entrances to the facility. Access through the main gate would require an electronic swipe card, preventing unaccompanied visitors from accessing the facility. All visitors would be logged in and out of the facility during normal business hours. Visitors and non-employees would be allowed entry only with approval from a staff member at the facility. Visitors would be issued visitor passes to be worn during their visit and returned at the main office when leaving.

Personnel would staff the facility 24 hours per day, 7 days per week. Even when the solar power plant is not operating, personnel would be present as necessary for maintenance, to prepare the plant for startup, and/or for site security.

2.5.9.2 Fire Protection

The project would rely on both on-site fire protection systems and off-site fire protection services during both construction and operation of the facility. The on-site fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water would be the service/fire water storage tank.

A Fire Protection and Prevention Plan would be prepared for construction and operation of the facility. The plan would include measures relating to safeguarding human life, preventing personnel injury, preserving property, and minimizing downtime attributable to fire or explosion. Fire protection measures would include the following:

- prevention of the inception of fires
- adequate exits
- fire-safe construction
- reduction of ignition sources
- control of fuel sources
- proper maintenance of fire water supply and sprinkler systems

During construction, the permanent facility fire suppression system would be placed in service as early as practicable. Prior to installation of the facility's permanent fire suppression system, fire extinguishers and other portable fire fighting equipment would be available on-site. These fire extinguishers would be maintained for the full construction duration, in accordance with local and federal OSHA requirements. During construction, water trucks would be first in and last out of the site for fire control purposes. Installation of a construction water source would be one of the first activities in order to provide an on-site source for construction and fire prevention water.

Locations of portable fire extinguishers would include, but not necessarily be limited to, portable office spaces, hot work areas, flammable chemical storage areas, and mobile equipment (e.g., passenger vehicles and earthmoving equipment). Fire-fighting equipment would be located to allow for unobstructed access to the equipment and would be conspicuously marked. Portable fire fighting equipment would be routinely inspected in accordance with regulatory requirements and replaced immediately if defective or in need of recharge.

The facilities operating fire protection water system would be supplied from a dedicated portion of the water storage tank located on the plant site. One electric and one diesel-fueled backup firewater pump, each with a capacity of approximately 3,000 gal per minute, would deliver water to the fire protection piping network. A smaller electric, motor-driven jockey pump would maintain pressure in the piping network. If the jockey pump were unable to maintain a set operating pressure in the piping network, the diesel fire pump would start automatically.

A piping network would be configured in a loop so that a piping failure could be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. The piping network would supply fire hydrants located at intervals throughout the power plant site, possibly a sprinkler deluge system at each unit transformer, and sprinkler systems at the STG lube oil equipment. Sprinkler systems would also be installed in the administrative/control/warehouse/maintenance building and fire pump enclosure as required by National Fire Protection Association (NFPA) and local code requirements.

Handheld fire extinguishers of the appropriate size and rating would be located in accordance with NFPA 10 throughout the facility.

2.5.9.3 Intentional Destructive Acts

Solar generation projects can be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are far more likely to occur than sabotage or terrorism. Theft usually involves equipment at substations and switchyards that contain salvageable metal when metal prices are high. Vandalism usually occurs in remote areas and is more likely to involve spontaneous acts such as shooting at equipment.

As indicated above, in order to keep the project infrastructure secure from threats from intentional destructive acts, the project site would be surrounded by an eight foot perimeter fence, and would be staffed 24 hours a day, 7 days a week. Furthermore, to ensure that the facility is not the target of unauthorized access, electronic controlled-access gates would be utilized.

Pursuant to DOE's policy set out in a December 1, 2006, memorandum, "Need to Consider Intentional Destructive Acts in NEPA Documents," DOE has considered the potential environmental consequences of intentional destructive acts at the Crescent Dunes site. DOE concludes that the risk of damage to the proposed Project from intentional destructive acts would be considered very low, in line with or less than the risk to similar generation facilities in the U.S. Theft or opportunistic vandalism is more likely than sabotage or terrorist acts, which are considered to be a negligible risk.

Protection of widely dispersed electrical generation equipment, substations, and thousands of miles of transmission lines from destructive acts is not practical. Damaged equipment and transmission lines may be quickly repaired or replaced in the same manner that storm damaged equipment are returned to service. The results of any such acts could be expensive to repair, but no substantial impacts to continued electrical service would be anticipated. No significant environmental impacts would be expected from physical damage to the proposed Project or from loss of power delivery.

2.5.10 Applicant-Committed Environmental Protection Measures

Vegetation

Between 1,628 and 1,673 acres of natural vegetation would be removed because of the various components of this project. Cactus and yucca would be salvaged in coordination with BLM. In coordination with BLM, the Proponent is developing a reclamation plan to be implemented at the termination of the lease.

The Proponent has developed a Preliminary Weed Risk Assessment and will develop Weed Management Plan (WMP) for the project. The WMP will prescribe management actions for monitoring and eradicating specified species by BLM-approved methods. The WMP also will describe applicable regulations for the use of herbicides on federally managed lands in Nevada, and provide the basis for proper management and use of herbicides in the project area. A preemergent herbicide would be applied in the spring, and spot foliar applications would be used throughout the year to maintain the area free of vegetation.

Typically, operations and maintenance requirements for native landscapes are low once established. The WMP will include weeding, annual pruning, and soil monitoring, if necessary. Weeding should occur frequently, typically weekly, during the initial growth period to ensure that invasive plants do not mature and set seed. Weeding activities would follow the approved WMP. Once the native plant species are established, weeding frequency would drop to less frequent intervals.

Wildlife Resources

Some wildlife such as small mammals and reptiles may still access the ponds, so ponds will be equipped with materials in each corner that would provide trapped wildlife with sufficient traction to be able to exit the ponds. Additional mitigation is described in Section 4.5.11. Mitigation would be further developed in coordination with NDOW as part of the Industrial Artificial Pond Permit.

Special Status Plant Species

A mitigation plan is being developed between BLM, NDOW, and TSE.

Special Status Wildlife Species

Mammals: Pale Kangaroo Mice and Bats

A mitigation plan is being developed between TSE, BLM, and NDOW. Mitigation would include raptor deterrent mechanisms on TLs and any vertical structures that could promote raptor predation. In addition, the proponent may undertake additional studies of the Pale Kangaroo mouse during construction, in coordination with NDOW.

Golden Eagles and Migratory Birds

In order to minimize impacts to migratory birds during initial grading activities, the Proponent would avoid land clearing activities such as vegetation removal during the avian breeding season (April 1 to August 31). These dates may be modified by BLM based on specific site and weather conditions. If land clearing activities take place during the avian breeding season, a qualified biologist would conduct preconstruction surveys in the affected area to identify nests and breeding birds. If active nests were located, then a protective buffer zone would be delineated around the area (approximately 100 feet) and land-clearing activities would be restricted within this buffer zone. A golden eagle monitoring plan for known nest locations would be developed between BLM, NDOW, and USFWS.

In order to mitigate potential effects of TLs on birds, all static TLs would be marked with wire marks. This should make the static lines easier to see and reduce bird/wire collisions. In order to minimize potential bird electrocutions, TL wires would be spaced to accommodate the wingspan of the largest bird in the project area.

Reptiles

No sensitive reptile species were identified in the proposed project area; therefore, no mitigation measures would be required.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No mitigation is proposed.

Water Quality and Quantity
Mitigation measures to avoid or eliminate the potential impacts to hydrological resources associated with various tasks of construction and operation of the proposed project are discussed below.

General water quality is protected under the Clean Water Act. All surface water runoff that would occur during and after construction as a result of the project would be controlled in accordance with the requirements of the construction and operational (post-construction) NPDES Stormwater Permit and other applicable laws, ordinances, regulations, and standards.

SPCC plans would be prepared for project construction and operation, to include spill prevention and countermeasure procedures to be implemented. To the extent practicable, SPCC would minimize the use of and need for disposal of hazardous and toxic wastes. The implementation of BMPs would prevent transport of contamination to the environment.

The preparation and implementation of a construction SWPPP (a requirement of NPDES) that includes site-specific BMPs would mitigate and reduce erosion and water pollution.

BMPs may include:

- silt barriers installed during construction to filter or contain sediment transport
- frequent inspection and cleaning of construction equipment to reduce or prevent contamination
- equipment fueling and service at designated locations away from drainage paths and wells to minimize contamination transport

As discussed in Section 2.5.2, grading of the site would allow storm flows to follow preexisting paths. The power island would be graded to direct rainfall within the power island to detention/retention basins adjacent to the on-site salt tanks to infiltrate into the ground instead of flowing off-site. Small ditches would be constructed along roadways and culverts as needed where washes cross roads. Transmission towers to be located along the proposed TL corridor would be positioned to avoid existing drainage paths of ephemeral washes to mitigate the potential for altered flow paths.

The construction plan would designate construction staging areas and approved access and exclusion areas. Wells identified for potential access or use impacts during the construction process would be appropriately included in the exclusion areas to maintain access at all times.

Facility water needs are estimated to be less than the anticipated maximum water right quantity to be acquired and would not negatively affect or alter the appropriation of groundwater.

The Proponent has filed for an approved jurisdictional determination requesting that the ephemeral Peavine Creek and its tributaries not be subject to jurisdiction under the Clean Water Act because they have been determined to be isolated intrastate waters (JBR 2010a).

Evaporation Ponds Avian and Wildlife Monitoring and Protection

A detailed monitoring and mitigation plan would be developed in coordination with NDOW as part of the Artificial Industrial Pond Permit application process. Initial mitigation and monitoring measures are described below.

Evaporation ponds would be covered with a porous screen, that would allow for evaporation, but also act as an avian deterrent. Avian monitoring at the evaporation ponds would be conducted twice monthly for the first 2 years of project operation and would continue at least monthly over the life of the project. The monitor (an appointed biologist or Environment Compliance Manager) would identify bird species and/or functional groups (e.g., waterfowl, waders, shorebirds, upland shorebirds) and wildlife observed utilizing the ponds, record the behavior of the birds and wildlife (e.g., feeding, swimming, wading, nesting), and note any mortalities or physical infirmities (e.g., birth defects or reduced growth) associated with any animals observed on or adjacent to the evaporation ponds. This information would be compiled and submitted to NDOW on a quarterly basis in accordance with the AIPP guidelines and permit requirements. Any dead bird or wildlife that could be safely retrieved from the evaporation ponds would be collected by a biologist or Environment Compliance Manager and sent to a qualified laboratory to determine whether the mortality was directly related to salt toxicity or encrustation. In accordance with the AIPP guidelines and permit requirements, all mortalities or injuries would be reported to NDOW within 24 hours of the observation. Documented mortality resulting from salt toxicity or encrustation would result in corrective measures or additional mitigation actions implemented in coordination with NDOW, BLM, and any other appropriate agencies.

Air Quality

The proponent will implement the most current air emission technologies to maintain air emissions in accordance with state and federal regulations.

Cultural Resources

Further archaeological data collection will be needed to mitigate the adverse impacts to historic properties. A Historic Property Treatment Plan (HPTP) is being developed by TSE. The HPTP will list all historic properties to be adversely affected by the project and specify and describe in detail the mitigation measures—site avoidance, testing, data recovery, or monitoring—to be implemented prior to and/or during construction.

Native American Religious Concerns

During initial consultation, no Native American values were identified being impacted.

Land Use and Access

No mitigation has been identified as being needed to address impacts on Land Use or Access. Access will be maintained throughout the construction and operation of the project.

Soils

Erosion

The objectives of erosion mitigation are to reduce short-term erosion and sedimentation, as well as quickly restore topography and vegetation to pre-construction conditions in all areas required and approved by the BLM. Measures to be implemented by the project Proponent during project construction and reclamation are listed below.

Implementation of the following measures and practices would minimize the effects of grading, excavation, and other surface disturbances in all project areas. Schedules and specifications on the use of these features would be included in the COM plan.

- Confine all vehicular and equipment traffic associated with construction to the construction footprint, material yards, and access roads designated in the COM Plan.
- Limit soils and vegetation disturbance and removal to the minimum areas necessary for access and construction.
- Where vegetation removal is necessary, use cutting/mowing methods instead of blading, wherever possible.
- Adhere to a construction methodology that mitigates impacts in sensitive areas during severe weather events.
- Prior to work on the project, inform all construction personnel of environmental concerns, pertinent laws and regulations, and elements of the erosion control plan.
- Minimize grading to the greatest extent possible. Where required, grading should be conducted away from drainages and watercourses to reduce the risk of material entering these features.
- Graded material should be sloped and bermed to reduce surface water flows across the graded area.
- Replace excavated materials and minimize the time between excavation and backfilling.
- Direct dewatering operations to stable surfaces to avoid soil erosion.
- Use detention basins, certified weed-free straw bales or wattles, or silt fences where appropriate to reduce soil loss via erosion.
- Use drainage control structures including culverts, ditches, water bars (berms and cross ditches), and sediment traps, as necessary, to direct surface drainage away from disturbed areas and minimize runoff and sedimentation down-slope from all disturbed areas.
- Implement other appropriate BMPs to minimize erosion-related impacts during site preparation and construction, and subsequent reclamation.
- Re-establish native vegetation and, if necessary, non-persistent, non-invasive, non-native vegetation in highly erodible areas as soon as possible following construction.

In areas of highly erodible soils, construction equipment and techniques that minimize surface disturbance, soil compaction, and loss of topsoil would be used, such as vehicles with low ground pressure tires. Erosion control measures, in accordance with the Soil Conservation and Erosion Control Plan, will be installed prior to construction in potential soil erosion areas. Erodible slopes that do not require grading should be cleared using equipment that results in little to no soil disturbance.

Compaction

Construction, operation, and maintenance activities will be restricted when the soil is too wet to support construction or maintenance equipment (i.e., when heavy equipment creates ruts in excess of 4 inches deep over a distance of 100 feet or more in wet or saturated soils). If soil is too wet, one or more of the following measures would apply:

- Where feasible, route all construction or maintenance activities to avoid wet areas as long as the route does not enter sensitive resource areas.
- If wet areas cannot be avoided, implement BMPs for use in these areas during construction and improvement of access roads, and during subsequent reclamation. Appropriate BMPs include use of wide-track or balloon-tire vehicles and equipment, or other approved weight dispersing systems, geotextile cushions, pre-fabricated equipment pads, and other materials to minimize damage to soil. If BMPs cannot be successfully applied, construction or routine maintenance activities would not be allowed in these areas until the project conditions improve and construction activity can proceed without damage to soils.
- Limit construction equipment access to the minimum amount feasible, remove and separate topsoil in wet or saturated areas, and stabilize subsurface soils with a combination of one or more of the following: grading to dewater problem areas, use of weight dispersion mats, and erosion control measures such as surface rilling and back-dragging. Following construction, re-grade and re-contour the area, replace topsoil, and reseed to achieve pre-construction native plant densities.

Diminished Reclamation/Re-vegetation

Vegetation removal and soil disturbances (including temporary road improvements) will be minimized. Where vegetation removal is required, mowing or cutting methods will be utilized to the greatest extent possible. Top soil removed during clear and grub activity and grading and excavation required for construction will be collected and stockpiled on-site. Stockpiles will be protected from wind and water erosion through establishment of native vegetation and temporary or permanent erosion control BMPs including weed-free straw bales or wattles for the duration of facility construction, operation, and decommission. Following decommission, the stockpiled topsoil will be replaced across the site where topsoil was previously removed to provide a proper soil substrate for seeding or planting and enhance re-establishment of native vegetation to pre-construction conditions.

Social and Economics

Following is the proposed mitigation for the socioeconomic impacts associated with the construction and operations/maintenance phases of the proposed Project:

- In coordination with the Tonopah Town Board, develop a housing and rental plan to coordinate available rental property in and around Tonopah.
- If available rental properties do not meet needs, work with the Town Board to develop temporary trailer park for relocating workforce in town or at the site.

Visual

To the extent possible, the project location will be integrated with the surrounding landscape to avoid conflict with significant aesthetic conditions. Subsequent to construction, restoration efforts will be made in areas that were temporarily disturbed.

Given the importance of maintaining dark sky conditions, conscious efforts will be made to protect the current dark skies from light pollution. The Federal Aviation Administration (FAA) requires lighting on any temporary or permanent structure that exceeds an overall height of 200-feet above ground level. In order to maintain dark sky conditions and minimize visual disturbance, it is recommended that the central receiver tower be illuminated with white lighting during daytime hours and red strobe lights during the night. Additionally, perimeter lighting, including lighting used to illuminate walkways, roadways, equipment yards, and parking lots, should be fully shielded, low-pressure sodium lighting to reduce or eliminate detrimental lighting impact and prevent unnecessary light pollution.

The TL poles will be constructed of wood which tends to blend into the landscape with distance. Given the flat, expansive nature of the landscape, the wood poles will provide less structural contrast as they blend into the horizon and skyline. The appearance of the wood poles will be similar to the existing power line poles in the corridor.

Hazardous Materials

During facility construction, various hazardous materials and one regulated substance will be stored onsite. Construction service personnel will follow general industry health, safety, and environmental Best Management Practices (BMP) for filling and servicing construction equipment and vehicles. The BMPs are designed to reduce the potential for incidents involving hazardous materials. They include the following:

- Refueling and maintenance of vehicles and equipment will occur only in designated areas that are either bermed or covered with concrete, asphalt, or other impervious surfaces to control potential spills. Employees will be present during refueling activities.
- Vehicle and equipment service and maintenance will be conducted only by authorized personnel.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- Catch-pans will be placed under equipment to catch potential spills during servicing.
- All disconnected hoses will be placed in containers to collect residual fuel from the hoses.
- Vehicle engines will be shut down during refueling.
- No smoking, open flames, or welding will be allowed in refueling or service areas.
- Refueling will be performed away from bodies of water to prevent contamination of water in the event of a leak or spill.
- When refueling is completed, the service truck will leave the project site.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents.
- Should a spill contaminate soil, the soil will be put in containers and disposed of as appropriate. All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure. All maintenance and refueling areas will be inspected monthly. Results of inspections will be recorded in a logbook that will be maintained onsite.

In the unlikely event of a spill, the spill may need to be reported to the appropriate regulatory agencies and cleanup of contaminated soil could be required. Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews. All personnel working on the project during the construction phase will be trained in handling hazardous materials and the dangers associated with hazardous materials. An onsite health and safety person will be designated to implement health and If there is a large spill from a service or refueling truck, contaminated soil will be placed into barrels or trucks by service personnel for offsite disposal at an appropriate facility in accordance with law. If a spill involves hazardous materials quantities equal to or greater than the specific RQ (42 gallons for petroleum products), all federal, state, and local reporting requirements will be followed. In the event of a fire or injury, the local fire department will be called.

In addition to these BMPs to address accidental hazardous materials releases, a construction site security plan will be prepared to address hazardous materials security and will include the following elements:

- Descriptions of the site perimeter fencing and access security
- Evacuation procedures
- A protocol for contacting law enforcement in the event of conduct endangering the facility, its employees, its contractors, or the public
- A site access protocol for contractors and vendors, including applicable personnel background checks consistent with state and federal law regarding security and privacy
- A protocol for hazardous materials vendors to prepare and implement security plans as per 49 CFR 172.800 and to ensure that all hazardous materials drivers are in compliance with personnel background security checks as per 49 CFR Part 172, Subpart I
- A protocol for security of nitrate salts in accordance with Department of Homeland Security (DHS) measures to protect listed Chemicals of Interest (risk: theft) as per 6 CFR Part 27

During facility operation, various hazardous materials and one regulated substance will be stored onsite as shown in Table 4-23. Material Safety Data Sheets (MSDS) for the chemicals likely to occur on site during operation of the proposed Project can be found in the POD (Tonopah Solar Energy 2009).

During operation of the facility, all hazardous materials will be handled and stored in accordance with applicable codes and regulations specified in Section 3.13 Affected Environment. Some general measures that will be implemented includes:

- Provision of an automatic sprinkler system for indoor hazardous material storage areas
- Provision of an exhaust system for indoor hazardous material storage areas
- Separation of incompatible materials by isolating them from each other with a noncombustible partition
- Spill control in all storage, handling, and dispensing areas
- Separate secondary containment for each chemical storage system; secondary containment is required to hold the entire contents of the tank plus the volume of water for the fire suppression system that could be used for fire protection for a period of 20 minutes in the event of a catastrophic spill

The above mitigation measures will be outlined in the following plans:

Health and Safety Requirements - To comply with regulations set forth by the Occupational Health and Safety Administration (OSHA) and the Nevada Division of Industrial Relations, health and safety programs will be established for construction and operations at the Site that will document potential hazards and requirements for establishing and maintaining a safe working environment during construction and operation. The programs will include identification of all hazardous substances and chemicals used at the site, including Material Safety Data Sheets (MSDS), a communication and training program, labeling, and identification of hazards and safe work practices. In addition, safety showers and eyewashes would be provided adjacent to, or in the vicinity of, chemical storage and use areas. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored onsite for spill cleanup.

Construction and Operating Stormwater Pollution Prevention Plans (SWPPP) – The project will comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) through preparation and implementation of a SWPPP and filing of a Notice of Intent (NOI) to comply with the General Construction and General Industrial Stormwater NPDES Permit. The plans will include procedures to be followed during construction to prevent erosion and sedimentation, non-stormwater discharges, and contact between stormwater and potentially polluting substances.

Hazardous Materials Management Plans (HMMP) – Hazardous Materials Management Plans will be filed with Nye County for the construction and operation of the facility. The plans will inventory the hazardous materials and waste properties, quantities, storage containers and locations, and contingency planning and emergency response procedures.

Spill Prevention Control and Countermeasure Plans (SPCC) - SPCC Plans will be prepared for construction and operation of the Site. The plans will include spill prevention and countermeasures procedures to be implemented including (but not limited to) a spill record (if applicable), analysis of potential spills, description of containment facilities, fill and overfill prevention facilities, spill response procedures, personnel training and spill prevention. In addition, all spills will be reported to the BLM Hazardous Materials Coordinator.

Range Resources

The project will be designed to minimize impacts where possible and construction measures will be taken to reduce long-term impacts during construction of the facility and the TLs, such as blading only areas that are needed for long-term access. Mitigation of these impacts will include recontouring and revegetating the area after removal and decommissioning of the facility at the end of the lease period. Goals of the revegetation plan are to return the site to a condition of production of comparable type and volume of forage and sustainable ecological condition.

Mitigation for temporary impacts will vary by the type and severity of the impact. Impacts requiring removal of vegetation will be mitigated through revegetation efforts as described in the Revegetation

Plan. These efforts may include salvage and subsequent redistribution of topsoil, distribution of seeds to promote reestablishment of native plants, and control of noxious and invasive weed species. Where possible, vegetation would be crushed to allow the necessary construction access, minimizing impacts to the vegetation and the soils. In other cases, plants may be cut to allow construction access, retaining a root stock to provide a base for resprouting and more rapid plant reestablishment.

Recreation and Wilderness

Access to recreation areas will be maintained throughout the construction and operation of the facility. No wilderness areas were identified as impacted by the proposed project.

2.5.11 Decommissioning and Reclamation

The procedures described for decommissioning are designed to ensure public health and safety, environmental protection, and compliance with applicable regulations. It is assumed that decommissioning of the permanent plant facilities would begin 30–50 years after the commercial operation date of the solar plant. Decommissioning of temporary facilities, including but not limited to temporary septic systems, temporary underground conduit, temporary power poles, temporary concrete pads, and similar items would be completed during the plant commissioning time frame or within the first 6 months of facility operation following completion. The project goals for site decommissioning are as follows:

- Remove aboveground structures unless converted to other uses.
- Restore the lines and grades in the disturbed area of the site to match the natural gradients of the site.
- Reestablish native vegetation in the disturbed areas.

The proposed implementation strategy to achieve the goals for site decommissioning would include the following:

- Use industry standard demolition means and methods to decrease personnel and environmental safety exposures by minimizing time and keeping personnel from close proximity to actual demolition activities to the extent practical.
- Plan each component of the decommissioning project such that personnel and environmental safety are maintained while efficiently executing the work.
- Conduct pre-decommissioning activities such as final decommissioning and restoration planning that address the "as-found" site conditions at the start of the project.
- Remove all residual materials and chemicals from the site prior to demolition for reuse at other facilities or for proper disposal at licensed facilities.
- Demolish aboveground structures (dismantling and removal of improvements and materials) in a phased approach while still using some items until close to the end of the project. For instance, the water supply, administrative building, and some electrical power components would be modified to be used until very late in the decommissioning project.
- Demolish and remove belowground facilities (floor slabs, footings, and underground utilities) as needed to meet the decommissioning goals.

- Clean up soils, if needed, with special attention given to retention pond and hazardous materials use/storage areas to ensure that clean closure is achieved.
- Dispose of materials in appropriate facilities for treatment/disposal or recycling.
- Recontour lines and grades to match the natural gradient and function of the site.
- Revegetate with native plants.

Although various types of decommissioning and demolition equipment would be used to dismantle each type of structure or equipment, dismantling would proceed according to the following general staging process. The first stage would consist of dismantling and demolishing aboveground structures to be removed. The second stage would consist of concrete removal as needed to ensure that no concrete structure remained within 3 feet of final grade (i.e., floor slabs, belowground walls, and footings) as appropriate, and removal/dismantling of underground utilities within 3 feet of final grade. The third stage would be excavation and removal of contaminated soils. The final stage would include contouring to return the disturbed area of the site to near original conditions while disturbing as little of the other site areas as possible, revegetating the site, and conducting associated monitoring.

Stage 1. Aboveground demolition entails breakdown and removal of aboveground structures and facilities. Residual materials from these activities would be transported by heavy haul dump truck to a central recycling/staging area where the debris would be processed for transport to an off-site recycler. A project recycle center (at each power unit either as the work progresses or at the central administrative area) would be established to:

- Size-reduce and stage metals and mirrors for transport to an off-site recycler.
- Crush concrete and remove rebar.
- Stockpile concrete for later use at the site.
- Stage rebar for transport to an off-site recycler.
- Temporarily store and act as a shipping point for any hazardous materials to an approved Treatment, Storage, and Disposal (TSD) facility.

The strategy for demolition consists of using mechanized equipment and trained personnel for the safe dismantling and removal of the following aboveground structures:

- Remove heliostats and related equipment using low environmental impact equipment.
- Dismantle towers using explosives to put the towers on the ground, then use conventional heavy equipment to size reduce and transport for recycling (this is the industry standard for safe demolition of large towers and massive concrete structures).
- Remove the turbine generators, condensers and related equipment, TLs and towers, and aboveground pipelines using conventional demolition equipment and techniques.
- Near the very end of the project, remove site-related fencing.

Stage 2. The belowground facilities to be removed include concrete slabs and footings that would remain within 3 feet of final grade at the end of the project. It is anticipated that any and all site-related piping and utilities, including water lines, belowground electric/control/communication lines, and gas lines would be completely removed, regardless of the depth below final grade. These materials would be excavated and transported to the recycling area(s) for processing and ultimate recycling. The resulting trenches would be backfilled with suitable material of similar consistency and permeability as the surrounding native materials and compacted to 85 percent relative compaction.

<u>Stage 3.</u> The need for, depth, and extent of contaminated soil excavation would be based on observation of conditions and analysis of soil samples after removal of the evaporation pond and hazardous materials storage areas, and upon closure of the recycling center(s) and waste storage areas using during decommissioning. At this time, removal of contaminated soil is assumed to be unnecessary. If required, removal would be conducted to the extent feasible and as required to meet regulatory cleanup criteria for the protection of groundwater and the environment. If contaminated soil removal were required, the resulting excavations would be backfilled with native soil of similar permeability and consistency as the surrounding materials and compacted to 85 percent relative compaction.

<u>Stage 4.</u> Recontouring of the site would be conducted using standard grading equipment to return the land to match, within reason, the previously existing surface and surrounding grade and function. Grading activities would be limited to previously disturbed areas that require recontouring. Efforts would be made to disturb as little of the natural drainage and vegetation as possible. Concrete rubble, crushed to approximately 2-inch minus size, would be placed in the lower portions of fills, at depths at least 3 feet below final grade. Fills would be compacted to approximately 85 percent relative compaction by wheel or track rolling to avoid over-compaction of the soils. To the extent feasible, efforts would be made to place a layer of coarser materials at the ground surface to add stability. After recontouring, the site would be revegetated where appropriate using native plants in accordance with a restoration plan developed in coordination with BLM.

2.6 Alternatives to the Proposed Action

Numerous alternative locations were considered for the Proposed Action using the siting criteria discussed in Section 2.2, Project Background.

2.6.1 Alternatives Considered in Detail (Including No Action)

Three alternatives to the Proposed Action were evaluated for potential impacts, including two alternative locations for the project and the No Action Alternative.

2.6.1.1 <u>Alternative 1</u>

The center of Alternative 1 would be located approximately 1.85 miles north of the center of the Proposed Action (see Figure 2-1). Alternative 1 was proposed during the scoping process by the U.S. Air Force to minimize impacts on instrumentation use to support the training mission on the Nevada Test and Training Range to the southeast of the Proposed Action. Many components of this alternative are similar to the Proposed Action. The sections below identify those items that differ from the Proposed Action.

2.6.1.1.1 Project Components

The overall site layout for the alternative facility is very similar to the Proposed Action, as shown in Figure 2-2, and would include an array of components that are described in this section of the document. Additional details on the project components may be found in the project Plan of Development (TSE 2009).

Generating Facility Components

The generating facility components required for Alternative 1 would be the same as for the Proposed Action. However, the location of the central receiving tower would be farther north, and the configuration of the mirror array would be slightly different, as depicted in Figure 2-2.

Major Electrical Systems and Equipment

The major electrical systems and associated equipment for Alternative 1 would be the same as described for the Proposed Action.

Transmission Systems and Interconnection

The transmission system and interconnection components for Alternative 1 would have only minor differences from those described for the Proposed Action.

Interconnection

The interconnection at the Anaconda Moly Substation would be the same as for the Proposed Action.

Potential Transmission Route

The transmission route would be similar to the route for the Proposed Action. The route would begin at the transformers on the facility and follow a path west to the existing transmission alignment (Figure 2-1). The total length of the new TL would be 7.5 miles.

Civil/Structural Features

The specifications and descriptions of the access roads, buildings and enclosures, material storage, storage tanks, and pipelines for Alternative 1 would be the same as for the Proposed Action. Details of the stormwater drainage plan for Alternative 1 would be designed specific to this site to accomplish the same objectives as the Proposed Action, and would be similar to the plan developed for the Proposed Action, which is shown in Figures 2-13 and 2-14.

Construction Activities

Temporary construction facilities, construction process and schedule, and construction work force and equipment for Alternative 1 would be the same as for the Proposed Action.

Operations and Maintenance

Operations and maintenance associated with Alternative 1 would be the same as for the Proposed Action.

2.6.1.1.2 Water Demand and Sources

Water Sources

The water source for Alternative 1 would come from a well located approximately at the center of the power block.

Water Demand

Water use for Alternative 1 would be the same as for the Proposed Action.

2.6.1.1.3 Hazardous Materials Management

Hazardous materials used and hazardous wastes generated for Alternative 1 would be the same as for the Proposed Action.

2.6.1.1.4 Security and Fire Protection

Security and fire protection for Alternative 1 would be the same as for the Proposed Action.

2.6.1.1.5 Applicant-Committed Environmental Protection Measures

Environmental protection measures would be the same as those for the proposed action.

2.6.1.1.6 Decommissioning and Reclamation

The general concepts and requirements of the decommissioning and reclamation for Alternative 1 would be the same as for the Proposed Action.

2.6.1.2 Alternative 2

The center of Alternative 2 would be located approximately 2.4 miles northwest of the center of the Proposed Action (see Figure 2-1). Alternative 2 was proposed to minimize potential impacts of Alternative 1 on the soils and associated resources near the Crescent Dunes. Many components of this alternative are similar to the Proposed Action and Alternative 1. The sections below identify those items that differ from the Proposed Action.

2.6.1.2.1 Project Components

The overall site layout for the Alternative 2 facility would be very similar to the Proposed Action, as shown in Figure 2-2, and would include an array of components described in this section of the document. Additional details on the project components may be found in the project Plan of Development (TSE 2009).

Generating Facility Components

The generating facility components required for Alternative 2 would be the same as for Proposed Action. However, the location of the central receiving tower would be northwest of the proposed project, and the configuration of the mirror array would be slightly different, as depicted in Figure 2-2.

Major Electrical Systems and Equipment

The major electrical systems and associated equipment for Alternative 2 would be the same as described for the Proposed Action.

Transmission Systems and Interconnection

The transmission system and interconnection components for Alternative 2 would have only minor differences from those for the Proposed Action.

Interconnection

The interconnection at the Anaconda Moly Substation would be the same as for the Proposed Action.

Potential Transmission Route

The transmission route would be similar to the route for the Proposed Action. The route would begin at the transformers on the facility and follows a path west to the existing transmission alignment (Figure 2-1). The total length of the new TL would be 6.9 miles.

Civil/Structural Features

The specifications and descriptions of the access roads, buildings and enclosures, material storage, storage tanks, and pipelines for Alternative 2 would be the same as for the Proposed Action. Details of the stormwater drainage plan for Alternative 2 would be designed specific to this site to accomplish the same objectives as the Proposed Action, and would be similar to the plan developed for the proposed project, which is shown on Figures 2-13 and 2-14.

Construction Activities

Temporary construction facilities, construction process and schedule, and construction work force and equipment for Alternative 2 would be the same as for the Proposed Action.

Operations and Maintenance

Operations and maintenance associated with Alternative 2 would be the same as for the Proposed Action.

2.6.1.2.2 Water Demand and Sources

Water Sources

The water source for Alternative 2 would come from a well located approximately at the center of the power block.

Water Demand

Water use for Alternative 2 would be the same as for the Proposed Action.

2.6.1.2.3 Hazardous Materials Management

Hazardous materials used and hazardous wastes generated for Alternative 2 would be the same as for the Proposed Action.

2.6.1.2.4 Security and Fire Protection

Security and fire protection for Alternative 2 would be the same as for the Proposed Action.

2.6.1.2.5 Applicant-Committed Environmental Protection Measures

Environmental protection measures would be the same as those for the proposed action.

2.6.1.2.6 Decommissioning and Reclamation

The general concepts and requirements of the decommissioning and reclamation for Alternative 2 would be the same as for the Proposed Action.

2.6.1.3 No Action Alternative

In accordance with CEQ [40 CFR 1502.14(d) and 1508.25(b)] and BLM guidelines (BLM 2008a), this EIS evaluates the No Action Alternative. The No Action Alternative describes the environmental consequences that would result if the Proposed Action were not implemented. The No Action Alternative forms the baseline from which the impacts of all other alternatives can be measured.

Under the No Action Alternative, BLM would not approve the SF-299 ROW grant, and the proposed solar facility would not be constructed. Not constructing the facility would require the state utilities to rely on other facilities to achieve the goals of the RPS.

2.6.2 Alternatives Considered but Eliminated from Detailed Analysis

In accordance with BLM's NEPA Handbook and associated guidelines, alternatives that do not meet the purpose and need of the project, are not technically or economically feasible, or are substantially similar to or have similar impacts as other alternatives being evaluated may be eliminated from detailed analysis. For this project, two additional alternative locations were initially considered and a different cooling technology was considered.

2.6.2.1 Alternative Locations

TSE performed preliminary screening of areas in the regional vicinity of Tonopah, Nevada, for consideration as potential locations for the Proposed Action. TSE's technology has specific siting requirements, including a large open space of approximately 4 square miles, minimal slope, transmission access, water availability, road access, and high solar incidence. TSE is also limited to sites not already claimed by other developers. The site selection process for the Proposed Action screened sites based on the following parameters:

- siting area with minimum area of 4 square miles and contiguous in configuration
- solar resource
- distance from TLs and substations
- environmental considerations
- stormwater drainage channels/waters of the United States
- land ownership
- water resources
- topography
- airport locations
- highways/roads

- faults
- population centers
- military interference issues

As a result of the effort, three sites were identified that met the screening criteria, and SF-299 applications were submitted on the three BLM-administered areas, including the proposed project site (Figure 2-17). The two additional sites were the Mud Lake Site, east of Tonopah, and the Peavine Creek Site, west of the proposed project site.

Each of these three sites met the criteria for solar resource, topography, proximity to interconnection, potential for water resources, and minimal interference with other land uses. After further review, the Mud Lake and Peavine Creek sites were ultimately eliminated from further consideration for one or more of the following reasons: a high potential for military and/or radar operations interference, potential for cultural resource occurrence and sensitivity, potential for substantial upgrades required for road access, potential for affecting areas with significant stormwater drainage channels, and the need for substantial interconnection capacity upgrades. In addition, interconnection studies showed that transmission would require extensive upgrades for the Mud Lake Site, including a new substation. Finally, given that the Mud Lake Site was being proposed in a dry lakebed, the area had a high potential for the presence of and impacts to sensitive cultural resources and values.

Based on discussions with personnel at Nellis Air Force Base and the DOD Preliminary Screening Tool (FAA 2010a), it was discovered that both the Mud Lake and Peavine Creek sites were located in areas where impacts on military training were highly probable.

Figure 2-17 Alternative Sites Considered but not Further Evaluated
Crescent Dunes Solar Energy Project

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2.6.2.1 Alternative Cooling Technology

The Proposed Action would include a hybrid wet-dry system for cooling. This system would optimize the efficiency of the power generation compared with water use. The following is a short description of the different cooling technologies; however, the hybrid cooling is the system carried forward in this EIS.

Wet Cooling

A wet cooling system consists primarily of a cooling tower, water recirculation pumps, and a wet surface condenser. Steam is condensed in the wet surface condenser with cooling water being pumped from the cold water basin. The warm water leaving the wet surface condenser returns to the cooling tower, where it is chilled by evaporative cooling. The cooling tower maintains a cold water basin temperature by turning fans on and off.

Cooling towers are typically the lowest cost system while providing the highest steam turbine efficiency. Higher turbine efficiencies are achieved because the cooling tower uses the wet bulb temperature instead of ambient temperature, thereby enabling cooler steam condensate. The downside to cooling towers is the high water use caused by the evaporative cooling.

By using wet cooling technology for the Proposed Action, it was estimated that approximately 1,000–1,200 AF of water would be needed per year. Because of this high water use and the option of using a hybrid technology using less water, this alternative was not carried forward in the analysis.

Dry Cooling

A dry cooling system consists primarily of an ACC. Steam is passed through a tube structure in the ACC and is cooled by air flowing over the tubes, similar to a car radiator.

ACC systems typically have higher costs than that of a cooling tower. The ACC itself is significantly more expensive than a cooling tower for the same power plant but removes the need for circulating pumps and a wet surface condenser. The most significant advantage of a dry cooled system is the lower water use than wet and hybrid cooling systems. The downside to an ACC is low turbine efficiency, which will relate to higher power costs because of lower power production for the same capital cost.

It is estimated that a dry cooled technology for this project would use 150–200 AF of water per year. However, because of the decrease in efficiency and, thereby, a higher power cost, the fully dry-cooled technology was not carried forward in the analysis.

2.7 Comparative Analysis of Alternatives

Table 2-5 provides a comparative analysis of the alternatives considered in detail in this EIS.

Table 2-5. Comparative analysis of alternatives considered in detail

Resource/Issue	Proposed Action	Alternative 1	Alternative 2	No Action Alternative
Land disturbance (acres)	**Permanent:** 1,704 acres **Temporary:** 102 acres **Total:** 1,806 acres	**Permanent:** 1,665 acres **Temporary:** 110 acres **Total:** 1,775 acres	**Permanent:** 1,652 acres **Temporary:** 110 acres **Total:** 1,762 acres	No land would be disturbed.
Vegetation (including noxious weeds)	**Construction:** Removal of 1,673 acres of common desert vegetation during construction of project facilities **Operation:** No effects	**Construction:** Removal of 1,640 acres of common desert vegetation during construction of project facilities, and removal of a large proportion (16 percent) of unique habitat (active and stabilized dunes) within the Cumulative Effect Study Area **Operation:** No effects	**Construction:** Removal of 1,628 acres of common desert vegetation during construction of project facilities **Operation:** Since vegetation would be removed during construction, no effects to vegetation	No vegetation would be affected.
Wildlife resources	**Construction:** Injury or mortality to wildlife during grading and construction activities, and removal of 1,673 acres of habitat **Operation:** Potential for wildlife injury or mortality related to operation of evaporation ponds	**Construction:** Injury or mortality to wildlife during grading and construction activities, and removal of 1,640 acres of habitat including 7 acres of unique dune habitat **Operation:** Potential for wildlife injury or mortality related to operation of evaporation ponds	**Construction:** Injury or mortality to wildlife during grading and construction activities, and removal of 1,628 acres of habitat **Operation:** Potential for wildlife injury or mortality related to operation of evaporation ponds	No wildlife would be affected.
Special status species (plants)	**Construction:** Removal of Nevada oryctes plants and 1,374 acres of suitable habitat **Operation:** No effects	**Construction:** Removal of Nevada oryctes plants and 803 acres of suitable habitat **Operation:** No effects	**Construction:** Removal of Nevada oryctes plants and 434 acres of suitable habitat **Operation:** No effects	No special status species would be affected.

Table 2-5. Comparative analysis of alternatives considered in detail

Resource/Issue	Proposed Action	Alternative 1	Alternative 2	No Action Alternative
Special status species (wildlife)	**Construction:** Injury or mortality to pale kangaroo mice during construction and grading activities, and removal of 1,466 acres of suitable habitat **Operation:** Pale kangaroo mice may suffer injury or mortality related to operation of the evaporation ponds	**Construction:** Injury or mortality to pale kangaroo mice and special status beetle species during construction and grading activities, removal of 1,191 acres of suitable habitat for pale kangaroo mouse, and removal of 7 acres of beetle habitat **Operation:** Pale kangaroo mice may suffer injury or mortality related to operation of the evaporation ponds	**Construction:** Injury or mortality to pale kangaroo mice during construction and grading activities, removal of 434 acres of suitable habitat **Operation:** Pale kangaroo mice may suffer injury or mortality related to operation of the evaporation ponds	No special status species would be affected.
Golden eagles and migratory birds	**Construction:** Removal of 1,673 acres of golden eagle foraging habitat and migratory bird nesting habitat **Operation:** Injury or mortality due to bird collisions with project structures and transmission line	**Construction:** Removal of 1,640 acres of golden eagle foraging habitat and migratory bird nesting habitat **Operation:** Injury or mortality due to bird collisions with project structures and transmission line	**Construction:** Removal of 1,628 acres of golden eagle foraging habitat and migratory bird nesting habitat **Operation:** Injury or mortality due to bird collisions with project structures and transmission line	Migratory birds or Golden eagles would no be affected.
Surface water quality and quantity	**Construction:** Increased potential for surface water contamination due to accidental hazardous material spills, and increased potential for sediment transport during storms **Operation:** Increased potential for sediment transport during storms	**Construction:** Increased potential for surface water contamination due to accidental hazardous material spills, and increased potential for sediment transport during storms **Operation:** Increased potential for sediment transport during storms	**Construction:** Increased potential for surface water contamination due to accidental hazardous material spills, and increased potential for sediment transport during storms **Operation:** Increased potential for sediment transport during storms	Surface water would not be affected.

Table 2-5. Comparative analysis of alternatives considered in detail

Resource/Issue	Proposed Action	Alternative 1	Alternative 2	No Action Alternative
Groundwater quality and quantity	**Construction:** Increased potential for groundwater quality effects due to naturally occurring total dissolved solids (TDS) in the area **Operation:** Increased potential for groundwater contamination due to accidental hazardous material spills	**Construction:** Increased potential for groundwater quality effects due to naturally occurring TDS in the area **Operation:** Increased potential for groundwater contamination due to accidental hazardous material spills	**Construction:** Increased potential for groundwater quality effects due to naturally occurring TDS in the area **Operation:** Increased potential for groundwater contamination due to accidental hazardous material spills	Groundwater would not be affected.
Waters of the United States	Not present	Not present	Not present	No waters of the United States would be affected.
Air quality	**Construction:** Temporary effects on air quality due to construction equipment exhaust, fugitive dust generated by vehicles and construction equipment, and wind driven fugitive dust; also, temporary effects on air quality due to initial heating of salt **Operation:** Emissions from operation of the plant not expected to exceed federal or state air quality standards	**Construction:** Temporary effects on air quality due to construction equipment exhaust, fugitive dust generated by vehicles and construction equipment, and wind driven fugitive dust; also, temporary effects on air quality due to initial heating of salt **Operation:** Emissions from operation of the plant not expected to exceed federal or state air quality standards	**Construction:** Temporary effects on air quality due to construction equipment exhaust, fugitive dust generated by vehicles and construction equipment, and wind driven fugitive dust; also, temporary effects on air quality due to initial heating of salt **Operation:** Emissions from operation of the plant not expected to exceed federal or state air quality standards	Air quality would not be affected.
Cultural resources	**Construction:** Effects include disturbance and removal of four existing properties eligible for listing on the National Register of Historic Places due to grading and construction activities **Operation:** No effects	**Construction:** Effects include disturbance and removal of one existing property eligible for listing on the National Register of Historic Places due to grading and construction activities **Operation:** No effects	**Construction:** Effects include disturbance and removal of eight existing properties eligible for listing on the National Register of Historic Places due to grading and construction activities **Operation:** No effects	Cultural resources would not be affected
Native American religious concerns	No Native American concerns were identified during consultations	No Native American concerns were identified during consultations	No Native American concerns were identified during consultations	No Native American concerns were identified during consultations

Table 2-5. Comparative analysis of alternatives considered in detail

Resource/Issue	Proposed Action	Alternative 1	Alternative 2	No Action Alternative
Land use and access (including special designations)	**Construction:** Consistent with U.S. Bureau of Land Management (BLM) policies, goals, objectives, and land use descriptions; removal of 1,673 acres of BLM land from potential public use or disposal; potential impacts to military flights and airspace **Operation:** Same as construction	**Construction:** Not consistent with BLM policies, goals, objectives, and land use descriptions; removal of 1,640 acres of BLM land from potential public use or disposal; removal of 130 acres of a right-of-way avoidance area (Special Recreation Management Area); effects on a designated mineral leasing area; potential impacts to military flights and airspace **Operation:** Same as construction	**Construction:** Consistent with BLM policies, goals, objectives, and land use descriptions; removal of 1,628 acres of BLM land from potential public use; potential impacts to military flights and airspace **Operation:** Same as construction	Land use and access would not be affected.
Soils	**Construction:** Potential increase in soil erosion and compaction **Operation:** No effects	**Construction:** Potential increase in soil erosion and compaction **Operation:** No effects	**Construction:** Potential increase in soil erosion and compaction **Operation:** No effects	Soils would not be affected.
Social and economic values	**Construction:** Temporary increase in local population during peak construction, and temporary increase in local jobs **Operation:** Increase in local population, and approximately 200 direct and indirect jobs created, with $30 million in revenues added to the State of Nevada annually	**Construction:** Temporary increase in local population during peak construction, and temporary increase in local jobs **Operation:** Increase in local population, and approximately 200 direct and indirect jobs created, with $30 million in revenues added to the State of Nevada annually	**Construction:** Temporary increase in local population during peak construction, and temporary increase in local jobs **Operation:** Increase in local population, and approximately 200 direct and indirect jobs created, with $30 million in revenues added to the State of Nevada annually	No new jobs would be created and no revenue would be added to the State of Nevada annually as a result of the proposed project.
Visual resources	**Construction:** Major viewshed effects for recreationalists using dunes; Moderate viewshed effects for travelers along Pole Line Road **Operation:** Same as construction	**Construction:** Major viewshed effects for recreationalists using dunes; Moderate viewshed effects for travelers along Pole Line Road **Operation:** Same as construction	**Construction:** Major viewshed effects for recreationalists using dunes; Moderate viewshed effects for travelers along Pole Line Road **Operation:** Same as construction	Visual resources would not be affected.
Hazardous materials and solid waste	**Construction:** Potential for hazardous spills would increase and may affect groundwater **Operation:** Same as construction	**Construction:** Potential for hazardous spills would increase and may affect groundwater **Operation:** Same as construction	**Construction:** Potential for hazardous spills would increase and may affect groundwater **Operation:** Same as construction	No impacts from hazardous materials would occur.

Table 2-5. Comparative analysis of alternatives considered in detail

Resource/Issue	Proposed Action	Alternative 1	Alternative 2	No Action Alternative
Rangeland resources and livestock grazing	**Construction:** Removal of 1,673 acres of forage production and livestock grazing area, which amounts to 52 Animal Unit Months (AUM) **Operation:** Increased activity and human presence in the area may cause livestock to avoid the area adjacent to the facility	**Construction:** Removal of 1,640 acres of forage production and livestock grazing area, which amounts to 50 AUMs. **Operation:** Increased activity and human presence in the area may cause livestock to avoid the area adjacent to the facility	**Construction:** Removal of 1,628 acres of forage production and livestock grazing area, which amounts to 50 AUMs **Operation:** Increased activity and human presence in the area may cause livestock to avoid the area adjacent to the facility	Rangeland resources and livestock grazing would not be affected.
Recreation, wilderness	No effects to recreation and wilderness are likely to occur.	**Construction:** Conversion of approximately 130 acres of the rights-of-way avoidance area (e.g., Crescent Dunes SRMA) into project facilities **Operation:** Same as construction	No effects to recreation and wilderness are likely to occur.	Recreation and wilderness would not be affected.

2.8 BLM-Preferred Alternative

In accordance with NEPA, Federal agencies are required by the CEQ (40 CFR 1502.14) to identify their preferred alternative for a project in the Draft EIS, if a preference has been identified, and in the Final EIS prepared for the proposed project. The preferred alternative is not a final agency decision; rather, it is an indication of the agency's preference.

The BLM has selected a preferred alternative based on the analysis in this DEIS; this preferred alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, considering economic, environmental, technical, and other factors.

The BLM has determined that the preferred alternative is Alternative 2 as described in Section 2.6, Alternatives to the Proposed Action. This alternative was chosen because this alternative:

- has the least impacts to special status plants and wildlife species;
- stays within the existing transmission corridor and reduces the length of the transmission line;
- does not impact the Crescent Dunes SRMA;
- has the least impact to recreationalists utilizing Crescent Dunes; and
- best complies with the TFO Resource Management Plan.

3.0 Affected Environment

3.1 Introduction

This chapter describes the affected environment associated with the construction and operation of the Proposed Action, Alternative 1, or Alternative 2. The affected environment is analyzed in the physical project area, including all ancillary facilities [i.e., TL(s), borrow pit, access road(s)].

During the scoping process, additional alternatives were identified for the location of the generation facilities. In order to assess the Proposed Action and these alternatives, two areas were identified for describing the affected environment for this EIS: the Proposed Area, which contains the Proposed Action, and the Alternative Area, which contains the overlapping Alternatives 1 and 2 (see Figure 3-1). The TL route and borrow pit were assessed individually in each resource section, but would be components of any of the three build alternatives, if selected. This section documents the baseline (existing conditions) to identify and evaluate the environmental changes resulting from construction and operation of the proposed project.

The following acreage applies to the above-described areas:

- Proposed Area = 2,762 acres
- Alternative Area = 3,821 acres
- TL and Substation = 180 acres
- Borrow Pit = 40 acres

In addition, a Cumulative Effects Study Area (CESA) was defined for each resource, as described in Table 3-1, and the existing environment for these areas is described in each resource section.

Best available information is used to describe the existing environment and the proposed project, and the discussion is based on consideration of issues raised during the public scoping meetings and guidance from NEPA and other related statutes.

Table 3-1. CESAs

Resource	Analysis Area	CESA
Water quality and quantity (groundwater and surface water)	Project area and associated facilities	Surface water: Tonopah Flat (137A) hydrographic basin of the Big Smoky Valley watershed (see Figure 2-15) Groundwater: 53-year, 1-foot draw down contour (See Figure 3-7)
Waters of the United States	Project area and associated facilities	53-year, 1-foot drawdown contour (See Figure 3-7)
Geology and minerals (aggregate)	Project area and associated facilities	5-mile radius of project area and associated facilities
Air quality	San Antone allotment	San Antone allotment
Soils	Project area and associated facilities	5-mile radius of project area and associated facilities
Wildlife	Project area and associated facilities	The southern end of Big Smoky Valley and relevant Nevada Department of Wildlife hunt areas
Special status species	Project area and associated facilities	Tonopah Flats Area for special status wildlife and plants. 10-mile buffer from boundaries of detailed study area for migratory birds and golden eagles
Range resources	Project area and associated facilities	San Antone allotment
Land use authorizations and access	Project area and associated facilities	1-mile buffer around the project area and associated facilities
Recreation and wilderness	25-mile radius of project area and associated facilities	25-mile radius of project area and associated facilities
Visual resources	Viewshed of the project area and associated facilities	Viewshed of the project area and associated facilities
Auditory resources	1-mile buffer around the project area	1-mile buffer around the project area
Social and economic values	50-mile radius of the town of Tonopah	50-mile radius of the town of Tonopah
Hazardous materials	1-mile buffer around project area and associated facilities	1-mile buffer around project area and associated facilities
Cultural resources	Project area and associated facilities	Project area and associated facilities
Native American traditional values	Project area and associated facilities	53-year, 1-foot draw down contour
Paleontology	Project area and associated facilities	Project area and associated facilities
Environmental justice	Same as social and economic values	Same as social and economic values
Invasive, nonnative species	Project area and associated facilities	5-mile radius of project area and associated facilities
Wetlands/riparian zones	Project area and associated facilities	53-year, 1-foot drawdown contour
Migratory birds	Project area and associated facilities	10-mile buffer around the boundaries of the detailed study area

To comply with NEPA, BLM is required to address specific elements of the environments that are subject to requirements specified in statute or regulations or by executive order. Table 3-2 includes the resource areas that must be addressed in all environmental analysis (BLM 2008a).

Table 3-2. Supplemental authorities/elements that must be addressed

Supplemental Authority[a]	Not Present[b]	Present/ Not Affected	Present/ May Be Affected[c]	Rationale
Noxious weeds	X			No noxious weeds are documented in the Proposed or Alternative Areas; however, noxious weeds may be in the region.
Migratory birds			X	The proposed project may affect migratory birds.
Threatened and endangered species	X			No threatened or endangered species are within or near the project area.
Areas of Critical Environmental Concern (ACECs)	X			No ACECs are found within or near the project area.
Water quantity and water quality			X	The 10-foot drawdown contour for groundwater withdrawal is within the project site and is approximately 150 feet below ground surface; it does not affect any external wells, and the groundwater table is not connected to surface water features.
Wetlands, riparian zones, and waters of the United States	X			No wetlands, riparian zones, or waters of the United States are in or near the project area.
Floodplains	X			No floodplains are in or near the project area.
Wild and scenic rivers	X			No wild and scenic rivers are in or near the project area.
Air quality			X	Emissions from construction and operation of the proposed project would be within established federal, state, and regional thresholds.
Cultural/Historic properties			X	Historical properties are present within the Proposed and Alternative Areas.
Native American religious concerns	X			The U.S. Bureau of Land Management is actively coordinating with three tribes in the region and one descendancy group in the region. To date, no special concerns have been identified.
Environmental justice		X		The proposed project would not disproportionately affect environmental justice populations, and may bring economic development and jobs to the areas that would benefit all populations.
Waste – hazardous materials			X	Hazardous materials would be used on site; mitigation measures and Best Management Practices would reduce potential for spills and contamination.
Wilderness	X			No designated wilderness exists within or near the project area.
Forest and rangelands (Healthy Forest Restoration Act [HFRA] only)	X			No forests or rangelands defined by HFRA are in or near the project area.
Prime or unique farmlands	X			No prime or unique farmlands are present in or near the project area.
Heath and human safety			X	The proposed project would have no effect on public heath or safety by implementing the regulatory safety and health plans.

[a] See H-1790-1 (BLM 2008a) Appendix 1: Supplemental Authorities to be considered.
[b] Supplemental Authorities determined to be “Not Present” were not carried forward for further analysis.
[c] Supplemental Authorities determined to be “Present/May be Affected” must be carried forward for analysis.

In addition to the critical elements of the human environment, other biological, physical and human resources are considered in the NEPA process. Table 3-3 lists resources considered by BLM for analysis in this document.

Table 3-3. Other resources considered for analysis in the EIS

Other Resources[a]	Not Present	Present/ Not Affected	Present/ May Be Affected	Rationale
Vegetation			X	Approximately 1,600 acres of vegetation would be removed due to construction of project components.
Wildlife resources			X	Wildlife may be injured or killed during construction and operation of the project.
Special status species (plants)			X	Removal of special status plant species and habitat would occur.
Special status species (wildlife)			X	Pale kangaroo mouse may be killed or injured during construction and operation of the facility.
Land use and access			X	Land use and access associated with the proposed project is consistent with the U.S. Bureau of Land Management's Tonopah Resources Management Plan (Tonopah RMP). Some impact to access of Crescent Dunes was identified
Geology		X		Construction and operation of the proposed project would not affect geologic resources within or near the project area because such resources would not be removed from the area.
Soils			X	Construction of the proposed project may increase erosion and soil compaction as well as diminish the potential for revegetation.
Minerals		X		The Tonopah RMP has indentified the area as low mineral potential. No areas of high, moderate, or low fluid mineral potential were identified within or near the project area.
Socioeconomics			X	Construction and operation of the project would create jobs for the local population, and add jobs to the community.
Noise		X		Project construction and operation activity would increase noise in and near the project area. There are no sensitive receptors within the project area.
Grazing			X	The proposed project would remove approximately 1,600 acres that could be used for grazing, resulting in a reduction in animal unit months in the project area.
Visual			X	The project would be visible to travelers and recreationalists at Crescent Dunes Special Recreation Management Area (SRMA).
Recreation			X	The project would be near the SRMA for Crescent Dunes.
Transportation and traffic		X		Traffic is expected to increase during construction activities because of the influx of construction and project materials. However, the analysis showed that it would not impact the overall traffic scenario of the area.
Wild horses and burros	X			The project area does not occur within a Horse Management Area.

[a] Other resources determined to be "Not Present" or "Present/Not Affected need to be carried forward for analysis or discussed further in the document based on the rationale provided.

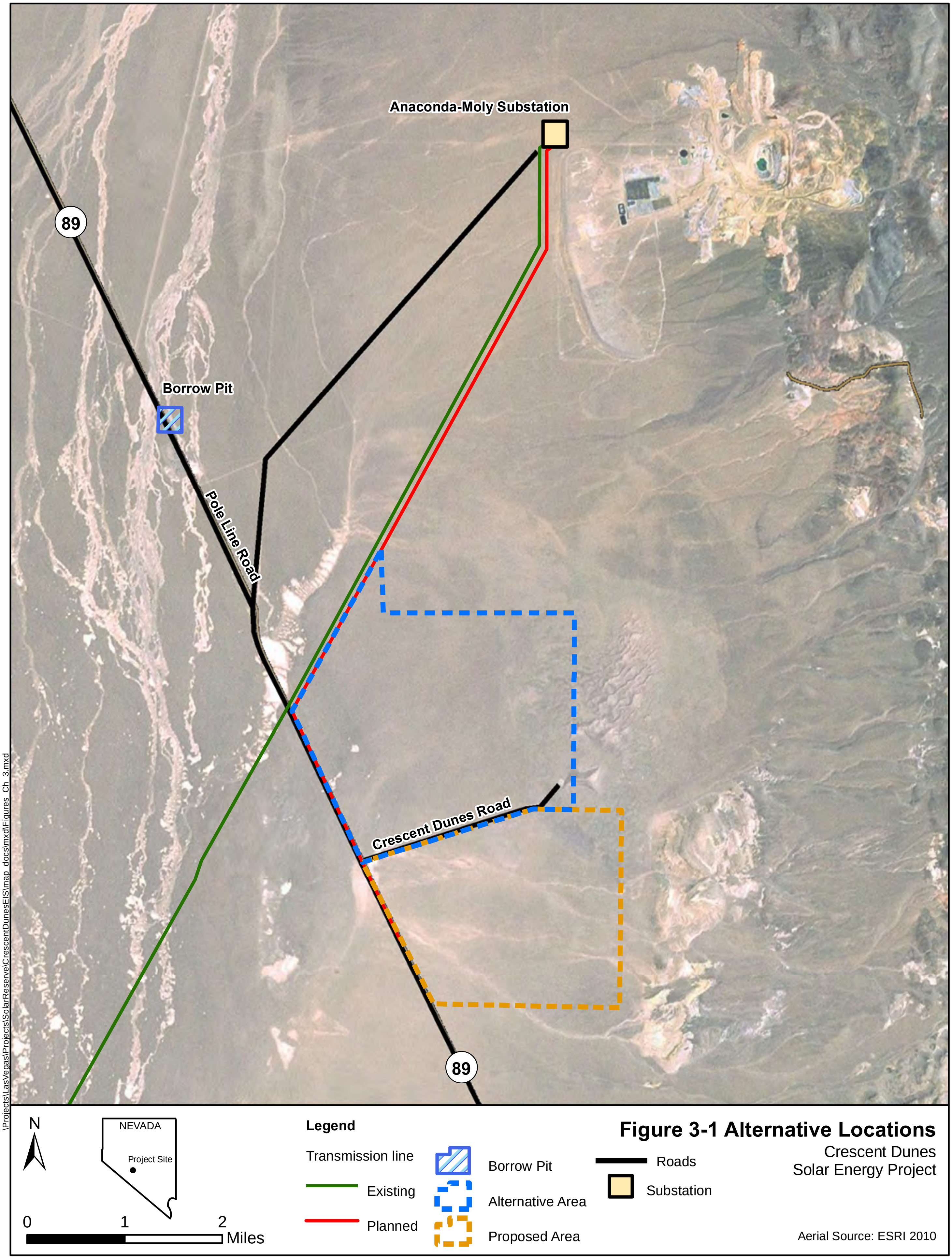


Figure 3-1 Alternative Locations
Crescent Dunes
Solar Energy Project

3.2 Vegetation

This section addresses vegetation resources in the proposed project area. Vegetation resources covered in this section include plant communities and noxious and invasive plant species. Special status plant species are addressed in Section 3.4.1, Special Status Plant Species.

3.2.1 Area of Analysis and Methodology

The detailed study area for vegetation resources includes the Proposed Area, the Alternative Area, the borrow pit, and the TL and Anaconda Moly Substation corridor. An assessment of cumulative impacts includes the areas within a 5-mile radius from the boundary of the detailed study area, which includes the southern end of the Big Smoky Valley and San Antonio Mountains.

Data on the vegetation resources were obtained from the Natural Resources Conservation Service (NRCS) Ecological Area Inventory, the Southwest Regional Gap Analysis Project (GAP), NRCS custom soil survey reports, Nevada Department of Agriculture (NDA), and 2006-color aerial photography. GAP data provide geographic information system (GIS) land cover type information developed from satellite imagery (U.S. Geological Survey [USGS] 2004). Major Land Resource Area (MLRA) Ecological Area Descriptions provide data on soils and reclamation potential.

Prior to the field surveys, GAP data were used to identify vegetation communities and land cover types within the detailed study area and CESA. During field surveys, delineations and descriptions of vegetation communities and land cover types in the GAP data were verified, and adjustments to those delineations or descriptions were documented. Field surveys within the Proposed Area, TL corridor, and the proposed borrow pit were conducted by botanists from JBR Environmental Consultants, Inc. (JBR), on May 18–23, 2009. Because of the subsequent identification of the Alternative Area during the scoping process, field surveys for the Alternative Area were conducted on May 3–6, 2010. Botanists walked the detailed study area to confirm and delineate Gap Land Cover types, identify the distribution of noxious weeds and invasive plant species, and inventory special status plant species (see Section 3.4.2, Special Status Plant Species). GAP data for the CESA were not verified outside the detailed study area.

Establishment of reclamation goals requires an evaluation of the area's plant cover prior to construction. To support development of reclamation goals, information on projected plant cover within the Proposed Area, Alternative Area, borrow pit, and TL and Anaconda Moly Substation corridor has been summarized from the descriptions of the ecological areas within the detailed study area.

3.2.2 Regulatory Framework

3.2.2.1 BLM Policy

In addition to adhering to Nevada policies regarding noxious weeds, BLM also recognizes the problem of invasive annual grasses and actively seeks to control the spread of these species on BLM land in part by forming Cooperative Weed Management Areas and Integrated Weed Management Plans. BLM requires that leasers of BLM land conduct a risk assessment for noxious weeds and invasive species and develop measures for prevention, control, and monitoring of such species in their project areas (BLM 2008b).

3.2.2.2 Nevada Regulations

Under NRS 555-005-201, NDA categorizes and maintains a list of noxious weeds that are determined to be a threat throughout the state. These statutes give NDA the power to investigate noxious weeds and require the landowners or occupants to control such weeds.

3.2.3 Affected Environment

The majority of Nevada is characterized as a basin and range setting, which is generally defined as parallel mountain ranges separated by valleys or intermontane basins. Valleys are generally drier and vegetated with shrubs and grasses (Griffith 2009). Mountain ranges have enough available moisture to support woody vegetation, including stands of pinyon pine and juniper trees (Griffith 2009). Winters are cold, with temperatures ranging from 20°F to 40°F. Temperatures in the summer are more variable, with the daytime highs ranging from 75°F to 90°F and nighttime lows ranging from 50°F to 60°F (Western Regional Climate Center 2010a). Annual rainfall in the region is approximately 5–10 inches per year, with slightly more precipitation in the winter and spring (January–May) (Western Regional Climate Center 2010a) (see Section 3.6, Air Quality).

3.2.3.1 Vegetation and Land Cover Types

The proposed project area is located at the southern end of the Big Smoky Valley east of the Crescent Dunes and the San Antonio Mountains. According to the Southwest Regional GAP, vegetation communities and land cover types identified within the southern end of the Big Smoky Valley and the San Antonio Mountains include:

- Inter-Mountain Basins Cliff and Canyon
- Inter-Mountain Basins Active and Stabilized Dunes
- Inter-Mountain Basins Playa
- Great Basin Pinyon-Juniper Woodland
- Inter-Mountain Basin Big Sagebrush
- Great Basin Xeric Mixed Sagebrush Shrubland
- Mojave Mid-Elevation Mixed Salt Desert Scrub
- Inter-Mountain Basins Mixed Salt Desert Scrub
- Inter-Mountain Basins Semi-Desert Shrub Steppe
- Inter-Mountain Basin Montane Sagebrush Steppe
- Inter-Mountain Basin Semi-Desert Grassland
- Inter-Mountain Basin Greasewood Flat
- Barren Lands
- Recently Mined or Quarried
- Invasive Annual Grasses

Below are the GAP land cover type descriptions abbreviated from USGS (2005) for all vegetation communities or land cover types found within the detailed study area and the CESA. Subsequent sections detail vegetation or land cover type specific to the Proposed Area, Alternative Area, borrow pit, TL and Anaconda Moly Substation, and CESA.

Inter-Mountain Basins Cliff and Canyon

This ecological system is found from foothills to subalpine elevations and includes barren and sparsely vegetated landscapes (generally less than 10 percent plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included is vegetation of unstable scree and talus slopes that typically occurs below cliff faces. Widely scattered tress and shrubs may include white fir (*Abies concolor*), common pinyon (*Pinus edulis*), limber pine (*Pinus flexilis*), singleleaf pinyon (*Pinus monophylla*), juniper (*Juniperus* spp.), sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), curlleaf mountain mahogany (*Cercocarpus ledifolius*), ephedra (*Ephedra* spp.), creambush (*Holodiscus discolor*), and other species.

Inter-Mountain Basins Active and Stabilized Dunes

This ecological system occurs in Intermountain West basins and consists of unvegetated to moderately vegetated (less than 10–30 percent plant cover) active and stabilized dunes and sandsheets. Species occupying these environments are often adapted to shifting, coarse-textured substrates (usually quartz sand) and form patchy or open grasslands, shrublands, or steppe composed of Indian ricegrass, sand sagebrush (*Artemisia filifolia*), sagebrush, fourwing saltbush, ephedra, blackbrush (*Coleogyne ramosissima),* rubber rabbitbrush (*Chrysothamnus nauseosus*), yellow wildrye (*Leymus flavescens*), chokecherry (*Prunus virginiana*), purch (*Psoralidium lanceolatum*), antelope bitterbrush (*Purshia tridentata*), alkali sacaton, fourpart horsebrush (*Tetradymia tetramers*), or crinklemat (*Tiquilia* spp).

Inter-Mountain Basins Playa

This ecological system is composed of barren and sparsely vegetated playas (generally less than 10 percent plant cover) found in the shrubs around the margins. These systems are intermittently flooded. The water is prevented from percolating through the soil by an impermeable soil subhorizon and is left to evaporate. Soil salinity varies greatly with soil moisture and greatly affects species composition. Characteristic species may include iodinebush (*Allenrolfea occidentalis*), greasewood (*Sarcobatus vermiculatus*), spiny hopsage (*Grayia spinosa*), Lemmon's alkaligrass (*Puccinellia lemmonii*), basin wildrye (*Leymus cinereus*), saltgrass (*Distichlis spicata*), and/or *Atriplex* spp.

Great Basin Pinyon-Juniper Woodland

This ecological system occurs on dry mountain ranges of the Great Basin region and eastern foothills of the Sierra Nevada. These woodlands occur on warm, dry areas on mountain slopes, mesas, plateaus, and ridges. Severe climatic events occurring during the growing season, such as frosts and drought, are thought to limit the distribution of pinyon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Woodlands dominated by a mix of singleleaf pinyon and Utah juniper (*Juniperus osteosperma*), pure or nearly pure occurrences of singleleaf pinyon, or woodlands dominated solely by Utah juniper comprise this system. Curlleaf mountain mahogany is a common associate. Understory layers are variable and may include shrubs such as sagebrush (*Artemisia* spp.) and bunch grasses.

Inter-Mountain Basins Big Sagebrush Shrubland

This ecological system occurs throughout much of the western United States, typically in broad basins between mountain ranges, plains, and foothills between 1,500 and 2,300 meters (m) in elevation. Soils are typically deep, well-drained, and non-saline. These shrublands are dominated by sagebrush (*Artemisia tridentata* spp.). Scattered juniper species, greasewood, and *Atriplex* spp. may be present in some stands. Perennial herbaceous components typically contribute less than 25 percent vegetative cover. Common graminoid species include Indian ricegrass (*Achnatherum hymenoides*) and blue gramma (*Bouteloua gracilis*), as well as others.

Great Basin Xeric Mixed Sagebrush Shrubland

This ecological system occurs in the Great Basin on dry flats and plains, alluvial fans, rolling hillslopes, saddles and ridges at elevations between 1,000 and 2,600 m (3,281 and 8,530 feet). Areas are dry, often exposed to desiccating winds, with typically shallow, rock, non-saline soils. Shrublands are dominated by black sagebrush (*Artemisia nova*) (middle and low elevations) or little sagebrush (*Artemisia arbuscula*) (higher elevation), and may be codominated by sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*) or rabbitbrush (*Chrysothamnus viscidiflorus*). The herbaceous layer is likely sparse and composed of perennial bunch grasses such as Indian ricegrass, desert needlegrass (*Achnatherum speciosum*), squirreltail (*Elymus elymoides*), or Sandberg bluegrass (*Poa secunda*).

Mojave Mid-Elevation Mixed Salt Desert Scrub

This ecological system represents the extensive desert scrub in the transition zone above creosote bush (*Larrea tridentata*) – burro bush (*Ambrosia dumosa*) desert scrub and below the lower montane woodlands (700–1,800 m [2,297–5,906 feet] in elevation) that occurs in the eastern and central Mojave Desert. It is also common on lower piedmont slopes in the transition zone into the southern Great Basin. The vegetation in this ecological system is quite variable. Codominants and diagnostic species include blackbrush (*Coleogyne ramosissima*), California buckwheat (*Eriogonum fasciculatum*), Nevada ephedra (*Ephedra nevadensis*), spiny hopsage (*Grayia spinosa*), and either Joshua tree (*Yucca brevifolia*) or Spanish dagger (*Yucca schidigera*). Desert grasses such as Indian ricegrass and desert needlegrass may be present. Scattered juniper species or desert scrub species may also be present.

Inter-Mountain Basins Mixed Salt Desert Scrub

This extensive ecological system includes open-canopied shrublands of typically saline basins, alluvial slopes, and plains across the intermountain western United States. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more Atriplex species such as shadscale (*Atriplex confertifolia),* cattle saltbush (*Atriplex polycarpa*), or spinescale saltbush (*Atriplex spinifera*). Other shrubs present to codominant may include sagebrush*,* rabbitbrush*,* rubber rabbitbrush (*Ericameria nauseosa*), ephedra (*Ephedra nevadensis*)*,* spiny hopsage (*Grayia spinosa*)*,* and winterfat (*Krascheninnikovia lanata)*, as well as others. Greasewood (*Sarcobatus vermiculatus*) is generally absent, but if present does not codominate. The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as Indian ricegrass*,* blue grama*,* thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*)*,* western wheatgrass (*Pascopyrum* *smithii*)*,* James' galleta (*Pleuraphis jamesii*)*,* big galleta (*Pleuraphis rigida*), Sandberg bluegrass*,* or alkali sacaton (*Sporobolus airoides*). Various forbs are also present.

The Inter-Mountain Basins Mixed Desert Scrub was the most extensive vegetation association throughout the detailed study area. In subsequent sections (Sections 3.4.1, Special Status Plant Species, and 3.4.2, Special Status Wildlife Species), this vegetation association is further delineated and refined to reflect dominant plant species and specific habitat for the pale kangaroo mouse and Nevada oryctes.

Inter-Mountain Montane Sagebrush Steppe

This system primarily occurs on deep-soiled to stony flats, ridges, nearly flat ridgetops, and mountain slopes. In general, this system shows an affinity for mild topography, fine soils, and some source of subsurface moisture. It is composed primarily of mountain sagebrush (*Artemisia tridentata* ssp. *Vaseyana*) and other sagebrush species. Antelope bitterbrush (*Purshia tridentata*) may codominate or even dominate some stands. Other common shrubs include snowberry (*Symphoricarpos* spp.), serviceberry (*Amelanchier* spp.), rabbitbrush, and wax currant (*Ribes cereum*). Most stands have an abundant perennial herbaceous layer (over 25 percent cover). Common graminoids include Arizona fescue (*Festuca arizonica*), Idaho fescue (*Festuca idahoensis*), needle and thread grass (*Hesperostipa comata*), as well as others. In many areas, frequent wildfires maintain an open herbaceous-rich steppe condition, although at most areas, shrub cover can be unusually high for a steppe system (greater than 40 percent), with the moisture providing equally high grass and forb cover.

Inter-Mountain Basins Semi-Desert Shrub-Steppe

This ecological system occurs throughout the intermountain western United States, typically at lower elevations on alluvial fans and flats with moderate to deep soils. This semiarid shrub-steppe is typically dominated by graminoids (greater than 25 percent cover) with an open shrub layer. Characteristic grasses include Indian ricegrass*,* blue grama*,* saltgrass (*Distichlis spicata*)*,* needle and thread (*Hesperostipa comata*)*,* James' galleta*,* Sandberg's bluegrass*,* and alkali sacaton. The woody layer is often a mixture of shrubs and dwarf-shrubs. Characteristic species include fourwing saltbush (*Atriplex canescens*)*,* sagebrush (*Artemisia tridentata*)*,* rabbitbrush (*Chrysothamnus* spp.)*,* Ephedra species, broom snakeweed *(Gutierrezia sarothrae*), and winterfat. Sagebrush species may be present but do not dominate. The general aspect of occurrences may be either open shrubland with patchy grasses or patchy open herbaceous layer. Disturbance may be important in maintaining the woody component. Microphytic crust is very important in some stands.

Inter-Mountain Basins Semi-Desert Grassland

This widespread ecological system occurs throughout the intermountain western United States on dry plains and mesas at approximately 1,450 to 2,320 m (4,757 to 7,612 feet) elevation. These grasslands occur in lowland and upland areas and may occupy swales, playas, mesatops, plateau parks, alluvial flats, and plains, but areas are typically xeric. The dominant perennial bunch grasses and shrubs within this system are all very drought-resistant plants. These grasslands are typically dominated or codominated by Indian ricegrass, three awn grass (*Aristida* spp.), blue grama, deer grass (*Muhlenbergia* sp.), or James' galleta (*Pleuraphis jamesii*) and others. This community may include scattered shrubs and dwarf shrubs of species of sagebrush, *Atriplex* sp., or winterfat.

Inter-Mountain Basins Greasewood Flat

This ecological system occurs throughout much of the western United States in intermountain basins and extends onto the western Great Plains. It typically occurs near drainages on stream terraces and flats or may form rings around more sparsely vegetated playas. Areas typically have saline soils, a shallow water table, and flood intermittently, but remain dry for most of the growing season. The water table remains high enough to maintain vegetation, despite salt accumulations. This system usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or codominated by greasewood, fourwing saltbush, shadscale, or winterfat that may be present to codominant. Occurrences are often surrounded by mixed salt desert scrub. The herbaceous layer, if present, is usually dominated by graminoids. There may be inclusions of alkali sacaton, salt grass (where water remains ponded the longest), or common spikerush (*Eleocharis palustris*) herbaceous types.

Barren Lands, Non-specific

Barren areas consist of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits, and other accumulation of earthen material. Generally, vegetation accounts for less than 15 percent of total cover.

Recently Mined or Quarried

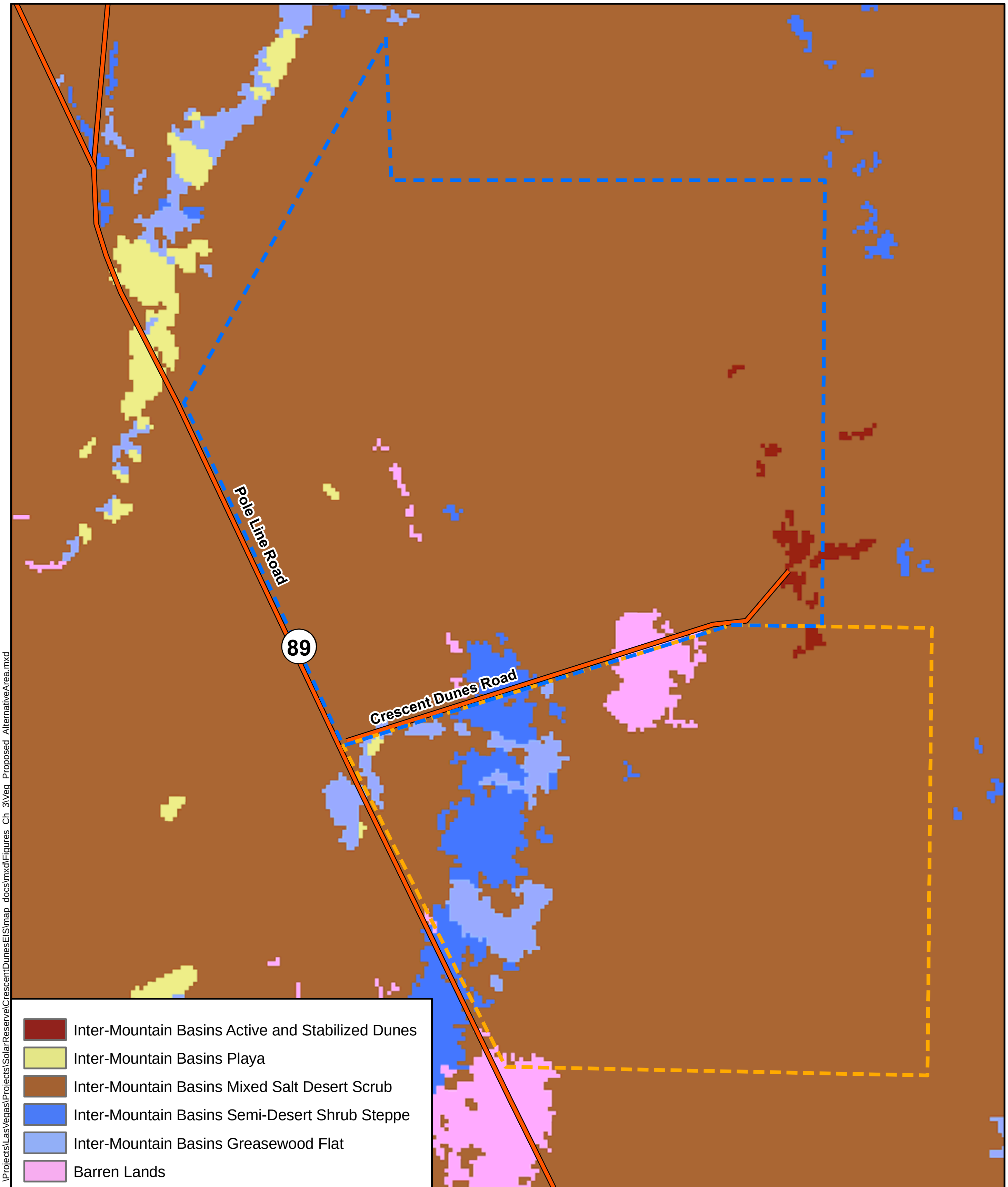
Areas where open pit mining or quarries are visible in the imagery (images acquired between 1999 and 2001), and are 2 hectares or greater in size.

Invasive Annual Grasses

Areas that are dominated by introduced annual grass species such as *Avena* spp., *Bromus* spp., and *Schismus* spp.

3.2.3.1.1 Proposed Area

The topography of the Proposed Area is generally flat with elevations ranging from approximately 5,000–5,060 feet. Six vegetation communities or land cover types were mapped and observed in the Proposed Area (see Table 3-4). Since GAP land cover type data are derived from satellite imagery, the vegetation community or land cover type observed during field surveys may deviate slightly from the USGS descriptions. During field surveys, biologists noted deviations in the land cover type description and distributions. Table 3-4 provides the number of acres of each vegetation community/land cover type mapped with GAP data, and the deviations in GAP data as observed during field surveys. Figure 3-2 illustrates the distribution of each vegetation community or land cover type in the Proposed and Alternative Areas. Projected plant cover percentages for soil units/ecological areas within the Proposed Area are presented in Table 3-5. Reclamation potential associated with soil units is addressed in Section 3.9, Soils.



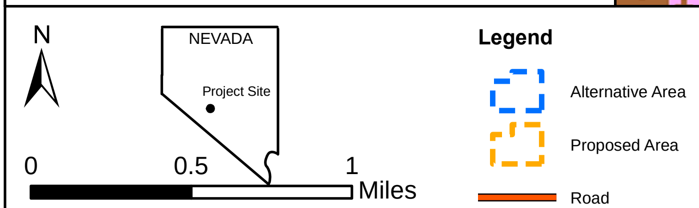


Figure 3-2 Vegetation / Land Cover Types within the Proposed and Alternative Areas

Crescent Dunes Solar Energy Project

Source: USGS

Table 3-4. Approximate area of each vegetation community and land cover type within the Proposed Area

Southwest Regional Gap Analysis Project (GAP) Vegetation Community or Land Cover Type	Area (acres)	Field Observations
Inter-Mountain Basins Mixed Salt Desert Scrub	2,408	Field surveys generally confirmed the GAP vegetation association description and distribution.
Inter-Mountain Basins Semi-Desert Shrub-Steppe	176	Field surveys generally confirmed distribution of the GAP vegetation association description. However, during field surveys biologists observed that greasewood was not always a component of this community.
Inter-Mountain Basins Active and Stabilized Dune	6	Field surveys generally confirmed the GAP vegetation association description; however, the northern portion of Proposed Area is classified as active and stabilized dunes, and although the soils are sandy, no active or stabilized dunes are present.
Inter-Mountain Basins Greasewood Flat	120	Field surveys generally confirmed the GAP vegetation association description and distribution.
Intermountain Basins Playa	3	Field surveys generally confirmed the GAP vegetation association description and distribution.
Barren Lands	74	Field surveys generally confirmed the GAP vegetation association description and distribution.

Table 3-5. MLRA ecological areas and project plant cover estimates within the Proposed Area

Soil Units within the Proposed Area	Corresponding Major Land Resource Area (MLRA) Ecological Area	Estimated Plant Cover
Belcher (BEB)	R029XY046NV – Sandy Loam 5-8 P.Z.	15–25 percent
Broyes (BrB)	R028BY017NV – Loamy 5-8 P.Z.	5–15 percent
Dune Land (DU)	No corresponding MLRA Ecological Area	Not applicable
Playas (PN)	No corresponding MLRA Ecological Area	Not applicable
Stumble (STC)	R029XY012NV Sandy 5-8 P.Z.	15–25 percent
Tipperary (TGE)	R027XY016NV Loamy Upland 5-8” P.Z.	20–30 percent

3.2.3.1.2 Alternative Area

The topography of the Alternative Area is generally flat with an elevation of approximately 5,000–5,060 feet. Five vegetation communities or land cover types were mapped and observed in the proposed area (see Table 3-6). Since GAP land cover type data are derived from satellite imagery, the vegetation community or land cover type observed during field surveys may deviate slightly from the USGS descriptions. During field surveys, biologists noted deviations in the land cover type description and distributions. Table 3-6 provides the number of acres of each vegetation community or land cover type mapped with GAP data, and the deviations in GAP data as observed during field surveys. Figure 3-2 illustrates the distribution of each vegetation community or land cover type. Project plant cover percentages for soil units/ecological areas within the Alternative Area are presented in Table 3-7. Reclamation potential associated with soil units is addressed in Section 3.9, Soils.

Table 3-6. Approximate area of each vegetation community and land cover type within the Alternative Area

Southwest Regional Gap Analysis Project (GAP) Vegetation Community or Land Cover Type	Area (acres)	Field Observations
Inter-Mountain Basins Mixed Salt Desert Scrub	3,721	Field surveys generally confirmed the GAP vegetation association description and distribution. However, it was noted that Lemon scurfpea and Indian ricegrass were more dominant in the eastern portion of the site. Nevada dalea was predominant in the central portion of the alternative area, and Bailey's greasewood was predominant in the western portion of the site.
Inter-Mountain Basins Semi-Desert Shrub-Steppe	38	Field surveys generally confirmed the GAP vegetation association description and distribution.
Intermountain Active and Stabilized Dunes	26	Field surveys generally confirmed the GAP vegetation association description and distribution.
Inter-Mountain Basins Greasewood Flat	3	Field surveys generally confirmed the GAP vegetation association description and distribution.
Barren Lands	39	Field surveys generally confirmed the GAP land cover type description and distribution.
Intermountain Basins Playa	2	Field surveys generally confirmed the GAP land cover type description and distribution.

Table 3-7. MLRA ecological areas and project plant cover estimates within the Alternative Area

Soil Units within the Proposed Area	Corresponding Major Land Resource Area (MLRA) Ecological Area	Estimated Plant Cover
Belcher (BEB)	R029XY046NV – Sandy Loam 5-8 P.Z.	15–25 percent
Dune Land (DU)	No corresponding MLRA Ecological Area	Not applicable
Stumble (STC)	R029XY012NV Sandy 5-8 P.Z.	15–25 percent
Timper (TEB)	R029XY017NV Loamy 5-8" P.Z.	15–25 percent
Tipperary (TGE)	R027XY016NV Loamy Upland 5-8" P.Z.	20–30 percent
Yomba (Ym)	R029XY017NV Loamy 5-8" P.Z.	15–25 percent

3.2.3.1.3 Borrow Pit

The topography in the borrow pit area is generally flat, with an elevation of approximately 4,881–4,972 feet. Three land cover types were observed in the proposed project area (Table 3-8). Since GAP land cover type data are derived from satellite imagery, the vegetation community or land cover type observed during field surveys may deviate slightly from the USGS descriptions. During field surveys, biologists noted deviations in the land cover type description and distributions. Table 3-8 provides the number of acres of each vegetation community or land cover type mapped with GAP data, and the deviations in GAP data as observed during field surveys. Figure 3-3 illustrates the distribution of each vegetation community or land cover type. Project plant cover percentages for soil units/ecological areas within the borrow pit area are presented in Table 3-9. Reclamation potential associated with soil units is addressed in Section 3-9, Soils.

Table 3-8. Approximate area of each vegetation community and land cover type within the borrow pit

Southwest Regional Gap Analysis Project (GAP) Vegetation Community or Land Cover Type	Area (acres)	Field Observations
Inter-Mountain Basins Mixed Salt Desert Scrub	40	Field surveys generally confirmed the GAP vegetation association description and distribution. The dominant shrubs were Bailey's greasewood and littleleaf horsebrush.

Table 3-9. MLRA ecological areas and project plant cover estimates within the borrow pit

Soil Units within the Proposed Area	Corresponding Major Land Resource Area (MLRA) Ecological Area	Estimated Plant Cover
Yomba (Ym)	R029XY017 – Loamy 5-8 P.Z.	15–25 percent
Yomba (including Playas)	R029XY017 – Loamy 5-8 P.Z.	15–25 percent

3.2.3.1.4 TL and Anaconda Moly Substation

The topography along the TL and Anaconda Moly Substation corridor rises slightly from the valley floor to the location of the substation, with an elevation of approximately 4,880–5,200 feet. Three vegetation communities or land cover types were observed within the TL and Anaconda Moly Substation corridor. Table 3-10 lists the land cover types/vegetation communities within the TL and Anaconda Moly Substation corridor. Since GAP land cover type data are derived from satellite imagery, the vegetation community/land cover type observed during field surveys may deviate slightly from the USGS descriptions. During field surveys, biologist noted deviations in the land cover type description and distributions. Table 3-10 provides the number of acres of each vegetation community or land cover type, and the deviations in GAP data observed during field surveys. Figure 3-3 illustrates distribution of each vegetation community or land cover type. Plant cover percentages for soil units/ecological areas within the TL and Anaconda Moly Substation corridor are presented in Table 3-11. Reclamation potential associated with soil units is addressed in Section 3.9, Soils.

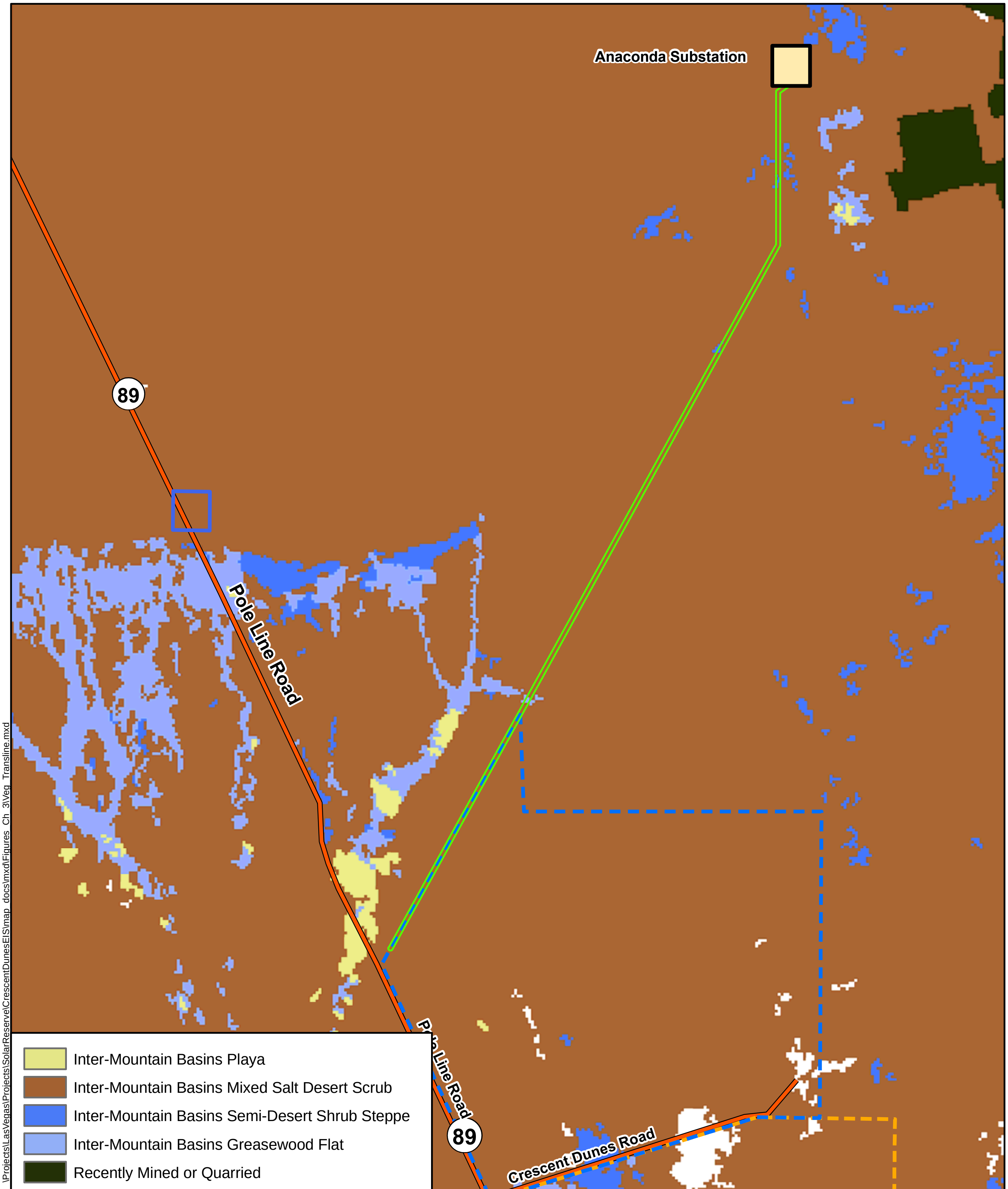


Figure 3-3 Vegetation / Land Cover Types within Borrow Pit, Transmission Line and Anaconda Substation Corridor

Crescent Dunes Solar Energy Project

Source: USGS

Table 3-10. Approximate area of each vegetation community and land cover type within the TL and Anaconda Moly Substation corridor

Southwest Regional Gap Analysis Project (GAP) Vegetation Community or Land Cover Type	Area (acres)	Field Observations
Inter-Mountain Basins Mixed Salt Desert Scrub	113	The southern part of the transmission line (TL) corridor next to Pole Line Road was dominated by Bailey's greasewood (*Sarcobatus baileyi*). At the northern end of the TL, fourwing saltbush and Bailey's greasewood were dominant.
Inter-Mountain Basins Semi-Desert Shrub-Steppe	1	Field surveys generally confirmed the GAP vegetation association description and distribution.
Inter-Mountain Basins Greasewood Flat	1	Field surveys generally confirmed the GAP vegetation association description and distribution.

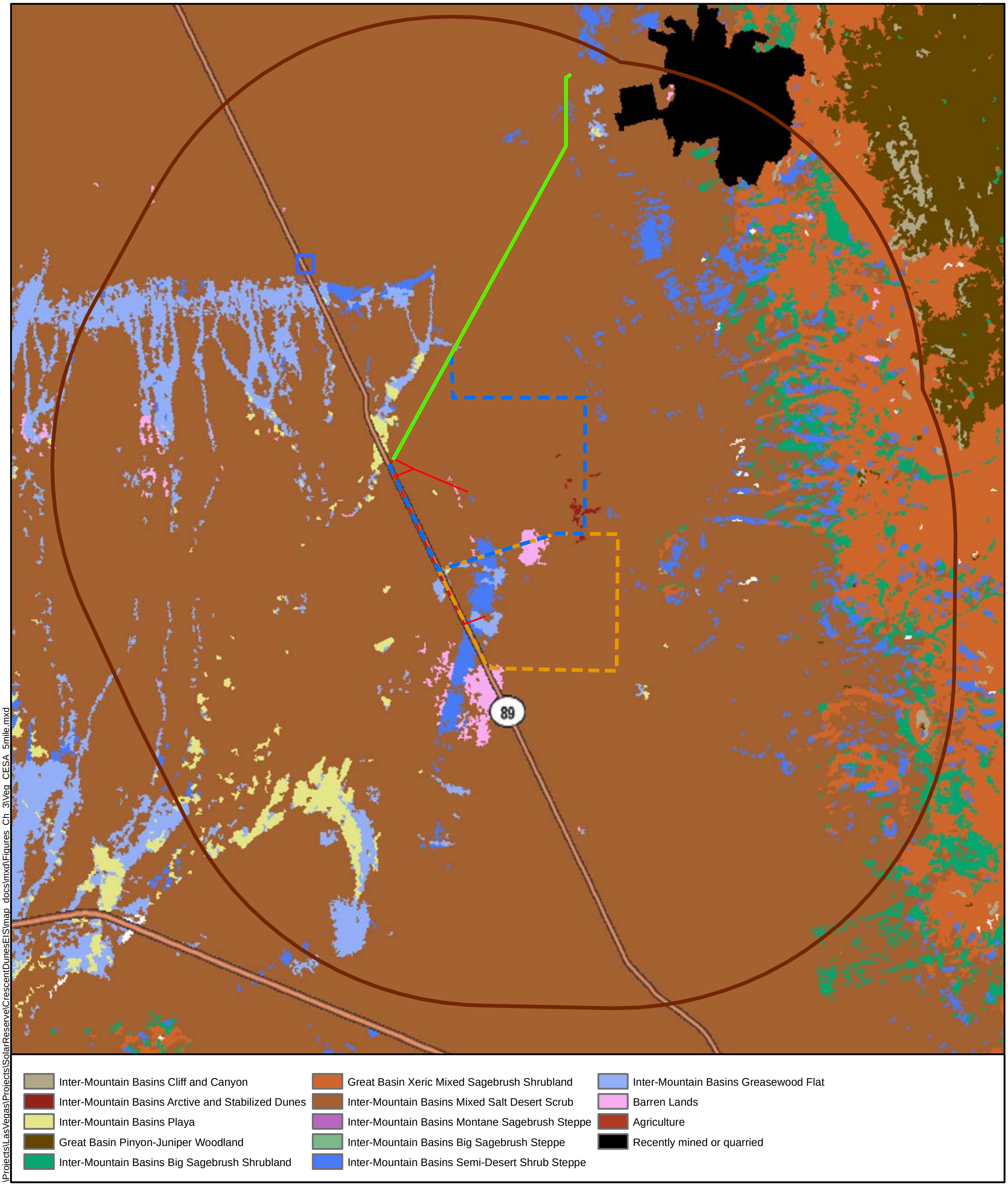
Table 3-11. MLRA ecological areas and project plant cover estimates within the TL and Anaconda Moly Substation corridor

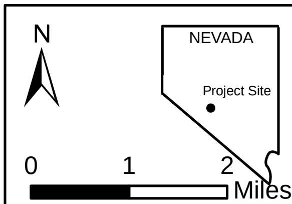
Soil Units within the Proposed Area	Corresponding Major Land Resource Area (MLRA) Ecological Area	Estimated Plant Cover (basal and crown)
Stumble (STC)	R029XY012NV – Sandy 5-8 P.Z.	15–25 percent
Timper (TEB)	R029XY017NV – Loamy 5-8" P.Z.	15–25 percent
Yomba (Ym)	R029XY017NV – Loamy 5-8" P.Z.	15–25 percent

3.2.3.1.5 CESA

All fifteen GAP vegetation communities/land cover types described previously were identified in the CESA. Differences between land cover types generally follow elevation changes from the valley floor to mountain slopes. For example, in the San Antonio Mountains, land cover types include Great Basin Pinyon-Juniper Woodland and Intermountain Basins Cliff and Canyon (see Figure 3-4). These are typical land cover types throughout the mountain ranges of the Great Basin.

Generally, within the CESA, the valley floor has a higher percentage of the Mixed Salt Desert Scrub and Inter-Mountain Basin Desert Scrub Steppe. As the elevation increases between the valley floor and the mountain slopes, sagebrush becomes increasingly more predominant on the landscape until reaching an elevation where sufficient moisture exists to support pinyon-juniper woodlands. The steep slopes of the San Antonio Mountains have exposed cliffs with minimal vegetation where limited soil and moisture are unable to support it. The exception to this generality is the presence of the Crescent Dunes between the valley floor and the San Antonio Mountains. The Crescent Dunes are unvegetated sand dunes. Table 3-12 illustrates the area vegetation community or land cover type and the proportion of each within the CESA.





Legend

Borrow Pit (40 acres)
Transmission Line Buffer
Alternative Area
Planned
CESA (5-mile buffer)
Proposed Area

Figure 3-4 Vegetation / Land Cover Types within the CESA

Crescent Dunes Solar Energy Project

Source: USGS

Table 3-12. Summary of area of each vegetation community or land cover type and their proportion within the CESA

Vegetation Community or Land Cover Type	Area (acres)	Proportion of Area in the CESA
Inter-Mountain Basins Cliff and Canyon	109.59	0.11%
Inter-Mountain Basins Active and Stabilized Dunes	43.12	0.04%
Inter-Mountain Basins Playa	100.52	0.10%
Great Basin Pinyon-Juniper Woodland	41.35	0.04%
Inter-Mountain Basins Big Sagebrush Shrubland	2061.5	2.08%
Great Basin Xeric Mixed Sagebrush Shrubland	6,936.94	7.00%
Mojave Mid-Elevation Mixed Desert Shrub	31.56	0.03%
Inter-Mountain Basins Mixed Salt Desert Scrub	81,992.96	82.71%
Inter-Mountain Basins Montane Sagebrush Steppe	1.78	0.00%
Inter-Mountain Basins Semi-Desert Shrub Steppe	2,821.95	2.85%
Inter-Mountain Basins Semi-Desert Grassland	1.78	0.00%
Inter-Mountain Basins Greasewood Flat	3,094.47	3.12%
Barren Lands	532.38	0.54%
Recently Mined or Quarried	1,349.51	1.36%
Invasive Annual Grassland	11.11	0.01%
Total	**99,130.52**	**100.00%**

3.2.3.2 Noxious Weeds and Invasive Species

The NDA list of noxious and invasive weeds includes 43 species identified as noxious in the State of Nevada. Weeds from this list that have been identified previously in Nye County include hoary cress (*Cardaria draba)* and Russian knapweed (*Acroptilon repens)* (Nevada Weed Action Committee 2001), but others may be present in the Big Smoky Valley.

Invasive species such as cheatgrass (*Bromus tectorum*) are also a concern in the area because it has been identified throughout the Great Basin. Because cheatgrass disturbs native ecosystems, the key to controlling this invasive species is understanding the current distribution and minimizing the dispersal and establishment of the species (Peterson 2003).

3.2.3.2.1 Proposed Area

No noxious weeds were found in the Proposed Area; however, two invasive nonnative species were observed in the Proposed Area: halogeton (*Halogeton gomeratus*) and Russian thistle (*Salsola* sp.). Halogeton was observed infrequently throughout the proposed project area. However, Russian thistle was prevalent, especially in sandier soils throughout the proposed project area. Cheatgrass was not observed in the detailed study area.

3.2.3.2.2 Alternative Area

No noxious weeds were found in the Alternative Area; however, two invasive nonnative species were observed in the Alternative Area: halogeton and Russian thistle.

3.2.3.2.3 Borrow Pit

Three tamarisk (*Tamarisk* sp.) plants were observed in the proposed borrow pit area along an ephemeral channel. Tall whitetop (*Lepidium latifolium*) was observed in a wash outside the southwest boundary of the proposed borrow pit area.

3.2.3.2.4 TL and Anaconda Moly Substation

No noxious weeds were found in the TL and Anaconda Moly Substation corridor; however, two invasive nonnative species were observed in the TL and Anaconda Moly Substation corridor: halogeton and Russian thistle.

3.2.3.2.5 CESA

It is likely that many of the noxious and invasive species are present throughout the CESA. Cheatgrass may be the greatest concern because it is now widely spread throughout the Great Basin. Other noxious weeds may be present within the CESA, including but not limited to tall whitetop, hoary cress, tamarisk, and Russian knapweed.

3.3 Wildlife Resources

This section covers general wildlife resources. It describes wildlife species, including game, that are relatively abundant and are not classified as "special status species" under statute, regulations, or agency guidelines. Special status species are covered in Section 3.4.2, Special Status Wildlife Species.

3.3.1 Area of Analysis and Methodology

The area of analysis for wildlife resources includes the Proposed Area, the Alternative Area, the borrow pit, and the TL and Anaconda Moly Substation corridor. A cumulative effects assessment will include the southern end of the Big Smoky Valley and relevant NDOW hunt areas.

3.3.2 Regulatory Framework

The BLM RMPs provide management standards for wildlife and wildlife habitat. BLM field offices, in cooperation with NDOW, monitor wildlife and habitat conditions and maintain crucial wildlife habitat. NDOW and BLM jointly manage habitat for mule deer, pronghorn antelope, and other game species.

3.3.3 Affected Environment

The detailed study area is completely within the southern end of the Big Smoky Valley. Although the specific land cover types may vary, the area is dominated by low growing shrubs and grasses that mostly provide 10–25 percent vegetative cover (see Section 3.2, Vegetation). East of the Proposed Area are the Crescent Dunes, which are mainly barren and consist only of exposed sand. Directly east of the dunes are the San Antonio Mountains, which rise to an elevation of approximately 6,300 feet within the CESA. These mountains provide rocky cliffs, sagebrush steppe, and some pinyon-juniper woodland.

3.3.3.1 Proposed Area

3.3.3.1.1 Mammals

According to the ecological area descriptions and GAP data, the main components of vegetation in this area include greasewood, blackbrush, four-wing saltbush, and Indian ricegrass. This vegetation provides food, water, and cover for many small mammals such as Jackrabbits (*Lepus californicus*), kit foxes (*Vulpes macrotis*), ground squirrels (*Spermophilus* spp.), desert woodrats (*Neotoma lepida*), pocket mice (*Perognathus* spp.), deer mice (*Peromyscus maniculatus*), grasshopper mice (*Onychomys* spp.), and kangaroo rats (*Dipodomys* spp.). Additionally, many bat species may forage within the project area.

3.3.3.1.2 Game

Many big game species are common throughout the Great Basin Desert, including American pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and elk (*Cervus elaphus*). According to NDOW, the project area falls within designated pronghorn habitat. Pronghorn tracks were observed in the project area during field surveys and it is likely that they utilize this area. Mule deer likely use this area for foraging; however, the area has not been designated as important or unique habitat for this species by NDOW. It is unlikely that bighorn sheep utilize the area because they prefer the steep cliffs of the surrounding mountain ranges; however, bighorn sheep may migrate through the area.

3.3.3.1.3 Birds

Most birds that utilize the project area are protected by the Migratory Bird Treaty Act (MBTA) (see Section 3.4.2, Special Status Wildlife Species); however, some birds may utilize the project area year round. For example, ravens (*Corvus corax*) may prey on reptiles, insects, and small mammals that are present throughout the project area. Horned larks (*Eremophila alpestris*) may forage on seeds and insects in the project area. Both common ravens and horned larks were observed during field surveys within the proposed area (in May 2009).

3.3.3.1.4 Reptiles

A wide variety of reptiles may be present in the project area, including western whiptail (*Cnemidophorus tigris*), leopard lizard (*Gambelia wislizenii*), gopher snake (*Pituophis melanoleucus*), and desert horned lizard (*Phrynosoma platyrhinos*) as well as others. These species as well as others are present in a wide variety of valley habitats and most likely utilize the project area.

3.3.3.2 Alternative Area

The wildlife found in the Alternative Area is consistent with the wildlife described in the Proposed Area.

3.3.3.3 Borrow Pit

The wildlife found in the borrow pit area is consistent with the wildlife described in the Proposed Area.

3.3.3.4 TL and Anaconda Moly Substation

The wildlife found in the TL and substation area is consistent with the wildlife described in the Proposed Area.

3.3.3.5 CESA

Species composition of wildlife throughout most of the valley portion of the CESA is similar to that described for the Proposed Area because most of the habitat is the same (see Section 3.2, Vegetation). However, the San Antonio Mountain Range is within the CESA and provides different habitat than the proposed area, including sagebrush, rock outcrops (including cliffs), and pinyon and juniper woodlands (see Section 3.2, Vegetation). These mountains may provide suitable habitat for species not found within the detailed study area. Common game species that may utilize this habitat include bighorn sheep, mountain lion (*Puma concolor*), and mule deer. A variety of additional mammals might utilize these higher mountainous habitats, including bobcat (*Lynx rufus*), ground squirrels (*Spermophilus* spp.), and voles (*Microtus* spp.). Steep slopes with exposed cliffs may provide good roosting habitat for a variety of bat species, golden eagles, and other raptors (see Section 3.4.2, Special Status Wildlife Species).

3.4 Special Status Species (Plants and Wildlife)

In this EIS, the term "special status species" encompasses species that are listed as threatened or endangered or species proposed or candidates for listing under the Endangered Species Act of 1973 as amended (50 CFR 17.11 [listed animals], 50 CFR 1712 [listed plants], and subsequent notices published in the Federal Register). It also encompasses species listed as protected by the State of Nevada under NRS 501.100–503.104, NRS 527.050, and NRS 527.60–527.300, and species listed as BLM sensitive species.

3.4.1 Special Status Plant Species

3.4.1.1 Area of Analysis and Methodology

The detailed study area for special status plant species includes the Proposed Area, the Alternative Area, the borrow pit, and the TL and Anaconda Moly Substation corridor. The CESA for special status plant species was determined to be the Tonopah Flats area.

According to the Nevada Natural Heritage Program (NNHP) data, no special status plant species have previously been recorded within 2 kilometers (1.24 miles) of the project area. Field surveys for special status plant species and cacti were conducted on May 18–23, 2009, for the Proposed Area, the TL corridor, and the borrow pit area. Field surveys for special status plants and cacti in the Alternative Area were conducted on May 3–6, 2010. Biologists completed pedestrian surveys for special status plant species by walking transects spaced 15 meters (49 feet) apart over a portion of the project area. As the biologist became more familiar with the particular habitats and soils associated with special status plant species, these habitats were searched thoroughly and special status plant species locations were recorded. Information on habitat and soil preferences for BLM sensitive species gathered during field surveys were used to identify the amount of potential habitat for special status plant species throughout the CESA.

3.4.1.2 Regulatory Framework

3.4.1.2.1 BLM Policy

BLM has implemented policies for special status species found on BLM-managed lands. BLM's list of special status species includes species that are listed or proposed for listing under the Endangered Species Act (ESA) and species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. Additionally, all federal candidate species, proposed species, and delisted species (for 5 years after delisting) will be conserved as BLM sensitive species (BLM 2008b).

3.4.1.2.2 Nevada Protected Species Regulations

The State of Nevada has identified plant species that are declining in their range throughout Nevada or are otherwise rare and at risk of extinction. Plants warranting such protection are listed as Critically Endangered under NRS 503.104. Taking of these plants is prohibited without a permit obtained from the Nevada Division of Forestry (Nevada Administrative Code [NAC] 527.250).

3.4.1.2.3 Nevada State Protection of Christmas Trees, Cacti, and Yucca

Under NRS 527.060–527.120, it is illegal for any individual or company to cut, destroy, remove, or posses any Christmas tree, cactus, yucca, or portions of such plants. This statute is applicable to any cacti or yucca on BLM-managed lands.

3.4.1.3 Affected Environment

3.4.1.3.1 Proposed Area

The field surveys did not identify any BLM sensitive plant in the Proposed Area during the May 2009 field surveys. However, in the 2010 surveys of the Alternative Area, Nevada oryctes (*Oryctes nevadensis*), a BLM sensitive species, was found to be widespread throughout the Inter-Mountain Basins Mixed Salt Desert Scrub vegetation association, where the dominant shrub cover was Nevada dalea (*Psorothamnus polydenius*) and the soils were Stumble Loamy fine sand 0-8 percent slopes (STC) (Figure 3-5 and Figure 3-14 in Section 3.8, Soils). Because this species appears only in years with optimal rainfall and temperature patterns (NNHP 2001), it is likely that Nevada oryctes is present throughout similar habitat in the Proposed Area even though it was not detected during the 2009 surveys. Anecdotal observations of four Nevada oryctes plants made during the 2010 small mammal trapping surveys in the Proposed Area support this conclusion. Based on this information, it can be assumed that Nevada oryctes is present within the same Nevada dalea-dominated Mixed Salt Desert Scrub vegetation association in the Proposed Area, which is approximately 2017 acres (Figure 3-5). Additionally, three cactus species were observed throughout the project area, including Wiggins' cholla (*Cylindropuntia echinocarpa*), sand cholla (*Grusonia pulchella*), and pricklypear (*Opuntia polyacantha* var. *erinacae*).

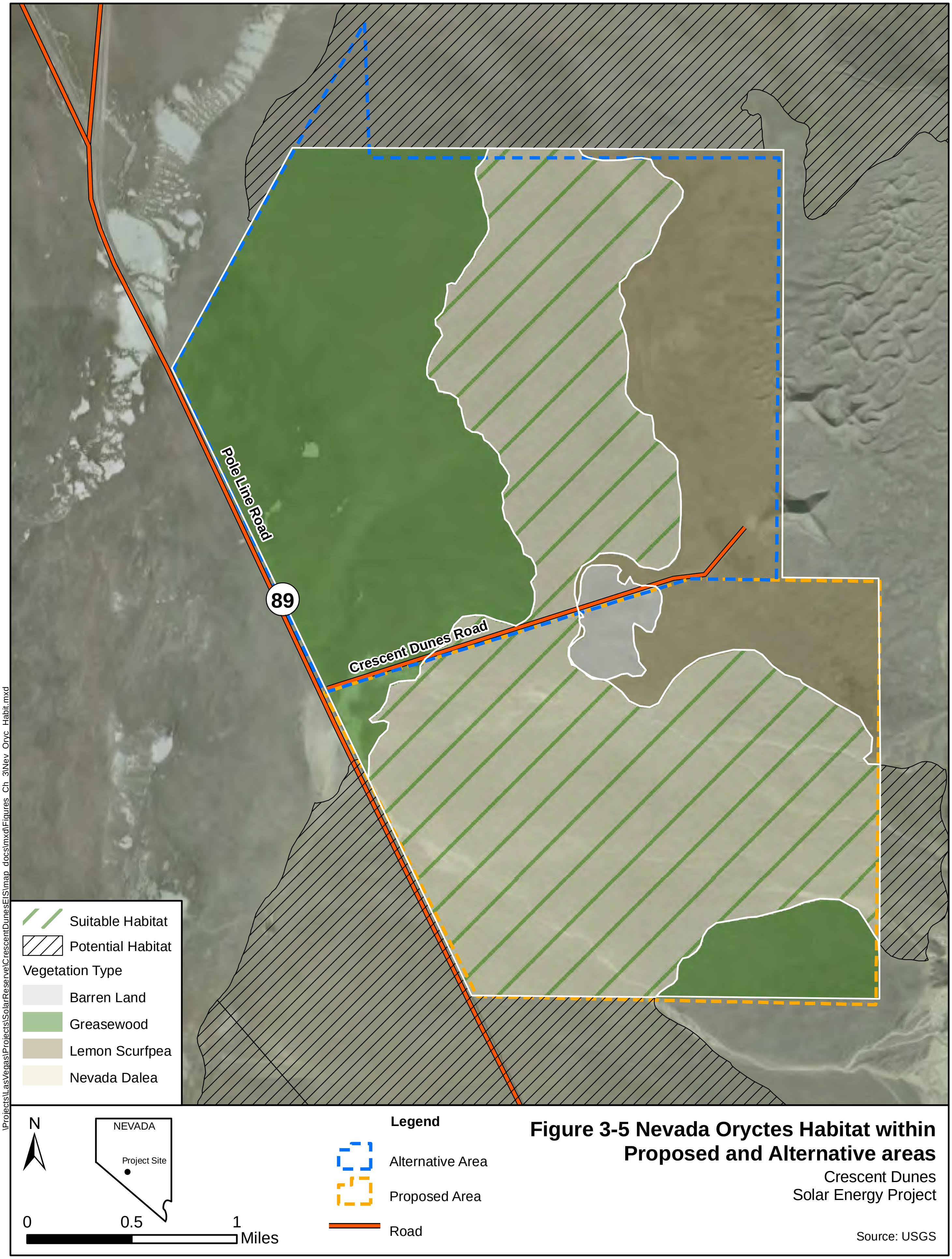


Figure 3-5 Nevada Oryctes Habitat within Proposed and Alternative areas

Crescent Dunes
Solar Energy Project

Source: USGS

3.4.1.3.2 Alternative Area

As discussed above, during 2010 field surveys biologists observed the Nevada oryctes (a BLM sensitive species) throughout approximately 1119 acres of the Alternative Area where the Mixed Salt Desert Scrub vegetation association is dominated by Nevada dalea and the soil is sandy. Because of the number of plants observed in the area, a detailed count of the plants was not obtained, but the boundary of the area within which the plants were observed was mapped (Figure 3-5, and Figure 3.15 in Section 3.8, Soils).

Additionally, one cactus species, sand cholla, was observed throughout the Alternative Area.

3.4.1.3.3 Borrow Pit

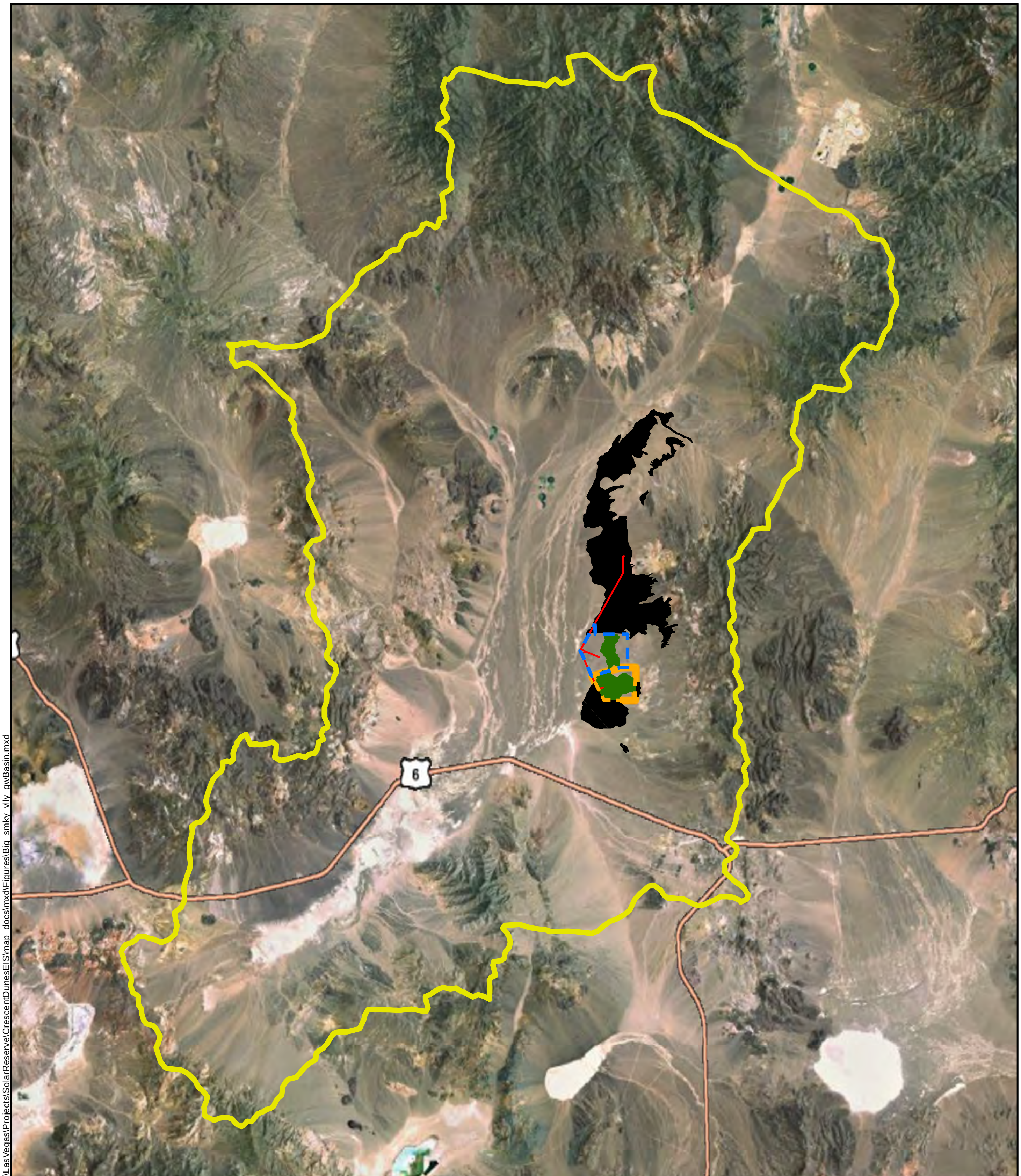
One cactus was found in proposed borrow pit. No other BLM sensitive species or associated habitat or soils were found throughout the borrow pit area (Figure 3.16 in Section 3.8, Soils).

3.4.1.3.4 TL and Anaconda Moly Substation

In 2009, one Nevada oryctes plant was found within the TL and Anaconda Moly Substation corridor (Figure 3-5). However, botanists observed that the Nevada dalea dominated the Mixed Salt Desert Scrub vegetation association throughout the TL corridor. As mentioned above, this is the vegetation association in which the Nevada oryctes was found to be common during the 2010 surveys. Although only one plant was found in 2009, the presence of this species is probably more widespread during years with optimal rainfall and temperatures, and may be more abundant within the TL corridor than previously documented.

3.4.1.3.5 CESA

Detailed surveys for special status plant species were not conducted throughout the CESA for this project. However, after overlaying the distribution of Nevada oryctes plants over the NRCS soils data it was determined that oryctes distribution is closely associated with the STC soil type (Figure 3-6). The STC soil type (i.e. oryctes habitat) occupies approximately 25,880 acres within the CESA. Additionally, information on observations of the species is available from the NNHP. Previous observations of the Nevada oryctes have been documented in Churchill, Esmeralda, Humboldt, Mineral, Pershing, Storey, and Washoe counties in Nevada, as well as Inyo County of California (NNHP 2001). Nevada oryctes may be found in similar soil types in these counties.



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NEVADA

Project Site

0 5 10 Miles

Legend

Tonopah Flat sub area

Potential

Suitable

Planned Transmission Line

Alternative Area

Proposed Area

3-6 Nevada Oryctes Plant Habitat throughout the CESA

Crescent Dunes
Solar Energy Project

Aerial Source: ESRI 2010

3.4.2 Special Status Wildlife Species

3.4.2.1 Area of Analysis and Methodology

The area of analysis for special status species includes the Proposed Area, Alternative Area; borrow pit, and TL and Anaconda Moly Substation corridor. The CESA for sensitive wildlife varied depending on the species. For pale kangaroo mice, the CESA was determined to be the Tonopah Flats Area (Figure 3-8). For golden eagles, the CESA was determined to be 10-mile radius around the perimeter of the detailed study area (Figure 3-9).

To develop a concise list of special status wildlife species potentially occurring in the detailed study area, data were compiled from USFWS (2009), the Nevada BLM Sensitive Species list, the Nevada State Protected Species list (NAC 503.030 for mammals, NAC 503.050 for birds, NAC 503.075 for amphibians, NAC 503.080 for reptiles), and the NHHP database. Agency biologists (USFWS, NDOW, and BLM) were consulted on several occasions to provide additional input. This information was used to develop a list of special status wildlife species that could occur within the project area. Species with no potential to occur because of documented range or distribution or a lack of preferred habitat (i.e., pinyon jays that only occur in pinyon-juniper habitat) were not included in this analysis. Based on an evaluation of listed species and habitats, and with concurrence from USFWS, no federally listed threatened, endangered, candidate, or proposed species occur in the project area (USFWS 2009a).

To assess the existing conditions of golden eagles in the project area and the CESA, BLM biologists, in coordination with USFWS biologists, developed a general approach to evaluate potential impacts on this species. The initial step was to evaluate data on previously documented and currently known nesting sites, and identify potential nesting habitat by reviewing topographic maps and other data. Multiple data sources were used to conduct this analysis including data from: NDOW, BLM, NRCS Soil Survey, MLRA, GAP, aerial photographs, current literature, Great Basin Bird Observatory, topographic maps, and National Climatic Data Center. BLM biologists conducted field surveys and aerial surveys of historic or known nesting sites and as well as potential habitat throughout the CESA. Field surveys for golden eagles were conducted June 4, 2010 in the southern portion of the San Antonio Mountains. Surveys focused on determining golden eagle occupancy and condition of two previously documented nests and potential nesting habitat in the area. Aerial surveys were on June 24, 2010 throughout the CESA. Transects were flown from southeast to northwest in a zigzag manner. All areas with rocky outcrops, mountains, and cliffs (i.e. potential golden eagle nesting habitat) were examined for golden eagles or sign (i.e. white wash or nests). Transects throughout portions of the CESA that were considered less suitable golden eagle habitat were approximately 2-3 miles apart. All potential golden eagles and nests locations were recorded with a GPS unit. Additionally, GAP data within the CESA was used to identify the extent of potential golden eagle habitat. The intermountain basin cliff and canyon land cover type was considered as potential nesting habitat.

According to NDOW, two Nevada State Protected Species could occur within the project area: the pale kangaroo mouse (*Microdipodops pallidus*) and the dark kangaroo mouse (*Microdipodops megacephalus*) (NDOW 2009). Field surveys were conducted in April 17–19 and May 5–19, 2010, to determine the presence or absence of these species in the Proposed Area and Alternative Area. Evaluating potential habitat it was found that there would not be suitable habitat in and around the borrow pit and transmission line, therefore surveys were not recommended for these components. Surveys for kangaroo mice consisted of a live-trapping effort within different habitats (soil units) of the Proposed Area and Alternative Area. Ten trap lines were established in the Proposed Area and Alternative Area (five trap lines in each) (Figure 3-7). Additionally, two trap lines were established outside the Proposed and Alternative Areas. Trapping efforts were conducted for up to four nights at each trapping location. Trapping did not occur within the borrow pit or TL areas (JBR 2010a). Information on habitat and soil preferences for the pale kangaroo mouse gathered during field surveys were used to identify the amount of potential habitat for kangaroo mice throughout the CESA.

3.4.2.2 Regulatory Framework

3.4.2.2.1 Endangered Species Act of 1973

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

3.4.2.2.2 Migratory Bird Treaty Act

The MBTA (16 USC 703) makes it unlawful to pursue, hunt, take, capture, kill, or possess any migratory bird, or part, nest, or egg of such bird listed in wildlife protection treaties among the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Union of Soviet Socialist Republics. In addition, this act also contains a clause that prohibits baiting or poisoning of these bird species. The current list of species covered by MBTA can be found in 50 CFR 10.13. Because several migratory bird species may occur within the study corridor, the MBTA applies to those bird species that may be affected during implementation of the proposed project. The MBTA (16 USC 701–718h) prohibits the "taking" of any migratory birds, including hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof.

3.4.2.2.3 Bald and Golden Eagle Protection Act

The Bald and golden eagle Protection Act (16 USC 668–668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles or golden eagles, including pursing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing bald eagles or golden eagles. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner any bald or golden eagle, alive or dead, or any part, nest, or egg thereof."

3.4.2.2.4 BLM Policy

BLM has implemented policies for special status species found on BLM-managed lands. BLM's list of special status species includes species that are listed or proposed for listing under the Endangered Species Act (ESA) and species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. Additionally, all federal candidate species, proposed species, and delisted species (for 5 years after delisting) will be conserved as BLM sensitive species (BLM 2008b).

3.4.2.2.5 Nevada Regulations

The State of Nevada has identified wildlife species that are declining in their range throughout Nevada or are otherwise rare and at risk of extinction. Sensitive and protected animal species are protected in Title 45 of NRS (NRS 501.100 through 503.104). Classification of wildlife species and related regulations are detailed in Chapter 503 of NAC. Taking of these species is allowed only after obtaining necessary permits or authorizations from NDOW.

3.4.2.2.6 Nevada State Protection and Propagation of Native Fauna

NRS 503.584 through 503.589 provide for the protection and propagation of native fauna, including migratory birds. The Board of Wildlife Commissioners determines which species will be fully protected under this statute (i.e., State of Nevada Protected Species).

3.4.2.2.7 South Central Nevada Sage Grouse Conservation Plan

This plan covers the south central portions of Nevada, including the project area, and was prepared by the South Central Planning Team, which consists of concerned citizens, property owners, land managers, land users, local governments, and other interested parties (South Central Planning Team 2004). The conservation strategy in this document reflects ideas consistent with the Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada (BLM 2000), and the Western Association of Fish and Wildlife Agencies (Connelly et al. 2000). The conservation plan includes an initial analysis of sage-grouse populations and habitat within the south central Nevada sage-grouse planning area and indentifies management recommendations for these populations and habitats.

3.4.2.3 Affected Environment

3.4.2.3.1 Proposed Area

Mammals

Four sensitive mammal species could potentially occur in the Proposed Area. The listing status, a description of suitable habitat, and an assessment of the potential for the species to occur and the potential for impacts to the species are included in Table 3-13.

Table 3-13. Special status mammal species potentially found in the project area

Species	Status[a]	Habitat	Presence in Project Area
Pygmy Rabbit *Brachylagus idahoensis*	BLM	Dense sagebrush with friable soils	Unlikely, no evidence found in sagebrush habitats in borrow pit area
Dark Kangaroo Mouse *Microdipodops megacephalus*	NV Protected	Gravelly to sandy habitats	Potential
Pale Kangaroo Mouse *Microdipodops pallidus*	NV Protected	Sandy habitats	Potential
Desert Bighorn Sheep *Ovis canadensis nelsoni*	BLM	Mountains	Highly unlikely, other than crossing between mountain ranges
California Myotis *Myotis Californicus*	BLM	Lower Sonoran desert scrub to forests Roosts in cliff crevices	Potential forager in the area
Western Small-footed Myotis *Myotis ciliolabrum*	BLM	Desert scrub, grasslands, sagebrush steppe, pinyon-juniper woodlands Roosts in caves, mines, and trees	Potential forager in the area
Long-eared Myotis *Myotis evotis*	BLM	Found throughout the state primarily associated with forests. Roosts in hollow trees, mines, caves and buildings	Unlikely except during migration
Little Brown Bat *Myotis lucifugus*	BLM	Primarily found at higher elevations and higher latitudes Roosts in hollow trees, rock outcrops, buildings, and occasionally mines and caves	Unlikely except during migration
Fringed Myotis *Myotis thysanodes*	BLM	Found throughout central and southern Nevada in a wide variety of habitats from low desert scrub to high elevation forests Roosts in mines, caves, trees and buildings	Potential forager in the area
Western Pipistrelle *Pipistrellus hesperus*	BLM	Lower and upper Sonoran desert habitats Roosts in rock crevices, mines, caves, or occasionally buildings and vegetation	Potential forager in the area
Brazilian free-tailed bat *Tadarida brasiliensis*	BLM	Found in a wide variety of habitats throughout Nevada Roosts in cliff faces, mines, caves, buildings, bridges and hollow trees	Potential forager in the area

[a] BLM = Nevada BLM Sensitive Species, NV Protected = protected under Nevada Revised Statutes 501.105 and listed under Nevada Administrative Code 503.030

The pale kangaroo mouse relies on the sandy soils and the open salt desert scrub vegetation like the habitat that occurs near the dunes in the project area (Wilson and Ruff 1999). Although, the GAP vegetation data illustrate only a small area of the Active and Stabilized Dunes vegetation association (see Section 3.2, Vegetation) within the Proposed Area. Biologists noted that within the northeastern portion of the Proposed Area, the soils were sandier and contained more dune or “mini” dune features. Mini dune features are small sandy mounds that are vegetated with shrubs and little understory. This Mixed Salt Desert Scrub vegetation association was dominated by lemon scurfpea. Farther west of the dunes, the Mixed Salt Desert Scrub vegetation association was dominated by Nevada dalea and also contained sandy soil or inclusions of mini dune features. It is within these two habitats where the most pale kangaroo mice were captured (JBR 2010a); therefore, these areas were delineated as suitable habitat (Figure 3-7). A small area of barren land was identified as potential habitat because it was close to the dune and lemon scurf pea community, and even though it did not have any vegetation, sandy soils were present. Generally, pale kangaroo mice were not trapped at sites that lacked sandy soils, dune, or mini dune features. This included the southeastern portion of the proposed project site where Bailey's greasewood was the dominant component of the Mixed Salt Desert Scrub vegetation association. Based on results of the field surveys, it was determined that kangaroo mouse suitable habitat was closely associated with two soil types including Dune Land (DU), and Tipperary fine sand (TGE). The Stumble Loamy Fine Sand soil type was identified both as suitable habitat and potential habitat. Within the proposed area, approximately 2,448 acres were identified as suitable habitat and 287 acres were identified as potential habitat.

Although historical literature identifies stabilized dunes as habitat for the dark kangaroo mouse (Hall and Linsdale 1929), more recent research shows that dark kangaroo mice prefer gravelly soils in valley bottoms dominated by sagebrush, rabbitbrush, and horsebrush (Ghiselin 1970; Wilson and Ruff 1999). During surveys, no dark kangaroo mice were captured in the Proposed or Alternative Areas, or off-site. Additionally, no dark kangaroo mouse habitat was observed in the Proposed or Alternative Areas.

As illustrated in Table 3-13, a wide variety of special status bats have the potential to occur in the area. Generally, bats are unlikely to roost in the area as most bat species roost in trees, cliff faces, mines, and buildings (Bradley et al. 2006), which are not present in the project area. However, bats may potentially forage throughout the project area or migrate through the Lower Big Smoky Valley.

Migratory Birds

Eleven bird species that are considered to have special status were observed or could potentially occur in the project area (Table 3-14). The listing status and a description of suitable habitat are included in Table 3-14.

In addition to the birds identified in Table 3-14, a wide variety of birds protected under the MBTA could utilize the Proposed Area for nesting, foraging, or as a migratory corridor. Field surveys were conducted during the avian spring migration period (May 2009, April/May 2010). Species observed included black-throated sparrows (*Amphispiza bilineata*) and loggerhead shrike (*Lanius ludovicianus*). Like most valleys in Nevada, the Big Smoky Valley contains playas that may be seasonally inundated and wetlands that could provide temporary habitat for migrating birds such as American avocets, vesper sparrows, and Northern Harriers, as well as others (Great Basin Bird Observatory 2010).

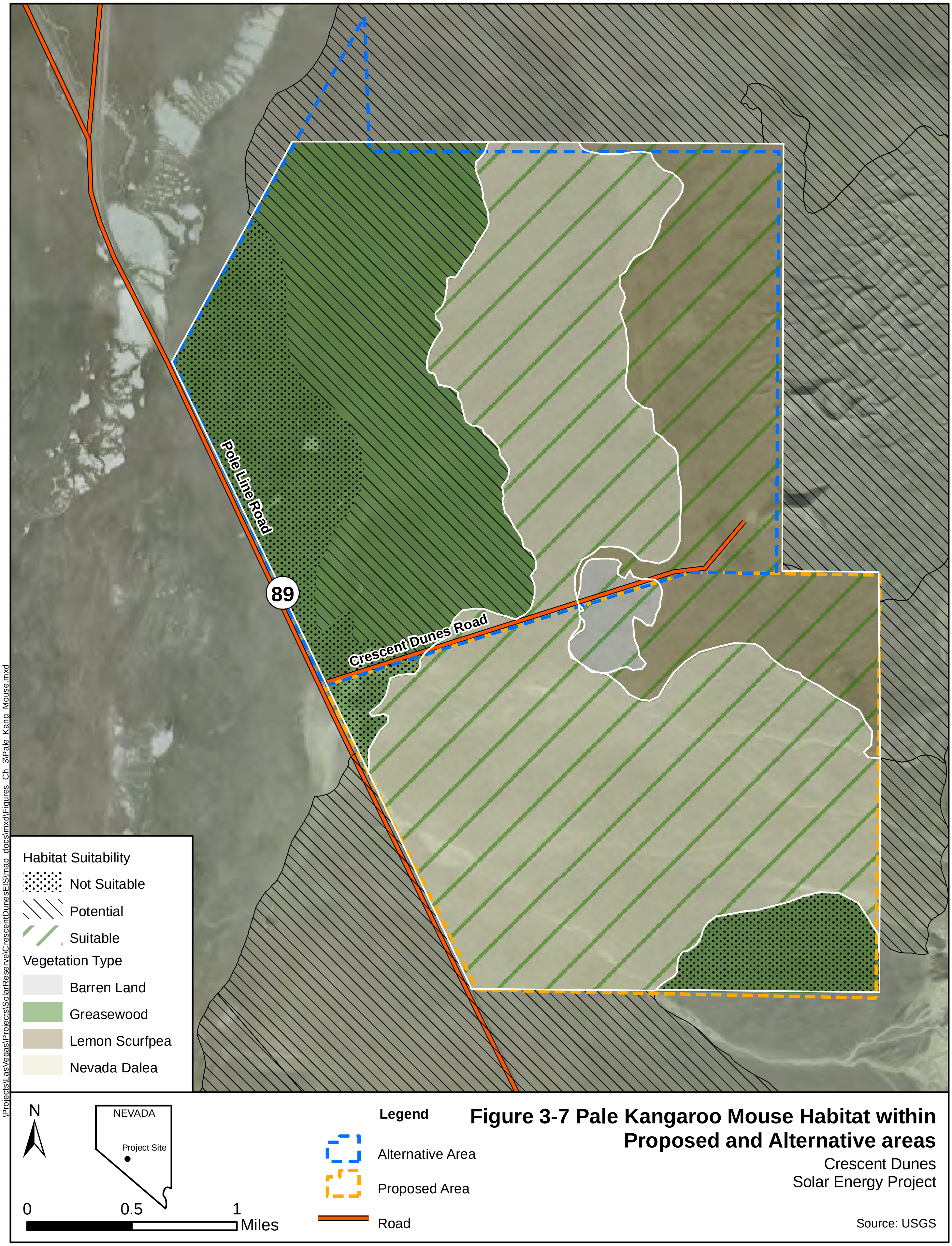

Figure 3-7 Pale Kangaroo Mouse Habitat within Proposed and Alternative areas

Crescent Dunes
Solar Energy Project

Source: USGS

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Golden Eagles

Golden eagles were observed in the region of the proposed project during 2010 field surveys and from anecdotal observations of field staff. Like much of the Big Smoky Valley, the project area is potential foraging habitat for golden eagles, though it provides no unique resources compared with the remaining area, and does not contain roosting or nesting habitat. Field surveys by BLM biologists confirmed that a golden eagle nest in the San Antonio Mountains, approximately 8 miles southeast from the project area, was active and contained young birds (BLM 2010a). One inactive nest was found approximately 4 miles east of the proposed project area. This nest was determined to be inactive and not occupied this season based on the lack of fresh whitewash and the sloughing of the nest material. Overall, the condition of the nest was considered fair to good.

Table 3-14. Birds considered special status species observed in or that may occur in the project area

Species	Status[a]	Habitat	Presence in Project Area
Sage Sparrow *Amphispiza belli*	BLM	Sagebrush, saltbush, coastal scrub	Potential, not observed
Golden Eagle *Aquila chrysaetos*	BLM	Mountains, deserts, plains	Potential forager, nests have been documented within 5 miles of the Proposed Area
Short-eared Owl *Asio flammeus*	BLM	Open country, ground nester	Potential, no evidence of nesting found
Burrowing Owl *Athene cunicularia*	BLM	Open country, nest areas usually include elevated perch	Potential, very sandy nature of soils in majority of area may makes nesting unlikely
Swainson's Hawk *Buteo swainsoni*	BLM	Open country, plains, prairie, agricultural areas	Potential forager
Greater Sage-grouse *Centrocercus urophasianus*	BLM C	Sagebrush habitats	Unlikely, sagebrush in gravel pit area, but no evidence of sage-grouse found
Prairie Falcon *Falco mexicanus*	BLM	Open country, nests on cliffs and outcrops	Potential forager
Loggerhead Shrike *Lanius ludovicianus*	BLM	Open country in greasewood, sagebrush, agricultural areas	Observed in borrow pit area
Long-billed Curlew *Numenius americanus*	BLM	Wet and dry uplands, wetlands, agricultural fields	Potential migrant
Vesper Sparrow *Pooecetes gramineus*	BLM	Grasslands, farmlands, forest clearings, sagebrush	Potential migrant
Brewer's Sparrow *Spizella breweri*	NV Sensitive	Sagebrush habitat	Recorded in sagebrush in borrow pit area

[a] BLM = Nevada BLM Sensitive Species; NV Sensitive = protected under Nevada Revised Statutes (NRS) 501.105, NRS 501.110, NRS 501.181 and listed under Nevada Administrative Code 503.050; C = U.S. Fish and Wildlife Service candidate species

Reptiles

No special status reptiles were observed in or have the potential to occur within the Proposed Area.

Insects

Three BLM sensitive species of insects are endemic to the Crescent Dunes: Crescent Dunes Aegialia Scarab (*Aegialia crescent*), Crescent Dunes Aphodious Scarab (*Aphodius* sp.), and Crescent Dunes Sirican Scarab (*Serica ammomenisco*). According to NNHP, these species have been documented on Crescent Dunes. It is unlikely that these three species would be present in the Proposed Area because they are associated with the sand dunes and the dunes do not extend into the proposed project area.

Alternative Area

Since the Alternative Area is directly adjacent to the Proposed Area, the existing environment for wildlife special status species is very similar. Also, since the Alternative Area overlaps the Crescent Dunes, it is likely that endemic beetle species are present within the Alternative Area.

During 2010 trapping efforts, the presence of pale kangaroo mice was confirmed within the Alternative Area. Similar to the Proposed Area, more mice were caught in the eastern portion of the Alternative Area near the dunes where the Mixed Salt Desert Scrub Community was dominated by lemon scurfpea and Nevada dalea (Figure 3-7). Some pale kangaroo mice were caught in the Mixed Salt Desert Scrub vegetation association dominated by greasewood where sandier soils or mini dune features were present. However, no pale kangaroo mice were captured in the westernmost portion of the Alternative Area that was dominated by greasewood, where sandy soils or mini dune features were not present. Within the alternative area, approximately 1,936 acres were identified as suitable habitat and 1,227 acres were identified as potential habitat.

3.4.2.3.2 Borrow Pit

Special status wildlife species composition is similar to that of the Proposed Area. Species that are dependent on habitat near or endemic to the Crescent Dunes such as kangaroo mice and beetle species are not likely to be found in the borrow pit area because of the lack of appropriate habitat.

3.4.2.3.3 TL and Anaconda Moly Substation

Special status wildlife species composition is similar to the Proposed Area. Species that are dependent on habitat near or endemic to the Crescent Sand Dunes such as kangaroo mice and various beetle species area not likely to be found within the TL and Anaconda Moly Substation corridor because of the lack of appropriate habitat.

3.4.2.3.4 CESA

Special status wildlife species composition is similar to the Proposed Area. Pale kangaroo mice likely are found throughout the CESA. Approximately 29,343 acres of potential or suitable pale kangaroo mouse habitat were identified throughout the CESA (Figure 3-8).

Golden eagles are likely to nest within the CESA. During field surveys, biologists observed that one previously identified nest was occupied approximately 8 miles southeast of the proposed project area as well as an abandoned nest approximately 4 miles east of the proposed project area. Additionally, biologists recorded two incidental sightings of golden eagles. Biologist observed that the potential habitat within the CESA is limited. Rocky cliffs in the San Antonio Mountains and utility poles throughout the valley may provide roosting opportunities. Potential nesting habitat within the CESA is limited to the cliff and rocky outcrops (i.e. inter-mountain basins cliff and canyon GAP land cover type). Approximately 691 acres of potential nesting habitat exists within the San Antonio Mountains (Figure 3-9).

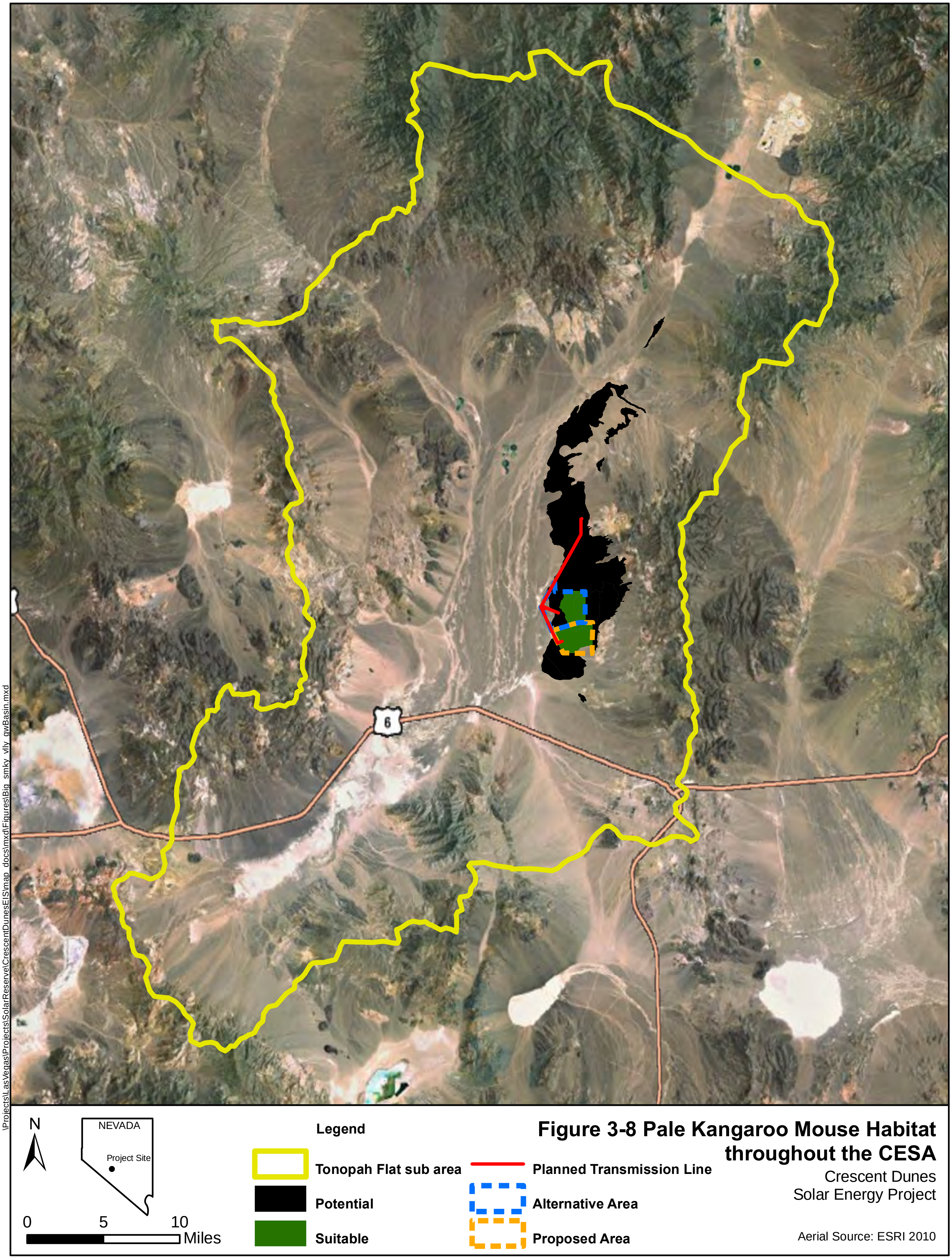

Figure 3-8 Pale Kangaroo Mouse Habitat throughout the CESA

Crescent Dunes
Solar Energy Project

Aerial Source: ESRI 2010

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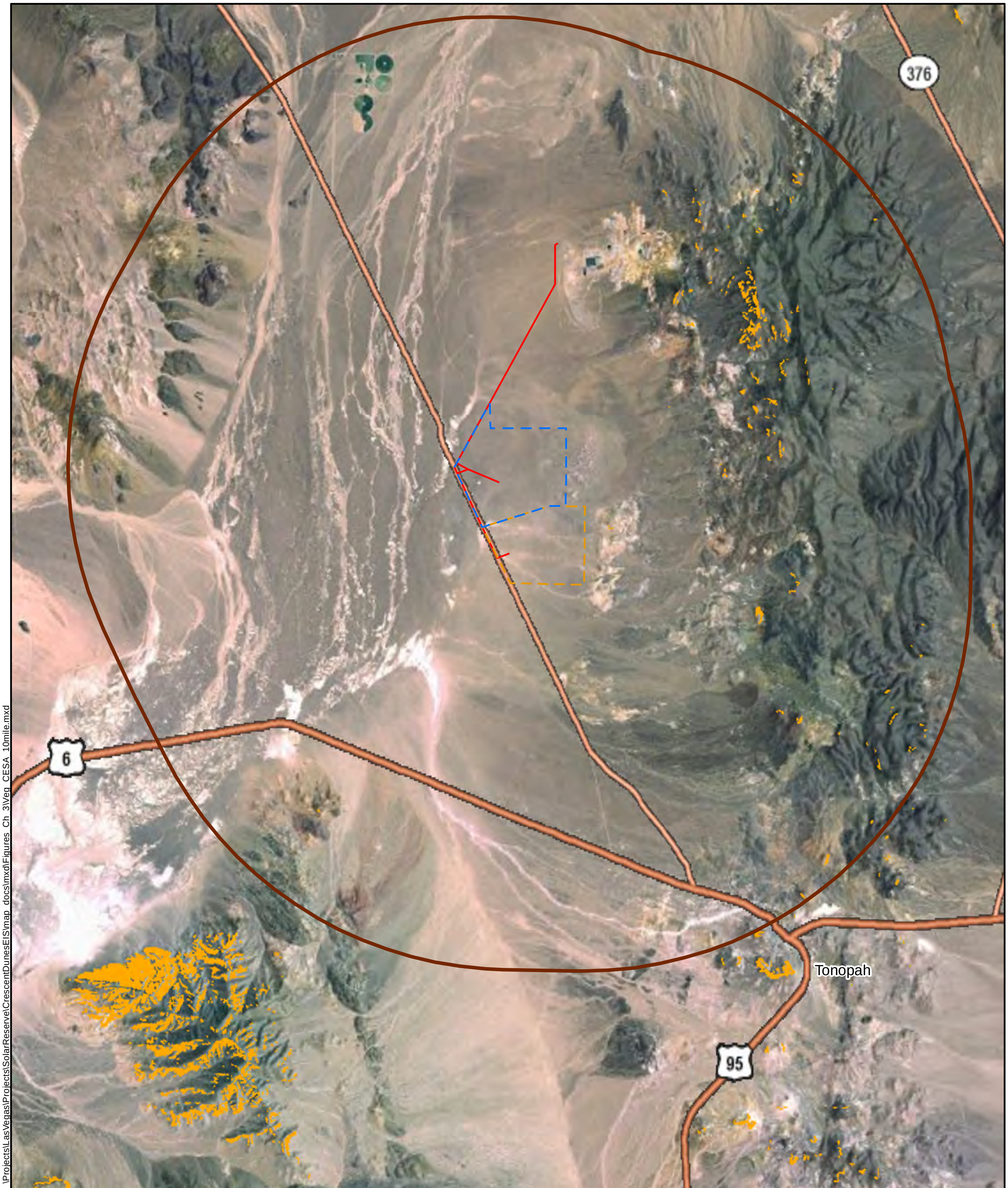

Figure 3-9. Potential Golden Eagle Nesting Habitat Throughout the CESA.

Crescent Dunes Solar Energy Project

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NEVADA

Project Site

0 2.5 5 Miles

Legend

Alternative Area

Planned

Proposed Site

Inter-Mountain Basins Cliff and Canyon (i.e. potential golden eagle habitat)

Source: USGS

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3.5 Water Quality and Quantity

3.5.1 Area of Analysis and Methodology

The area of analysis for water quality and quantity includes the Project Area, Alternative Area, borrow pit, and the TL and Anaconda Moly Substation corridor. In addition, there are two CESAs:

- Groundwater CESA – The 1-foot, 53-year draw down contour for the proposed groundwater well (Figure 3-10). The CESA for groundwater resources was developed using a numerical model developed by WorleyParsons (WorleyParsons 2010c) in cooperation with the BLM Nevada State Office. The full report is available at the BLM TFO for review.
- Surface water and stormwater drainage CESA – The subbasin within the Tonopah Flat (137A) hydrographic basin of the Big Smoky Valley watershed (see Figure 2-15). A subbasin has been delineated to define the CESA. The subbasin encompasses the northeastern quarter within hydrologic basin 137A. This subbasin accounts for the drainage area upstream of the project location bound by the San Antonio Range to the east, the Toiyabe Range to the north, and the valley downstream to the southwest where Peavine Creek drains. Aerial photography and USGS 10-foot interval topographic mapping was used to determine the hydrologic limits of the subbasin. This subbasin is considered the CESA for water quality and quantity.

3.5.2 Regulatory Framework

BLM is authorized by Section 313 of the Clean Water Act as amended (33 U.S.C. 1323), Section 1447 of the Public Health Service Act, as amended by the Safe Drinking Water Act (42 U.S.C. 300j-6), Section 6001 of the Solid Waste Disposal Act, as amended (42 U.S.C. 6961) and Section 22 of the Toxic Substances Control Act and Section 301 of Title Three of the United States Code to insure Federal compliance with the applicable pollution control requirements.

Nevada water law is based on prior appropriation and beneficial use. All water within the boundaries of the state, whether above or beneath the surface of the ground, belongs to the public and is subject to appropriation for beneficial use under the laws of the state (WorleyParsons 2010a).

An application with the State of Nevada has been filed by TSE for permission to retire active irrigation groundwater rights near the project area and to divert the rights approximately 10.6 miles southeast to the project area for industrial water use. The anticipated groundwater right quantity (consumptive use) to be granted to TSE and available for transfer is 854 AFY. It is estimated that only 600 AFY would be needed for facility operations.

3.5.3 Affected Environment

3.5.3.1 <u>Groundwater</u>

The project area is located in the Central Hydrographic Region and overlies the basin fill aquifer system that is composed primarily of alluvial, colluvial, and lacustrine deposits. Groundwater in the Tonopah Flat subarea flows horizontally from the mountains surrounding the subarea to the valley floor, reaching the water table through watercourse infiltration or percolation into rock fractures.

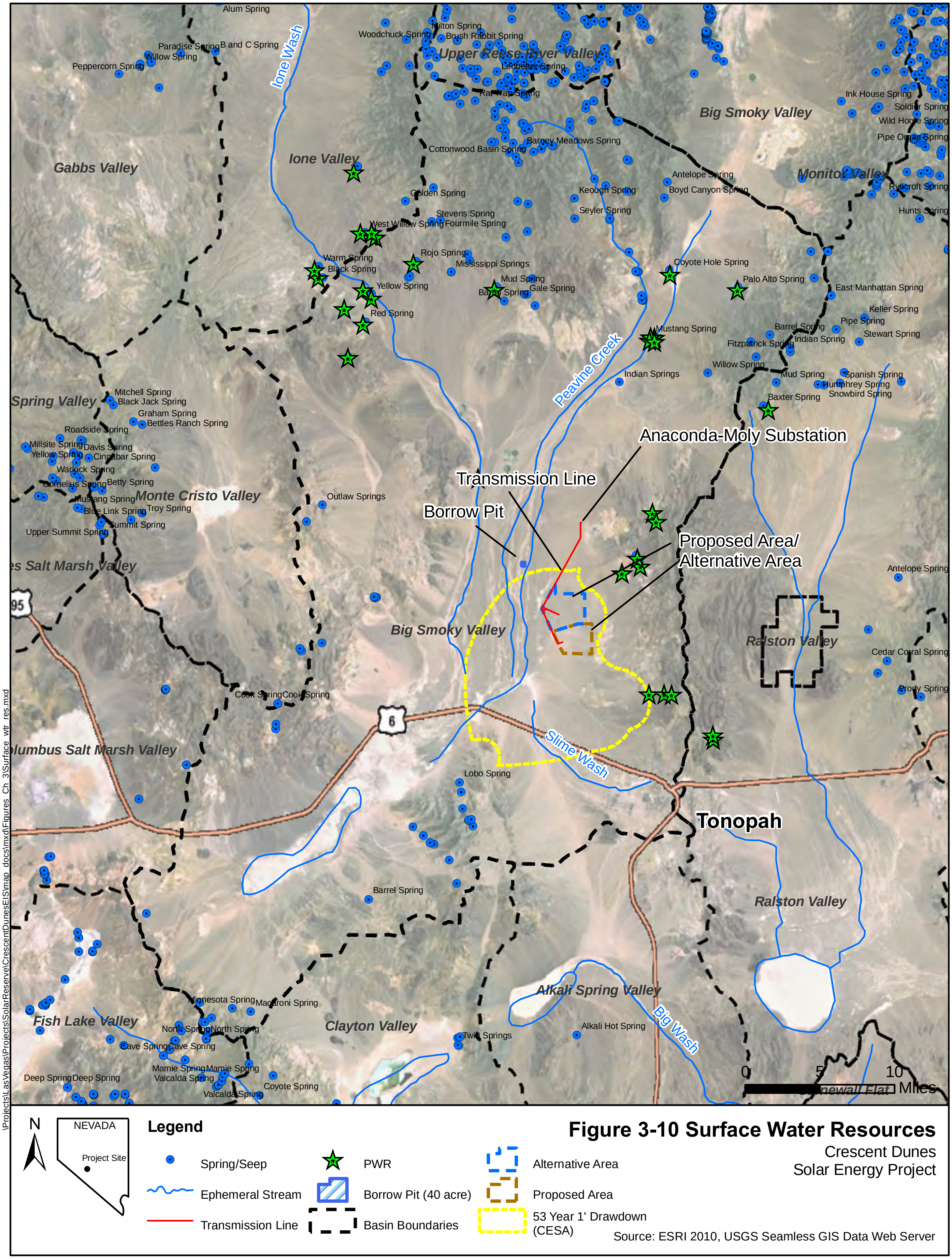

Figure 3-10 Surface Water Resources
Crescent Dunes
Solar Energy Project

There are many springs and seeps within the Tonopah Flat (137A) hydrographic basin (Figure 3-11). Most springs are located in bedrock areas, and the closest springs to the project area are more than 10 miles away (WorleyParsons 2010a). A BLM database and a USGS National Hydrography Dataset both identify seeps, springs, and wells. An assessment of these databases indicates that no springs or seeps exist within the groundwater CESA.

The general depth to water in the Tonopah Flat subarea is typically greater than 100 feet bgs, and some central locations of the subarea have depths to groundwater ranging from 0–100 feet bgs (Figure 3-11). The test well drilled by TSE indicates that the depth to groundwater at the project area is approximately 172 feet bgs.

Historical groundwater consumption in the undeveloped Tonopah Flat subarea is attributed to agriculture water use. This includes irrigation of crop and pasture land and stock watering. Current groundwater consumption is summarized in Table 3-15.

Table 3-15. Current groundwater consumption in the Tonopah Flat subarea

Manner of Use	Nevada Division of Water Resources (2010)	Nye County Water Resources Plan (Buqo 2004)
	acre-feet per year	acre-feet per year
Irrigation	10,204.69	11,797.00
Mining and Milling	8,330.76	12,683
Municipal	58.95	1,507
Quasi-Municipal	20.84	14
Stockwater	916.31	864
Total	**19,531.55**	**26,865.00**

Source: WorleyParsons 2010

The Tonopah subarea reportedly has 12,000 acre-feet (AF) of annual recharge, 2,000 AF of annual inflow, 6,000 AF of annual evapotranspiration, and 8,000 AF of annual outflow (Buqo 2004). The perennial yield (safe yield) is estimated at 6,000 AF per year (Buqo 2004). The total water rights demand through March 1999 was reportedly at 26,724 AF per year (AFY). However, these are the estimated committed water rights in the subarea and do not represent the actual groundwater withdrawal and consumption, which are significantly less (Buqo 2004). The majority of the water rights are committed to irrigation, mining, and milling.

Total dissolved solids (TDS) are very low in surface water as precipitation enters the Tonopah Flat subarea hydrologic system. TDS increases as surface water flows from the mountains to the valley. Similarly, groundwater TDS is lowest in the mountains and highest in the valley where water is evaporated or vegetation is present. In general, the groundwater quality in the subarea is suitable to marginally suitable, but groundwater in portions of the subarea where groundwater is shallow exceeds state and/or federal drinking water standards for TDS (WorleyParsons 2010a).

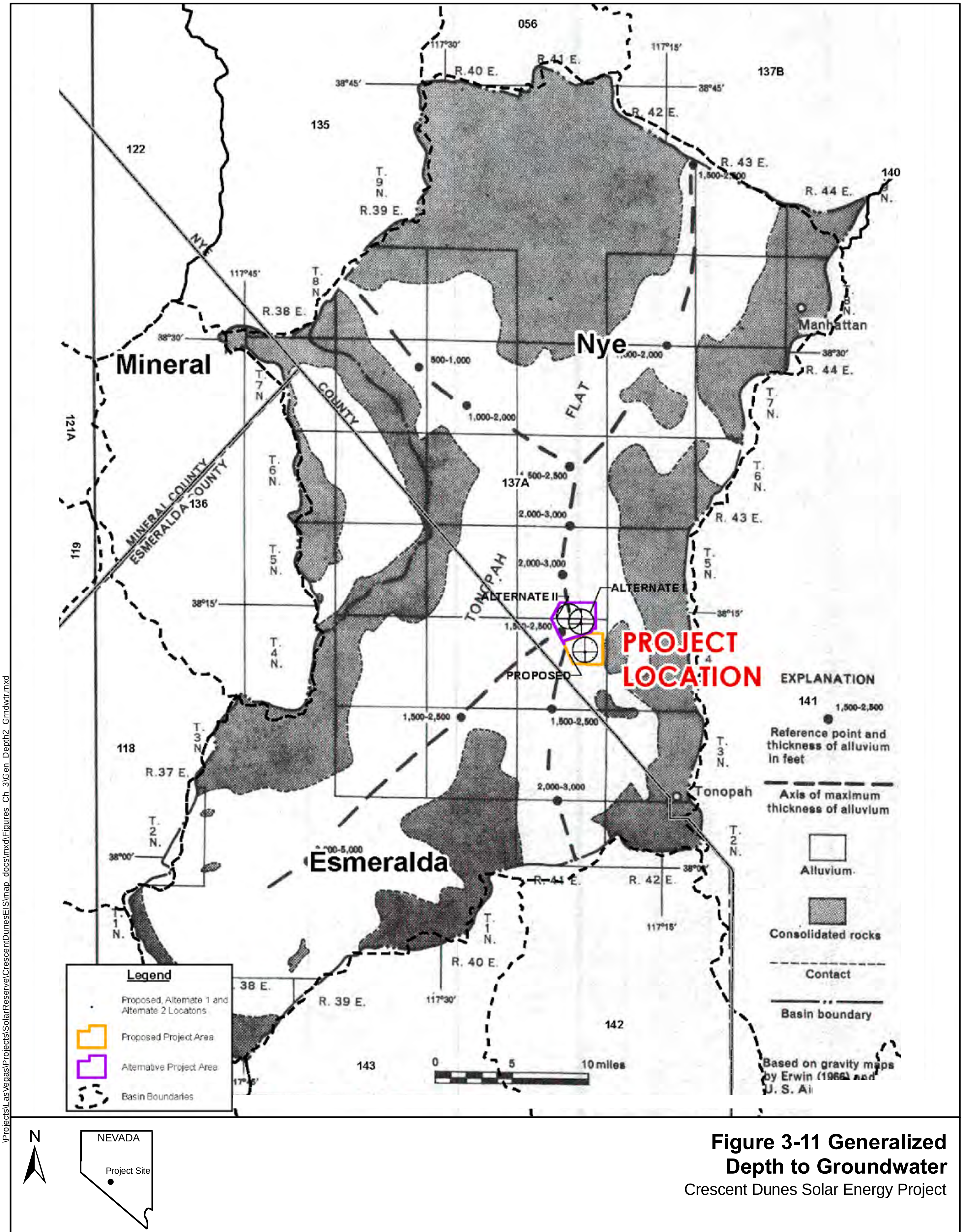

Figure 3-11 Generalized Depth to Groundwater

Crescent Dunes Solar Energy Project

Source: Worley Parsons, 2010

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According to the Nevada State Engineer well log database, there are 173 logged wells within the Tonopah Flat subarea, and they are shown on Figure 3-12 (State of Nevada Department of Conservation and Natural Resources Division of Water Resources 2010). Several of the wells closest to the project location are summarized in Table 3-16, based on data (WorleyParsons 2010a) tabulated from the Nevada State Engineers well log.

Table 3-16. Summary of wells within the project CESA

Well Number	Well Depth (feet below ground surface)	Water Level (feet below ground surface)	Water Quality	Use/Notes
11	280	50	Good	Municipal
12	350	36	Not available	Quasi-municipal
13	100	40	Not available	Mining
16	312	9	Not available	Domestic
21	30	15	Not available	Unknown
22	30	No water	Not available	Unknown
23	400	Dry	Not available	Abandoned stock
24	179	20	Not available	Domestic
43	200	Not available	Not available	Abandoned, cemented
44	220	104	Good	Stock, replacement well
45	255	68	Not available	Stock

3.5.3.1.1 Proposed Area

The Proposed Area is located in the region where the depth to groundwater is greater than 100 feet bgs. A TSE test well has been drilled and installed near the northern boundary of the area. Groundwater wells numbers 43 and 44 are located outside of the southeastern corner of the Proposed Area boundary (State of Nevada Department of conservation and Natural Resources Division of Water Resources 2010). Rogers Well (USGS 2010) is located within 1 mile of the western boundary of the Proposed Area. No seeps or springs are located within the Proposed Area boundary.

3.5.3.1.2 Alternative Area

The Alternative Area is located in the region where the depth to groundwater is greater than 100 feet bgs. There are no existing wells located within the boundary of the Alternative Area, but the TSE test well will be drilled and installed near the southern boundary of the area. No seeps or springs are located within the Alternative Area boundary.

3.5.3.1.3 Borrow Pit

The borrow pit is located in the region where the depth to groundwater ranges from 50–100 feet bgs. No seeps, springs, or existing wells are located in the vicinity of the borrow pit.

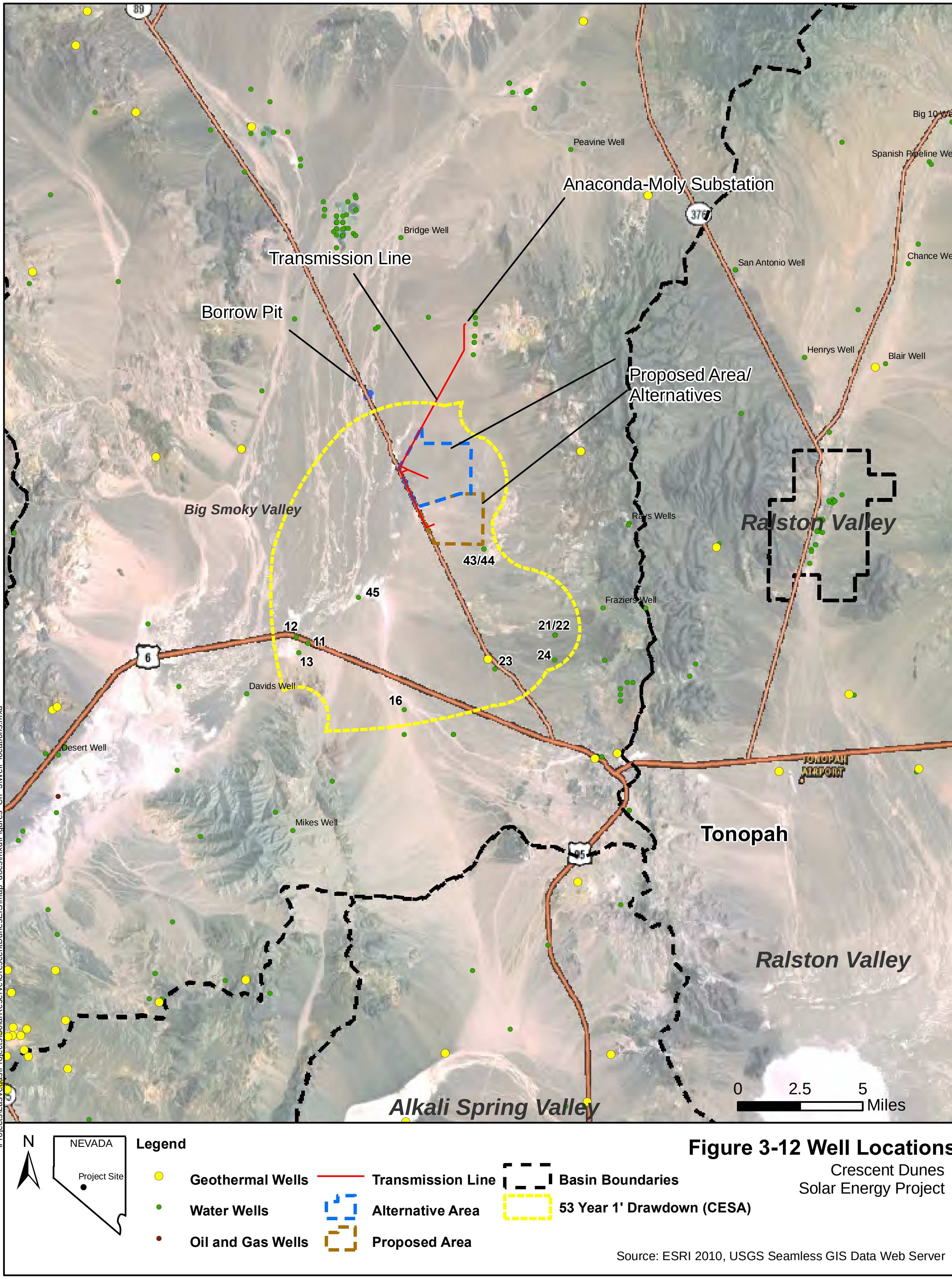

Figure 3-12 Well Locations

Crescent Dunes
Solar Energy Project

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3.5.3.1.4 TL and Anaconda Moly Substation

The TL corridor and the Anaconda Moly Substation are located in the region where the depth to groundwater is greater than 100 feet bgs. No seeps, springs, or existing wells are located within the TL corridor or at the Anaconda Moly Substation. Seven sink/rise locations have been identified within a 1-mile buffer of the TL corridor (USGS 2010).

3.5.3.1.5 CESA

Nine existing groundwater wells are located within the CESA. Well numbers 11, 12, 13, 16, 21, 22, and 23 are located between the 1- and 1.5-foot draw down contours. Well numbers 43 and 44 are located at the 2-foot draw down contour, see Figure 3-12 (WorleyParsons 2010a).

3.5.3.2 Surface Water

Hydrographic basin 137A of the Big Smoky Valley (Tonopah Flat subarea) is a semiarid to arid desert climate that has a season of winter cold fronts and a season of summer monsoons. Most precipitation falls in the winter, with an annual average precipitation of 4–8 inches per year over the basin (WorleyParsons 2010a). Because most of the precipitation in the area falls in the mountains, the primary source of surface water is generated from runoff in short watercourses in the surrounding mountain ranges. These watercourses drain steeply to the adjacent valleys, where they seep into the sediments and evaporate.

Within the Tonopah Flat subarea, the majority of the basin alluvial valley is undeveloped desert rangeland, with patches of agriculture, surrounded by rocky mountain ranges. The basin's primary source of surface water is stormwater runoff in intermittent streams originating in the Toiyabe Range and stormwater flowing southeast into Tonopah Flat from Ione Valley, including Knickerbocker, Cloverdale, Cottonwood, and Peavine creeks (WorleyParsons 2010a). Peavine Creek, the largest drainage from Toiyabe Range to Tonopah Flat, passes approximately 2 miles west and downgrade of the project location, terminating as it loses flow on the alluvial apron of the valley floor. Figure 3-10 shows the surface water resources in the basin.

Approximately 30 springs and seeps were identified around the boundary of the Tonopah Flat subarea. Most springs identified by WorleyParsons are located in bedrock areas, with the closest springs and seeps located more than 10 miles from the project area (WorleyParsons 2010a).

Within this subbasin, one watercourse has a mapped floodplain. Peavine Creek is a Federal Emergency Management Agency (FEMA) mapped effective Zone A floodplain (FEMA FIRM 32023C4450E, February 17, 2010). A Zone A floodplain has a 1 percent annual chance of flooding. It should be noted that a detailed analysis has not been performed for the area, so no depth or base flood elevation is given.

Aerial photographs and USGS maps of the area show several ephemeral drainage paths that drain west from the San Antonio Range and pass through the CESA. JBR conducted a field visit in the area and concluded that these ephemeral drainage paths lose definition and do not reach Peavine Creek (JBR 2009). Based on preliminary field surveys, JBR recommended to the USACE that Peavine Creek and its tributaries are isolated intrastate waters with no apparent interstate or foreign commerce connection and would, therefore, not be considered subject to jurisdiction under the Clean Water Act (JBR 2009).

Federal reserved water rights are primarily limited to Public Water Reserves (PWRs) for the BLM in Nevada. In 1926, an EO created "Public Water Reserves No. 107," which ended the site-specific system of reserving springs and water holes. Prior to PWR 107, federal agencies identified springs and public water holes to be reserved as chronologically numbered PWRs. PWR 107 was created to reserve public water holes and natural springs yielding amounts in excess of homesteading requirements. This order states that "legal subdivision(s) of public land surveys which is vacant, unappropriated, unreserved public land and contains a spring or water hole, and all land within one quarter of a mile of every spring or water be reserved for public use" (BLM 2010b). PWR 107 was not intended to reserve the entire yield of each public spring or water hole. All waters from these sources in excess of the minimum amount necessary for domestic human consumption and stock watering purposes are available for appropriation through state water law.

3.5.3.2.1 Proposed Area

The Proposed Area is located primarily in undeveloped desert rangeland and is set at the foothills of the San Antonio Range. There are a few existing ephemeral surface water drainage paths that meander across the Proposed Area boundary, draining to the west from the San Antonio Mountains and Crescent Dunes (Figure 3-10). Ephemeral washes show the path that surface water runoff typically takes during intense storms. The Proposed Area has very low vegetation density, which is common with ephemeral wash conditions.

There is a culvert crossing under SH 89, but a field visit conducted by JBR revealed that the ephemeral drainage paths that cross the Proposed Area lose definition before reaching the culvert at the highway (JBR 2009).

Off-area stormwater sheet flow may be allowed to follow its present drainage paths and continue to flow through the project area where the solar field would be constructed. If it is decided that the off-area storm flows will be routed around the area (after detailed design and consultation with Nye County), flows would discharge to historic flow paths downstream of the area. If detention basins are required for storm flows from the solar field, they will be sized to meet current stormwater requirements.

No PWR 107 waters are located within the limits of the Proposed Area.

3.5.3.2.2 Alternative Area

Located directly north of the Proposed Area, the Alternative Area is also located at the foothills of the San Antonio Range where the land is primarily undeveloped desert rangeland. There is one potential existing ephemeral drainage path crossing into the Alternative Area at the eastern boundary.

No PWR 107 waters are located within the limits of the Alternative Area.

3.5.3.2.3 Borrow Pit

The borrow pit is located northwest of the project area location and just southeast of the intersection of Peavine Creek and SH 89. A culvert crossing under SH 89 conveys Peavine Creek's intermittent flow. An ephemeral reach branches from Peavine Creek upstream of SH 89 and passes through the borrow pit area.

No PWR 107 waters are located within the limits of the proposed borrow pit.

3.5.3.2.4 TL and Anaconda Moly Substation

Several existing ephemeral drainage paths from the San Antonio Range cross the proposed TL corridor. The ephemeral drainages cross in various locations starting at a point where the corridor turns east from SH 89 and continues along the existing TL to the Anaconda Moly Substation. None of these ephemeral washes reach Peavine Creek.

No PWR 107 waters are located within the limits of the proposed TL and substation corridor.

3.5.3.2.5 CESA

The ephemeral washes discussed above continue through the CESA, ending at the ephemeral Peavine Creek. No seeps and springs are located within the defined CESA.

Several PWR 107 waters are located within the surface water CESA. The closest PWR 107 is located approximately 4.5 miles northeast of the northeastern corner of the Alternative Area. Three are located just outside of the surface water CESA limits, approximately 6 miles southeast from the southeastern corner of the proposed site.

3.6 Air Quality

3.6.1 Area of Analysis

The area of analysis for air quality includes hydrographic subbasins 53, 139, and 153, which encompasses all of the Proposed Area, Alternative Area, borrow pit, and TL and Anaconda Moly Substation corridor. The CESA includes the same area.

3.6.2 Regulatory Framework

3.6.2.1 Federal Air Quality Regulations

The federal Clean Air Act of 1970 was the first comprehensive legislation aimed at reducing levels of air pollution throughout the country. The 1970 law required the EPA to establish National Ambient Air Quality Standards (NAAQS), which set maximum allowable concentrations for six criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, and lead, as shown in Table 3-17 and briefly described below.

Table 3-17. National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard	Secondary Standard
Carbon monoxide (CO)	1-hour	35 ppm[a]	NS[b]
	8-hour	9 ppm	NS
Nitrogen dioxide (NO_2)	1-hour	0.100 ppm[c]	NS
	Annual	0.053 ppm	0.053 ppm
Ozone (O_3)	8-hour (1997 standard)	0.08 ppm[d]	0.08 ppm
	8-hour (2008 standard)	0.075 ppm[d]	0.075 ppm
Particulate matter (PM_{10})	24-hour	150 μg/m^3 [e]	150 μg/m^3
Fine particulate matter ($PM_{2.5}$)	24-hour	35 μg/m^3	35 μg/m^3
	Annual	15 μg/m^3	15 μg/m^3
Sulfur dioxide (SO_2)	3-hour	NS	0.5 ppm
	24-hour	0.14 ppm	NS
	Annual	0.03 ppm	NS
Lead	Rolling 3-month average	0.15 μg/m^3	0.15 μg/m^3
	Quarterly	1.5 μg/m^3	1.5 μg/m^3

Source: 40 Code of Federal Regulations § 50
[a] parts per million
[b] no standard
[c] based on a 3-year average of the 98th percentile of the daily maximum 1-hour average
[d] based on a 3-year average of the 4th highest concentration
[e] micrograms per cubic meter

Carbon monoxide (CO) is a colorless, odorless gas resulting from the incomplete combustion of carbon-based fuels, including petroleum products. In most areas, vehicle emissions are the primary source of CO.

Nitrogen dioxide (NO_2) is a yellowish-orange to reddish-brown gas resulting from high temperature combustion. Diesel vehicles and power plants are major sources of NO_2.

Ozone (O_3) is produced through a complex chemical reaction in which precursor compounds, such as hydrocarbons and nitrogen oxides, are transformed by sunlight into O_3 molecules, which consist of three oxygen atoms. The primary sources for O_3 precursors are vehicle and industrial emissions.

Particulate matter (PM_{10} and $PM_{2.5}$) consists of suspended dust, fibers, combustion ash, and other fine particles. The major source is industrial emissions, but it also results from diesel vehicle emissions, unpaved roadways, agricultural activity, and mechanical resuspension on paved roads from vehicle activity.

Sulfur dioxide (SO_2) is a colorless gas with a rotten egg odor that results from the combustion of fuels containing sulfur. Primary sources are coal-fired power plants, industrial plants, and metals smelters, with some emissions from diesel vehicles burning low-grade fuels.

Lead in the atmosphere results primarily from the burning of leaded fuels; this type of pollution has been drastically reduced in the United States in recent years with the ban on leaded automobile fuels.

Amendments to the Clean Air Act were passed in 1977 and 1990. Among many revisions included in the amendments are requirements for nonattainment areas and State Implementation Plans for areas that do not meet the standards.

For most of the criteria pollutants, two standards have been established: a primary standard and a secondary standard. The primary standard was established with the goal of protecting public health, while the secondary standard is intended for the protection of the public welfare.

3.6.2.1.1 Class I Federal Lands

Class I federal lands consist of 156 national parks and wilderness areas across the country for which pristine air quality and visibility are protected. Regulations pertaining to Class I areas affect major projects within 100 kilometers (about 60 miles) of designated lands.

The nearest Class I areas to the project area are a series of national parks and wilderness areas in the Sierra Nevada of California, including Yosemite National Park, Kings Canyon National Park, John Muir Wilderness, and Ansel Adams Wilderness. The closest of these areas is approximately 90 miles (150 kilometers) from the project area, which is outside of the 100-kilometer regulatory threshold.

3.6.2.2 State Air Quality Regulations

Nevada has established state-specific ambient air quality standards, which are maintained by the NDEP. With a few exceptions, the Nevada standards mirror the NAAQS (NDEP 2010a). Notable differences in the two sets of standards, with the Nevada standard being more stringent than the NAAQS, are:

- hydrogen sulfide (0.08 parts per million [ppm], 1-hour average)
- a separate CO standard for elevations at or above 5,000 feet above sea level (6 ppm, 8-hour average)
- an 0_3 standard specific to the Lake Tahoe Basin (0.10 ppm, 1-hour average)

Recent changes in the NAAQS have made them more stringent than the state standards for several of the pollutants, specifically NO_2, O_3, lead, and $PM_{2.5}$.

3.6.2.3 Local Air Quality Regulations

The project area is located in the northwestern portion of Nye County, which regulates air quality in terms of dust control for construction areas; however, those regulations apply only in the Pahrump Regional Planning District in the southern portion of the county. There are no local air quality regulations applicable to the project area.

3.6.2.4 Potential Permits

The NDEP Bureau of Air Pollution Control issues several types of permits for construction and operation of projects (NDEP 2010a). The type of permit required depends on the project size and quantity of pollutant emissions expected from the project. Major sources—those generating more than 100 tons per year of any one regulated pollutant—require a Class 1 permit, while minor sources—those generating less than 100 tons per year of any one regulated pollutant—require a Class 2 permit. A third classification, a Class 3 permit, is available for small sources generating less than 5 tons per year in total regulated air pollutants. For construction activities, a Surface Area Disturbance permit is required if the total surface area disturbance is greater than 5 acres.

For the proposed project, a Surface Area Disturbance permit would be required for construction and either a Class 2 or Class 3 permit would be required for facility operation. The actual class of permit needed would be determined through modeling and dispersion of project-generated emissions.

3.6.3 Climate Change

Ongoing scientific research as identified the potential impacts of anthropogenic (i.e., man-made) greenhouse gas (GHG) emissions and changes in biological carbon dequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into spacel Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that "warming of the climate system in unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations."

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24°N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated thare are uncertainties regarding how climate changes may affect different regions. Computer model predictions indicate that increases in temperature would not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. Although large-scale spatial shifes in precipitation distribution may occur, these changes are more uncertain and difficult to predict.

As with any field of scientific study, there are uncertainties associated with the science of climate change. This does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documents trends (USEPA 2008).

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially CO_2 and methane) from fossil fuel development, large wildfires, and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs would have a sustained climatic impact over different temporal scales. For example, recent emissions of CO_2 can influence climate for 100 years.

It may be difficult to discern whether glocal climate change is already affecting resources in the proposed project area. In most cases, there is more information about potential or projected effects of global blimate change on resources. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change may not be measurably discernible within the reasonably foreseeable future.

3.6.4 Affected Environment

3.6.4.1 Regional Climate

The project area is located in the northwestern portion of Nye County in southwestern Nevada. The project area is situated at an elevation of approximately 5,000 feet above sea level and lies within a portion of the Great Basin Desert. Climate in the Great Basin Desert is characterized by hot summers, cold winters, and very low precipitation.

The nearest weather station to the project area is at the Tonopah Airport, approximately 15 miles southeast of the project area. Average daily maximum temperatures recorded at this station during the summer months range between 84°F and 91°F. Average minimum daily temperatures in the winter months range between 19°F and 24°F. Annual precipitation averages just less than 6 inches and is distributed throughout the year. Total annual snowfall averages about 13 inches, but accumulation is uncommon, as monthly snow depth averages 0 inches. A summary of average temperature and precipitation is presented in Table 3-18.

Table 3-18. Climate data for Tonopah Airport, Nevada (1971–2000)

Month	Average Daily Temperature (°F)[a]	Average Daily Maximum Temperature (°F)	Average Daily Minimum Temperature (°F)	Average Precipitation (inches)
January	32.1	44.4	19.8	0.47
February	37.1	49.8	24.3	0.56
March	42.4	56.1	28.7	0.62
April	49.0	63.8	34.1	0.46
May	57.8	73.3	42.3	0.62
June	67.4	84.2	50.5	0.33
July	73.6	91.0	56.2	0.47
August	71.5	88.5	54.5	0.68
September	63.8	80.1	47.4	0.51
October	52.5	68.0	37.0	0.40
November	38.5	51.7	25.3	0.43
December	32.2	44.9	19.5	0.35
Annual	51.6	66.5	36.7	5.90

Source: Western Regional Climate Center 2010b
[a] in degrees Fahrenheit

3.6.4.2 Proposed Area

The NDEP Bureau of Air Quality Planning maintains a network of air monitoring sites throughout most of Nevada, although Washoe and Clark counties conduct their own air quality monitoring. Monitoring sites vary in the extent and number of pollutants monitored, with some sites monitoring one pollutant and others monitoring several pollutants. Some of the monitoring sites operate for the entire year, while others operate for the peak pollutant season only.

There are no monitoring sites near the project area. The nearest monitoring sites to the project area are the Fallon Site, located at West End Elementary School in Fallon, approximately 110 miles northwest of the project area, and four sites located around Pahrump, approximately 155 miles southeast of the project area. The Fallon monitoring site collects data on O_3 only, while the Pahrump monitoring sites collect data on PM_{10} only. The Fallon site recorded 1 day above the 8-hour O_3 standard, and the Pahrump-Wilson Road site recorded 2 days above the 24-hour PM_{10} standard. Exceedances, however, are based on longer-term trends. For O_3, the standard is based on a 3-year average of the fourth-highest daily maximum 8-hour average concentration. For PM_{10}, the standard is not to be exceeded more than once per year on average over a 3-year period. There were no exceedances of either the 8-hour O_3 or the 24-hour PM_{10} standard at the Fallon or Pahrump monitoring sites. A summary of the concentrations monitored at these locations is presented in Table 3-19.

Table 3-19. 2008 air quality monitoring data

Monitoring Site	Pollutant	Averaging Time	Concentration		Number of Days Above Standard[a]	Number of Exceedances[a]
			Maximum	Fourth Highest		
Fallon[b]	O_3	8-hour	0.078 ppm[c]	0.068 ppm	1	0
Pahrump – Linda Street[d]	PM_{10}	24-hour	63 μg/m^3 [e]	57 μg/m^3	0	0
Pahrump – Red Butte[f]	PM_{10}	24-hour	126 μg/m^3	75 μg/m^3	0	0
Pahrump - Gamebird[g]	PM_{10}	24-hour	94 μg/m^3	74 μg/m^3	0	0
Pahrump – Wilson Road[h]	PM_{10}	24-hour	223 μg/m^3	119 μg/m^3	2	0

Source: U.S. Environmental Protection Agency 2010

[a] The National Ambient Air Quality Standards for ozone (O_3) and particulate matter (PM_{10}) are based on 3-year averages. The number of days above the standard column is for information only, because these data alone do not result in a violation. The number of exceedances column show violations of the standard.

[b] West End Elementary School, 280 South Russell Street, EPA Area ID 32-001-0002

[c] parts per million

[d] 8825 North Linda Street, EPA Area ID 32-023-0011

[e] micrograms per cubic meter

[f] 1500 Red Butte, EPA Area ID 32-023-0012

[g] 781 East Gamebird, EPA Area ID 32-023-0013

[h] 1020 East Wilson Road, EPA Area ID 32-023-0014

The Clean Air Act amendments of 1977 and 1990 authorized the EPA to designate areas that have not met the NAAQS as being in nonattainment and to classify the severity of the nonattainment. Each nonattainment area requires a State Implementation Plan that outlines the actions that will be taken to reduce air pollution to levels that achieve compliance with the NAAQS. This proposed project lies within an area that is designated as being in attainment for all of the NAAQS.

3.6.4.3 Alternative Area

Conditions for the Alternative Area are the same as for the Proposed Area.

3.6.4.4 Borrow Pit

Conditions for the borrow pit are the same as for the Proposed Area.

3.6.4.5 TL and Anaconda Moly Substation

Conditions for the TL and Anaconda Moly Substation are the same as for the Proposed Area.

3.6.4.6 CESA

Conditions for the CESA are the same as for the Proposed Area.

3.7 Cultural Resources

3.7.1 Area of Analysis and Methodology

The area of analysis, hereafter referred to as the area of potential effect (APE), includes the Proposed Area, Alternative Area, borrow pit, the TL, the Anaconda Moly Substation, and a 1-mile radius. Figure 3-1 shows the project area. A Class I cultural resource inventory was performed for the APE; a Class III survey was performed within the project area (proposed area, alternative area, TL, substation, and borrow pit).

The APE for Native American values includes the proposed project area, as well as the CESA, defined as the project viewshed. Steward (1938) documented that the *Wiyumahunovi* (buffalo berry water valley; Big Smoky Valley) was home to a Western Shoshone band called the *Wiymbitükanü* (buffalo berry eaters). The valley was a favored gathering area of the *Wiymbitükanü* and other Western Shoshone bands for seeds from the *hukümbi* and *töpoi* roots (both plants were unidentified by Steward). Big Smoky Valley is still home to descendents of the *Wiymbitükanü*, who are organized into a group called the Western Shoshone Descendents of the Big Smoky Valley.

The following is a brief description of the methods used to conduct the literature review and Class III cultural resources survey.

3.7.1.1 Literature Review

Information regarding previously documented cultural resources was obtained from the BLM TFO in Tonopah, Nevada; the online Nevada Cultural Resources Information System; BLM General Land Office plat maps and historic topographic and other maps accessed at the University of Nevada, Reno; Mary B. Ansari Map Library; and on the Nevada Bureau of Mining and Geology Web site. Data included previous cultural resource investigations and documented cultural resources. The literature review covered the area of analysis.

3.7.1.2 Survey

Intensive Class III cultural resource surveys were conducted within the project area , the results of which are reported in *A Cultural Resources Inventory for a Solar Development near Crescent Dunes, Nye County, Nevada* (Malinky and Harmon 2009) and *Crescent Dunes Extensions, Nye County, Nevada* (Risse 2010). The Malinky and Harmon (2009) survey encompassed the Proposed Area, borrow pit, TL, and Anaconda Moly Substation corridor; the Risse (2010) survey covered the Alternative Area. The purpose of fieldwork was to identify historic properties that might be adversely affected by this project. The surveys were conducted with 100 percent ground surface coverage within the area of analysis because of sparse vegetation. Survey crews employed parallel pedestrian transects spaced no more than 30 meters (100 feet) apart, except when expectations of finding cultural resources were high or ground surface visibility was compromised, in which case transects were spaced 15 meters (50 feet) apart. The cultural resource surveys were undertaken in June 2009 and February 2010.

Sites were documented using Intermountain Antiquities Computer System site forms and Nevada Short Forms, drawings, 35 mm photographs, and a portable Thales global positioning system receiver. Areas of cultural activity were intensively surveyed in transects spaced no more than 2 meters (6 feet) apart. Sites recorded over 10 years prior were revisited and the site forms updated.

3.7.1.3 Consultation

A Class III Cultural Survey Report was submitted to the Nevada State Historic Preservation Office (SHPO) in April 2010. On May 17, 2010, the SHPO concurred with the BLM determination regarding the eligibility of the historic properties within the proposed project area (Nevada SHPO 2010).

3.7.2 Definition of the Resource

A cultural resource is any definable location of past human activity identifiable through field survey, historical documentation, or oral evidence. Cultural resources include archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

For management purposes, cultural resources can be subdivided into prehistoric archaeological resources, historic resources, and traditional cultural properties (TCPs). Prehistoric archaeological resources are material remains of human activity that predate the written record, and are generally identified as artifacts, features, loci, sites, and districts. Historic resources consist of objects, artifacts, structures, buildings, and/or districts that can be associated with some aspect of history. A TCP is defined as:

> "a property eligible for inclusion in the National Register of Historic Places (National Register) for its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community." (Parker and King 1998)

A historic property is any prehistoric or historic district, site, building, structure, or object, included in, or eligible for inclusion in, the National Register maintained by the Secretary of the Interior. The term can also apply to TCPs.

3.7.3 Regulatory Framework

Because the proposed undertaking would involve public lands administered by BLM, it is subject to compliance with federal regulatory guidelines. Environmental laws applicable to this undertaking and involving cultural resources include NEPA, the National Historic Preservation Act, the American Indian Religious Freedom Act, and Executive Order 13007. The following is a brief overview of each legal authority.

3.7.3.1 NEPA

NEPA, as amended (42 USC 4371 et seq.), requires agencies to analyze the impacts of any federal undertaking on the environment, including both natural and cultural resources. With regard to cultural resources, NEPA stipulates that:

1) federal agencies must work to preserve important historical and cultural aspects of our national heritage [Section 101(b)(4)]
2) compliance studies involving historic properties require coordination with other preservation laws such as the National Historic Preservation Act

3.7.3.2 National Historic Preservation Act

The National Historic Preservation Act of 1966, most recently amended in 2006, specifically addresses the need to protect cultural resources. In particular, Section 106 requires that federal undertakings, defined as projects on federal land, receiving federal funding, or requiring federal approval, license, or permit, must identify, manage, and take into consideration the potential effects an undertaking may have on historic properties. Federal agencies also must allow the Advisory Council on Historic Preservation an opportunity to comment on such actions.

To be eligible for inclusion in the National Register, properties must be important in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the following four criteria:

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

Properties may be of local, state, or national importance. Typically, historic properties are at least 50 years old, but younger properties may be considered for listing if they are of exceptional importance.

In accordance with Section 106 regulations, the lead federal agency is required to initiate the Section 106 review process and consult with all interested parties, such as the SHPO, the Advisory Council on Historic Preservation, and Native American tribes. Because the Nevada BLM has been designated the lead agency, it is responsible for identification, evaluation, and provision of management recommendations for historic resources within the project area of potential effects; determination of the project's effect(s) on those historic resources; and determination and subsequent implementation of mitigation measures, if applicable.

3.7.3.3 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 is a joint resolution passed by Congress (Public Law 95-341) to protect and preserve Native Americans' inherent right of freedom to believe, express, and exercise their traditional religions, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites. The American Indian Religious Freedom Act requires that agencies consider impacts on Native American religious places and practices through consultation with tribes see Chapter 3.8 Native American Religious Concerns for consultation information and results.

3.7.3.4 Executive Order 13007

Alternately referred to as "Indian Sacred Sites," this EO requires that federal agencies: (1) accommodate access to and ceremonial use of Indian sacred sites (as long as access does not compromise federal law or essential agency functions); (2) avoid adverse effects to the physical integrity of sacred sites; (3) as appropriate, maintain confidentiality of the location of such sites; and (4) implement procedures to execute the order (such as consultation).

3.7.4 Affected Environment

3.7.4.1 Environmental Setting

The project is in Big Smoky Valley in south central Nevada. This region is part of the Great Basin, which falls within the larger basin and range physiographic province that extends from southeastern California through Nevada, into western Utah, southern Arizona, and northwestern Mexico. Elevations within the project area range from 4,760 to 5,380 feet above mean sea level. Average annual precipitation in Big Smoky Valley is less than 10 inches.

Geological formations within the APE can be characterized as Quaternary and Tertiary alluvial, colluvial, and talus deposits predominantly consisting of fluviate gravels in the bajada areas grading into fluviate and lacustrine sand and silt in the valleys, and including eolian (wind-blown) and playa deposits (Kleinhampl 1985). Soils generally consist of coarse-textured loamy fine sand, fine sandy loam, and gravelly sand.

The APE flora mostly consists of a mixed desert salt shrub vegetation community dominated by shadscale and other *Atriplex* spp. Other vegetation in the area may include Bailey's greasewood, winter fat, bud sage, Nevada joint-fir, Indian rice grass, bottlebrush squirreltail, and galleta (see Section 3.2, Vegetation). Fauna include waterfowl such as grebes, cormorants, herons, and egrets, which exploit the wetlands of Mud Lake; falconiform birds such as vultures, hawks, falcons, and eagles; and game birds like the Gambel's quail, which occupy the uplands. Mammals include the coyote, kit fox, gray fox, ring-tailed cats, badger, striped skunk, bobcat, deer, pronghorn, bighorn sheep, and lagomorphs and rodents (rabbits, mice, gophers) (see Sections 3.3, Wildlife, and 3.4.2, Special Status Wildlife Species).

3.7.4.2 Cultural Setting

Past occupation in this region can be subdivided into four distinct periods: Pre-Archaic (9000–6000 BC), Early Archaic (6000–2500 BC), Middle Archaic (2500 BC–AD 700), and Late Archaic (AD 700–1850). Following are brief descriptions of each period.

3.7.4.2.1 Pre-Archaic

Two lithic traditions developed during the late Pleistocene/Early Holocene period: the Fluted Point Tradition (Clovis and Folsom) and the Stemmed Point or Western Pluvial Lakes Tradition. The Fluted Point Tradition consists of lanceolate projectile points with longitudinal flake scars, termed "fluting." In the Great Basin, these sites are often located around extinct Pluvial lakes (Faught and Freeman 1998). These types of points are most commonly found in isolated contexts or in surficial scatters consisting of multiple temporal components. Fluted points have been documented in the southern end of Big Smoky Valley, as well as Lake Tonopah, Mud Lake, and in Long and Jake's Valleys. The ephemeral contexts of these sites suggest that the Fluted Point Tradition represented a more nomadic lifestyle.

Stemmed Point artifact assemblages consist of edge-ground, stemmed, and non-notched lanceolate projectile points, lanceolate knives, and scrapers, crescents, and possibly core-blades and burins. Stemmed points have been recorded in the Sunshine Locality in Long Valley and Lake Tonopah at the southern end of Big Smoky Valley (Beck and Jones 1997; Grayson 1993). Unlike the Fluted Point Tradition, Stemmed Point Tradition sites indicate more long-term occupation of the region.

3.7.4.2.2 Early Archaic

This period is characterized by large side-notched projectile points, large concave-based Triple-T and Humboldt Series points, and Pinto Series points. During the Early Archaic, ground stone tools are more commonplace, suggesting an increase in reliance on wild plant foods. Changes in the Middle Holocene paleoclimate, which experienced a warming trend accompanied by drier conditions, likely influenced a migration of populations to areas outside the region.

3.7.4.2.3 Middle Archaic

During the Late Holocene, however, sites increased significantly, as did the general population in the Great Basin region (Mabry 1998). Site types representing more varied activities are found, such as assaying stations, kill and butchering sites, plant gathering, food processing, and rock art sites. Point types that date to this period include Gatecliff, Humboldt, Pinto, and Elko Series. A more diversified ground stone tool assemblage, including manos, metates, mortars, and pestles, is found during the Middle Archaic. By AD 500, the appearance of pit houses, surface masonry structures, and ceramics indicates regional occupation in southern and far eastern Nevada by the Fremont culture.

3.7.4.2.4 Late Archaic

Prehistoric occupation dating to the early part of the Late Archaic is most widely identified by the presence of Rosegate Series projectile points, including the Rose Springs and Eastgate varieties. This point type signifies the evolution of the hunting strategy from atlatl and dart to bow and arrow. Quarrying, butchering, shelter, and habitation sites are most common during the first half of this period.

From AD 1300 to 1850, pre-contact sites are characterized by Desert Series points and Intermountain Brownware pottery. Following European contact, sites generally contain Euroamerican or aboriginal artifacts, and often a combination of the two. Mining-related sites are probably most common in the Big Smoky Valley, although wagon trails, stage lines, farms or ranches, and homesteads are other site types found in the region.

3.7.4.3 Summary of Findings

The cultural resource inventories conducted by Malinky and Harmon (2009) and Risse (2010) resulted in the documentation of 142 sites (Table 3-20). The majority of the sites (78) are prehistoric, 59 are historic, and 5 are multicomponent (evidencing both prehistoric and historic use). The prehistoric sites generally can be characterized as small (less than 50 artifacts), surficial lithic scatters with no associated features. Historic sites consist of mining features—a prospecting pit and a claim post, small trash scatters, and one road segment. Only 13 sites—all prehistoric lithic scatters—qualify as historic properties. All are recommended National Register eligible under Criterion D for their potential to provide information regarding lithic technology and chronology in the Big Smoky Valley region. The prevailing site types suggest that both prehistoric and historic activity in this region can be characterized as short term, involving lithic reduction in the case of prehistoric peoples, and during the historic period, prospecting for mineral deposits.

Table 3-20. Summary of cultural resource site types, by area

Area	Site Types						Total Sites
	Prehistoric		Historic		Multicomponent		
	Eligible[a]	Not Eligible[a]	Eligible	Not Eligible	Eligible	Not Eligible	
Proposed Area	4	35	0	10	0	1	50
Alternative Area	9	30	0	49	0	4	92
Borrow pit	0	0	0	0	0	0	0
Transmission line and Anaconda Moly Substation	0	0	0	0	0	0	0
Total	**78**		**59**		**5**		**149**

[a] describes National Register of Historic Places status

3.7.4.4 Proposed Area

Refer to Table 3-20 for a summary of cultural resources in this area.

3.7.4.5 Alternative Area

Refer to Table 3-20 for a summary of cultural resources in this area.

3.7.4.6 Borrow Pit

Refer to Table 3-20 for a summary of cultural resources in this area.

3.7.4.7 TL and Anaconda Moly Substation

Refer to Table 3-20 for a summary of cultural resources in this area.

3.7.4.8 <u>CESA</u>

During the tribal consultations, no traditional cultural properties were identified in the CESA (Section 3.8).

3.8 Native American Religious Concerns

3.8.1 Area of Analysis and Methodology

The area of analysis, hereafter referred to as the project area, includes the Proposed Area, Alternative Area, borrow pit, and the TL and Anaconda-Moly Substation corridor as shown in Figure 3-1. Considering BLM has limited knowledge of any past or contemporary traditional or cultural uses, resources, or activities within the immediate and surrounding area, and considering that consultation is ongoing, a BLM-proposed CESA is defined as the Tonopah Flat (137A) Hydrographic Basin of the Big Smoky Valley watershed (see Figure 2-15). Given the limited water sources in the region, traditional/cultural activities most likely would have been concentrated around such locations.

Approximately 30 springs and seeps were identified around the boundary of the Tonopah Flat subarea. Most springs identified by WorleyParsons are located in bedrock areas, with the closest springs and seeps located more than 10 miles from the Project (WorleyParsons 2010a).

This BLM-proposed CESA boundary may be altered by participating tribal entities throughout the course of Native American consultation and as further input is received.

3.8.2 Definition of the Resource

Given past and present tribal participation in various projects and proposals throughout lands administered by BLM in Nevada, the following are examples of traditional or cultural resources, activities, and sites of concern considered sacred or detrimental to the continuation of family and community traditions, beliefs, and lifeways: prehistoric and historic habitation sites, sources of water (hot and cold springs), pine nut gathering locations, firewood harvesting locations, sites of ceremony and prayer, certain prehistoric and ethno-historic archaeological sites, gravesites, “rock art” sites, medicinal/edible plant gathering locations, areas and features associated with creation stories, tribally designated traditional cultural properties (TCPs), and tribal land acquisition efforts involving Congressional delegations.

3.8.3 Regulatory Framework

In accordance with the National Historic Preservation Act (P.L. 89-665), NEPA (P.L. 91-190), FLPMA (P.L. 94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601), and EO 13007, BLM must provide affected tribal governments, traditional leaders, and lineal descendants an opportunity to comment and consult on the proposed project.

These laws and other mandates and directives, such as BLM’s Manual Handbook H-8120-1, need to be considered when identifying and evaluating the significance of, considering impacts to, and developing treatment plans for specific sites, activities, or resources of traditional or cultural importance within the Native American Religious Concerns area of analysis and CESA boundary.

3.8.4 Affected Environment

3.8.4.1 Environmental Setting

Although a significant distance from the project area, known locations (to BLM) of cultural or traditional significance within the general region are: Darrough's Hotspring, Blue Spring, and other spring complexes in central Big Smoky Valley; Peavine Canyon in the Southern Toiyabe Range; Indian Allotment lands throughout central and northern Big Smoky Valley; cemeteries; Toiyabe and Toquima Range pine nut harvesting sites; "Wiam" or "Buffalo Berry Trees" of central Big Smoky Valley; and Toquima Cave.

Steward (1938) documented that the *Wiyumahunovi* (buffalo berry water valley; Big Smoky Valley) was home to a Western Shoshone band called the *Wiymbitükanü* (buffalo berry eaters). The valley was a favored gathering area of the *Wiymbitükanü* and other Western Shoshone bands for seeds from the *hukümbi* and *töpoi* roots (both plants were unidentified by Steward). Big Smoky Valley is still home to descendents of the *Wiymbitükanü,* with many having organized into a group called the Western Shoshone Descendents of the Big Smoky Valley.

3.8.4.2 Summary of Findings

BLM's TFO initiated consultation by providing the project proposal description and location (with attached maps) by mail on March 8, 2010, to the Timbisha Shoshone Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Descendants of Big Smoky Valley, and various other family members known to have interests in the Tonopah and/or Big Smoky Valley areas. Following the initial mailing, multiple communications or coordination occurred (e-mails, telephone calls, meetings, and site visits), with BLM requesting input and extending field visit and meeting invitations. Of the tribal entities contacted, the Timbisha Shoshone Tribe, Descendants of Big Smoky Valley, and, more recently, the Yomba Shoshone Tribe have expressed the most interest and have requested further participation.

On April 7, 2010, the TFO and Timbisha Shoshone Tribe participated in a field visit to the project site. On June 8, 2010, the TFO conducted a status update meeting with the Timbisha Shoshone Tribe in Beatty, Nevada. In addition the BLM conducted a field tour and meeting with representatives of the Yomba Shoshone Tribe, no special concerns were raised by the tribe. BLM continues to provide opportunities for tribal participation through the EIS analysis.

As a result of recent communications and coordination, the following are issues and concerns given to date by participating tribal entities: potential impacts to water sources and avoidance of identified cultural resources, further tribal participation (monitor or observer opportunities) during implementation of a cultural resources treatment plan (data recovery) and/or during new surface disturbance associated with construction activities, general concerns about possible impacts to older sites along the "old lakeshore" or sites that might exist within the dunes (Crescent Dunes), maintenance of existing access routes, possibly damage to solar panels from vandalism, and cultural resource site inspections to ensure construction employees avoid known sites.

3.8.4.3 CESA

It is believed that cultural resources—including tribal resources and sites of cultural, traditional, and spiritual use and associated activities—are increasingly in danger of losing their physical and spiritual integrity. As populations grow and technology advances, public interest in using lands administered by BLM increases and, thus, the potential for the decline of culturally sensitive areas also increases. Different world views and social and spiritual practices and beliefs often conflict with each other.

As told by previous tribal participants, perhaps the leading contributors affecting cultural properties and traditional resources have been historic and modern mining, livestock grazing, cheat grass invasion, catastrophic wildfires, impacts to water sources, drought, and the general growth of populations and public use or interest in areas once considered remote.

Considering BLM has limited knowledge of any past or contemporary traditional or cultural uses, resources, or activities within and adjacent to the project boundary, a CESA has been defined as the Tonopah Flat (137A) Hydrographic Basin of the Big Smoky Valley watershed (see Figure 2-15). Given the limited water sources in the Tonopah area, traditional or cultural activities most likely would have been concentrated near water sources. This tentative BLM determination has been presented to tribal participants for concurrence, further analysis, and identification of any specific inclusions.

As stated earlier, known locations (to BLM) of any cultural or traditional significance within the general region are: Darrough's Hotspring, Blue Spring, and other spring complexes in central Big Smoky Valley; Peavine Canyon; cemeteries; Indian Allotment lands throughout central and northern Big Smoky Valley; Toiyabe and Toquima Range pine nut harvesting locations; "Wiam" or "Buffalo Berry Trees" of central Big Smoky Valley; and Toquima Cave. Because of significant distances, project activities are not expected to affect the properties noted above.

In addition to all the existing, growing, and developing uses of the public lands, renewable energy development (geothermal, wind, and solar) may contribute to the regional decline of cultural or traditional use sites, resources, and associated activities. However, contributions of this specific Proposed Action are expected to be minimal because most of the proposed activities currently appear to be located within an area of little past or contemporary use or significant usable resources.

3.9 Land Use and Access

This section provides an overview of the existing and future land use and public access in the project area. It includes a description of the area of analysis and methodology and analyzes the project in relation to property ownership, land use plans, policies, authorizations, and access issues.

3.9.1 Area of Analysis and Methodology

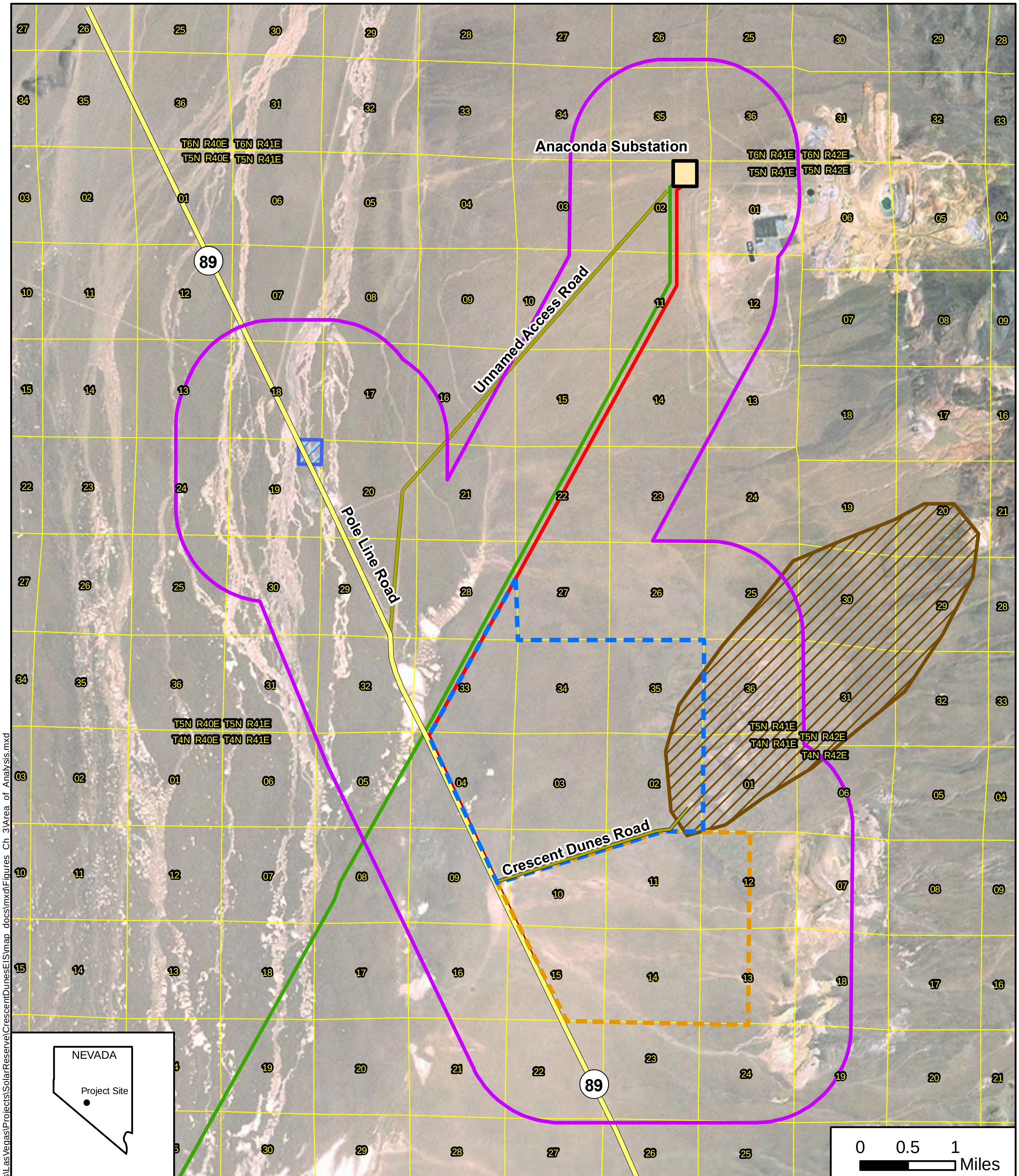
The area of analysis for land use and access of the proposed project includes the Proposed Area, Alternative Area, borrow pit, and TL and Anaconda Moly Substation corridor (Figure 3-1). The CESA varies by resource area within this EIS. For land use and access, it includes a 1-mile buffer surrounding each of these four identified areas (also see Figure 3-13). The land use and access evaluation methodology involved a review of related data of county, state, and federal land use plans, as well as master title plats, geothermal plats, oil and gas plats, land use plats, and other land records available at BLM's Nevada State Office in Reno and the Carson City Field Office. Data were also collected through analysis of aerial photography, field verification, and coordination with County staff. Individuals from BLM were contacted, and the BLM Legacy Rehost (LR2000) database was used to verify land use and ROW resources on BLM land within the area of analysis. The data were compiled to assess potential land use impacts from the construction, operation, and maintenance of the proposed project.

3.9.2 Regulatory Framework

The primary legal basis for granting a land-use authorization for this proposed project on BLM land is Section 501 of the FLPMA. Under the FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew ROWs over, upon, or through such land for utility corridors, roads, trails, highways, railroads, canals, etc (43 CFR 2800). The FLPMA provides BLM with authority to issue leases and permits for the use, occupancy, and development of public land. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920. Relevant federal, state, regional, and local land use plans, goals, policies, and objectives are discussed below.

3.9.2.1 BLM Tonopah RMP and ROD (1997)

The BLM Tonopah RMP provides a comprehensive framework for managing approximately 6.1 million acres of public lands administered by the Tonopah Field Station of the BLM Battle Mountain District (BLM 1997). The RMP lands and ROWs objective is to make lands available for community expansion and private economic development and to increase the potential for economic diversity. Lands within the Tonopah Planning Area will be open to consideration for linear or areal ROWs, leases, and land use permits where there are no unresolvable conflicts with other resource values. Any such grants, leases, or permits will include appropriate stipulations to protect the area's special values. Land use lease or permit applications are addressed on a case-by-case basis, where consistent with other resource management objectives and local land uses.



Legend

N

- CESA One Mile Buffer
- Alternative Area
- Proposed Area
- Local Road
- State Highway
- Substation
- Proposed Transmission Line (138kV)
- Existing Transmission Line (120kV)
- Borrow Pit (40 acres)
- Rights-of-way avoidance areas (Crescent Dunes SRMA)

Figure 3-13 Land-Use Area of Analysis and CESA

Crescent Dunes Solar Energy Project

Aerial Source: ESRI 2010

3.9.2.2 Nye County Comprehensive Plan

Use of privately owned lands in the project area is planned and regulated by Nye County. The *Nye County Comprehensive Plan* (Nye County Board of Commissioners 1994, amended 2010) was developed to act as a guide to the Nye County Board of Commissioners on all matters of growth and development. This guidance is accomplished by establishing goals and objectives that address countywide issues and concerns and implementing policies and programs to accomplish the objectives. The plan also serves as a framework for local land use plans and other growth management mechanisms. The federal government owns and manages certain parcels of land within Nye County and has the ability to acquire additional lands pursuant to Article I, Section 8, Clause 17 of the U.S. Constitution and Chapter 328 of the NRS. Nye County is in the process of creating a Federal Lands Element of the Comprehensive Plan to develop goals, objectives, and policies for federal lands within Nye County.

It is Nye County's objective to:

- protect the health, safety, and welfare of its residents
- enhance their economic opportunities
- preserve their quality of life

3.9.3 Affected Environment

3.9.3.1 Land Ownership Status and Existing Land Use

Two major categories of land ownership were identified: federal lands administered by BLM and privately held land (Figure 3-13).

Existing land use conditions in the area of analysis are characterized primarily by open desert, utility corridors and facilities, grazing allotment, recreation, and transportation and access. BLM administers the vast majority of land in the proposed project area through the TFO. BLM grants land use authorizations that allow private entities to use public lands for specific purposes. According to the Tonopah RMP (BLM 1997), the area of analysis for the proposed project is subject to the following authorizations or restrictions (Figure 3-13):

- San Antone grazing allotment (covers entire area of analysis) (for additional information see Section 3.14, Range Resources)
- a ROW avoidance area (Classification 2—other),
- off-highway vehicle restriction (limited to existing roads and trails and closed to competitive events)
- visual resource management (Class 4) (covers entire area of analysis)
- a utility corridor
- mineral leasing restrictions (no surface occupancy)
- avoidance of Crescent Sand Dunes (Special Resource Management Area [SRMA])

In addition, based on a data search within BLM's GeoCommunicator (BLM 2010b), the area of analysis and the CESA are all contained within a DOD Airspace Consultation Area. This is an important BLM coordination requirement for wind, solar, and communication development projects. Since the proposed project is within this area, consultation with the DOD would be required. The U.S. Air Force is a Cooperating Agency on the EIS, and consultation with DOD has occurred throughout the process (see Chapter 5).

Based on a data search within BLM's LR2000 (BLM 2010c) and Mining Claim Geographic Report (BLM 2010d), a variety of leases, easements, and ROWs have been granted by BLM within the area of analysis (Table 3-21).

3.9.3.1.1 Proposed Area

This area consists entirely of lands administered by BLM. In addition to the universal land use authorizations mentioned previously that cover this entire area, Table 3-21 lists specific land uses authorized by BLM.

Table 3-21. Authorized and pending BLM ROWs within the Proposed Area, Borrow Pit, and TL Corridor

Area of Analysis	U.S. Bureau of Land Management Serial Number	Status	Description
Proposed Area	N-086292	Pending	Crescent Dunes Solar Energy Project, by Tonopah Solar Energy, LLC
Proposed Area	N-88207	Authorized	Section 302 FLPMA permit, by Tonopah Solar Energy, LLC (meteorological tower)
TL Corridor	N-87933	Pending	Crescent Dunes Solar Energy Project, by Tonopah Solar Energy, LLC, 230 kV TL
TL Corridor	N-33242	Authorized	Sierra Pacific Power Company, 120 kV TL, Expires 12/29/2011
TL Corridor	N-043264	Authorized	Sierra Pacific Power Company, 55 kV TL, in perpetuity
Borrow Pit	N-88525	Authorized	Crescent Dunes Solar Energy Project, by Tonopah Solar Energy, LLC, Temporary Geotechnical Studies Permit

3.9.3.1.2 Alternative Area

This area consists entirely of lands administered by BLM. In addition to the universal land use authorizations mentioned previously that cover this entire area, Table 3-22 lists specific land uses authorized by BLM.

Table 3-22. Authorized and pending BLM ROWS within the Alternative Area

Area of Analysis	U.S. Bureau of Land Management Serial Number	Status	Description
Alternative Area	N-086292	Pending	Crescent Dunes Solar Energy Project, by Tonopah Solar Energy, LLC
Alternative Area	N-033242	Authorized	Right-of-way (ROW) – power transmission, by Sierra Pacific Power Company (now NV Energy)
Alternative Area	N-040052	Authorized	ROW – water facility, by federal government
Alternative Area	N-88177	Authorized	ROW – test well for Crescent Dunes Solar Energy Project, by Tonopah Solar Energy, LLC

3.9.3.1.3 Borrow Pit

This area consists of lands administered by BLM. In addition to the universal land use authorizations mentioned previously that cover this entire area, Table 3-23 lists specific land uses authorized by BLM.

Table 3-23. Authorized and pending BLM ROWs and mining claims within the borrow pit area

Area of Analysis	U.S. Bureau of Land Management Serial Number	Status	Description
Borrow pit	NVN 059045	Expired	Mineral materials (negotiated all), by Larson Construction
Borrow pit	NVN 077836	Authorized	Government free use mineral (all), by Nye County Road Department
Borrow pit	NMC1010435 (MW-13)	Active	Mining claim – Chris Gibson, Fredrick Gibson, Jan Lamb, Sue Latta, John Rud, Rod Sipes, Lorin Stieff, and Jeff Summerer
Borrow pit	NMC1010433 (MW-11)	Active	Mining claim – Chris Gibson, Fredrick Gibson, Jan Lamb, Sue Latta, John Rud, Rod Sipes, Lorin Stieff, and Jeff Summerer

3.9.3.1.4 TL and Anaconda Moly Substation

The area proposed as a TL corridor is located on lands administered by BLM (Figure 3-13). However, this area is immediately adjacent to an authorized power/transmission ROW grant to NV Energy by BLM (ROW number NVN 033242).

The area proposed for the Anaconda Moly Substation area is located on lands owned by Sierra Pacific Power Company (now doing business as NV Energy) and is classified as Nye County Planning Department land use code 700, Centrally Assessed Public Utility (Nye County Board of Commissioners 1994). This area is currently used for a power conversion facility.

3.9.3.1.5 CESA

This area includes a 1-mile buffer surrounding the area of analysis (each of the four previously identified areas). Therefore, it includes both public (BLM-administered) and private (NV Energy) lands (Figure 3-14).

In addition, a 3,000-acre natural dune area (Crescent Sand Dunes) is located just east of the Proposed and Alternative Area boundaries. These dunes have been designated by BLM as an SRMA, and any new or amended ROW within this area would have to be compatible with the special values of this area. This area is also closed to competitive recreational events to protect sensitive resources such as threatened and endangered species and cultural resources.

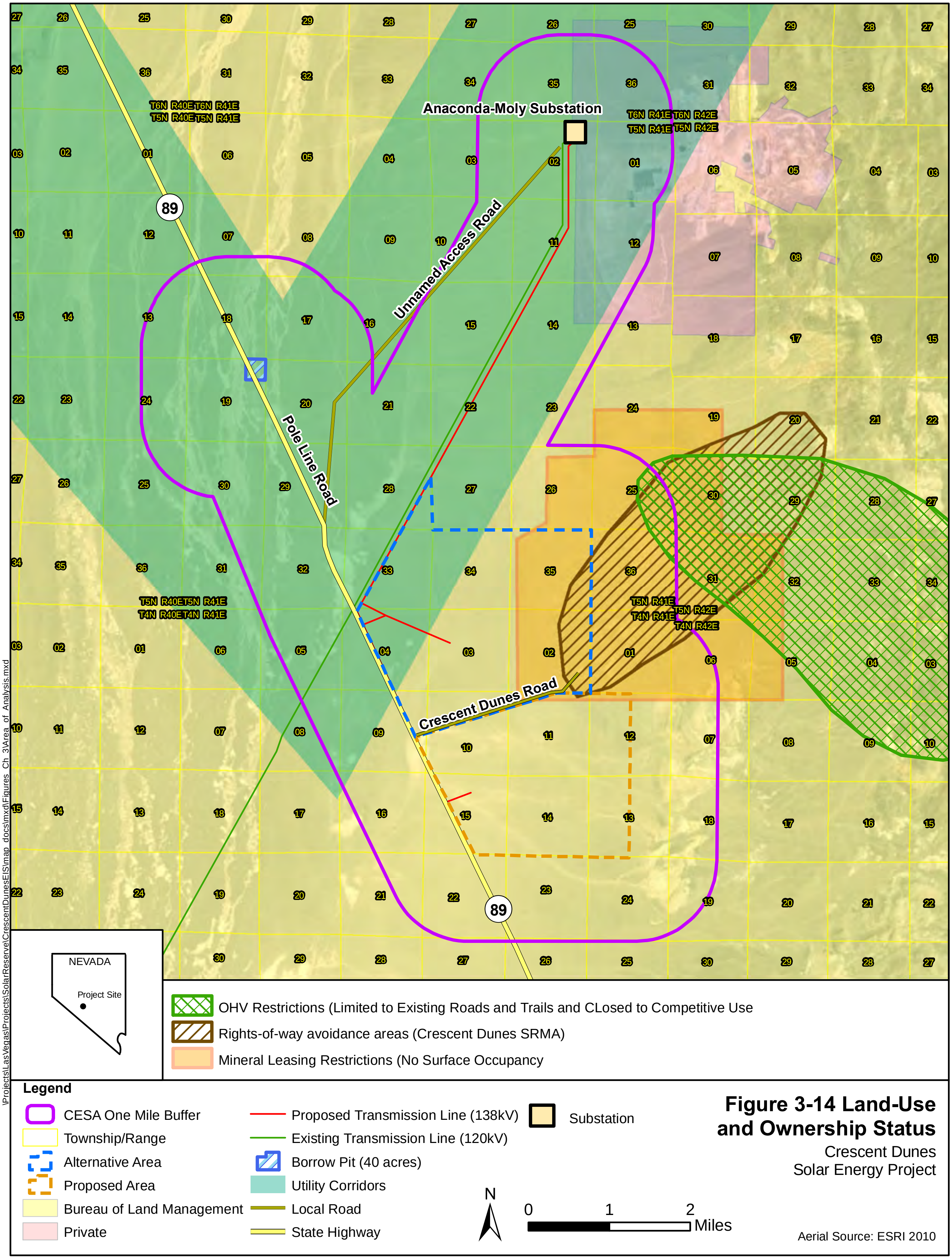


Figure 3-14 Land-Use and Ownership Status

Crescent Dunes Solar Energy Project

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3.9.3.2 Access

Access to the proposed project would be provided from SH 89 (Pole Line Road) (Figure 3-14). Pole Line Road is a Nye County owned and maintained road near the proposed project and is asphalt surfaced from its intersection with US 6/95 and continues north of the proposed project area. A short section of Pole Line Road from its intersection with US 6/95 to a location south of the proposed project area is in Esmeralda County. This section of Pole Line Road, although located in Esmeralda County, is maintained by Nye County through the terms of a formal agreement. According to Nye County representatives, the existing paved surface of Pole Line Road is between 24 and 28 feet wide.

3.9.3.2.1 Proposed Area

Access to the project site would be along a new access road that would be created from Pole Line Road. It would be a paved, two-lane road constructed with adequate width for two directions of travel and shoulders. Access to the new road would be restricted to authorized project personnel during construction and operation. Additionally, unpaved roads would be constructed from the power block to the edges of the solar field.

The main access road to Crescent Dunes is Crescent Dunes Road. This road currently exists along the northern border of the Proposed Area. This unpaved road provides vehicle and recreational access to the Crescent Sand Dunes SRMA. No other trails or roads are present within the Proposed Area.

3.9.3.2.2 Alternative Area

Access to each of the project sites would be along new access roads that would be created from Pole Line Road. The roads would be paved, two-lane roads constructed with adequate width for two directions of travel and shoulders. Access to the new road would be restricted to authorized project personnel during construction and operation. Additionally, unpaved roads would be constructed from the power block to the edges of the solar field.

Crescent Dunes Road currently exists along the southern border of the Alternative Area. This unpaved road provides vehicle and recreational access to the Crescent Sand Dunes SRMA. No other trails or roads are present within the Alternative Area.

3.9.3.2.3 Borrow Pit

Access to the borrow pit is directly provided from Pole Line Road, and no changes to this access are anticipated.

3.9.3.2.4 TL and Anaconda Moly Substation

Primary access to the TL would be from Pole Line Road and from an existing maintenance road along an existing TL corridor. Direct access to TL towers would occur along short spurs off of the main road. Access to the Anaconda Moly Substation would originate from Pole Line Road and head north-northeast on an unnamed paved TL access road as indicated in Figure 3-14. Public access to these roads would not change.

3.10 Soils

3.10.1 Area of Analysis and Methodology

The areas of analysis for soils are the Proposed Area, Alternative Area, borrow pit, and TL and Anaconda Moly Substation corridor (Figure 3-1). Soils were identified and mapped for the areas of analysis as stipulated by the data adequacy standards. The CESA for soils consists of the area within a 5-mile radius of the project areas and proposed facilities. Identification and mapping of soils for the CESA was not stipulated by the data adequacy standards and was not performed.

The primary source of information for soils was obtained from the NRCS online Web Soil Survey, which was accessed to obtain the soils data presented herein (NRCS 2009). The specific soil survey represented by the soil data obtained through the Web Soil Survey is the Soil Survey of the Big Smoky Valley Area, Nevada, Part of Nye County. Information related to the principal soil orders and dominant suborders as provided by BLM in the data adequacy standards is also used.

As used in this section of the EIS document, the term "soil" refers to the naturally weathered geologic sediments existing in layers or horizons of minerals and/or organic constituents of variable thickness, which differ from the geologic parent material (rock) in their morphological, physical, chemical, and mineralogical properties as well as their biological characteristics.

NRCS identifies and delineates soils into units with the objective of separating the landscape into segments with similar use and management requirements. This provides information sufficient for the development of resource plans. On-site investigations are required to precisely define and locate soils and evaluate their various physical, chemical, and engineering characteristics. Soils within the areas of analysis are described based on ten factors stipulated by the data adequacy standards, including soil series name, texture, permeability, pH, available water capacity, hydrologic group, wind and water erosion hazard, landscape position, depth to bedrock, and suitability as topsoil for reclamation. This information is presented separately for each detailed study area below.

3.10.2 Regulatory Framework

3.10.2.1 <u>NPDES</u>

NDEP administers EPA regulations (55 CFR 47990) that require permitting of stormwater-generated pollution under the NPDES. Pursuant to these EPA regulations, a General Permit under the NPDES Stormwater Program must be obtained for all construction activities affecting areas of 5 acres or greater. The General Permit requires implementation of Best Management Practices (BMPs) to reduce pollutant loads into the waters of the state.

3.10.2.2 <u>Nevada BMPs</u>

Use of BMPs in Nevada is addressed in the Handbook of Best Management Practices published by the State of Nevada Environmental Commission (1994), which references two definitions of BMPs—the EPA definition and the NAC definition. EPA defines BMPs as "methods, measures, or practices to prevent or reduce water pollution, including but not limited to, structural and non-structural controls, operation and maintenance procedures and scheduling and distribution of activities." NAC 445.200 defines "Best Practices" as "measures, methods, or operation or practice that are reasonably designed to prevent, eliminate, or reduce water pollution from diffuse sources and that are consistent with the best practices in the particular field under the conditions applicable" and states that this term is intended to be equivalent to the term "best management practices" as used in federal laws and regulations.

Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

3.10.3 Affected Environment

3.10.3.1 <u>Geologic Overview</u>

A brief summary of geologic information is provided here.

The areas of analysis are located in the southern portion of Big Smoky Valley known as the Tonopah Flat Subarea in northern Nye County, Nevada. This area is located near the center of the Great Basin Section of the basin and range physiographic province. The valley is surrounded to the north by the Toiyabe and Shoshone ranges, to the south by Lone Mountain and the Silver Peak Range, to the east by the San Antonio Range, and to the west by the Royston Hills and Monte Cristo Range. Uplift exhibited by the present-day mountain ranges was caused by Cenozoic Era basin-and-range faulting that reached great magnitude during the middle to late Tertiary Period and continues to the present. The floor of Big Smoky Valley consists of alluvial sediments derived from the surrounding mountains and is internally drained. Margins of the valley include alluvial fans, talus slopes, and pediments. Wind action has affected the intermontane valleys and resulted in deflation basins (blowouts) and sand accumulations in the form of solitary dunes and dune fields.

Geologic materials present in the project region vary greatly and include Paleozoic to Tertiary rocks and Tertiary to Quaternary sediments. These geologic materials are briefly summarized below.

- Paleozoic Sedimentary and Metamorphic Rocks
- Cretaceous Granitic Rocks
- Tertiary Intrusive and Extrusive Rocks
- Tertiary Sedimentary Rocks
- Quaternary and Tertiary Sediments

Based on the geologic map covering the project area and surrounding areas, geologic material exposed at the surface of all four areas of analysis consists of Alluvium, Colluvium, and Talus described as Quaternary and Tertiary deposits predominantly consisting of fluviate gravels flanking mountains, grading into fluviate and lacustrine sand and silt in valleys, and including eolian (wind-blown) and playa deposits. The estimated thickness of alluvium is about 1,500 to 3,000 feet beneath western portions of the areas of analysis (WorleyParsons 2010a). The thickness of alluvium is expected to thin to the east where the areas of analysis approach the foothills and flanks of the San Antonio Mountains.

3.10.3.2 Soil Characteristics

Entisols are the principal soil order and psamments are the dominant soil suborder at the proposed project area. Soils are dominated by relatively coarse-textured soils including loamy fine sand, fine sandy loam, fine sand, and gravelly sand, which support important vegetation communities adapted to the arid climate. The potential for soil displacement by water is low, but by wind action is high. These soils are easily displaced by wind if vegetative cover is removed. If there is an increase in soil movement because of a loss of vegetation, resultant cumulative impacts on adjoining vegetation communities and modification in the structure and productivity of the soils can occur, including short- and long-term, direct and indirect effects.

Specific NRCS soil types present at each area of analysis and their respective characteristics, including soil series name, texture, permeability, pH, available water capacity, hydrologic group, wind and water erosion hazard, landscape position, depth to bedrock, and suitability as topsoil for reclamation, are presented in Tables 3-24 through 3-27 and illustrated in Figures 3-15 through 3-18, by area of analysis.

Table 3-24. NRCS soil types and evaluation criteria for the Proposed Area

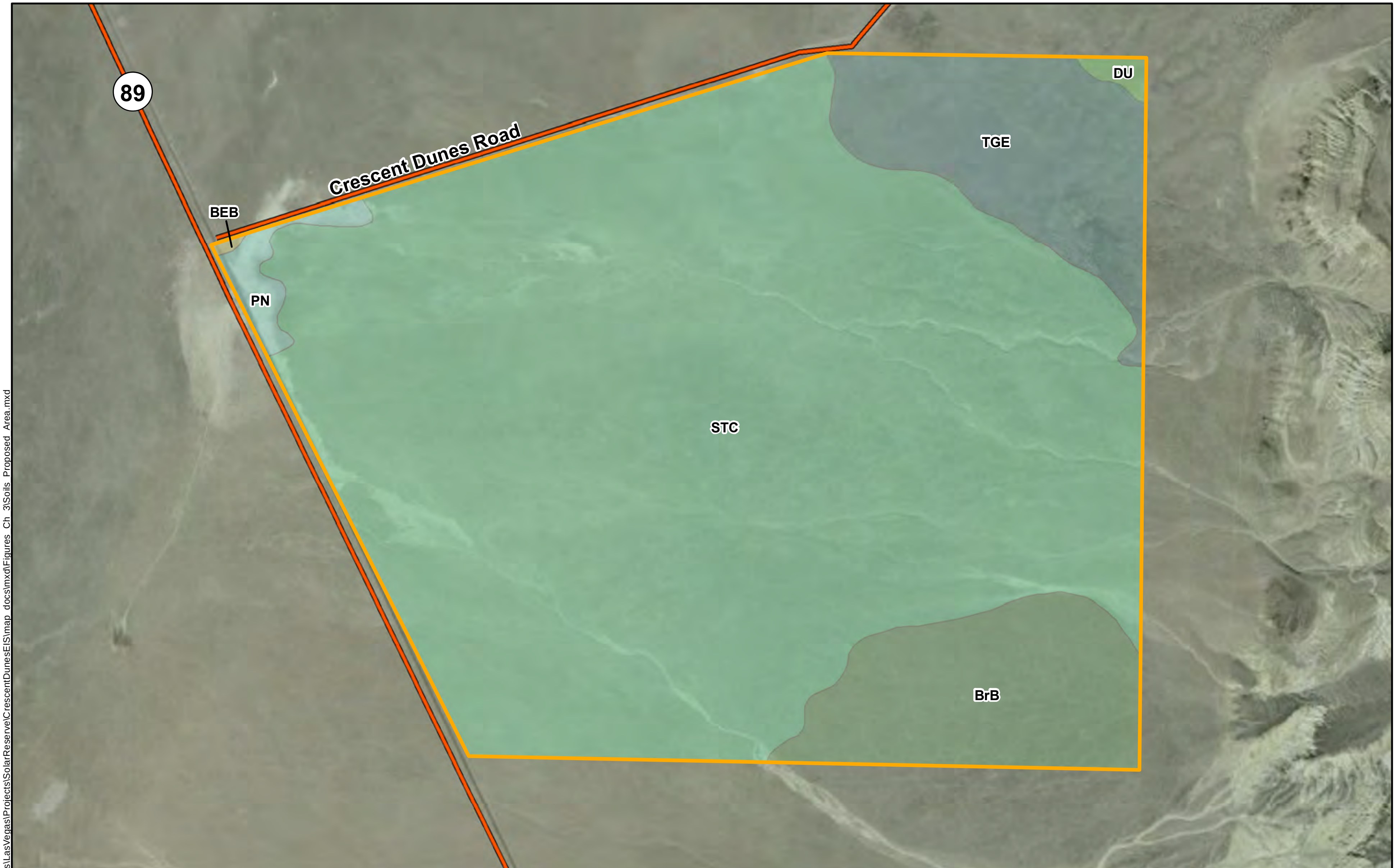
NRCS Soil Series (NRCS Symbol)	Approx. Percentage of Study Area	Natural Resources Conservation Service (NRCS) Evaluation Criteria									
		USDA Surface Texture Rating	Permeability Standard Class Rating (K_{sat} in µm/sec) and Class Limit[a]	pH	Available Water Capacity (in/in)	Hydrologic Group	Wind Erosion Hazard (Erodibility Group/Index)[b]	Water Erosion Hazard (K Factor Rating) (K_w/K_f)[c]	Landscape Position[d]	Depth to Bedrock	Suitability as Topsoil for Reclamation
Broyles fine sandy loam, 2 to 4 percent slopes (BrB)	8.1%	Fine sandy loam	28.0000 High	7.9–9.6	0.09–0.15	B	3/86	.32/.32	VS AF	>60 inches	Poor
Dune land (DU)	0.3%	Fine sand	92.0000 High	7.4–8.4	0.03–0.05	A	1/250	.15/.20	DU VS	>60 inches	Poor
Playas (PN)	0.6%	Silty clay	0.2150 Moderately Low	8.5–9.6	0.02–0.04	D	4/86	.37/.37	PL VF BZ	>60 inches	Poor
Stumble loamy fine sand, 0 to 8 percent slopes (STC)	81.5%	Loamy fine sand	92.0000 High	6.6–8.4	0.06–0.08	A	2/134	.17/.20	VS VF AF	>60 inches	Poor
Tipperary fine sand, 4 to 30 percent slopes (TGE)	9.5%	Fine sand	423.0000 Very High	8.5–9.6	0.05–0.07	A	1/250	.15/.15	VS AF	>60 inches	Poor

[a] Permeability is expressed as the representative saturated hydraulic conductivity (Ksat) rating in micrometers per second (µm/sec), which corresponds to various NRCS classes based on Ksat range as follows: Very Low (0.00–0.01), Low (0.01–0.1), Moderately Low (0.01–1.0), Moderately High (1–10), High (10–100), and Very High (100–705).

[b] Wind erodibility groups (Groups 1 through 8) are made up of soils with similar properties affecting their susceptibility to wind erosion; Group 1 soils are most susceptible, Group 8 soils are least susceptible. Wind erodibility index is a numerical value indicating the soil susceptibility to wind erosion in tons per year per acre that can be expected to be lost to wind erosion.

[c] K Factor Rating indicates the susceptibility of a soil to sheet and rill erosion by water and is one of the factors used in the Universal Soil Loss Equation. Values of K can range from 0.02 to 0.69 and other factors being equal, the higher the value the more susceptible the soil is to sheet and rill erosion by water. K_w is the value for the whole soil; K_f is the value for the fine fraction of the soil (material less than 2.0 millimeters in size).

[d] NRCS Geomorphic Description System Category (Landscape) Symbols: AF = alluvial fan, BZ = braided stream, DU = dune, PL = playa, VF = valley floor, VS = valley side (NRCS 2009)



N

NEVADA
Project Site

Legend

Proposed Area

BEB (Belcher gravelly sand, 0 to 4 percent slopes)

BrB (Broyles fine sandy loam, 2 to 4 percent slopes)

DU (Dune land)

PN (Playas)

STC (Stumble loamy fine sand, 0 to 8 percent slopes)

TGE (Tipperary fine sand, 4 to 30 percent slopes)

0 0.1 0.2 0.3 0.4 0.5 Miles

Figure 3-15 Soils Within Proposed Area

Crescent Dunes
Solar Energy Project

Sources: National Resources Conservation Service; Photo: ESRI 2010

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Table 3-25. NRCS soil types and evaluation criteria for the Alternative Area

NRCS Soil Series (NRCS Symbol)	Approx. Percentage of Study Area	Natural Resources Conservation Service (NRCS) Evaluation Criteria									
		USDA Surface Texture Rating	Permeability Standard Class Rating (K_{sat} in µm/sec) and Class Limit[a]	pH	Available Water Capacity (in/in)	Hydrologic Group	Wind Erosion Hazard (Erodibility Group/Index)[b]	Water Erosion Hazard (K Factor Rating) (K_w/K_f)[c]	Landscape Position[d]	Depth to Bedrock	Suitability as Topsoil for Reclamation
Timber gravelly sandy loam, 0 to 4 percent slopes (TEB)	3.0%	Gravelly sandy loam	74.5376 High	7.9–9.6	0.04–0.15	D	4/86	.17/.28	VF PL	>60 inches	Fair
Dune land (DU)	8.9%	Fine sand	92.0000 High	7.4–8.4	0.03–0.05	A	1/250	.15/.20	DU VS	>60 inches	Poor
Playas (PN)	0.4%	Silty clay	0.2150 Moderately Low	8.5–9.6	0.02–0.04	D	4/86	.37/.37	PL VF BZ	>60 inches	Poor
Stumble loamy fine sand, 0 to 8 percent slopes (STC)	75.1%	Loamy fine sand	92.0000 High	6.6–8.4	0.06–0.08	A	2/134	.17/.20	VS VF AF	>60 inches	Poor
Belcher gravelly sand, 0 to 4 percent slopes (BEB)	12.1%	Gravelly sand	14.9240 High	7.9–9.6	0.04–0.15	D	2/134	.32/.20	VF PL	19 inches	Poor
Tipperary fine sand, 4 to 30 percent slopes (TGE)	0.5	Fine sand	423.0000 Very High	8.5–9.6	0.05–0.07	A	1/250	.15/.15	VS AF	>60 inches	Poor

[a] Permeability is expressed as the representative saturated hydraulic conductivity (Ksat) rating in micrometers per second (µm/sec), which corresponds to various NRCS classes based on Ksat range as follows: Very Low (0.00–0.01), Low (0.01–0.1), Moderately Low (0.01–1.0), Moderately High (1–10), High (10–100), and Very High (100–705).

[b] Wind erodibility groups (Groups 1 through 8) are made up of soils with similar properties affecting their susceptibility to wind erosion; Group 1 soils are most susceptible, Group 8 soils are least susceptible. Wind erodibility index is a numerical value indicating the soil susceptibility to wind erosion in tons per year per acre that can be expected to be lost to wind erosion.

[c] K Factor Rating indicates the susceptibility of a soil to sheet and rill erosion by water and is one of the factors used in the Universal Soil Loss Equation. Values of K can range from 0.02 to 0.69 and other factors being equal, the higher the value the more susceptible the soil is to sheet and rill erosion by water. K_w is the value for the whole soil; K_f is the value for the fine fraction of the soil (material less than 2.0 millimeters in size).

[d] NRCS Geomorphic Description System Category (Landscape) Symbols: AF = alluvial fan, BZ = braided stream, DU = dune, PL = playa, VF = valley floor, VS = valley side (NRCS 2008)

Legend

- Alternative Area
- BEB (Belcher gravelly sand, 0 to 4 percent slopes)
- DU (Dune land)
- PN (Playas)
- STC (Stumble loamy fine sand, 0 to 8 percent slopes)
- TEB (Timper gravelly sand loam, 0 to 4 percent slopes)
- TGE (Tipperary fine sand, 4 to 30 percent slopes)

Figure 3-16 Soils Within the Alternative Area

Crescent Dunes
Solar Energy Project

Sources: National Resources Conservation Service; Photo: ESRI 2010

Table 3-26. NRCS soil types and evaluation criteria for the borrow pit

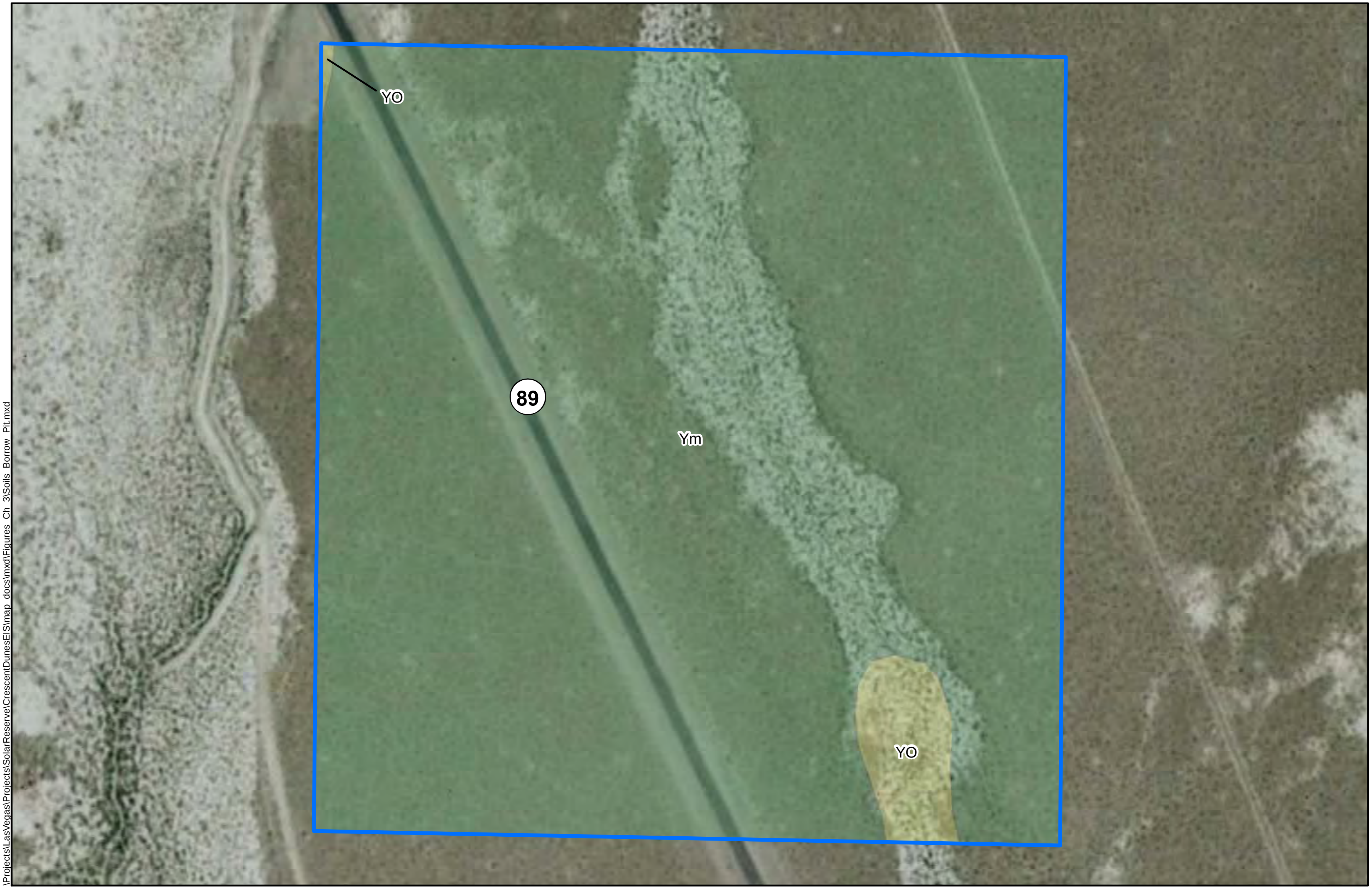
NRCS Soil Series (NRCS Symbol)	Approx. Percentage of Study Area	Natural Resources Conservation Service (NRCS) Evaluation Criteria									
		USDA Surface Texture Rating	Permeability Standard Class Rating (K_{sat} in µm/sec) and Class Limit[a]	pH	Available Water Capacity (in/in)	Hydrologic Group	Wind Erosion Hazard (Erodibility Group/Index)[b]	Water Erosion Hazard (K Factor Rating) (K_w/K_f)[c]	Landscape Position[d]	Depth to Bedrock	Suitability as Topsoil for Reclamation
Yomba gravelly sand (Ym)	55.9%	Gravelly sand	71.4868 High	7.4–9.0	0.04–0.18	B	2/134	.20/.37	BZ VF PL	>60 inches	Poor
Yomba-Playas complex (YO)	44.1%	Gravelly sand	71.4868 High	7.4–9.6	0.03–0.18	B	2/134	.20/.37	BZ VF PL	>60 inches	Poor

[a] Permeability is expressed as the representative saturated hydraulic conductivity (Ksat) rating in micrometers per second (µm/sec), which corresponds to various NRCS classes based on Ksat range as follows: Very Low (0.00–0.01), Low (0.01–0.1), Moderately Low (0.01–1.0), Moderately High (1–10), High (10–100), and Very High (100–705).

[b] Wind erodibility groups (Groups 1 through 8) are made up of soils with similar properties affecting their susceptibility to wind erosion; Group 1 soils are most susceptible, Group 8 soils are least susceptible. Wind erodibility index is a numerical value indicating the soil susceptibility to wind erosion in tons per year per acre that can be expected to be lost to wind erosion.

[c] K Factor Rating indicates the susceptibility of a soil to sheet and rill erosion by water and is one of the factors used in the Universal Soil Loss Equation. Values of K can range from 0.02 to 0.69 and other factors being equal, the higher the value the more susceptible the soil is to sheet and rill erosion by water. K_w is the value for the whole soil; K_f is the value for the fine fraction of the soil (material less than 2.0 millimeters in size).

[d] NRCS Geomorphic Description System Category (Landscape) Symbols: AF = alluvial fan, BZ = braided stream, DU = dune, PL = playa, VF = valley floor, VS = valley side (NRCS 2008)



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NEVADA
Project Site

0 100 200 300 400 500
Feet

Legend

Borrow Pit (40 acre)

YO (Yomba-Playas complex)

Ym (Yomba gravelly sand)

Figure 3-17 Soils Within the Borrow Pit Area

Crescent Dunes
Solar Energy Project

Sources: National Resources Conservation Service; Photo: ESRI 2010

Table 3-27. NRCS soil types and evaluation criteria for the TL and Anaconda Moly Substation corridor

NRCS Soil Series (NRCS Symbol)	Approx. Percentage of Study Area	Natural Resources Conservation Service (NRCS) Evaluation Criteria									
		USDA Surface Texture Rating	Permeability Standard Class Rating (K_{sat} in µm/sec) and Class Limit[a]	pH	Available Water Capacity (in/in)	Hydrologic Group	Wind Erosion Hazard (Erodibility Group/Index)[b]	Water Erosion Hazard (K Factor Rating) (K_w/K_f)[c]	Landscape Position[d]	Depth to Bedrock	Suitability as Topsoil for Reclamation
Timber gravelly sandy loam, 0 to 4 percent slopes (TEB)	14.2%	Gravelly sandy loam	74.5376 High	7.9–9.6	0.04–0.15	D	4/86	.17/.28	VF PL	>60 inches	Fair
Playas (PN)	0.4%	Silty clay	0.2150 Moderately Low	8.5–9.6	0.02–0.04	D	4/86	.37/.37	PL VF BZ	>60 inches	Poor
Stumble loamy fine sand, 0 to 8 percent slopes (STC)	68.9%	Loamy fine sand	92.0000 High	6.6–8.4	0.06–0.08	A	2/134	.17/.20	VS VF AF	>60 inches	Poor
Belcher gravelly sand, 0 to 4 percent slopes (BEB)	16.5%	Gravelly sand	14.9240 High	7.9–9.6	0.04–0.15	D	2/134	.32/.20	VF PL	19 inches	Poor

[a] Permeability is expressed as the representative saturated hydraulic conductivity (Ksat) rating in micrometers per second (µm/sec), which corresponds to various NRCS classes based on Ksat range as follows: Very Low (0.00–0.01), Low (0.01–0.1), Moderately Low (0.01–1.0), Moderately High (1–10), High (10–100), and Very High (100–705).

[b] Wind erodibility groups (Groups 1 through 8) are made up of soils with similar properties affecting their susceptibility to wind erosion; Group 1 soils are most susceptible, Group 8 soils are least susceptible. Wind erodibility index is a numerical value indicating the soil susceptibility to wind erosion in tons per year per acre that can be expected to be lost to wind erosion.

[c] K Factor Rating indicates the susceptibility of a soil to sheet and rill erosion by water and is one of the factors used in the Universal Soil Loss Equation. Values of K can range from 0.02 to 0.69 and other factors being equal, the higher the value the more susceptible the soil is to sheet and rill erosion by water. K_w is the value for the whole soil; K_f is the value for the fine fraction of the soil (material less than 2.0 millimeters in size).

[d] NRCS Geomorphic Description System Category (Landscape) Symbols: AF = alluvial fan, BZ = braided stream, DU = dune, PL = playa, VF = valley floor, VS = valley side (NRCS 2008)

N

NEVADA
Project Site

Legend

Transmission line 500'

BEB (Belcher gravelly sand, 0 to 4 percent slopes)

PN (Playas)

STC (Stumble loamy fine sand, 0 to 8 percent slopes)

TEB (Timper gravelly sand loam, 0 to 4 percent slopes)

0 0.5 1 1.5 2 Miles

Figure 3-18 Soils Within the Transmission Line Corridor

Crescent Dunes Solar Energy Project

Sources: National Resources Conservation Service; Photo: ESRI 2010

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3.11 Social and Economics

3.11.1 Area of Analysis and Methodology

The proposed project area is located approximately 13 miles northwest of Tonopah in Nye County, Nevada. The area of analysis for social and economic conditions includes the Proposed Area, Alternative Area, borrow pit, and TL and Anaconda Moly Substation corridor. The CESA includes Nye and Esmeralda counties, with emphasis on communities closest to the project area, such as Tonopah, Round Mountain, Silver Peak, and Goldfield. In many cases there are limited or no comparative data for these towns because of their small populations (i.e., less than 20,000). State- and county-level data were used to set the proposed project in a regional context.

3.11.2 Regulatory Framework

Under NEPA, social and economic effects by themselves are not required in the preparation of an EIS. However, an EIS must include discussion of a proposed action's social and economic effects when they relate to the effects on the natural or physical environment. These effects were examined to determine the impacts of the Proposed Action, alternatives, and the No Action Alternative on local and regional social and economic conditions.

3.11.3 Affected Environment

3.11.3.1 <u>Proposed Area</u>

3.11.3.1.1 Social Conditions

Social conditions result from interactions of humans with one another, over time, and from observable patterns and characteristics that they create in their surroundings. Social conditions include demographic characteristics, community character, and pubic facilities related to societal activities.

Key demographic characteristics of the project area include race, income, employment, housing, and population growth. Population growth is an important socioeconomic factor because of its direct influence on housing and employment growth and on existing and planned infrastructure. Population growth influences the demand for energy and catalyzes construction of energy-generating facilities.

Populations

The project area is located in Nye County, approximately 13 miles northwest of the unincorporated town of Tonopah. In 2000, the population of Nye County was 32,978 (Table 3-28). In 2008, the Nevada State Demographer's Office projected that the 2009 population of Nye County would be 46,360, an increase of approximately 40.6 percent. Tonopah is the Nye County seat. In 2000, Tonopah's population was 2,833. The 2009 projections anticipated an 8.9 percent decline in population. The unincorporated community of Round Mountain, approximately 70 miles northeast of the project area, was also projected to experience a decline in population (19 percent).

The Esmeralda County line is located approximately 2 miles west of the project area. The current population of Esmeralda County is 1,187, an 11.9 percent increase from the 2000 population of 1,061. The county seat is Goldfield, located approximately 35 miles south of the project area. It has experienced a 4 percent increase in population between 2000 and 2009, from 424 to 441. Silver Peak, located approximately 35 miles southwest of the project area, was projected to experience a 12 percent decline in population during the same period, from 161 to 141.

Table 3-28. Population estimates for Nye and Esmeralda counties and Nevada, 2000–2009

Geographic Area	Population (2000)	Population (2009[a])	Percentage Change
Nevada	1,998,257	2,711,206	34.0
Nye County	32,485	46,360	40.6
Tonopah	2,721	2,580	–8.9
Round Mountain	1,039	837	–19.4
Esmeralda County	971	1,187	11.9
Silver Peak	161	141	–12.4
Goldfield	424	441	4.0

Source: Nevada State Demographer's Office 2008
[a] 2009 population as projected in 2008

For the last 23 years, Nevada has been among the four fastest-growing states in the country. In 2008 and 2009, Nevada dropped to eighth place and lost population across the majority of towns in the project area (Table 3-29). This decline is attributable to a slowdown in the construction industry and the slowing of migration across the nation as current economic conditions make it more difficult for people to change jobs, sell their homes, and move to Nevada.

Furthermore, Nye County's economy has historically revolved around the mining sector and activities at the U.S. Department of Energy's Nevada Test Area, resulting in unstable population growth rates from 1970 to 2002, indicating the need for economic diversification in the county (EDEN 2009).

Table 3-29. Population estimates for Nye and Esmeralda counties and Nevada, 2008–2009

Geographic area	Population (2008)	Population (2009[a])	Percentage change
Nevada	2,738,733	2,711,206	–1.0
Nye County	47,370	46,360	–2.1
Tonopah	2,628	2,580	–1.8
Round Mountain	850	837	–1.5
Esmeralda County	1,240	1,187	–4.3
Silver Peak	182	141	–2.2
Goldfield	415	441	6.4

Source: Nevada State Demographer's Office 2008
[a] 2009 population as projected in 2008

According to the Nevada State Demographer's Office, the population of Nevada is projected to increase by 31 percent over the next 15 years (2010–2025). Additionally, both Nye and Esmeralda counties are anticipated to experience steady growth through 2025 (Table 3-30). Population projections derive from historical population trends and have not been modified to account for future probable and foreseeable developments and events such as the current economic downturn.

Table 3-30. Population projections for Nye and Esmeralda counties and Nevada

Year	State of Nevada		Nye County		Esmeralda County	
	Projected Population	Percentage Change	Projected Population	Percentage Change	Projected Population	Percentage Change
2010	2,963,812	—	55,028	—	1,280	—
2015	3,321,189	12.0	66,292	20.5	1,321	3.2
2020	3,619,563	9.0	75,240	13.5	1,373	3.9
2025	3,872,937	7.0	81,852	8.8	1,457	6.1

Source: Nevada State Demographer's Office 2008.

Nye County is approximately 18,159 square miles (11.6 million acres). For a county of this size, it has a sparse population, partially attributable to the lack of available private land for development. Over 97 percent of the county's land area is managed by federal agencies (Table 3-31) as compared with 87 percent in the state of Nevada. Additionally, 19,000 acres are under state management, leaving only approximately 249,000 acres of private land in the county.

Table 3-31. Federal agencies managing lands in Nye County

Agency	Acreage
U.S. Bureau of Land Management (BLM)	6,500,000
U.S. Forest Service	1,900,000
U.S. Department of Defense	1,800,000
U.S. Department of Energy	863,000
National Park Service	107,000
U.S. Fish and Wildlife Service (USFWS)	13,700
BLM/USFWS jointly managed	8,400
U.S. Bureau of Indian Affairs	8,000
Total	**11,200,100**

Housing

Tables 3-32 and 3-33 summarize the housing characteristics of the population centers in the area of analysis. Housing data were obtained from the U.S. Census Bureau. Because of the small population in most towns in the project area, data gaps were present.

Between 2000 and 2008, the U.S. Census Bureau estimated that Nye County would have a 4.1 percent increase in available housing. In 2000, the towns near the project area in both Esmeralda and Nye counties had vacancy rates greater than 29 percent. Although more recent data are unavailable, with the current state of the economy and the decline in population (Table 3-30), it is likely that vacancy rates will continue to maintain this high rate.

Table 3-32. Housing characteristics

Area	2000 Number of Units	2000 Vacant Units	2000 Percentage Vacant	2006–2008 Number of Units	2006–2008 Vacant Units	2006–2008 Percentage Vacant
Nevada	827,457	76,292	9.2	1,098,307	151,160	13.8
Nye County	15,934	2,625	16.5	16,592	3,202	19.3
Tonopah	1,589	463	29.1	Not available	Not available	Not available
Round Mountain	872	203	23.3	Not available	Not available	Not available
Esmeralda County	833	378	45.4	Not available	Not available	Not available
Silver Peak	399	165	41.4	Not available	Not available	Not available
Goldfield	434	213	49.1	Not available	Not available	Not available

Source: U.S. Census Bureau 2009

Additional housing in the form of hotels and motels is also available near the project area. According to TravelNevada.com, in 2009 Tonopah had eight hotels/motels and Goldfield had one. Based on information from the Web site, the two towns had approximately 351 guest rooms among the nine hotels and motels. Additional accommodation is available in the form of recreational vehicle facilities, mobile home sites, and campgrounds.

The most recent data on housing conditions and mortgage costs indicate that median housing conditions in Nye County are generally about 60 percent less than for the state of Nevada as a whole (Table 3-34). Housing conditions in Tonopah and other communities near the project area are also lower than those for the state and for Nye County. Many areas of the country report today’s housing values have declined to near 2000 housing values.

Table 3-33. Housing conditions and costs

Area	2000 Median Housing Conditions	2006–2008 Median Housing Conditions	2000 Average Monthly Mortgage Costs	2006–2008 Average Monthly Mortgage Costs	2000 Median Monthly Gross Rental Costs	2006–2008 Median Monthly Gross Rental Costs
Nevada	142,000[a]	296,200	1,190[a]	1,796	699	999
Nye County	122,100	187,100	866	1,239	541	848
Tonopah	78,200	Not available	869	Not available	478	Not available
Round Mountain	66,300	Not available	806	Not available	476	Not available
Esmeralda County	75,600	Not available	825	Not available	381	Not available
Silver Peak	87,000	Not available	550	Not available	336	Not available
Goldfield	71,300	Not available	950	Not available	389	Not available

Source: U.S. Census Bureau 2009
[a] figures are in nominal dollars

3.11.3.1.2 Economic Conditions

Historically, Nye County's economy revolved around mining, agriculture, federal defense research and development, and the railroad. Mining and agriculture have been the primary activities; however, the importance of these sectors has decreased over time. Nye County has also been subject to the "boom-and-bust" economy long associated with the cyclical mining industry; mirroring this are both high and low population growth rates. The nearest town to the project area, Tonopah, has seen its historic dependence on mining shift to tourist traffic through the community and traffic serving the nearby Tonopah Test Range.

In nearby Esmeralda County, the major employer is the government, primarily state government. Mining, trade, transportation, and utilities play a role. Like Nye County, Esmeralda County is restoring its mining ghost towns to attract more tourism.

Over a 20-year period, Nevada and Nye County showed an increase in employment, but also an increase in the unemployment rate. These rates include the current recession. Esmeralda County appears to show a decrease in jobs and a decrease in the unemployment rate (Table 3-34). The small size of Esmeralda County magnifies even small changes to the economy.

Table 3-34. Labor force characteristics of Esmeralda and Nye counties and Nevada, 1990–2010

Characteristic	Nevada		Esmeralda County		Nye County	
	1990	2010	1990	2010	1990	2010
Labor force	655,896	1,373,387	613	481	8,945	17,411
Employment	622,516	1,185,677	575	457	8,616	15,714
Unemployment	33,380	187,710	38	24	329	1,697
Unemployment rate	5.1%	13.7%	6.2%	5.0%	3.7%	9.7%

Source: Nevada Department of Employment, Training, and Rehabilitation – Research and Analysis Bureau 2010

Table 3-35 summarizes the number of people employed by all economic sectors in Nevada and in Nye and Esmeralda counties. Nye and Esmeralda counties have 89 percent and 68 percent, respectively, of their labor force employed by the private sector. Government is an important sector statewide and in each of the counties. This is particularly true in Esmeralda County, where 30 percent of the labor force holds government jobs.

Table 3-35. Employment by industry for Nye and Esmeralda counties and Nevada, 2007

Industry	State of Nevada	Esmeralda County	Nye County
Farm	4,835	53	255
Total Private	1,492,783	320	16,425
Forestry, fishing, etc.	1,886	(D)[a]	74
Mining	14,512	(D)	1,044
Utilities	4,680	0	131
Construction	156,837	(D)	1,571
Manufacturing	54,528	(D)	229
Wholesale trade	44,853	(D)	193
Retail trade	171,545	(D)	2,142
Transportation and warehousing	57,709	(D)	291
Information	20,518	(D)	137
Finance and insurance	75,034	11	478
Real estate	121,332	27	1,736
Professional, scientific, technical services	88,541	(D)	2,532
Management	19,447	(D)	34
Administrative and waste services	109,530	12	1,268
Educational services	11,393	0	(D)
Health care and social assistance	102,592	(L)[b]	(D)
Arts, entertainment, recreation	52,576	(L)	962
Accommodation and food services	318,494	(D)	1,614
Other services, except public administration	66,776	(D)	953
Total government	168,913	98	2,068
Federal, civilian	17,119	(L)	157
Military	14,672	(L)	115
State, local	137,122	91	1,796
State	33,329	(D)	167
Local	103,793	(D)	1,629
Total	1,666,531	471	18,748

Source: U.S. Department of Commerce, Bureau of Economic Analysis 2009
[a] (D) = not reported, confidential but included in total
[b] (L) = less than 10 jobs, but estimates for this item are included in the totals

Retail, professional, scientific, and technical services, along with government, are the largest employment sectors in Nye County. The largest sectors in Esmeralda County are farm, real estate, and government. Professional, scientific, and technical services, the largest sector in Nye County, accounts for 13.5 percent of employment, compared with only approximately 5 percent statewide.

Rural counties have a tendency to lose population in the 20–34 year age group because many members of this cohort move to more urban areas where there is greater opportunity to realize educational and career opportunities. Additionally, increased rates of retirees moving to rural areas raise concerns that more public services will be required, which would tax an economy with a shrinking revenue base. In Nye County, government payments to individuals for retirement and disability insurance benefits (primarily Medicare and Medicaid), income maintenance benefits, and veteran's benefits accounted for 22.7 percent of the total personal income compared with 10.7 percent in the state of Nevada; an indicator of a relatively large retirement population in the county (U.S. Department of Commerce 2009).

Tables 3-36 and 3-37 list the largest employers in Nye and Esmeralda counties. It is unknown whether these employees reside in the county where they work or whether they commute. For instance, an employee may reside in Esmeralda County but commute to Nye County to work.

Table 3-36. Largest employers in Nye County

Employer	City	Industry	Number of Employees
Bechtel Nevada Corporation	—	Research and development	1,000–1,499
Nye County School District	Tonopah	Elementary and secondary schools	900–999
Smoky Valley Mining Division	—	Gold ore mining	700–799
Nye County	Tonopah	Tonopah executive and legislative offices combined	600–699

Source: NV Energy 2010

Table 3-37. Largest employers in Esmeralda County

Employer[a]	City	Industry	Number of employees
Esmeralda County	Goldfield	—	60–69
Chemetall Foote Corporation	Silver Peak	Lithium mining	50–59
Esmeralda County School district	Goldfield	Elementary school	30–39

Source: Esmeralda County 2010

[a] all other, greater than 20 employees

Income

Median household income and per capita income data were obtained from the U.S. Census Bureau's American Community Survey. The most recent data, 2008, indicate the median household income in the state was $56,432, Nye County's was $43,463, and Esmeralda County's was $40,299. U.S. Census Bureau data were not available for towns with less than 20,000 residents.

Law Enforcement and Emergency Services

Law enforcement in the project area is provided by the Nye County Sherriff's Department and the Nevada Highway Patrol. The Nye County Sheriff's Office North Area Command has headquarters in Tonopah. Emergency services, including fire and ambulance, in the surrounding area are provided by the town of Tonopah. The Nye Regional Medical Center is located in Tonopah. BLM is responsible for fire protection for wildland fires on public land.

Electricity and Natural Gas

The project area is served by NV Energy (formerly Sierra Pacific Power Company). NV Energy service covers 54,500 square miles, providing electricity to 2.4 million customers throughout Nevada and northeastern California (NV Energy 2010).

Public Water Supply and Wastewater

There are few public water supply systems in the project area. The majority of water users rely on individual wells. Tonopah Public Utilities manages public water supply systems near the project area (Economic Development Authority of Nye County 2010).

Solid Waste

NDEP, Bureau of Waste Management, oversees permitting of solid waste landfills and other waste management facilities within the state of Nevada. Tonopah has an operating Class II landfill.

Schools

The project area is located within the Nye County School District. Of the district's five public schools, none are within the project area. A summary of school information and enrollment is provided in Table 3-38.

Table 3-38. Summary of schools in the Nye County School District

Schools	Grade Levels	Number of Students for 2009–2010 School Year
Silver Rim Elementary (Tonopah)	K–2	87
Tonopah Elementary /Middle (Tonopah)	3–8	191
Tonopah High (Tonopah)	9–12	161
Round Mountain Elementary (Round Mountain)	K–5	145
Round Mountain Middle/High (Round Mountain)	6–12	177

Source: Nye County School District 2010

Fiscal Resources

The Nye County Finance Department describes County governmental revenues and expenditures within 5 major funds and approximately 67 nonmajor funds. The General Fund is the primary operating fund for Nye County (Nye County 2010). Tables 3-39 and 3-40 summarize the Nye County revenues and expenditures, respectively. Any tax (direct revenue) benefit of the proposed facility would go to Nye County; however, indirect revenue such as employment would benefit the region.

Table 3-39. Nye County revenues, 2008–2009

Revenue	General Fund	Education Endowment Fund	Special Project Fund	Endowment Capital Projects Fund	Repository Oversight Fund	Other Governmental Funds	Totals
Taxes	$16,049,402	$—[a]	$—	$—	$—	$6,118,385	$22,167,787
Licenses	128,395	—	—	—	—	1,233,861	1,362,256
Intergovernmental resources	14,756,343	—	8,651,700	—	4,467,271	9,448,981	37,324,295
Charges for services	2,370,025	—	—	—	—	2,111,922	4,481,947
Fines for forfeitures	354,485	—	—	—	—	1,133,408	1,487,893
Other	1,714,752	479,252	914,422	645,209	—	2,188,873	5,942,508
Total Revenues	**35,373,402**	**479,252**	**9,566,122**	**645,209**	**4,467,271**	**22,235,430**	**72,766,686**

Source: Information was taken directly from Nye County 2010; inconsistencies have been noted.

[a] Dashes indicate that the relevant revenue source did not contribute to the County fund or that the fund did not pay for the relevant expense in fiscal year 2008–2009.

Table 3-40. Nye County expenditures for fiscal year 2008–2009

Expenditure	General Fund	Education Endowment Fund	Special Project Fund	Endowment Capital Projects Fund	Repository Oversight Fund	Other Governmental Funds	Totals
General government	$12,520,443	$—	$321,648	$—	$4,467,271	$4,028,094	$21,337,456
Judicial	6,613,059	—	10,906	—	—	349,108	6,973,073
Public safety	16,358,654	—	50,071	—	—	3,585,514	19,994,239
Public works	99,432	—	108,100	—	—	6,472,230	6,679,762
Health and sanitation	315,963	—	—	—	—	983,838	1,299,801
Welfare	—	—	—	—	—	1,935,744	1,935,744
Culture and recreation	—	—	26,745	—	—	522,554	549,299
Community support	410,070	—	76,539	—	—	459,967	946,576
Inter-governmental	—	479,252	124,590	—	—	709,416	1,313,258
Capital projects	—	—	2,154,100	—	—	936,710	3,090,810
Debt service	—	—	—	—	—		
Principal	—	—	—	—	—	2,262,887	2,262,887
Interest	—	—	—	—	—	356,958	356,958
Total expenditures	**36,317,621**	**479,252**	**2,872,699**	—	**4,467,271**	**22,603,020**	**66,739,863**
Excess (deficiency) of revenues over expenditures	**(944,219)**	—	**6,693,423**	**645,209**	—	**(367,590)**	**6,026,823**

Source: Information was taken directly from Nye County 2010; inconsistencies have been noted.
[a] Blank cells indicate that the relevant revenue source did not contribute to the County fund or that the fund did not pay for the relevant expense in fiscal year 2008–2009.

3.11.3.2 Alternative Area

Existing conditions are the same as described previously for the Proposed Area.

3.11.3.3 Borrow Pit

Existing conditions are the same as described previously for the Proposed Area.

3.11.3.4 TL and Anaconda Moly Substation

Existing conditions are the same as described previously for the Proposed Area.

3.12 Visual

3.12.1 Area of Analysis and Methodology

The visual resources study area for the proposed project was defined as the area wherein potential undesirable visual effects from construction and maintenance of the proposed project may be observed. The methodology used for this visual analysis is based on the BLM *Visual*

Resource Inventory and Visual Resource Contrast Rating handbook (BLM 1986a,b). This BLM methodology establishes a baseline for visual characteristics. A viewshed delineation was prepared for the proposed and alternative areas using a digital elevation model (DEM) (HDR 2010). This delineation illustrates areas from which viewers would have a clear line-of-sight to the project area within 10 miles of the proposed and alternative areas (HDR 2010). Output from this DEM indicates areas in which the project would be "visible" and "not visible" to observers in the study area. The model takes into account topography, viewer height, and the height of project components mainly the central receiver tower (as this would be the most visible feature throughout the viewshed). This is important because changes in topography can block or expose views. During the field reconnaissance, six critical viewpoints or Key Observation Points (KOPs) were established within the visible portion of the viewshed delineation using BLM Visual Resource Management (VRM) guidance (Figure 3-19). KOPs were selected in populated or commonly utilized areas where people could possible have a view of the proposed project. These areas included the Crescent Dunes Special Recreation Management Area, commonly traveled roads, and residential communities.

According to the Tonopah RMP and Final EIS, the proposed and alternative areas as well as the surrounding land in the Big Smoky Valley are classified as Class C and managed according to VRM Class IV standards (BLM 1997). However, since the RMP and EIS were published in 1997, visual resource specialists completed a Scenic Quality Evaluation worksheet at each KOP. Additionally, Visual Contrast Rating worksheets were completed for each KOP and discussed in Chapter 4(HDR 2010).

Since the Proposed Area and the Alternative Area are adjacent to each other, the KOPs presented in this chapter illustrate the view from the KOP to the proposed project area. KOPs and visual simulations for the proposed action and alternatives are included in Chapter 4.

3.12.2 Regulatory Framework

The following section outlines all federal, state, and local laws, policies, and regulations that apply to the area of analysis and were considered in the development of this visual resources analysis.

3.12.2.1 Federal

The FLPMA requires BLM to protect the quality of scenic values on public lands (43 USC 1701). BLM has developed an analytical process that identifies, sets, and meets objectives for maintaining scenic values and visual quality. The VRM system functions in two ways: first, BLM conducts an inventory that evaluates visual resources on all lands under its jurisdiction; once inventoried and analyzed, lands are given relative visual ratings (i.e., VRM classifications). VRM classes describe the different degrees of modification allowable within the landscape. The BLM VRM classes are as follows:

- **Class I.** To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- **Class II.** To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- **Class III.** To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
- **Class IV.** To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. The area of analysis for the proposed project is located on Class IV land.

The Tonopah RMP and ROD assign VRM classes ranging from Class I to IV to all BLM lands in the planning area. All future projects and actions must adhere to the objectives of the applicable VRM classes. The original VRM inventory was completed by BLM in 1997 and is included in the Tonopah RMP and ROD.

3.12.3 Affected Environment

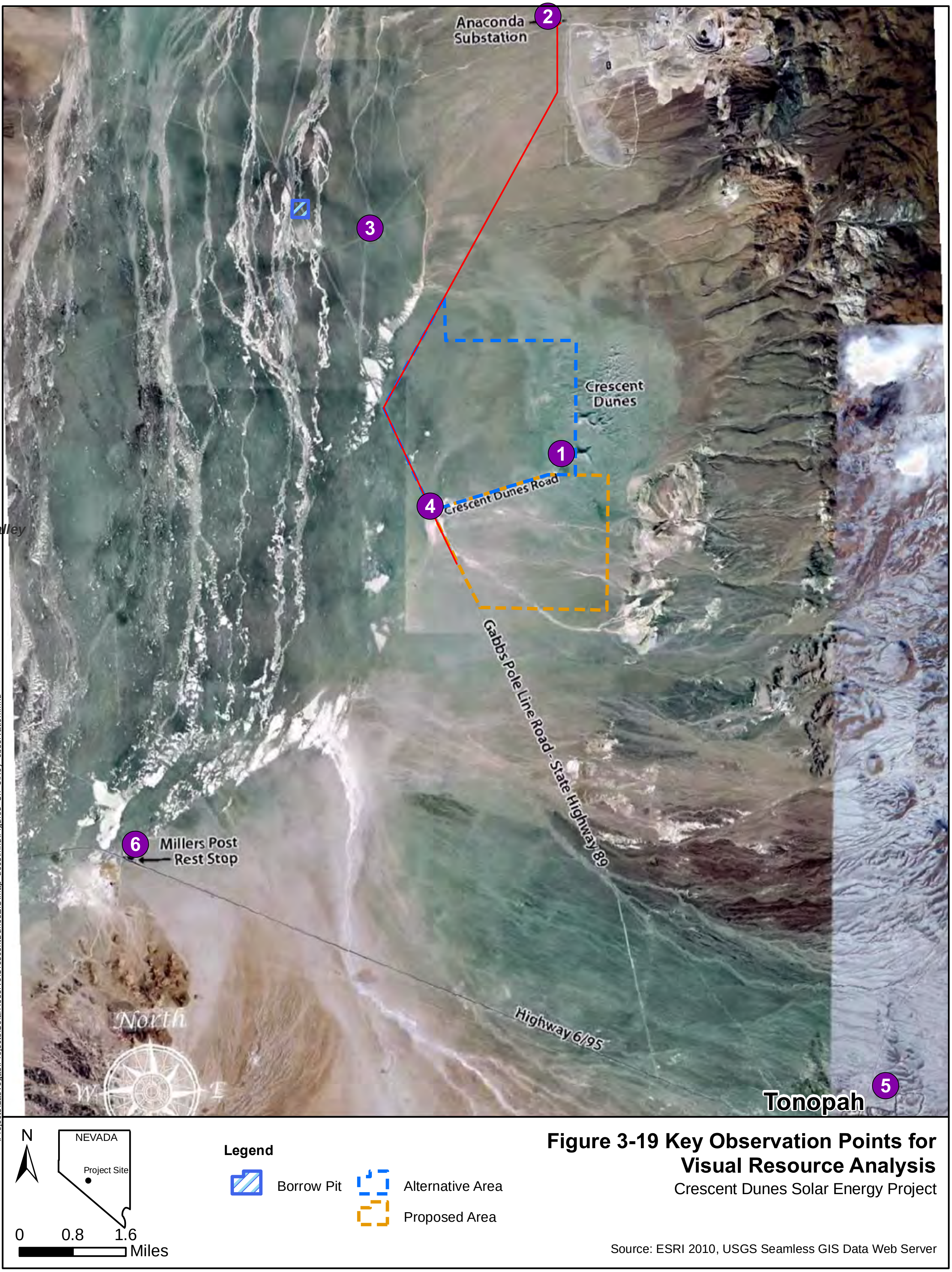
This section provides a detailed inventory of the existing visual landscape. The area of analysis for this visual resources assessment is defined as the area wherein potential undesirable visual effects from construction, operation, and decommissioning of the Proposed Action may be discerned.

3.12.3.1 Regional Setting

The proposed solar energy project is located in Nye County, Nevada, approximately 13 miles from the town of Tonopah, Nevada. The project area is located on unincorporated land administered by BLM. The project area is located in the basin and range physiographic province in the Great Basin Desert sub-province characterized by expansive flat desert valleys surrounded by high fault-block mountains. The region generally consists of wide valleys or basins bounded by alluvial slopes and mountain ranges. Views from travel routes (e.g., US 95) tend to be of broad, sweeping desert in a semiarid landscape.

Other nearby mountains include Lone Mountain to the south, Pilot Peak to the east, and the Shoshone and Toiyabe Ranges to the north.

Within the regional setting, the visual resources study area was defined by viewpoints from which the proposed facilities would be seen. The viewshed is extensive given the openness of the landscape and the availability of viewpoints from travel routes, recreational areas, and the nearby community of Tonopah.



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Legend

Borrow Pit

Alternative Area

Proposed Area

Figure 3-19 Key Observation Points for Visual Resource Analysis

Crescent Dunes Solar Energy Project

Source: ESRI 2010, USGS Seamless GIS Data Web Server

3.12.3.2 Project Setting

The project area is located in northeastern Esmeralda County and southwestern Nye County and lies in Gabb's Valley Range north of SR 95 and south of the Humboldt-Toiyabe National Forest. The topography of the area is flat, with steeply sloping elevations ranging between 9,100 and 11,000 feet in the background distances. The project area is accessible via SR 95 and Pole Line Road. Access into the landscape is open due to the flat expanses of land.

The majority of land in the study area is administered by BLM and has been classified as a VRM Class IV landscape. BLM has defined the objectives for development on Class IV landscapes as having "to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements."

Development within the area of analysis is minimal and is limited to utility development such as "H" frame and monopole power lines, a power substation, and paved roads. Vegetation within the area of analysis is xeric shrub-steppe or sagebrush, which is typical of the region. No visible flowing water features are located within the project area, although ephemeral drainages may be present seasonally or during precipitation.

Tonopah has been designated as a premier stargazing destination. Dark sky conditions are a valuable asset to the town, and efforts to encourage the proper use of lighting and light shielding is included in the mitigation section of this assessment.

3.12.3.3 Proposed Area

The landscape in the Proposed Area is generally characterized by flat desert with low-lying desert scrub vegetation bounded by high-relief fault-block mountains in the seldom seen distance zone (over 15 miles away). Landscape in the region appears desolate, that is, devoid of any major cultural modification aside from a paved two-lane rural highway and a power line corridor (oriented northeast and southwest) that bisects the landscape approximately 3 miles north of the Proposed Area. The colors within the landscape are limited to bands of earth tone browns and tans, with few other distinguishing colors, creating a relatively homogenous appearance.

The most distinctive natural feature in the area is the Crescent Dunes SRMA. The Crescent Dunes are relatively unique as they are smooth, undulating sand dunes that are visible from over 5 miles away. According to the BLM, approximately 1,200 people/year visit the site (BLM 2010f)

The closest residences to the Proposed Area are approximately 10 miles away to the south. The residential area is on the outskirts of the town of Tonopah located off Radar Road. Most of the residences in this area are single-family detached homes. Approximately 10 houses (located at a slightly higher elevation) currently have views of Crescent Dunes in the distance and, as such, would have views of the Proposed Area. Views from this area may be slightly obstructed by vegetation, topography, and distance.

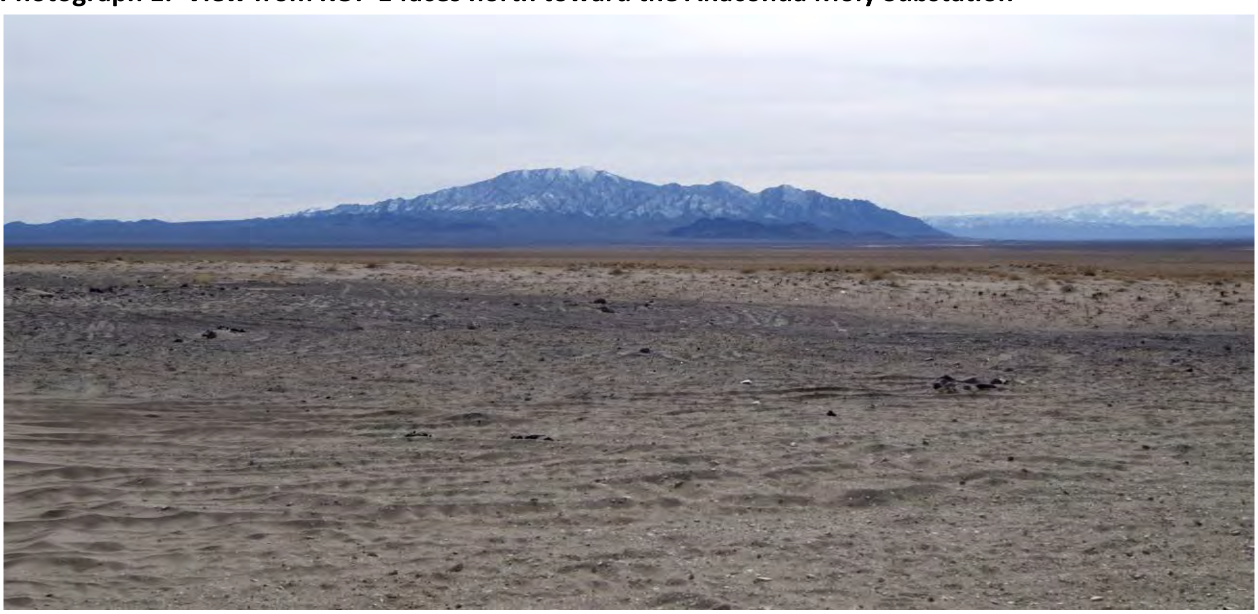
The Proposed Area is located immediately adjacent to Pole Line Road, which is a paved two-lane highway. This road provides access to residences and farmland, as well as the existing Anaconda Moly Substation from SR 95. Pole Line Road has a very low level of daily traffic.

Given the special recreation designation of Crescent Dunes, the area supports some recreational activity, although no signs indicating recreational areas are apparent. Crescent Dunes and the surrounding landscape are used by off-highway vehicle recreationists, as evidenced by an extensive network of 4-wheel drive trails and staging areas located sporadically throughout the area.

3.12.3.3.1 KOP 1 – Crescent Dunes SRMA

KOP 1 is within the SRMA (the view faces north toward the Anaconda Moly Substation). From this vantage point, high-relief mountains are visible for nearly 180 degrees from north to south (Photograph 1). The landscape in the foreground and middleground is flat and sparsely vegetated. Background distances reveal high-relief fault-block mountains that form a distinct line along the horizon. The landscape in the area is very desolate and undeveloped. The area is unique to the region in that the series of smooth, sandy dunes form a distinctive and interesting visual feature that is visible from nearly 10 miles away in almost any direction.

Photograph 1. View from KOP 1 faces north toward the Anaconda Moly Substation



3.12.3.3.2 KOP 2 – Anaconda Moly Substation

KOP 2 is located at the western edge of the Anaconda Moly Substation (Photograph 2; view faces south toward the Crescent Dunes along the existing TL corridor). The landscape in this area is relatively flat, with a few hills in the middleground. The background distances reveal high-relief, fault-block mountains that form a distinct line along the horizon. Vegetation in this area is limited to low-lying desert scrub that creates a coarse texture in the foreground. There is an access road to the Anaconda Moly Substation off of Pole Line Road. Viewers from KOP 2 would likely be limited to those with access to the substation.

Photograph 2. View from KOP 2 faces south toward the Crescent Dunes along the existing TL corridor

3.12.3.3.3 KOP 3 – Anaconda Moly Substation

KOP 3 is approximately 1.5 miles southwest of the Anaconda Moly Substation. Facing southeast from the roadway, the existing TL corridor is evident (Photograph 3). The landscape in this area is relatively flat with some hills in the middleground. Vegetation is sparse and limited to desert scrub typical of the region. High-relief mountains are evident in the seldom seen distance zone.

Photograph 3. KOP 3 is the view facing southeast toward the project area from the Anaconda Moly Substation access road

3.12.3.3.4 KOP 4 – Pole Line Road

KOP 4 faces east toward the Crescent Dunes from the intersection of Pole Line Road and the unpaved access road to Crescent Dunes (Photograph 4). The landscape in this area is flat in the foreground and middleground with low-lying desert scrub vegetation. Exposed soil unpaved roads provide access to Crescent Dunes to the east. High-relief mountains are visually dominant in the background and form the horizon line. These mountains dominate the viewshed.

Photograph 4. KOP 4 faces east toward the Crescent Dunes from the intersection of Pole Line Road and the unpaved access road to Crescent Dunes

3.12.3.3.5 KOP 5 – Penstemon Court

KOP 5 is located slightly higher (on a hill) with views to the north toward the proposed project (Photograph 5). This area is characterized by panoramic views of expansive desert with low-lying desert scrub and some hills evident in the middleground. High-relief mountains are evident in the background and seldom seen distances form the horizon line. Because of the relatively flat nature of the landscape, unobstructed viewing conditions exist for over 15 miles. Additionally, with distance, the detail and texture within the landscape appears as horizontal striations in background distances. There are approximately 100 residences in this area; views from these residences are over 10 miles away.

Photograph 5. KOP 5 at Penstemon Court to the north

3.12.3.3.6 KOP 6 – Miller's Rest Stop

Miller's Rest Stop is located approximately 11 miles from the proposed project area (Photograph 6). The rest stop is located off Interstate 6, and the existing TL corridor is evident in this area. The landscape is characterized largely by bare earth and sparse vegetation. Views of the mountains are a dominant visual feature and form the horizon line. Crescent Dunes is evident in the background. Views from this area would largely be from travelers along Interstate 6.

Photograph 6. KOP 6 at Miller's Rest Stop to the east

3.12.3.4 Alternative Area

Located slightly north of the Proposed Area, the Alternative Area is in an aesthetic setting that is the same as the Proposed Area. The conceptual footprint of Alternative 1 is located on the cusp of the Crescent Dunes SRMA, and Alternative 2 is located closer to Pole Line Road (see Figure 3-1 for project layout). Residences located to the south are approximately 12 miles away from the Alternative Area. Additionally, this area is used by off-highway vehicle recreationists accessing the Crescent Dunes SRMA.

3.12.3.5 Borrow Pit

The borrow pit area is an existing industrial use located outside of the viewshed. None to very few sensitive viewers are likely to see this area.

3.12.3.6 TL and Anaconda Moly Substation

The proposed TL and substation would connect the existing Anaconda Moly substation to the proposed power block location at the project site. The majority of the proposed TL would follow the existing Miller's to Anaconda Moly TL corridor oriented northeast-to-southwest. The TL corridor would run perpendicular to Pole Line Road in the vicinity of the proposed project site, then parallel the road before connecting with the proposed power block.

The landscape in the area of the TL corridor is flat desert valley, bounded by high-relief, fault-block mountains in the seldom seen distance zone (beyond 15 miles). Views of the proposed TL would be evident from Pole Line Road but would likely be indiscernible from other areas. Recreationists using the Crescent Dunes SRMA would be able to see the proposed TL from some vantage points.

3.12.3.7 CESA

The CESA, or viewshed, is defined as the area where the project facilities, including the solar field and TLs, are visible. The viewshed has an approximate radius of 10 miles in any direction from the project site. The proposed project would not be a dominant visual feature beyond 5 miles, and views beyond 10 miles of the project would be very difficult to discern.

3.13 Hazardous Materials

3.13.1 Area of Analysis and Methodology

A Phase I Environmental Site Assessment (Phase I ESA) was performed by JBR (JBR 2010b). The areas assessed included the Proposed Area, the Alternative Area, the borrow pit, and the TL and substation corridor (see Figure 3-1), totaling approximately 7,050 acres. The Phase I ESA goal was to gather evidence of the use of hazardous materials and petroleum products on-site and off-site near the subject property that may have resulted in environmental hazards.

The analysis included an online data source review and interviews with relevant agency personnel.

3.13.2 Regulatory Framework

The Phase I ESA was conducted in accordance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice E 1527-05, and the standards for conducting all appropriate inquiries set forth by EPA in 40 CFR 312.

The use, storage, and disposal of hazardous materials are regulated by several local, state, and federal agencies. Table 3-43 summarizes the various regulations and regulatory agencies. Laws and regulations related to hazardous waste and regulated, non-hazardous waste are summarized in Table 3-46.

3.13.3 Affected Environment

3.13.3.1 Proposed Area

The Phase I ESA did not reveal any recognized environmental conditions (RECs) as defined by ASTM E 1527-05.

3.13.3.2 Alternative Area

The Phase I ESA did not reveal any RECs as defined by ASTM E 1527-05.

3.13.3.3 Borrow Pit

The Phase I ESA did not reveal any RECs as defined by ASTM E 1527-05.

3.13.3.4 TL and Anaconda Moly Substation

The Phase I ESA did not reveal any RECs as defined by ASTM E 1527-05.

Table 3-43. Summary of applicable regulations for the use, storage, and disposal of hazardous materials

Regulation	Requirements/Applicability
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA): 42 United States Code (USC) Section 9601 et seq., 40 Code of Federal Regulations (CFR) Part 302	Requires notification to various agencies when there is a release of hazardous substances from a facility.
Emergency Planning and Community Right to Know Act of 1986 (EPCRA), commonly known as SARA Title III: 42 USC Section 11001 et seq., 40 CFR Parts 350, 355 370, and 372	Requires inventory reporting, planning, and reporting for storage and release of hazardous and acutely hazardous materials.
EPCRA, Section 302 (Public Law 99–499), 42 USC 11022	Requires agency notification if extremely hazardous substances are stored in excess of Threshold Planning Quantities.
EPCRA, Section 311 (Public Law 99–499), 42 USC 11021	Requires that either material data safety sheets for all hazardous materials or a list of all hazardous materials be submitted to Nevada Emergency Response Commission and local fire department.
EPCRA, Section 313 (Public Law 99–499), 42 USC 11023	Requires annual reporting of releases of hazardous materials.
Occupation Safety and Health Administration, 29 USC Section 651 et seq., 29 CFR Part 1910, Safety and Health Regulations for Construction: 29 CFR Part 1926	Specifies standards for hazardous materials storage, handling, and worker protection in emergencies.
Oil Pollution Prevention: 40 CFR Part 112	Requires the preparation of a Spill Prevention Control and Countermeasure Plan if storage capacity exceeds certain volumes, and should there be a reasonable possibility that the tank(s) may discharge oil into navigable waters of the United States.
Hazardous Materials Transportation, 49 CFR 171–172	Requires transporters of hazardous materials to properly label, manifest, package, and ship hazardous materials.
Chemical Accident Prevention Provisions, 40 CFR Part 68	Requires the preparation of a Risk Management Plan if certain listed toxic or flammable substances are used in excess of the listed threshold quantity.
Chemical Facility Antiterrorism Standard, 6 CFR Part 27	Requires facilities that possess any “chemicals of interest” above threshold quantities must register and provide specified information to the U.S. Department of Homeland Security.
Hazard Communication (HAZCOM) Program, 29 CFR 1910.1200, Safety and Health for Construction, 29 CFR 1926.1 et seq.	Requires employers to implement HAZCOM Standard that gives workers the right to know the hazards and identities of chemicals in their workplaces (29 CFR 1910.1200). Requires written procedures and personnel protective equipment for employees working with hazardous materials.

Table 3-44. Summary of regulations applicable to hazardous and non-hazardous wastes

Regulation	Requirements/Applicability	Administering Agency
Resource Conservation and Recovery Act (RCRA), 42 United States Code (USC) 6901 et. seq. (1976), 40 Code of Federal Regulations (CFR) Parts 260, 261, 262, Hazardous Waste Management Applicable to Generators	Requires hazardous waste generators to obtain an Environmental Protection Agency Identification (EPA ID) number and annually register with the Nevada Division of Environmental Protection (NDEP) to accumulate and store hazardous waste for no more than 90 days and ship hazardous waste under a manifest to a licensed disposal site. Requires generator to identify and profile hazardous waste, store hazardous waste in appropriate containers, label containers stored on-site and transported to disposal site, and train operators in hazardous waste management.	EPA Region IX NDEP
RCRA; 42 USC 6901 et. seq. (1976), 40 CFR 263, Hazardous Waste Transportation, Nevada Revised Statutes (NRS) 459	Requires hazardous waste generator to use registered transporters of hazardous wastes that have an EPA ID number, use manifests to accompany waste shipments, and conduct proper cleanup of any hazardous waste discharges.	EPA Region IX NDEP Nevada Department of Transportation
Universal Waste, 60 Federal Register (FR) 25542, May 11, 1995, as amended at 64 FR 36488, July 6, 1999; 70 FR 45520, August 5, 2005, 40 CFR 273	Requires management, employee training, and proper disposal of universal waste that includes batteries, fluorescent lamps, mercury switches, and pesticides.	EPA Region IX NDEP
Used Oil Solid Waste Disposal Act, as amended [42 USC 6905, 6912(a), 6921 through 6927, 6930, 6934, and 6974]; and Comprehensive Environmental Response, Compensation, and Liability Act [42 USC 9601(37) and 9614(c)], 40 CFR 279, Nevada Administrative Code Chapter 444	Requires generators of used oil to prevent spills and correctly label, store, transport, and dispose of/recycle used oil.	NDEP EPA Region IX

3.13.4 CESA

The Phase I ESA did not reveal any RECs as defined by ASTM E 1527-05.

3.14 Range Resources

3.14.1 Area of Analysis and Methodology

This section addresses range resources, which include livestock grazing and wild horses, within the detailed area of analysis that includes the Proposed Area, Alternative Area, borrow pit, and the TL corridor. This section provides a discussion of the livestock grazing areas, class of livestock grazed, and existing grazing management. The proposed project is not within a Herd Management Area for wild horses or burros.

3.14.2 Regulatory Framework

3.14.2.1 BLM Standards and Guidelines for Livestock Grazing

BLM has established Standards and Guidelines by the Secretary of the Interior (43 CFR 4180). The purpose of these Standards and Guidelines is to ensure that the BLM administration of grazing helps preserve currently healthy conditions and restores healthy conditions of rangelands.

3.14.2.2 BLM RMPs

In addition, the BLM Tonopah RMP that covers the project area has developed rangeland programs that authorize livestock grazing on public lands [43 CFR 1601.0-5(b) and CFR 4100.08]. The regulations require that BLM manage livestock grazing on public lands under the principle of multiple use and sustained yield. To accomplish this, rangeland has been broken down into controllable allotments to manage short- and long-term objectives for livestock grazing. Allotments are leased to permittees for a defined period of time. Allotments are managed to increase availability of forage and develop improvements, and are evaluated periodically to determine whether management goals are being met.

3.14.2.3 Allotment Grazing Management Plan

A Grazing Management Plan has not been developed for the affected grazing allotment; therefore, management of grazing follows the guidelines provided in the RMP.

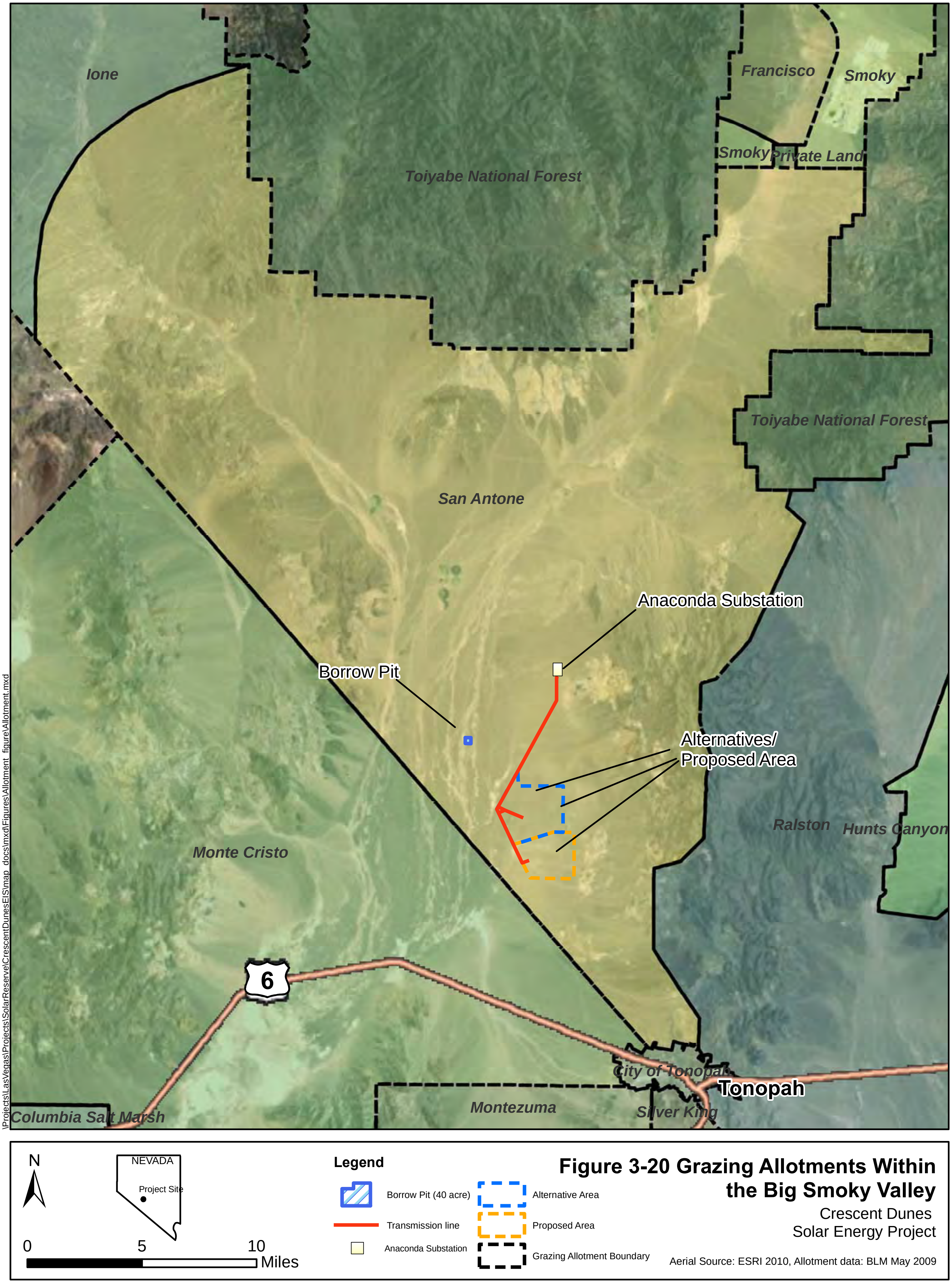
3.14.3 Affected Environment

3.14.3.1 Proposed Area

3.14.3.1.1 Livestock Grazing

The study area is open to livestock grazing as managed by BLM. The Proposed Area, the Alternative Area, the borrow pit, and the TL and Anaconda Moly Substation corridor are within the San Antone Grazing Allotment (Allotment Number 0073) based on BLM allotment maps (Figure 3-20). The San Antone Grazing Allotment covers 442,555 acres. One permittee is authorized to graze within this allotment, and the permittee is authorized to graze cattle at a stocking level of 13,505 animal unit months (32.7 acres per animal unit month). Access to the proposed project is along US 95, and then along SH 89 (Pole Line Road), which passes through the extreme northeastern edge of the Monte Cristo Grazing Allotment. However, because no construction would occur within this allotment, the area potentially affected is very small, and the same individual holds permits for grazing this allotment and the San Antone allotment and manages them as one—this evaluation does not address the Monte Cristo Allotment separately.

Grazing allotment management is guided by objectives and guidelines established in the RMP. Based on the RMP, the San Antone Allotment has been assigned an allotment management category of "Improve," which indicates that the management of the allotment is to focus on improving the current unsatisfactory resource condition.



Legend

Borrow Pit (40 acre)

Transmission line

Anaconda Substation

Alternative Area

Proposed Area

Grazing Allotment Boundary

Figure 3-20 Grazing Allotments Within the Big Smoky Valley

Crescent Dunes
Solar Energy Project

Aerial Source: ESRI 2010, Allotment data: BLM May 2009

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Important forage production plant species within this allotment include Indian ricegrass, winterfat, galleta grass, sand dropseed, shadscale, kochia, Nevada Ephedra, fourwing saltbush, and squirreltail (BLM 1997) (see Section 3.2, Vegetation) for MLRA ecological units within the project area, and forage species typically produced within these units include the species listed as important forage species.

No naturally occurring seeps or springs are present within or near the Proposed Area, the Alternative Area, the borrow pit, and the TL and Anaconda Moly Substation corridor. Also, no troughs, pipelines, or wells for cattle use have been developed near the Proposed Area or within the borrow pit or alignment for the TL corridor.

No fences, corrals, cattle guards, or other range improvements have been made in the vicinity of the proposed project, alternatives, or ancillary facilities.

3.14.3.2 Alternative Area

Existing conditions are the same as for the Proposed Area.

3.14.3.3 Borrow Pit

Existing conditions are the same as for the Proposed Area.

3.14.3.4 TL and Anaconda Moly Substation

Existing conditions are the same as for the Proposed Area.

3.14.3.5 CESA

Existing conditions are the same as for the Proposed Area.

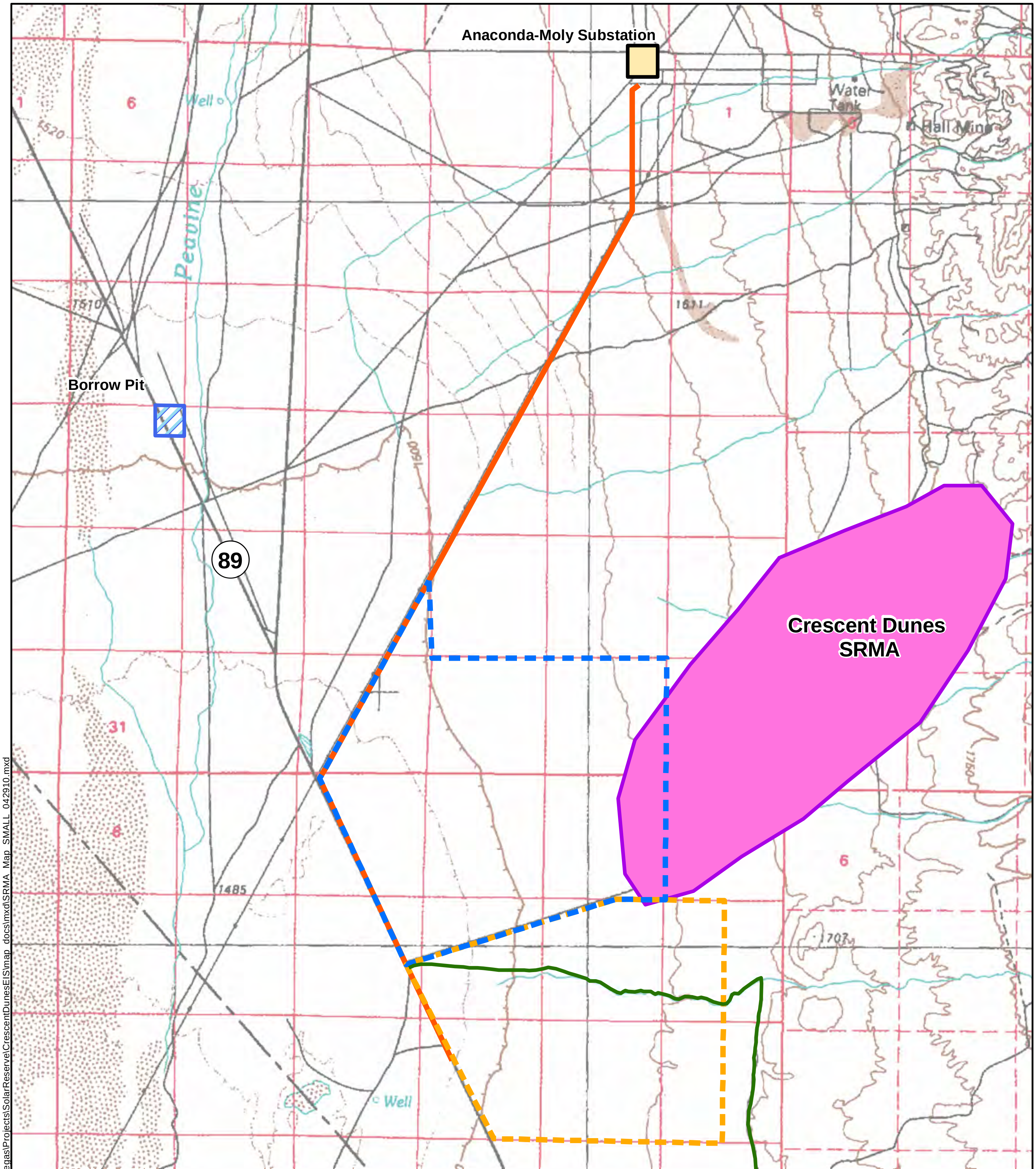
3.15 Recreation and Wilderness

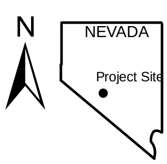
This section describes recreational opportunities in the project area and provides a discussion of the relevant recreation plans and policies.

3.15.1 Area of Analysis and Methodology

The area of analysis for recreation and wilderness resources includes the Proposed Area, Alternative Area, borrow pit, and TL corridor. The CESA for recreation/wilderness resources includes all federal, state, local, and private recreational areas within 25 miles of the project area.

To assess the existing condition of recreation and wilderness, the locations of national forests, wilderness areas, wilderness study areas, hunting units, campgrounds, and SRMAs were reviewed and are illustrated on Figures 3-21 and 3-22. In addition, these resources were evaluated within a 10-mile radius of the project area to assess potential cumulative effects (Figure 3-22). Additionally, the Statewide Comprehensive Outdoor Recreational Plan, hunter information sheets, and NDOW Big Game Statistics were reviewed to identify recreational opportunities within the project area.





Legend

- Transmission line
- Alternative Area
- Proposed Area
- Borrow Pit (40 acre)
- Rights-of-way avoidance areas (Crescent Dunes SRMA)
- Nevada Test and Training Range
- TRAC-ON Trail

0 0.6 1.2 Miles

Figure 3-21 Recreational Management Areas within the Project Area

Crescent Dunes Solar Energy Project

Aerial Source: ESRI 2010

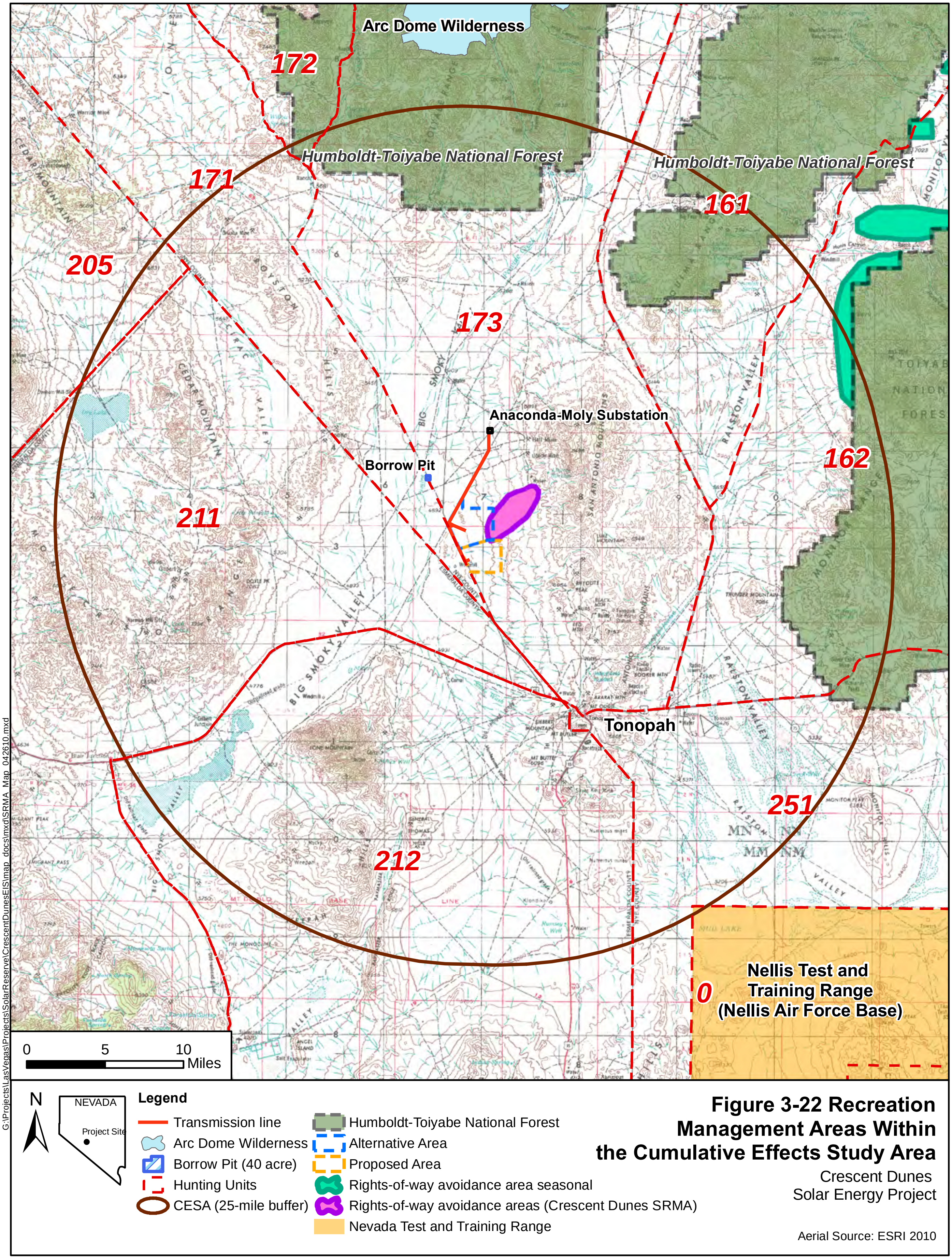


Figure 3-22 Recreation Management Areas Within the Cumulative Effects Study Area

Crescent Dunes Solar Energy Project

Aerial Source: ESRI 2010

3.15.2 Regulatory Framework

3.15.2.1 BLM and Tonopah RMP

The RMP provides the TFO with a comprehensive framework for managing 6.1 million acres of public land in Nye and Esmeralda counties. All public land within the planning area, unless otherwise classified as ROWs avoidance areas, is available for land use leases and permits under Section 302 of the FLPMA (43 CFR 2920). Regarding the ROWs avoidance areas, the RMP directs that ROWs and other discretionary land actions will be granted only if no feasible alternative routes are available. Any such leases, grants, or permits will include appropriate stipulations to protect the area's special values.

3.15.2.2 Nevada Hunting Statutes and Regulations

Hunting in the state of Nevada is governed by Nevada state law (NRS 503.005–503.660) and is implemented by NDOW in accordance with regulations NAC 503.141– 503.195.

3.15.3 Affected Environment

3.15.3.1 Proposed Area

3.15.3.1.1 Recreational Opportunities

The Crescent Dunes are unvegetated sand dunes that lie to the northeast of the Proposed Area. BLM manages Crescent Dunes as an SRMA that is approximately 3,000 acres (Figure 3-21). According to the RMP, vehicle use within the SRMA is limited to existing roads and trails. Off-highway vehicle use on unvegetated sand areas may be allowed provided that such vehicle use is compatible with the areas' values (BLM 1997). The BLM estimates that average annual visitation is 1,200 people (BLM 2010f). The RMP identifies this area as a ROW avoidance area. The Proposed Area does not overlap this SRMA ROW avoidance area. The only access to the dunes is an unnamed dirt road that diverges from Pole Line Road (Figure 3-21). This unnamed dirt road would be the same road that would lead to the Proposed Area. Currently, the Crescent Dunes SRMA is a semi-primitive recreational area with no established campground or facilities. Lack of any developed facilities may give recreationalists a sense of a remote recreational experience meaning that there is a lack of man-made structures and sounds.

Additionally, other recreational vehicle use may take place within the proposed project area. For example, TRAC-ON, a Las Vegas based recreation company, provides 3-5 day motorcycle and ORV tours of central Nevada; one of the routes passes through the Proposed area. TRAC-ON received a BLM Special Recreation Permit in August 2010 for the trail.

3.15.3.1.2 Hunting

The Proposed Area is completely within Hunting Unit 173. According to NDOW, mule deer, pronghorn antelope, and bighorn sheep are present within this hunting unit. However, it is unlikely that bighorn sheep would be found in the project area because this species prefers higher elevation habitats and spend the majority of time at elevations above 11,000 feet (NDOW 2010a).

Although NDOW says that mule deer may be found throughout the hunt unit, during hunting season NDOW specifies that the highest deer densities can be found above the pinyon-juniper habitat at higher elevations (between 8,500 and 10,000 feet) in more open habitat (NDOW 2010b). Also, according to NDOW, pronghorn sheep are spread out throughout this hunting unit. However, during hunting season, NDOW specifies that pronghorn antelope are associated with water sources or alfalfa fields (NDOW 2010c).

3.15.3.1.3 Wilderness Areas and Wilderness Study Areas

No designated Wilderness Areas or Wilderness Study Areas were identified in within the proposed area.

3.15.3.2 Alternative Area

The existing condition of the Alternative Area is similar to the Proposed Area, except that the Alternative Area overlaps approximately 130 acres of the ROWs avoidance area that is identified as the Crescent Dunes SRMA (Figure 3-22).

3.15.3.3 Borrow Pit

No specific recreational opportunities were identified within the borrow pit area.

3.15.3.4 TL and Anaconda Moly Substation

No specific recreational opportunities were identified within the TL and Anaconda Moly Substation corridor.

3.15.3.5 CESA

In addition to the recreational opportunities within the detailed study area, BLM and U.S. Forest Service lands are public lands that provide a wide variety of dispersed outdoor recreational opportunities within the CESA (Figure 3-22).

USDA Forest Service

The Humboldt-Toiyabe National Forest, managed by the U.S. Forest Service, provides numerous recreational opportunities within 25 miles of the project area. No private outdoor recreational opportunities were identified within the CESA.

The Humboldt-Toiyabe National Forest is a 2.5-million-acre national forest that is the largest national forest outside of Alaska. Recreational opportunities include hiking, camping, hunting, wildlife viewing, fishing, snowmobiling, cross-country skiing, and other activities. The southern boundary of the Humboldt-Toiyabe National Forest is approximately 19 miles from the Proposed Area. Located within the Toiyabe-Humboldt National Forest is Peavine Creek Campground, which is approximately 30 miles from the area of analysis. Peavine Creek Campground and the southeastern portion of the Humboldt-Toiyabe National Forest are most easily accessible from a unnamed dirt road that diverts from SH 376. The southern end of the range is most accessible by way of Pole Line Road and Peavine Creek Road. The southwestern portion of the Toiyabe Range is accessible by an unnamed dirt road that diverges from Pole Line Road.

ROW Avoidance Areas

An additional ROWs avoidance area was identified within the CESA on the western side of the Monitor Range (Figure 3-22), approximately 23 miles from the proposed project site. This area is identified as a sage-grouse hunting area, and must be avoided seasonally (February 15–May 15).

Hunting

Hunting is permitted on public land (BLM and U.S. Forest Service) within defined hunting seasons. NDOW manages hunting by hunt units (i.e., hunting management units throughout Nevada). A number of hunting units are within the CESA, including:

- southern portion of Units 161, 162, 171, 172, and 173
- eastern portion of Unit 205 and 211
- northern portion of Unit 212
- western portion of Unit 251

Species hunted within the CESA of the project area within these hunting units include mule deer, desert bighorn sheep, and pronghorn antelope. Within hunt units 161, 162, and 171, the Big Smoky Valley was identified as a good location to hunt pronghorn antelope. Unit 173 within the Arc Dome Wilderness Area of the Toiyabe Range was identified as good hunting grounds for mule deer. The Monte Cristo Range (unit 211) may have good hunting grounds for bighorn sheep, although NDOW claims that most animals are located in the more western portions of the units. Lastly, mule deer may be found in low densities throughout hunting units 212 and 251.

Wilderness Areas and Wilderness Study Areas

No Wilderness Areas or Wilderness Study Areas were identified within the CESA.

4.0 Environmental Consequences

This chapter discusses the environmental consequences that would result from construction and operation of the facility and associated components (TL, substation, borrow pit) of the Proposed Action, Alternative 1, Alternative 2, and the No Action Alternative. The impact analysis focuses on potential direct, indirect, and cumulative effects on each resource area described in Chapter 3.0, Affected Environment.

Direct Effects
Direct effects are the impacts caused by the construction and operation of the proposed project and alternatives and occur at the same time and place.

Indirect Effects
Indirect effects occur in the near and distant future and are caused by the proposed project and alternatives. The effects can be both short- and long-term effects.

Cumulative Effects
Cumulative effects are the sum of direct and indirect impacts of past, present, and reasonably foreseeable future projects in addition to the proposed project or alternatives in the CESA. As described in Chapter 3.0, Affected Environment, this area changes depending on the specific resource category.

The environmental consequences analysis has been prepared by imposing the Proposed Action, Alternative 1, Alternative 2, borrow pit, TL, and substation acreages onto data discussed in Chapter 3.0 for the Proposed Area, Alternative Area, borrow pit, TL, and substation. Table 4-1 lists the acreage used for the evaluations documented in this chapter.

Table 4-1. Estimated area (in acres) for each project component used in the assessment of impacts

Component	Right-of-Way (acreage)					
	Proposed Action		Alternative 1		Alternative 2	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Project site	0	1,498	0	1,499	0	1,499
Access road	0	2	0	5	0	2
Transmission line and substation	173	173	136	136	127	127
Borrow pit	40	0	40	0	40	0
Total	**213**	**1,673**	**176**	**1,640**	**167**	**1,628**

4.1 Vegetation

4.1.1 Methods

Biologists analyzed the effects of the Proposed Action, Alternative 1, Alternative 2, borrow pit, and the TL and Anaconda-Moly Substation corridor on vegetation resources. To assess the direct effects on vegetation resources, biologists used GIS to overlay the footprints of the project components on the mapped vegetation communities and land cover types to identify those resources that would be directly affected by project construction. The biologists then used GIS and the same datasets to calculate the amount of those resources in the CESA to gain insight as to the regional abundance of the communities that would be affected.

As part of the analysis of effects to vegetation, a noxious weed assessment was conducted in accordance with BLM Manual 9015. The first step in this analysis was to assign a numerical rating for Factor 1, which is the likelihood of noxious weed species spreading to the project area. Factor 2, which is the consequence of noxious weed establishment in the project area, was also given a numerical rating. These two factors were then multiplied and that value used to identify a risk rating for the project. The risk rating then identified guidelines for noxious weed control in the project area.

4.1.2 Proposed Action

4.1.2.1 Construction

Direct Effects

Construction activities associated with the Proposed Action would result in direct effects, including the removal of topsoil and vegetation within the project areas during grading activities. Approximately 1,500 acres (including the access road) would be graded in order to construct the project facilities (i.e., heliostats, power block, evaporation ponds, and administrative buildings), and a paved access road (Table 4-2). Within these areas, the constructed facilities would be present for the life of project, which is anticipated to be 33 years. Revegetation and reclamation activities following decommissioning and removal of the project would result in eventual reestablishment of vegetative cover (a reclamation plan is being developed by BLM). Table 4-2 presents the amount of vegetation communities or land cover types that would be replaced with project facilities and the percentage of that vegetation community or land cover type affected within the CESA (Figure 4-1).

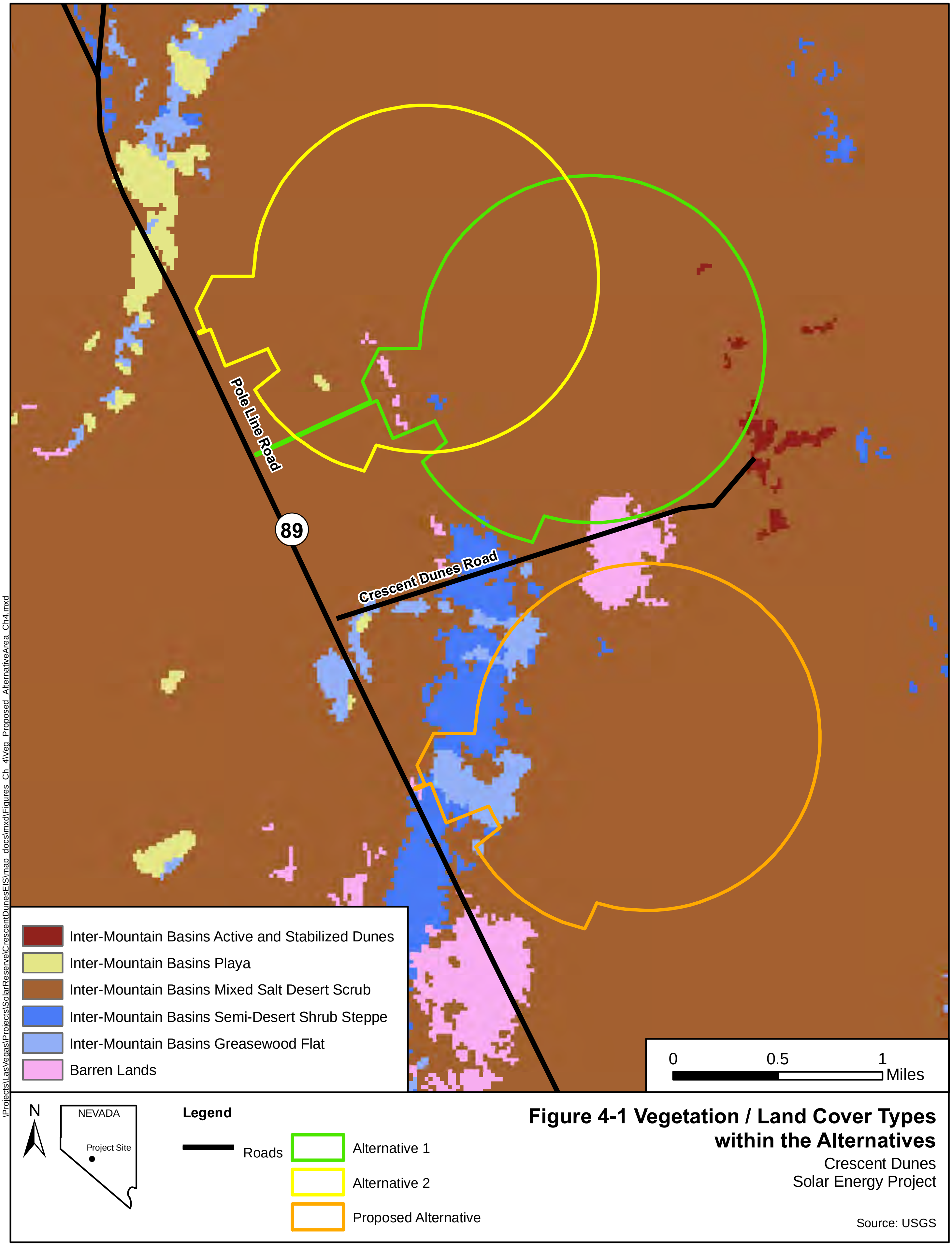


Figure 4-1 Vegetation / Land Cover Types within the Alternatives

Crescent Dunes
Solar Energy Project

Source: USGS

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Table 4-2. Summary of effects to vegetation communities or land cover types for the Proposed Action in the project footprint and the CESA

Southwest Regional Gap Analysis Project Vegetation Community or Land Cover Type	Area Replaced by Project Facilities (acres)	Vegetation Community/ Land Cover in Project Area (%)	Vegetation Community/ Land Cover Affected in the CESA (%)
Inter-Mountain Basins Mixed Salt Desert Scrub	1,325	88.4%	1.61%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	57	3.8%	2.02%
Inter-Mountain Basins Greasewood Flat	83	5.5%	2.68%
Barren Lands, Non-specific	35	2.3%	6.39%
Total	**1,500**	**100.0%**	**12.70%**

As illustrated in Table 4-2, the majority of the acreage that would be affected for the proposed project consists of Inter-Mountain Basins Mixed Salt Desert Scrub (1,325 acres), which is a small amount (1.61%) of the available salt desert scrub within the CESA (total area of 81,993 acres). This means that the majority of the vegetation that would be affected for the project is not unique habitat throughout the CESA. Similarly, only a small amount of Inter-Mountain Basins Semi-Desert Shrub Steppe (57 acres), Inter-Mountain Basins Greasewood Flat (83 acres), and Barren Lands (35 acres) would be affected compared with the available amount of these vegetation communities within the CESA.

Another direct effect of the proposed project is the potential for the introduction of noxious weeds into the project area. Noxious weed species were not found within the Proposed Area during field surveys, but were present in adjacent areas (i.e., near the borrow pit). The establishment of noxious weeds would have an effect on vegetation adjacent to the project area. Noxious weed species can displace native vegetation and diminish wildlife habitat quality. To determine the potential for noxious weeds in the project area, a Noxious Weed Risk Assessment was performed (see Section 4.1.1). Table 4-3 summarizes the results of the Noxious Weed Risk Assessment and the value assigned to the two risk factors.

Table 4-3. BLM noxious weed risk assessment factors and rating risk assessment factors worksheet (BLM 1992)

Factor	Rating for the Proposed Action	Value
Factor 1 – Likelihood of Noxious Weed Species Spreading to Project Area	Low: Noxious weed species present in areas adjacent to but not within the project area. Project activities can be implemented and prevent the spread of noxious weeds into the project area.	1
Factor 2 – Consequence of Noxious Weed Establishment in Project Area	Possible adverse effects on site and possible expansion of infestation within project area. Cumulative effects on native plant community are likely but limited.	5
	Total Risk Rating (Factor 1 Rating Value * Factor 2 Rating Value)	**5**

As presented in Table 4-3, the total risk rating for the proposed project is less than 10, resulting in a low risk rating. For this rating, BLM recommends proceeding with the project as planned. The Proponent would be required to initiate control treatment on noxious weed populations if they become established in the project area.

In addition to noxious weeds, the Proposed Area may be more vulnerable to the introduction of invasive species such as cheatgrass, Russian thistle, and halogeton. These species are not currently included on the NDA's Noxious Weed List, but are considered aggressive and can potentially dominate areas after introduction. Russian thistle and halogeton were documented in the Proposed Area, and project activities could further the establishment of these species. Cheatgrass was not documented in the Proposed Area, but is widespread throughout the Great Basin and could be introduced because of increased traffic in the area.

Indirect Effects

Vegetation in the project area will be removed during construction activities; therefore, no indirect effects to vegetation are associated with construction of the Proposed Action.

4.1.2.2 Operation

Direct Effects

Vegetation within the project area would be removed during construction activities, so no direct effects to vegetation are likely to occur during operation of the Proposed Action. Ongoing maintenance activities within the heliostat field, particularly the use of water for cleaning mirrors, may increase the potential for the establishment of noxious and invasive weed species within the developed areas, which then could spread to adjacent areas. Weed control measures within the project area would minimize the likelihood of this occurring.

Indirect Effects

Vegetation in the project area would be removed during construction activities, so no indirect effects to vegetation are likely to occur with operation of the Proposed Action.

4.1.3 Alternative 1

4.1.3.1 Construction

Direct Effects

The direct effects for Alternative 1 are similar to those for the Proposed Action, only differing in the acreage of vegetation communities or land cover types that would be affected (1,504 acres including access road). Table 4-4 presents the acreage of each of the vegetation communities or land cover types that would be affected during grading activities (Figure 4-1).

Table 4-4. Summary of effects to vegetation communities or land cover type for Alternative 1 in the project footprint and the CESA

Southwest Regional Gap Analysis Project Vegetation Community or Land Cover Type	Area Replaced by Project Facilities (acres)	Vegetation Community/ Land Cover in Project Area (%)	Vegetation Community/ Land Cover Affected in the CESA (%)
Inter-Mountain Basins Mixed Salt Desert Scrub	1,473	98.0%	1.77%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	3	0.2%	0.11%
Inter-Mountain Basins Active and Stabilized Dune	8	0.5%	16.23%
Barren Lands, Non-specific	20	1.3%	3.76%
Total	**1,503**	**100.0%**	**21.87%**

As presented in Table 4-4, most of the acreage that would be affected for Alternative 1 consists of Inter-Mountain Basins Mixed Salt Desert Scrub (1,473 acres), which is a small amount (1.77%) of the available salt desert scrub within the CESA (81,993 acres). This means that the majority of the vegetation that would be affected for the project is not unique habitat throughout the CESA. Similarly, only a small amount of Inter-Mountain Basins Semi-Desert Shrub Steppe (3 acres) and Barren Lands (20 acres) would be affected compared with the available amount of these vegetation communities within the CESA. However, approximately 8 acres of Inter-Mountain Basins Active and Stabilized Dunes would be affected by the proposed project, and this is a relatively high percentage (16.23%) of this unique land cover type available throughout the CESA.

No noxious weeds were observed within Alternative 1; therefore, the noxious weed assessment for Alternative 1 is the same as the Proposed Action (see Table 4-3). The total risk rating for Alternative 1 is less than 10, resulting in a low risk rating. For this rating, the BLM recommends proceeding with the project as planned. The Proponent would be required to initiate control treatment on noxious weed populations if they become established in the project area.

Indirect Effects

Vegetation in the project area would be removed during construction activities; therefore, no indirect effects to vegetation are associated with construction of the Alternative 1.

4.1.3.2 Operation

Direct Effects

Vegetation within the project area would be removed during construction activities, so no direct effects to vegetation are likely to occur during operation of the Alternative 1. Ongoing maintenance activities within the heliostat field, particularly the use of water for cleaning mirrors, may increase the potential for the establishment of noxious and invasive weed species within the developed areas, which then could spread to adjacent areas. Weed control measures within the project area would minimize the likelihood of this occurring.

Indirect Effects

Vegetation in the project area would be removed during construction activities, so no indirect effects to vegetation are likely to occur with operation of Alternative 1.

4.1.4 Alternative 2

4.1.4.1 <u>Construction</u>

Direct Effects

The direct effects for Alternative 2 are similar to those for the Proposed Action, only differing in the acreage of vegetation communities or land cover types that will be affected (1,401 acres including access road). Table 4-5 presents the acreage of the four vegetation communities or land cover types that would be affected during grading activities (Figure 4-1).

Table 4-5. Summary of effects to vegetation communities or land cover type for Alternative 2 in the project footprint and the CESA

Southwest Regional Gap Analysis Project Vegetation Community or Land Cover Type	Area Replaced by Project Facilities (acres)	Vegetation Community/ Land Cover in Project Area (%)	Vegetation Community/ Land Cover Affected in the CESA (%)
Inter-Mountain Basins Mixed Salt Desert Scrub	1,491	99.3%	1.80%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	2	0.1%	0.08%
Inter-mountain Basins Playa	2	0.1%	1.55%
Barren Lands, Non-specific	6	0.4%	1.21%
Total	**1,501**	**100.0%**	**4.64%**

As shown in Table 4-5, most of the acreage that would be affected for Alternative 2 consists of Inter-Mountain Basins Mixed Salt Desert Scrub (1,491 acres), which is a small amount (1.80%) of the available salt desert scrub within the CESA (81,993 acres). This means that the majority of the vegetation that would be affected for the project is not unique habitat throughout the CESA. Similarly, only a small amount of Inter-Mountain Basins Semi-Desert Shrub Steppe (2 acres), Inter-Mountain Basins Playa (2 acres), and Barren Lands (6 acres) would be affected compared with the available amount of these vegetation communities within the CESA.

No noxious weeds were observed within Alternative 2; therefore, the noxious weed assessment for Alternative 2 is the same as for the Proposed Action (see Table 4-3). The total risk rating for Alternative 2 is less than 10, resulting in a low risk rating. For this rating, the BLM recommends proceeding with the project as planned. The Proponent would be required to initiate control treatment on noxious weed populations if they become established in the project area.

Indirect Effects

Vegetation in the project area would be removed during construction activities; therefore, no indirect effects to vegetation are associated with construction of Alternative 2.

4.1.4.2 Operation

Direct Effects

Vegetation within the project area would be removed during construction activities, so no direct effects to vegetation are likely to occur during operation of Alternative 2. Ongoing maintenance activities within the heliostat field, particularly the use of water for cleaning mirrors, may increase the potential for the establishment of noxious and invasive weed species within the developed areas, which then could spread to adjacent areas. Weed control measures within the project area would minimize the likelihood of this occurring.

Indirect Effects

Vegetation in the project area would be removed during construction activities, so no indirect effects to vegetation are likely to occur with operation of Alternative 2.

4.1.5 Borrow Pit

The following subsections summarize the impacts of the construction and operation of the borrow pit together because the borrow pit would be open only until completion of construction of the generation facility.

Direct Effects

Expansion of the borrow pit would result in the removal of vegetation and topsoil, as well as the underlying materials that would be used for construction activities. Approximately 40 acres of vegetation would be removed for the expansion of the pit, affecting only the Inter-mountain Basins Mixed Salt Desert Scrub vegetation communities (Table 4-6). All construction activities are anticipated to remain within the area proposed for the pit, therefore, no temporary direct effects are likely to occur.

Table 4-6. Summary of effects to vegetation communities or land cover type for the borrow pit

Southwest Regional Gap Analysis Project Vegetation Community or Land Cover Type	Area Replaced by Project Facilities (acres)	Vegetation Community/ Land Cover in Project Area (%)	Vegetation Community/ Land Cover Affected in the CESA (%)
Inter-Mountain Basins Mixed Salt Desert Scrub	40	100.0%	0.05%
Total	40	100.0%	0.05%

As mentioned under the Proposed Action, noxious weeds were found adjacent to the borrow pit. Although the BLM risk rating for noxious weeds in the area is low (see Table 4-3), construction activities particularly near the borrow pit may facilitate the spread of noxious weeds throughout the project area. Three tamarisk plants and tall whitetop were found in a nearby wash. However, because these species are dependent on moist environments like those associated with the wash, it is unlikely that these species would spread to other parts of the project area. The majority of the project area is a drier environment that would not support such species.

Indirect Effects

Vegetation in the project would be removed during construction activities; therefore, no indirect effects to vegetation are likely to occur with construction of the borrow pit.

4.1.6 TL and Anaconda-Moly Substation

4.1.6.1 <u>Construction</u>

Direct Effects

Construction activities associated with the TL would result in both temporary and permanent direct effects on vegetation. Direct effects would be the removal of approximately 173 acres of vegetation to install TL poles and associated spur roads (i.e., construction and maintenance access roads that branch from the existing Pole Line Road and the other access roads). The short spur road and an area at the base of each tower would be graded to remove vegetation, as well as topsoil for the base of the towers. These facilities and the associated impacts would remain for the life of the project. In addition to these effects, temporary disturbances are likely to occur with construction and installation of the TL. Although the TL corridor would not be graded, trucks and equipment may drive over and crush existing vegetation to allow for tensioning of the lines and other activities. This temporary disturbance area is expected to be minimal because the TL corridor is directly adjacent to the existing Pole Line Road until it converges with the existing Anaconda-Millers TL, where an existing two-track dirt road is present. By avoiding the grading and vegetation removal in these temporary disturbance areas, vegetation may recover rapidly. Although efforts would be made to avoid it, some construction activities would require vegetation removal for safety or quality reasons. In those cases, vegetation would be cut at the ground surface, allowing the plants to sprout from the remaining crown.

The TL and Anaconda-Moly Substation may be more vulnerable to the introduction of invasive species such as cheatgrass, Russian thistle, and halogeton. Seeds of these species are easily spread because their seeds can get caught in vehicle tires and, if deposited in disturbed areas, could proliferate. Cheatgrass was not documented in the proposed corridor, but is widespread throughout the Great Basin and could be introduced because of increased traffic and disturbances during construction. Washing vehicles prior to arrival on site can mitigate this potential effect.

Indirect Effects

Where needed, vegetation would be removed for construction of the TL and substation; therefore, no indirect effects to vegetation are likely to occur with construction of the TL and Anaconda-Moly Substation.

4.1.6.2 Operation

Direct Effects

Generally, direct effects on vegetation from the normal operation and maintenance of the TL and substation are anticipated to be minimal. Maintenance of the access spur roads and base of transmission towers may include periodic removal of vegetation to minimize fire risks; however, those activities would be minimal.

Indirect Effects

Vegetation within the project area would be removed during construction activities, so no direct effects to vegetation are likely to occur during operation of the TL or the Anaconda-Moly Substation.

4.1.7 No Action Alternative

Under the No Action Alternative, no project-related impacts to existing vegetation communities or land cover types would occur.

4.1.8 Summary of Impacts

Direct impacts would include the removal of vegetation within the project area as the result of grading and construction activities. Indirectly, the project may increase the likelihood for the introduction and proliferation of invasive weed species in the surrounding area; however, there is a low risk for the introduction of noxious weeds into the surrounding area.

4.1.9 Mitigation

Between 1,628 and 1,673 acres of natural vegetation would be removed as a result of the various components of this project. Cactus and yucca would be salvaged in coordination with BLM. In coordination with BLM, the Proponent is developing a reclamation plan to be implemented at the termination of the lease.

The Proponent has developed a Preliminary Weed Risk Assessment and will develop Weed Management Plan (WMP) for the project. The WMP will prescribe management actions for monitoring and eradicating specified species by BLM-approved methods. The WMP also will describe applicable regulations for the use of herbicides on federally managed lands in Nevada, and provide the basis for proper management and use of herbicides in the project area. A preemergent herbicide would be applied in the spring, and spot foliar applications would be used throughout the year to maintain the area free of vegetation. Typically, operations and maintenance requirements for native landscapes are low once established. The WMP will include weeding, annual pruning, and soil monitoring, if necessary. Weeding should occur frequently, typically weekly, during the initial growth period to ensure that invasive plants do not mature and set seed. Weeding activities would follow the approved WMP. Once the native plant species are established, weeding frequency would drop to less frequent intervals.

4.2 Wildlife

4.2.1 Methods

Biologists analyzed the effects of the Proposed Action, Alternative 1, Alternative 2, borrow pit, and the TL and Anaconda-Moly Substation corridor on wildlife resources. Direct impacts to wildlife were assessed by taking into consideration how construction and operation of the facilities may directly kill, injure, harm, or harass wildlife, or affect wildlife behavior patterns. To assess the indirect effects on wildlife resources, biologists identified the type and quantity of terrestrial wildlife habitat affected as a result of project levels of surface disturbance in relation to the habitat available throughout the CESA (see Section 4.1).

4.2.2 Proposed Action

4.2.2.1 Construction

Direct Effects

Direct effects to wildlife may include injury or mortality during initial grading activities. Some wildlife such as game and bird species that are particularly mobile may be able to avoid injury or mortality by leaving the area. However, some wildlife such as smaller mammals and lizards, especially nocturnal species or species that utilize burrows, may be injured or killed during grading or clearing activities.

Increased traffic and newly established access roads in the area may result in an increase of vehicle-wildlife collisions, resulting in animal injury or death. This may be of particular concern for larger mammals (such as coyotes and kit foxes), game animals (such as deer and pronghorn), and smaller species that utilize roads as a heat source (such as snakes and lizards). The effect on birds is anticipated to be minimal given that birds are generally able to avoid vehicles traveling on roads.

Although temporary in nature, direct effects may occur as a result of increased noise levels associated with construction activities. Noise may cause wildlife to avoid the area, resulting in a disruption of normal behavioral patterns.

The proposed project also may directly affect wildlife species by removing approximately 1,500 acres of habitat. However, most of this habitat consists of Inter-mountain Basins Mixed Salt Desert Scrub (see Section 4.1). This is a relatively small proportion (less than 2 percent) of the available salt desert scrub habitat available throughout the CESA. The Proposed Action would not remove any specialized or unique habitat throughout the region.

Indirect Effects

Wildlife may be indirectly affected because of increased human activity in the area. This increased activity may cause wildlife to avoid the adjacent area, possibly affecting migration and other activities.

4.2.2.2 Operation

Direct Effects

One of the major direct effects to wildlife associated with operation of the Proposed Action would be the effect of the evaporation ponds on wildlife, particularly birds. Since most birds in the project area are considered migratory birds and effects to migratory birds and year-round resident birds are the same, evaporation pond effects on birds are discussed in Section 4.4.

The evaporation ponds could potentially attract other wildlife to the project site, although larger wildlife would be excluded from the area by a fence that surrounds the facility. The water in the evaporation ponds would be saturated with salt (making a brine solution). Wildlife that could breach the fence and access the ponds (such as mice, bats, and reptiles) may die or become ill by ingesting toxic levels of salt.

Indirect Effects

Wildlife may be indirectly affected because of increased human activity in the area. This increased activity may cause wildlife to avoid the adjacent area, possibly affecting migration and other activities.

4.2.3 Alternative 1

4.2.3.1 Construction

Direct Effects

Direct effects associated with Alternative 1 are similar to those for the Proposed Action, except that Alternative 1 would remove approximately 8 acres of Inter-Mountain Basins Active and Stabilized Dunes, which is a relatively large percentage (16.23 percent) of this habitat type available throughout the CESA (see Section 4.1). Removal of this type of habitat may affect species that specifically depend on this habitat, such as kangaroo rats and mice. Kangaroo mice are considered a special status species and are addressed in Section 4.4.

Indirect Effects

Indirect effects associated with the construction of Alternative 1 would be the same as those associated with the Proposed Action.

4.2.3.2 Operation

Direct Effects

Direct effects associated with the operation of Alternative 1 would be the same as those associated with the Proposed Action.

Indirect Effects

Indirect effects associated with the operation of Alternative 1 would be the same as those associated with the Proposed Action.

4.2.4 Alternative 2

4.2.4.1 Construction

Direct Effects

Direct effects on wildlife associated with the construction of Alternative 2 would be similar to those of the Proposed Action. Alternative 2 may indirectly affect wildlife species by removing approximately 1,501 acres of habitat. However, most of this habitat consists of Inter-mountain Basins Mixed Salt Desert Scrub (see Section 4.1). This is a relatively small proportion (less than 2 percent) of the available salt desert scrub habitat available throughout the CESA. Alternative 2 would not remove any specialized or unique habitat throughout the region.

Indirect Effects

Indirect effects associated with the construction of Alternative 2 would be the same as those associated with the Proposed Action.

4.2.4.2 Operation

Direct Effects

Direct effects on wildlife associated with the operation of Alternative 2 would be the same as those associated with the Proposed Action.

Indirect Effects

Indirect effects associated with the operation of Alternative 2 would be the same as those associated with the Proposed Action.

4.2.5 Borrow Pit

The following subsections summarize the impacts of the construction and operation of the borrow pit together because the borrow pit would be open only until completion of construction of the generation facility.

Direct Effects

Construction of the borrow pit may directly affect wildlife species by removing approximately 40 acres of habitat. However, all of this habitat consists of Inter-mountain Basins Mixed Salt

Desert Scrub (see Section 4.1). The vegetation communities affected would be relatively small proportions (less than 1 percent) of the available habitat throughout the CESA. Construction of the borrow pit would not remove any specialized or unique habitat throughout the region.

Indirect Effects

Indirect effects associated with the construction of the borrow pit would be the same as those associated with the Proposed Action.

4.2.6 TL and Anaconda-Moly Substation Corridor

4.2.6.1 Construction

Direct Effects

Direct effects on wildlife associated with construction of the TL and Anaconda-Moly Substation corridor would be similar to those of the Proposed Action; between approximately 127 and 173 acres (depending on the alternative chosen) of wildlife habitat would be removed to install TL poles and spur roads. The new TL would be located in an existing utility corridor, paralleling an existing TL (Anaconda-Millers), along Pole Line Road. The existing utility corridor includes an existing maintenance road (2-track dirt) for the Anaconda-Millers TL. Because the proposed TL would follow existing roads (ROW), no new barriers would impede wildlife movement throughout the lower Big Smoky Valley; therefore, impacts to wildlife would be minimal.

Indirect Effects

Indirect effects associated with the construction of the TL and Anaconda-Moly Substation would be the same as those associated with the Proposed Action.

4.2.6.2 Operation

Direct Impacts

The major direct effect on wildlife associated with the TL and Anaconda-Moly Substation corridor is the potential effect of power lines on birds. Since the effects to year-round resident birds would be the same as the effects to migratory birds, TL effects are discussed in Section 4.4.

Indirect Effects

Indirect effects associated with the operation of the TL and Anaconda-Moly Substation would be the same as those associated with the Proposed Action.

4.2.7 No Action Alternative

Under the No Action Alternative, no project-related impacts to wildlife would occur.

4.2.8 Summary of Impacts

Impacts to wildlife are likely to include the loss of habitat attributable to conversion to the generation facility, excavation of aggregate in the borrow pit, and construction of the TL. During these activities, wildlife that is unable to flee the area may be injured or killed by heavy equipment. Additional injuries or deaths may occur as a result of vehicle collisions involving construction and operation vehicles, as well as those vehicles being driven by employees commuting to and from their residences and the project site. It is possible that some wildlife may be affected by the brine formed in the on-site evaporation ponds.

4.2.9 Mitigation

In addition to fencing that would exclude larger wildlife, the evaporations ponds would covered with a porous screen, which would allow evaporation but exclude wildlife (i.e. birds, mice and bats). Additional mitigation is described in Section 4.5.11. Mitigation would be further developed in coordination with NDOW as part of the Industrial Artificial Pond Permit.

4.3 Special Status Plant Species

4.3.1 Methods

Biologists analyzed the effects of the Proposed Action, Alternative 1, Alternative 2, borrow pit, and TL and Anaconda-Moly Substation corridor on special status plant species. To assess the direct effects on special status plant species, biologists used GIS to overlay the footprints of the project components on the mapped special status plant species to identify those resources that would be directly affected by project construction. Because of the lack of data on regional distribution of this species, the biologists then used GIS and the same datasets to calculate the percentage of special status plant species potential habitat that would be affected throughout the CESA. Figure 4-2 shows the Nevada oryctes habitat that would be affected by the Proposed Action, Alternative 1, and Alternative 2.

4.3.2 Proposed Action Alternative

4.3.2.1 <u>Construction</u>

Direct Effects

Construction activities associated with the Proposed Action would directly affect Nevada oryctes by removing plants and suitable habitat within the project areas during grading activities. Approximately 1,374 acres of suitable habitat for Nevada oryctes would be graded in order to construct the project facilities (i.e., heliostats, power block, evaporation ponds, and administrative buildings) and a paved access road. This is approximately 5.3 percent of the available suitable habitat identified within the CESA (25,880 acres).

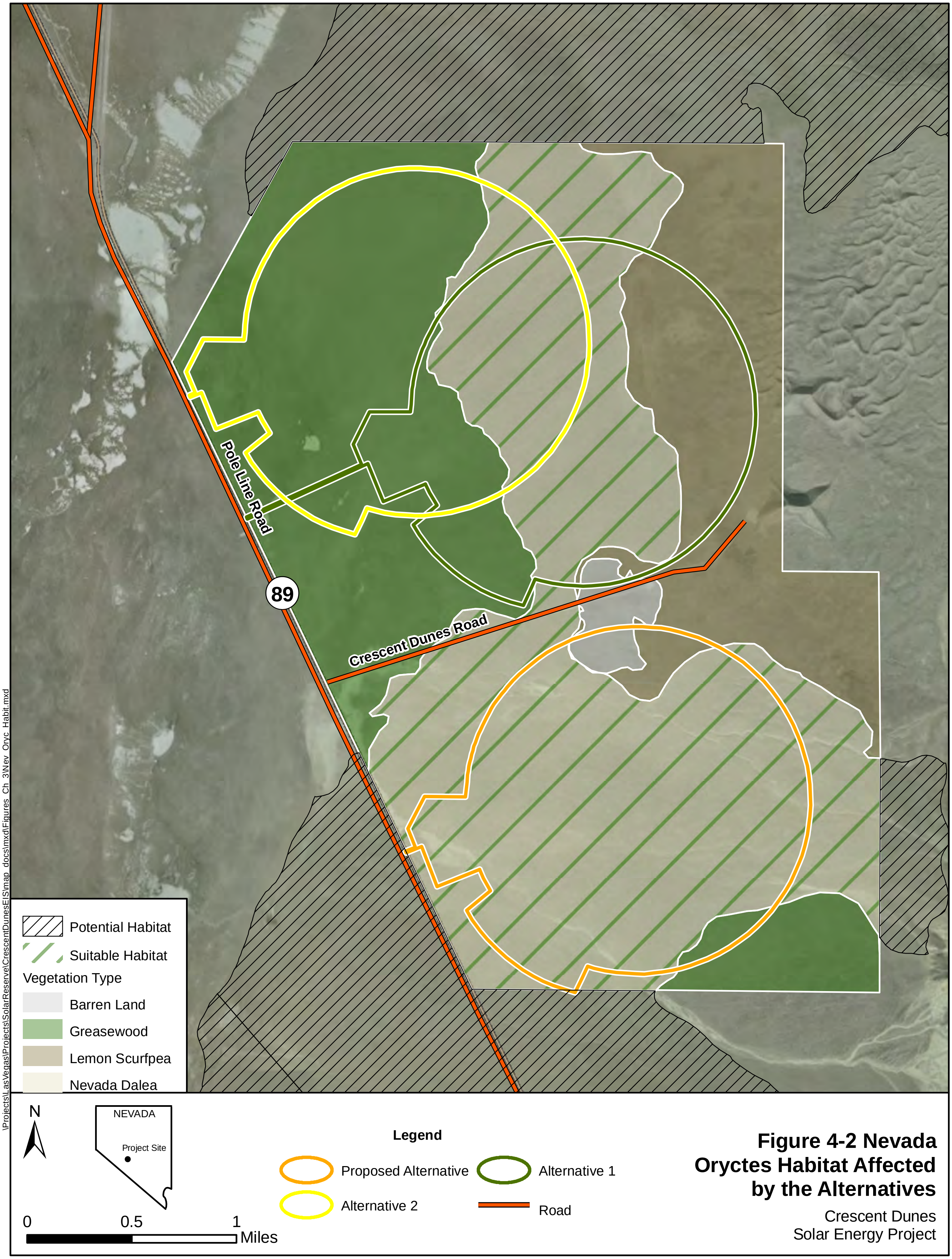

Figure 4-2 Nevada Oryctes Habitat Affected by the Alternatives

Crescent Dunes
Solar Energy Project

\Projects\LasVegas\Projects\SolarReserve\CrescentDunesEIS\map_docs\mxd\Figures_Ch_3\Nev_Oryc_Habit.mxd

Indirect Effects

Nevada oryctes and associated habitat within the project area would be removed during construction activities, and all construction activities would stay within the disturbed area; therefore, no indirect effects on Nevada oryctes are associated with construction of the Proposed Action.

4.3.2.2 Operation

Direct Effects

Nevada oryctes and associated habitat within the project area would be removed during construction activities, so no direct effects on Nevada oryctes are likely to occur during operation of the Proposed Action.

Indirect Effects

Nevada oryctes and associated habitat in the project area would be removed during construction activities, so no indirect effects to this species are likely to occur with operation of the Proposed Action.

4.3.3 Alternative 1

4.3.3.1 Construction

Direct Effects

Construction activities associated with Alternative 1 would directly affect Nevada oryctes by removing plants and suitable habitat within the project area during grading activities. Approximately 803 acres of suitable habitat for oryctes would be graded in order to construct the project facilities (i.e., heliostats, power block, evaporation ponds, and administrative buildings) and a paved access road (Figure 4-2). This is approximately 3.1 percent of the available suitable habitat identified within the CESA (25,880 acres).

Indirect Effects

Nevada oryctes and associated habitat within the project area would be removed during construction activities; therefore, no indirect effects to vegetation would be associated with construction of Alternative 1.

4.3.3.2 Operation

Direct Effects

Nevada oryctes and associated habitat within the project area would be removed during construction activities, so no direct effects to Nevada oryctes are anticipated during operation of the Alternative 1.

Indirect Effects

Nevada oryctes and associated habitat in the project area would be removed during construction activities, so no indirect effects to vegetation are likely to occur with operation of Alternative 1.

4.3.4 Alternative 2

4.3.4.1 Construction

Direct Effects

Construction activities associated with Alternative 2 would directly affect Nevada oryctes by removing plants and suitable habitat within the project areas during grading activities. Approximately 434 acres of suitable habitat for oryctes would be graded in order to construct the project facilities (i.e., heliostats, power block, evaporation ponds, and administrative buildings) and a paved access road (Figure 4-2). This is approximately 1.7 percent of the available suitable habitat identified within the CESA (25,880 acres).

Indirect Effects

Nevada oryctes and associated habitat within the project area would be removed during construction activities; therefore, no indirect effects to vegetation are associated with construction of Alternative 2.

4.3.4.2 Operation

Direct Effects

Nevada oryctes and associated habitat within the project area would be removed during construction activities, so no direct effects to Nevada oryctes are likely to occur during operation of Alternative 2.

Indirect Effects

Nevada oryctes and associated habitat in the project area would be removed during construction activities, so no indirect effects to vegetation are likely to occur with operation of Alternative 2.

4.3.5 Borrow Pit

The following subsections summarize the impacts of the construction and operation of the borrow pit together because the borrow pit would be open only until completion of construction of the generation facility.

Direct Effects

No special status plant species or Nevada oryctes habitat were found in the borrow pit; therefore, no direct effects to special status plants species are associated with construction of the borrow pit.

Indirect Effects

No special status plant species or Nevada oryctes habitat were found in the borrow pit; therefore, no indirect effects to special status plants species are associated with construction of the borrow pit.

4.3.6 TL and Anaconda-Moly Substation Corridor

4.3.6.1 <u>Construction</u>

Direct Effects

In 2009, one Nevada oryctes plant was found within the TL corridor, and the northern portion of the corridor was classified as suitable habitat. However, only a relatively small area within the TL corridor would be affected by grading and excavation activities needed to install TL poles.

Indirect Effects

Construction activities within the TL corridor may increase the spread of nonnative invasive plant species throughout the area (see Section 4.1). Introduction of nonnative invasive plant species could potentially displace Nevada oryctes or limit its reproduction success because invasive species can often dominate areas, out-competing native plants. Mitigation measures would be taken to limit the spread of invasive species throughout the TL area (see Section 4.1).

4.3.6.2 <u>Operation</u>

Direct Effects

No direct effects to special status plant species are associated with operation of the TL and Anaconda-Moly Substation corridor.

Indirect Effects

No indirect effects to special status plant species are associated with operation of the TL and Anaconda-Moly Substation corridor.

4.3.7 No Action Alternative

Under the No Action Alternative, no project-related impacts to special status plant species would occur.

4.3.8 Summary of Impacts

Direct impacts to Nevada oryctes would include removing plants and suitable habitat areas during grading activities. Indirect impacts may include the introduction on nonnative invasive species into adjacent oryctes habitat, which may potentially affect habitat quality and oryctes reproduction success.

4.3.9 Mitigation

BLM, NDOW, and TSE is in the process of developing a mitigation plan for impacts to wildlife, the final plan will be included as part of the Final EIS.

4.4 Special Status Wildlife Species

4.4.1 Methods

Biologists analyzed the effects of the Proposed Action, Alternative 1, Alternative 2, borrow pit, and TL and Anaconda-Moly Substation corridor on special status wildlife species. Direct impacts to special status wildlife were assessed by taking into consideration how construction and operation of the facilities may directly injure, harm, or harass special status wildlife species, or affect their behavior patterns. To assess the indirect effects on special status species, biologists identified the type and quantity of terrestrial wildlife habitat affected as a result of project levels of surface disturbance in relation to the habitat available throughout the CESA (see Section 4.1).

4.4.2 Proposed Action

4.4.2.1 Construction

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects to pale kangaroo mice would include injury or mortality during initial grading activities associated with construction of the facility and roadway, and the resulting loss of habitat. Mice occupying approximately 1,466 acres of habitat would be directly affected (Figure 4-3). This is approximately 5 percent of the available potential habitat identified within the CESA (29,343 acres).

Direct effects to a wide variety of special status bat species would include the removal of approximately 1,673 acres of potential foraging habitat. The Proposed Action would not restrict bat migration throughout the lower Big Smoky Valley.

Golden Eagles and Migratory Birds

Golden eagles and migratory birds would be directly affected because the project would remove approximately 1,500 acres of potential foraging habitat for golden eagles and nesting and foraging habitat for migratory birds. However, most of this habitat consists of Inter-mountain Basins Mixed Salt Desert Scrub, and this represents a relatively small proportion (less than 2 percent) of the available salt desert scrub habitat available throughout the CESA and a small area in relation to the lower Big Smoky Valley. The Proposed Action would not restrict bird migration throughout the lower Big Smoky Valley, but may destroy a small proportion of the available migratory bird habitat and golden eagle foraging habitat.

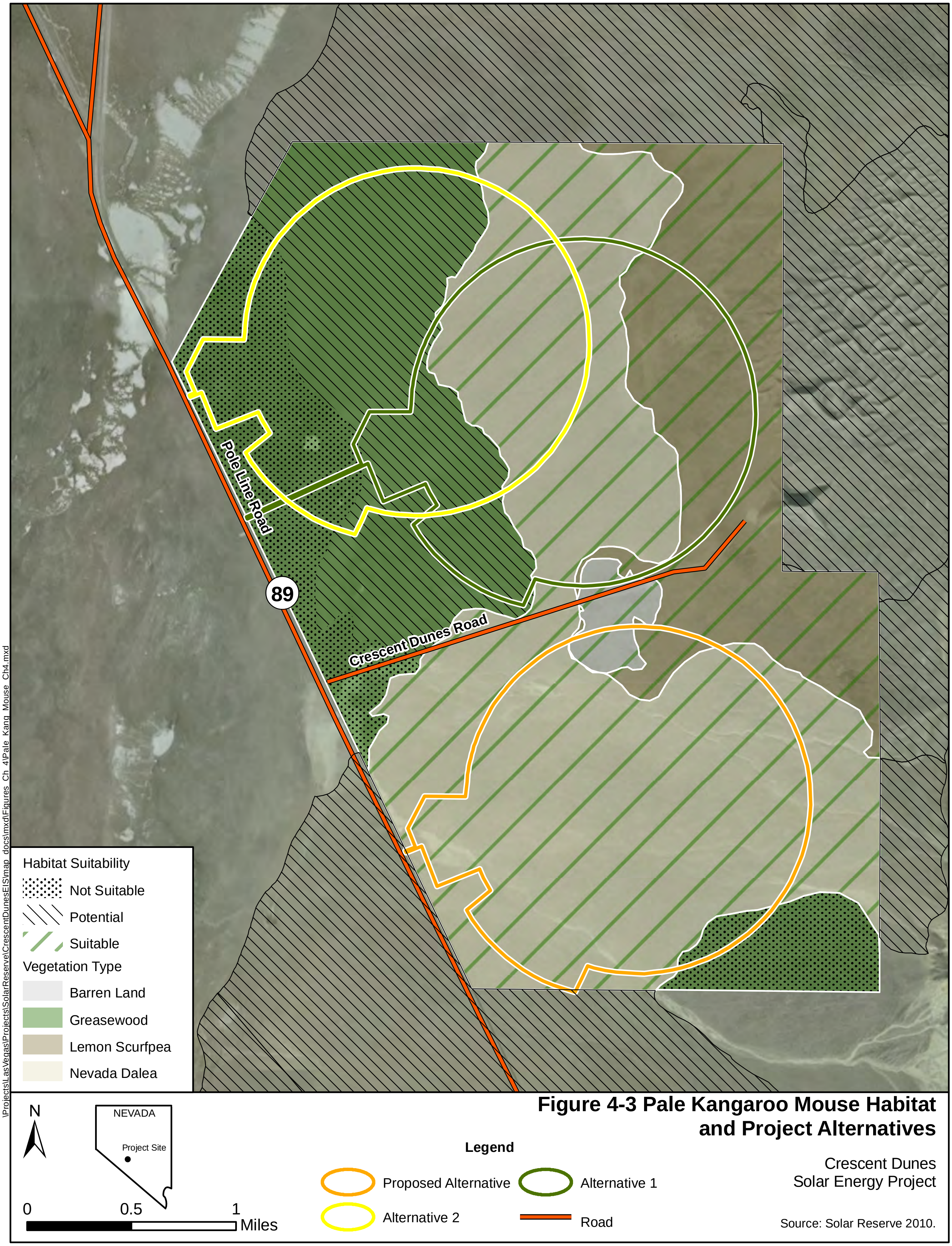

Figure 4-3 Pale Kangaroo Mouse Habitat and Project Alternatives

Crescent Dunes
Solar Energy Project

Source: Solar Reserve 2010.

Because most birds are highly mobile, and initial construction activities would not occur during nesting periods, it is unlikely that grading activities associated with project construction would result in bird injury or death because most birds can flee the area. However, a few species such as burrowing owls may be more susceptible to injury or death during grading activities because they may hide in their burrows and not be able to flee in time. Grading activities could destroy nests; however, disturbances to nesting birds would be avoided by implementing mitigation measures. Mitigation would include restricting grading activities during migratory bird breeding season (April 1 – August 31) or having a monitoring biologist on-site during grading activities so that nests can be identified and avoided. Increased noise levels during construction may cause birds to avoid the area temporarily, possibly disrupting normal behavior patterns.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no direct effects to special status reptile species are likely to occur with construction of the project.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No direct effects of the Proposed Action on special status insects are likely to occur because these species are associated with the Crescent Dunes, and the dunes do not extend into the Proposed Area.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

No indirect effects on the pale kangaroo mouse or special status bat species from the construction of this project are likely to occur.

Golden Eagles and Migratory Birds

No indirect effects on golden eagles or migratory birds from the construction of the proposed project are likely to occur.

Reptiles

No special status reptiles were observed or have the potential to occur within the Proposed Area; therefore, no direct effects to special status reptiles are associated with construction of the Proposed Action.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No indirect effects of the Proposed Action on these special status insects are likely to occur because these species are associated with the Crescent Dunes, and the dunes do not extend into the Proposed Area.

4.4.2.2 Operation

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects to pale kangaroo mice and bats may result from the operation of the facility's evaporation ponds. Mice and bats may be attracted to the water in the ponds (and would not be excluded by the fence around the facilities). The water in the evaporation ponds would be saturated with salt (making a brine solution). If mice or bats ingest water from the pond, they may become ill or die from sodium toxicity. Mice and bats could also fall into the ponds and drown if no escape route is available.

Golden Eagles and Migratory Birds

Direct effects may include bird injury or mortality during operation because of the presence of evaporation ponds associated with the facility, the presence of additional structures in the area, and the presence of the high-temperature central receiver. The evaporation ponds may attract birds to the project site. The water in the evaporation ponds would be saturated with salt (making a brine solution). Birds using the evaporation pond could ingest the brine and die from sodium toxicity if a freshwater source is not available nearby (USFWS 2009b). Additionally, birds that utilize the water may experience a build-up of sodium crystals in their feathers, resulting in a reduction of the feathers' thermoregulatory properties, causing the birds to die of hypothermia during cold weather (USFWS 2009b). A porous screen would cover the evaporation ponds this minimizing/eliminating these effects on golden eagles and migratory birds.

A potential direct effect of the project on golden eagles and other migratory birds is death or injury resulting from collisions with structures associated with the project. A variety of species of birds have been documented colliding with buildings and other structures, resulting in death or injury. Such collisions probably occur because of the reflection of the sky in the structure. A study on a project similar to this proposed project found that a variety of migratory birds were injured or killed after colliding with various components of the facility (McCrary et al. 1986). However, the study found that only a small proportion (less than 1 percent) of the birds in the area were affected.

Another potential direct effect on golden eagles and other migratory birds is injury or death associated with the heat generated by the central receiver/tower component of the proposed project. Reflected solar energy would be focused on the central receiver/tower, causing the surface temperature of the receiver to exceed 1,000 degrees Fahrenheit during the day. In the 40-week study at the previously mentioned project site with the central receiver, several birds were found dead at the base of the central tower; they had been severely singed or burned (McCrary et al. 1986). The dead birds were small, fast-flying species (swallows), and the authors speculated that the birds may have been unable to alter course at high speeds to avoid the heat in time to prevent injury. Based on these findings, it is possible that other migratory birds that fly at elevations similar to the receiver (600 feet), and those attracted to the tower as a potential perch or roost site, including golden eagles, may be at risk of death or injury.

Reptiles

No special status reptiles were observed or have the potential to occur within the Proposed Area; therefore, no direct effects to special status reptile species are associated with operation of the project.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

As stated previously, it is unlikely that special status insects would be found in the Proposed Area; therefore, no direct effects to special status insects are likely to occur from operation of the Proposed Action.

Indirect Effects

Mammals: Pale Kangaroo Mouse and Bats

Pale kangaroo mouse habitat and bat foraging habitat within the project area would be removed during construction activities. No indirect effects to these species are likely to occur during operation of the facility.

Additionally, project structures may provide roosting opportunities for raptors, owls, and other predatory birds that prey on sensitive species such as the pale kangaroo mouse and various bat species, thus increasing predation pressure on these sensitive species.

Golden Eagles and Migratory Birds

Migratory bird habitat and golden eagle foraging habitat within the project area would be removed during construction activities. No indirect effects to these species are likely to occur during operation of the facility.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area. No indirect effects to special status reptile species are associated with operation of the Proposed Action.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

As stated previously, it is unlikely that special status insects would be found in the Proposed Area. No indirect effects to special status insects are likely to result from operation of the Proposed Action.

4.4.3 Alternative 1

4.4.3.1 Construction

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects on special status mammal species associated with the construction of Alternative 1 would be similar to those associated with the Proposed Action, including the potential injury and death of mice in the area and the loss of habitat associated with construction of the facility. However, Alternative 1 would remove 1,191 acres of pale kangaroo mouse habitat. Additionally, Alternative 1 would remove 306 acres of potential habitat, which is greasewood dominated mixed salt desert scrub with sandy soil or “mini” dune features. This is approximately 4.1 percent of the available potential habitat identified within the CESA (29,343 acres).

Direct effects to a wide variety of special status bat species would include the removal of approximately 1,640 acres of potential foraging habitat. Alternative 1 would not restrict bat migration throughout the lower Big Smoky Valley.

Golden Eagles and Migratory Birds

Direct effects on golden eagles and migratory birds associated with construction of Alternative 1 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the Proposed Area; therefore, no indirect effects to special status reptile species are associated with operation of the Proposed Action.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Alternative 1 would have the greatest potential effects on special status insect species compared with the other alternatives because this location would grade approximately 8 acres of Inter-Mountain Basins Active and Stabilized Dunes Habitat (see Section 4.1). This is the specific habitat on which these species depend. Direct effects to special status insect species may include injury or mortality during initial grading activities associated with construction of the facility and roadway. Insects may be able to avoid injury or death by flying away from grading activities.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

Indirect effects to special status mammal species associated with the construction of Alternative 1 would be the same as those associated with the Proposed Action.

Golden Eagles and Migratory Birds

Indirect effects to golden eagles and migratory birds associated with the construction of Alternative 1 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no indirect effects to special status reptile species are likely to occur with operation of Alternative 1.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Indirect effects to special status insect species would include habitat loss (see Section 4.1). Alternative 1 would remove 8 acres of the Crescent Sand Dunes (also known as Inter-mountain Basins Active and Stabilized Dunes), and this is a relatively high proportion (16.23 percent) of sand dune habitat available within the CESA.

4.4.3.2 Operation

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects to special status mammal species associated with operation of Alternative 1 would be the same as those associated with the Proposed Action.

Golden Eagles and Migratory Birds

Direct effects to golden eagles and migratory birds associated with operation of Alternative 1 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no direct effects to special status reptile species are associated with operation of Alternative 1.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Special status insect habitat would be removed during grading activities associated with the construction of the facility and roadway; therefore, no direct effects to special status insects would be associated with the operation of Alternative 1.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

Indirect effects to special status mammals associated with operation of Alternative 1 would be the same as those associated with the Proposed Action.

Golden Eagles and Migratory Birds

Indirect effects to golden eagles and migratory birds associated with operation of Alternative 1 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no direct effects to special status reptile species are associated with the operation of Alternative 1.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Special status insect habitat would be removed during grading activities associated with the construction of the facility and roadway; therefore, no direct effects to special status insects would be associated with the operation of Alternative 1.

4.4.4 Alternative 2

4.4.4.1 Construction

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects on special status mammal species associated with construction of Alternative 2 would be similar to those associated with the Proposed Action, including the potential injury or death of mice in the area and the loss of habitat associated with construction of the facility. Alternative 2 would remove the least amount of pale kangaroo mouse habitat (434 acres), and a smaller portion of this area has sandy soils (because of the distance from the dunes) and contains less lemon scurfpea and Nevada dalea-dominated mixed salt desert scrub vegetation. Additionally, 761 acres of potential habitat (i.e., greasewood-dominated areas with sandy soils) would be removed. This is approximately 2.7 percent of the available suitable habitat identified within the CESA (29,343 acres).

Direct effects to a wide variety of special status bat species would include the removal of approximately 1,628 acres of potential foraging habitat. Alternative 2 would not restrict bat migration throughout the lower Big Smoky Valley.

Golden Eagles and Migratory Birds

Direct effects on golden eagles and migratory birds associated with the construction of Alternative 2 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no indirect effects to special status reptile species are associated with construction of Alternative 2.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No direct effects to special status insect species are associated with the construction of Alternative 2 because these species are endemic to the Crescent Dunes, and the dunes do not extend into the Alternative 2 project area.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

Indirect effects to special status mammal species associated with construction of Alternative 2 would be the same as those associated with the Proposed Action.

Golden Eagles and Migratory Birds

Indirect effects to golden eagles and migratory birds associated with construction of Alternative 2 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no indirect effects to special status reptile species are associated with construction of Alternative 2.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No indirect effects to special status insect species are associated with construction of Alternative 2 because these species are endemic to the Crescent Dunes, and the dunes do not extend into the Alternative 2 project area.

4.4.4.2 Operation

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects to special status mammal species associated with operation of Alternative 2 would be the same as those associated with the Proposed Action.

Golden Eagles and Migratory Birds

Direct effects to golden eagles and migratory birds associated with operation of Alternative 2 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no direct effects to special status reptile species are associated with the operation of Alternative 2.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No direct effects to special status insect species are associated with the operation of Alternative 2 because these species are endemic to the Crescent Dunes, and the dunes do not extend into the Alternative 2 project area.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

Indirect effects to special status mammals associated with operation of Alternative 2 would be the same as those associated with the Proposed Action.

Golden Eagles and Migratory Birds

Indirect effects to golden eagles and migratory birds associated with operation of Alternative 2 would be the same as those associated with the Proposed Action.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no direct effects to special status reptile species are associated with the operation of Alternative 2.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No indirect effects to special status insect species are associated with the operation of Alternative 2 because these species are endemic to the Crescent Dunes, and the dunes do not extend into the Alternative 2 project area.

4.4.5 Borrow Pit

The following subsections summarize the impacts of the construction and operation of the borrow pit together because the borrow pit will be open only until completion of construction of the generation facility.

4.4.5.1 Construction

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

No direct effects to pale kangaroo mice are associated with construction of the borrow pit because habitat for this species is not present.

Direct effects to a wide variety of special status bat species would include the temporary removal of approximately 40 acres of potential foraging habitat. Construction of the borrow pit would not restrict bat migration throughout the lower Big Smoky Valley.

Golden Eagles and Migratory Birds

Direct effects to golden eagles and migratory birds associated with construction of the borrow pit would be the same as those associated with construction of the Proposed Action in that 40 acres of potential foraging habitat would be lost.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no direct effects to special status reptiles are associated with construction of the borrow pit.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Special status insect species are associated only with the Crescent Dunes, which are not located near the borrow pit; therefore, no direct effects to special status insect species are associated with construction of the borrow pit.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

Indirect effects to special status mammal species associated with construction of the borrow pit would be the same as those associated with construction of the Proposed Action.

Golden Eagles and Migratory Birds

No indirect effects to golden eagles and migratory birds associated with construction of the borrow pit were identified.

Reptiles

No special status reptiles were observed or have the potential to occur within the project area; therefore, no indirect effects to special status reptiles are associated with construction of the borrow pit.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Special status insect species are only associated with the Crescent Dunes, which are not located near the borrow pit; therefore, no indirect effects to special status insect species are associated with construction of the borrow pit.

4.4.6 TL and Anaconda-Moly Substation Corridor

4.4.6.1 Construction

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Direct effects of TL construction activities would be similar to those associated with the Proposed Action in those areas with potential habitat. Mice, if present, could be injured or crushed during initial grading activities and TL installation, and habitat would be lost.

Golden Eagles and Migratory Birds

Direct effects of TL construction activities would be similar to those associated with construction of the Proposed Action in that potential foraging habitat would be lost (see Section 4.4.2.1).

Reptiles

No special status reptile species were observed or have the potential to occur within the TL area; therefore, no direct effects to special status reptile species are associated with construction of the TL.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Since special status insect species are associated only with the Crescent Dunes, which are not located near the TL, no direct effects are associated with construction of the TL.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

No indirect effects to special status mammal species have been identified from construction of spur roads and installation of TL poles.

Golden Eagles and Migratory Birds

No indirect effects to golden eagles and other migratory birds have been identified from the construction of spur roads and installation of TL poles.

Reptiles

No special status reptile species were observed or have the potential to occur within the TL area; therefore, no indirect effects to special status reptile species are associated with construction of the TL.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

Since special status insect species are associated only with the Crescent Dunes, which are not located near the TL; therefore, no indirect effects are associated with construction of the TL.

4.4.6.2 Operation

Direct Effects

Mammals: Pale Kangaroo Mice and Bats

Because habitat for special status mammal species would be removed during initial grading activities associated with installation of the TL and completion of spur roads, no additional direct effects from operation of the TL are likely to occur.

Golden Eagles and Migratory Birds

Direct effects resulting from operation of the TL on migratory birds may include injury or mortality attributable to TL collisions and/or electrocutions. Birds may collide with TLs because TLs are not readily visible to them. Recent research has shown that the rate of bird collisions may be closely related to bird size (Janss and Ferrer 1998). This means that larger birds in the project area may be particularly at risk because it is harder for them to change direction quickly. Smaller birds such as passerines are generally much more agile and may be better at avoiding TLs. Because the TL would be built in a corridor that already contains several TLs, the concentration of TLs may make them more visible, therefore making it more likely for birds to avoid the area. Bird electrocutions occur when the bird's body bridges the gap between two energized components of the TL (Harness and Wilson 2001). Once again, larger birds with greater wingspans may be much more susceptible to electrocution because larger wingspans can increase the potential for two points of contact. This potential effect can be mitigated by spacing the wires appropriately so that it is impossible for the wingspan of the largest birds in the area to contact two wires. Current design standards dictate these specifications.

In addition to collisions and electrocutions, electromagnetic fields may affect birds that roost or nest near TLs. Electromagnetic fields could affect a number of factors including but not limited to fertility rates, nest success, egg quality, and hatch success (Fernie et al. 2000). Some studies suggest that effects of electromagnetic fields are species-specific (Doherty and Grubb 1997), so the complete range of effects for birds in the area is unknown.

Not all direct impacts of the TL may be adverse. Recent research shows that raptors and *Corvids* (ravens) may benefit from the presence of TLs because they may provide more roosting or nesting opportunities (Steenhof et al. 1993). This study also found that nest success for golden eagles was higher (10 percent) for nests on TLs than for nests in cliffs.

Indirect Effects

Mammals: Pale Kangaroo Mice and Bats

Introduction of a new TL throughout the valley may increase perching opportunities for raptors, owls, and other avian predators. These avian species may increase the predation pressures on vulnerable species, such as the pale kangaroo mice and bat species in the area.

Golden Eagles and Migratory Birds

Because habitat for golden eagles and migratory birds would be removed during initial grading and excavation activities, no additional indirect impacts are likely to occur with operation of the TL and Anaconda-Moly Substation corridor.

4.4.7 No Action Alternative

Under the No Action Alternative, no project-related impacts to special status wildlife species would occur.

4.4.8 Summary of Impacts

Mammals: Pale Kangaroo Mice and Bats

Impacts to pale kangaroo mice would include direct mortality during grading and the removal of suitable habitat. Impacts to special status bat species would include the removal of approximately 1,628 to 1,673 acres of potential foraging habitat.

Golden Eagles and Migratory Birds

Impacts to golden eagles and migratory birds would include potential injury or mortality attributable to the operation of the facility or TL and the removal of approximately 1,628 to 1,673 acres of potential foraging habit. Impacts to migratory birds would include the loss of approximately 1,628 to 1,673 acres of potential nesting and foraging habitat.

4.4.9 Mitigation

Mammals: Pale Kangaroo Mice and Bats

A mitigation plan is being developed between TSE, BLM, and NDOW, and will be included as part of the Final EIS. Mitigation would include raptor deterrent mechanisms on TLs and any vertical structures that could promote predation by raptors. The evaporations ponds would be covered with a porous screen, which would allow evaporation but exclude wildlife (i.e. bats and mice).

Golden Eagles and Migratory Birds

In order to minimize impacts to migratory birds during initial grading activities, the Proponent would avoid land clearing activities such as vegetation removal during the avian breeding season (April 1 to August 31). These dates may be modified by BLM based on specific site and weather conditions. If land clearing activities take place during the avian breeding season, a qualified biologist would conduct preconstruction surveys in the affected area to identify nests and breeding birds. If active nests were located, then a protective buffer zone would be delineated around the area (approximately 100 feet) and land-clearing activities would be restricted within this buffer zone. An Avian Protection Plan (APP) is being developed by the proponent in corporation with the BLM, and USFWS that will detail additional monitoring, mitigation, and an adaptive management approach. The APP will be included as part of the Final EIS.

Reptiles

No sensitive reptile species were identified in the proposed project area; therefore, no mitigation measures would be required.

Insects: Aegialia Scarab, Crescent Dunes Aphodious Scarab, and Crescent Dunes Sirican Scarab

No mitigation is proposed.

4.5 Water Quality and Quantity

4.5.1 Methods

This section presents impacts that project actions, including construction and operation, may have on the hydrologic environment. This section includes mitigation measures to avoid or eliminate these impacts or reduce the effects. The groundwater portion of this section has been developed using data from the analytical hydro-geological report prepared by the Proponent (WorleyParsons 2010a).

The hydro-geological report outlines the data and methods used to assess the potential effects of water use for construction and operation of the proposed project, including the effects from the original point of diversion, which was located approximately 10.6 miles northwest of the project site(s). The location of the final point of diversion would be within the project area boundary based on the alternative chosen.

The proposed project would use the following amounts of water, regardless of the location:

- 500 acre-feet for the first year of construction
- 150 acre-feet per year for the next 2 years of construction
- 600 acre-feet per year for the operation of the proposed project

TSE has estimated the life cycle of the project to be 30 years, but has indicated that, with proper maintenance, the life cycle could be extended an additional 20 years to a total life cycle of 50 years. The numerical model was run for a 53-year time period to encompass 3 years of project construction and the 50-year operational life of the project as the reasonably foreseeable development scenario. Groundwater would be pumped from on-site wells for both construction and project operation. The model showed the anticipated drawdown contours for the 53-year water usage. The area analyzed included the 1-foot drawdown contour for the 53-year scenario.

Data from the test well boring show that the groundwater table from which water is pumped is located approximately 172 feet bgs and is not connected to any surface water features. Therefore, when describing the drawdown contour, it should be noted that it occurs approximately 172 feet bgs. In addition, the 10-foot drawdown contour occurs in an approximately 5-foot radius from the well.

To simulate aquifer recovery at the end of project life, the numerical model was run for 153 years, including 53 years of pumping at the project area, followed by 100 years of groundwater level recovery. Thus, the assumption was made that actual recovery would take less than 100 years, in order to allow the model simulation to capture the full time period of recovery. The purpose of this section is to estimate the time period required for groundwater levels to recover after 53 years of project-related pumping.

Six hundred AFY of steady-state agricultural pumping was simulated to turn off as it is diverted to the project area for 53 years. During the 100-year period of recovery evaluation, the original 600 AFY of diverted agricultural pumping was not restored to agricultural use in the model simulation. This matches the expected conditions that would likely occur. As a result of the diverted agricultural pumping not being restored, the aquifer was simulated to recover to above pre-pumping steady state groundwater levels. However, this effect does not change the time period needed for recovery from project pumping because each well affects the aquifer individually.

See Section 4.5.10 for a list of the expected drawdown of existing wells within the 53-year, 1-foot drawdown contour.

4.5.2 Proposed Action

4.5.2.1 Construction

For purpose of water impacts during construction, the analysis used the impacts derived from the operational water consumption of 600 AFY.

The existing test well would be used as a source of construction water for the Proposed Action. Figure 4-4 shows the 1-foot contour for the 53-year scenario.

Direct Effects

Drawdown imposed by a well on another nearby pumping well can have adverse effects on the performance of that nearby well and is referred to as interference drawdown, or well interference. Specific potential adverse effects that could be evaluated using model results reported in this document include the following:

- Interference drawdown can result in the water level of an aquifer being drawn down below the screen of the well (i.e., the well goes dry).
- Interference drawdown can result in the water level of an aquifer being drawn down to a point where the affected well's capacity to pump water is decreased and the well can no longer produce the amount of water that is needed for a particular use, or the well is at risk of becoming damaged and unusable over time because of exposure of the well's screen above the water table and resulting corrosion.
- Interference drawdown can result in the water level in the affected well being drawn down to near the intake of the well's pump, requiring lowering of the pump intake in order for the well to remain operational.
- Interference drawdown can cause a decrease in groundwater level in the affected well such that the well and pump can continue to operate and produce adequate amounts of water, but pumping must occur at either greater frequency or duration, and/or water must be lifted to a greater height, resulting in greater operational and maintenance costs.

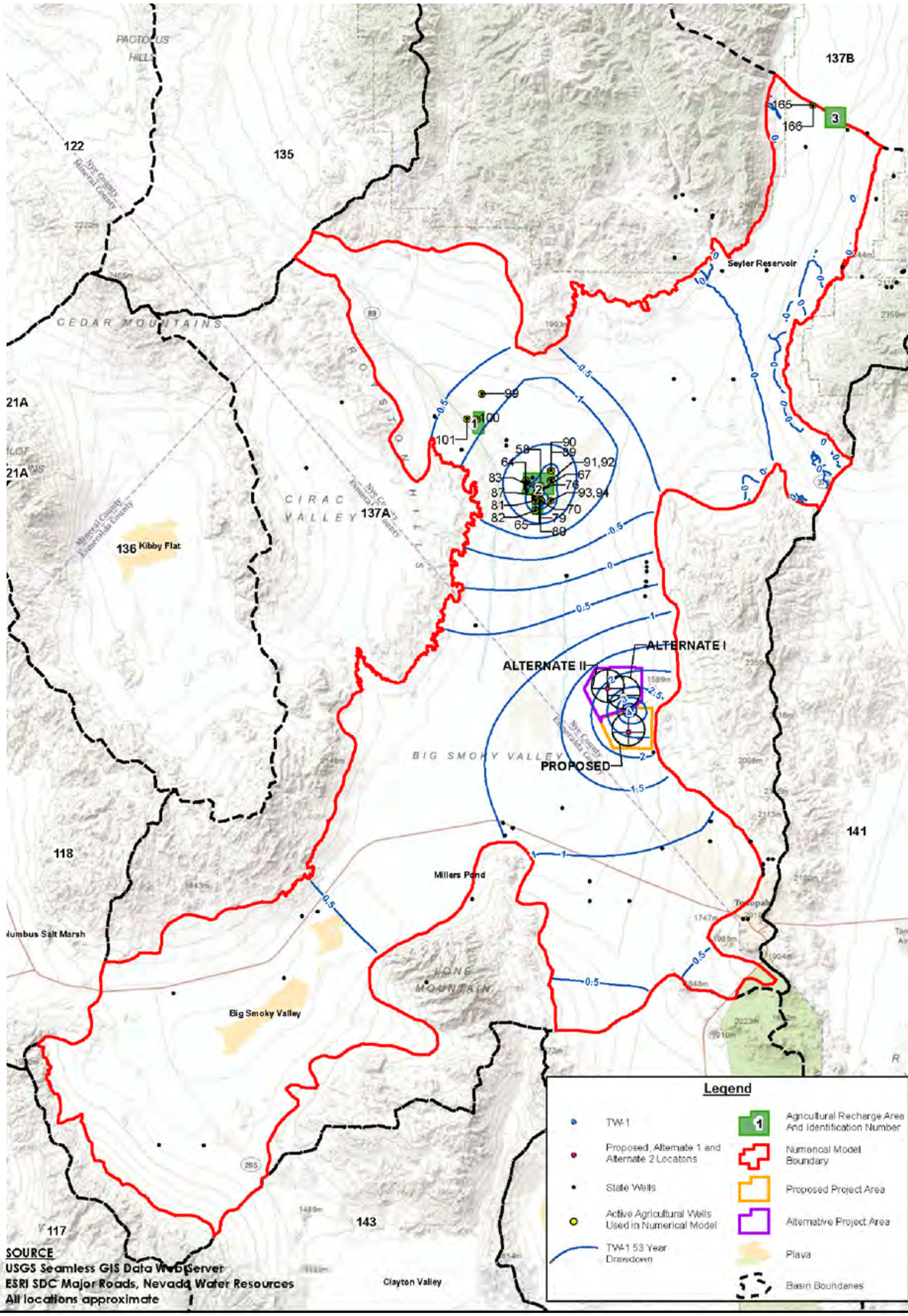

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Figure 4-4 1-foot Drawdown Contour for Construction Activities

Crescent Dunes Solar Energy Project

Source: Worley Parsons, 2010

The extent and type of well interference experienced by an affected well depends on hydrogeologic conditions in the aquifer as well as characteristics of the affected well. These factors include the following:

- the amount of interference drawdown that is applied (which varies with the distance of the affected well from the proposed project well/wells)
- the depth and screened interval of the affected well
- the thickness of saturated sediments penetrated by the affected well
- local variations in the transmissivity of the saturated sediments in which the affected well is completed, if any
- the condition and efficiency of the affected well
- the affected well's pump specifications, including its rating curve, the depth at which the pump intake is set, and the resulting pumping water level in the well during operation
- the minimum required water production rate of the well

As shown in Figures 4-4 to 4-7, the amount of interference drawdown induced at the closest existing well ranges from approximately 1 to 2.5 feet for wells within 5 miles of the production well for the proposed project, Alternative 1, and Alternative 2 locations. This amount of drawdown will not result in wells going dry, their well screens being exposed, or the wells having a noticeably diminished capacity. Other wells located at a greater distance would experience lesser effects.

Lowering the water table would cause an incremental increase in electrical costs to pump groundwater from a greater depth and possibly higher maintenance costs over time or per unit of water pumped. For the limited amount of predicted interference drawdown, this effect would be relatively small.

Accidental spills from vehicles, motorized machinery, and heavy equipment could result in potential discharge of contaminants; however, applicable spill management plans would be implemented to minimize such impacts. In addition, no seeps or springs are located in or adjacent to the Proposed Action. The proposed project well has a depth to groundwater of 172 feet bgs (WorleyParsons 2010a). The wellhead protection area of the project well could be affected by on-site discharged contaminants.

Surface Water

Because the drawdown of groundwater would occur approximately 172 feet bgs, and would not be connected to surface water resources, no direct impacts to surface water are likely.

The potential of a large storm occurring during construction on disturbed surfaces within the proposed project site could increase sediment transport in stormwater runoff.

Accidental spills from vehicles, motorized machinery, and heavy equipment could result in potential discharge of contaminants. The potential for accidental spills and the additional impervious areas (paved access roads, unpaved perimeter roads surfaced with rock, and several buildings and enclosures—with some buildings only temporary for construction) could result in increased pollutant loading of stormwater surface runoff during a storm.

The location of temporary construction facilities and laydown areas may affect the existing drainage patterns and runoff of the project site.

Indirect Effects

Groundwater

Water quality could potentially be affected by naturally occurring high-TDS water below the playa (in the southern part of the Tonopah Flat Subarea) migrating with pumping from the well.

Upon completion of construction, the well used for construction water would be capped in accordance with local and state regulations. A new well will be installed at the power block area of the Proposed Action to provide water during operation.

The modeled recovery time was shown to approximately 40 years, if the project well was pumped for 53 years. It should be noted that the construction water would be needed for only 3 years and, therefore, the recovery time would be shortened.

Surface Water

Because the drawdown of groundwater would occur at 172 feet bgs and because groundwater is not connected to surface water resources, no direct impacts to surface water are likely.

An increase in stormwater runoff flows generated by the addition of impervious areas could potentially result in the extension of downstream limits of existing ephemeral streams crossing the proposed project site. Currently, these ephemeral streams lose definition before reaching Peavine Creek, as shown in Figure 3-7. The effect of increased runoff could result in flow reaching closer to Peavine Creek.

The potential for a large storm occurring during construction on disturbed surfaces within the proposed project site could increase sediment transport in stormwater runoff. If disturbed surfaces remain exposed (possibly denuded of vegetation) during long storms, the increased sediment in runoff could potentially clog the culvert under Pole Line Road (SH 89) and/or possibly discharge to Peavine Creek, creating turbidity and degrading water quality downstream.

4.5.2.2 Operation

During operation of the project, water usage would be 600 AFY. The water use would result in industrial wastewater effluent that would be discharged to evaporation ponds as described in Chapter 2. A wastewater plan was prepared (WorleyParsons 2010b) that describes this effluent and its components.

In a 30-year operating life of the evaporation ponds, up to 3 feet of sludge may accumulate in the base of the ponds that consists of precipitated solids from the evaporated wastewater. The total amount of accumulated solids is estimated to be approximately 50,000 tons. The predicted chemical makeup of the sludge, based on the raw water chemistry, is provided in Table 4-7. The concentration of chemical constituents expected in the evaporation residue is compared to the TCLP as reported under CFR Part 261, Section 261.24; however, there are no TCLP limits for the expected chemicals in the sludge. Therefore, it would be considered a non-hazardous waste under federal regulations.

The action leakage rate (ALR) is the allowable leakage from the primary liner system above which contingency actions are triggered. According to 40 CFR Section 264.222, the ALR is defined as "…the maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding 1 foot." The ALR must also include an adequate safety margin to allow for variability in the containment system design (e.g., liner and collection pipe slope, interstitial fill hydraulic conductivity, thickness of drainage material).

The estimated ALR for the evaporation ponds is 2,750 gallons per acre per day, which is based on one standard hole per acre, a drainage layer geonet with hydraulic conductivity of 0.06 m/s, and a 50 percent safety factor. The assumption underlying this ALR calculation would be verified in the actual constructed ponds. Based on a 10-acre pond, each evaporation pond would have an ALR of 27,750 gallons per day. However, the ALR would need field verification because this rate would vary depending on the actual drainage material used and its hydraulic conductivity.

Waterfowl and other birds may be attracted to the evaporation ponds. The use of anti-perching devices around the perimeter of each pond would assist in excluding ravens and other birds from accessing the edge of the ponds to drink the water. Additionally, operational design of the ponds is such that a minimum freeboard of 2 feet would be maintained at all times, and the interior slopes of the ponds would be at a 33 percent (a 3:1 slope). These project design features would make it difficult for perching birds and/or shorebirds to access the water, and are anticipated to minimize risk to wildlife by minimizing availability of water as a new subsidy. However, in the event that a bird or other animal accidentally falls into the ponds, they would be able to crawl out using the textured portion of the liner that would be present in each corner of the pond for that purpose.

1 **Table 4-7. Predicted chemical makeup of the pond sludge**

Constituent	Concentration in EP Discharge (mg/L)	Conversion to lbs/gal	Solids per year (lbs)	Total Residue Mass at Clean Out (lbs)	Total Residue Mass After 30 Years (lbs)	Weight (%)	Weight (ppm)	TCLP (mg/L)
Cations								
Calcium	206	0.001722	59,419	415,932	1,782,566	1.8184%	18,184	*
Magnesium	79	0.000659	22,743	159,204	682,305	0.6960%	6,960	*
Potassium	187	0.001557	53,698	375,887	1,610,943	1.6433%	16,433	*
Sodium	3,327	0.027763	957,752	6,704,265	28,732,562	29.3104%	293,104	*
Anions								
Chloride	533	0.004448	153,431	1,074,016	4,602,927	4.6955%	46,955	*
Fluoride	24.0	0.000200	6,904	48,328	207,121	0.2113%	2,113	*
Silica (dissolved)	176	0.001470	50,717	355,021	1,521,517	1.5521%	15,521	*
Sulfate	6,817	0.056891	1,962,611	13,738,276	58,878,326	60.0625%	600,625	*
Metals								
Manganese	0.67	0.000006	193	1,354	5,804	0.0059%	59	*
Zinc	0.504	0.000004	145	1,016	4,353	0.0044%	44	*
Total	**11,350**		**3,267,614**	**22,873,299**	**98,028,424**	**100.00%**	**1,000,000**	
TDS	**11,410**	**0.095220**	**3,284,867**	**22,994,071**	**98,546,018**			

Conversion Factors:

8.34 lb H_2O to 1 gallon of H_2O	8.345
Average wastewater flow rate (gal/min)	130.2
Operation time (min/year)	264,960
Wastewater quantity (gal/year)	34,497,792

Notes: Regulatory standards/reportable quantities are for mentioned elements only. * Not listed/no standards

1) Constituents in the evaporation pond discharge are based on the raw water constituents.
2) There may be other constituents in the residue; however, they are not listed because they have not been evaluated.
3) If the parameter was not detected in the groundwater, then it is considered to have zero residue in the sludge.
4) All waste would be non-volatile and would be collected in the evaporation ponds.
5) All species removed by MMF and RO would be returned to the evaporation ponds.
6) A comparison to TDS values is provided to show the consistency of the calculation.

Because the ponds would remain uncovered to maximize evaporation and to avoid trapping birds under netting or monofilament arrays, it is anticipated that primarily waterfowl such as ducks and geese would be able to access the evaporation ponds by landing on the water.

Adaptive measures that would be taken, as necessary, to keep birds from using the ponds include:

- In the event that climatic conditions are such that evaporation must be increased to maintain pond levels below the freeboard limits, evaporative disposal nozzles (see, for example, <www.bete.com/applications/disposal.html>) would be used to increase wastewater evaporation rates.
- An air cannon would be used to haze waterfowl and frighten them away from the evaporation ponds. The air cannon would be stored on-site, but would be used only under this circumstance because birds may become acclimated to the disturbance caused by air cannon hazing, if used on a regular basis. The air cannon would be used until the evaporation process was completed in the pond, or until the crystallized salts returned to solution.
- A "Bird-B-Gone Balloon" (a visual scare device) or other hazing devices would be deployed into the pond to discourage waterfowl from landing on the pond.

Direct Effects

During operation of the Proposed Action, the well would be located within the power block area, approximately 5,000 feet south of the test well. According to the hydrogeological model information, the geological features of this area are similar to that of the test well location, and the same drawdown contour can be expected from pumping water at this location (WorleyParsons 2010b). Figure 4-5 shows the 1-foot contour for the 53-year scenario at this location.

Direct effects would be similar to those discussed in Section 4.5.2.1.

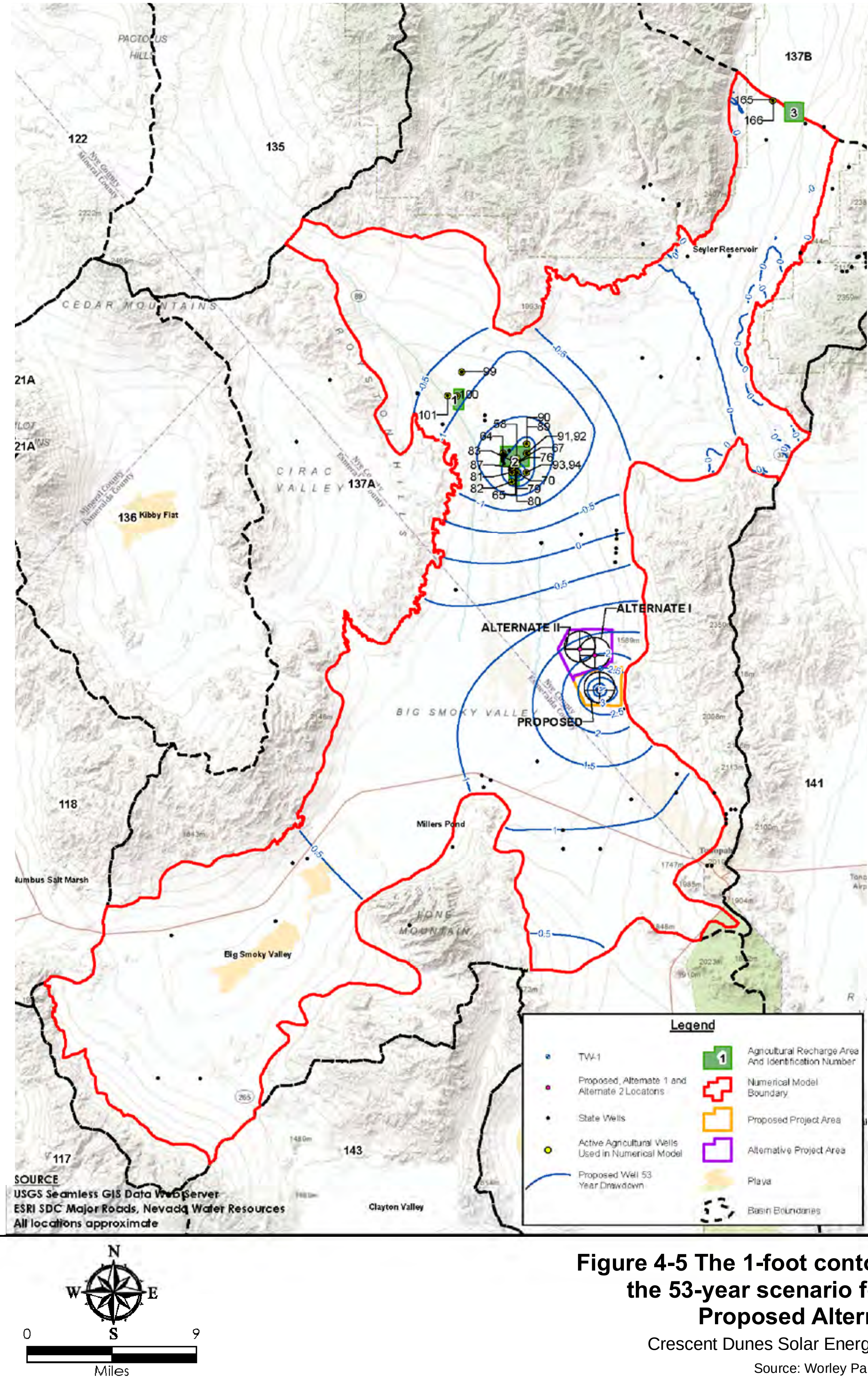

Figure 4-5 The 1-foot contour for the 53-year scenario for the Proposed Alternative.

Crescent Dunes Solar Energy Project

Source: Worley Parsons, 2010

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Indirect Effects

Groundwater

The model showed that the recovery time for pumping groundwater for a 50-year lifetime of the project would be 47 years.

Accidental spills from vehicles, motorized machinery, and heavy equipment could result in potential discharge of contaminants. Project operation activities could result in contamination of the wellhead protection area of the project well on-site. The proposed project well would have a depth to groundwater of 172 feet bgs (WorleyParsons 2010a).

Surface Water

Because the drawdown of groundwater would occur at 172 feet bgs, and is not connected to surface water resources, no indirect impacts to surface water are likely.

Accidental spills from vehicles, motorized machinery, and heavy equipment during facility operations and maintenance could result in discharge of contaminants. The potential for accidental spills and the additional impervious areas (paved access roads, unpaved perimeter roads surfaced with rock, and several buildings and enclosures) could result in increased pollutant loading of stormwater surface runoff during a storm.

The location of operation facilities and addition of impervious areas may affect the existing drainage pattern and runoff of the project site.

4.5.3 Alternative 1

4.5.3.1 <u>Construction</u>

Direct Effects

Groundwater

Direct effects of the construction of Alternative 1 on groundwater would be similar to those described for the Proposed Action because the groundwater resource data are similar for both sites.

Surface Water

Direct effects of the construction of Alternative 1 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

Indirect Effects

Groundwater

Indirect effects of the construction of Alternative 1 on groundwater would be similar to those described for the Proposed Action.

Surface Water

Indirect effects of the construction of Alternative 1 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

4.5.3.2 Operation

During operation of Alternative 1, the well would be located within the power block area, approximately 1.85 miles north of the test well. The geological features of this area are similar to that of the test well location, and the same drawdown contour can be expected from pumping water at this location (WorleyParsons 2010b). Figure 4-6 shows the 1-foot drawdown contour for the 53-year scenario at this location.

Direct Effects

Groundwater

Impacts would be similar to those described for the Proposed Action.

Surface Water

Direct effects of the construction of Alternative 1 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

Indirect Effects

Groundwater

Indirect effects to groundwater would be similar to those described for the Proposed Action. The model showed that the recovery time for a well at this location would be 37 years.

Surface Water

Indirect effects of the construction of Alternative 1 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

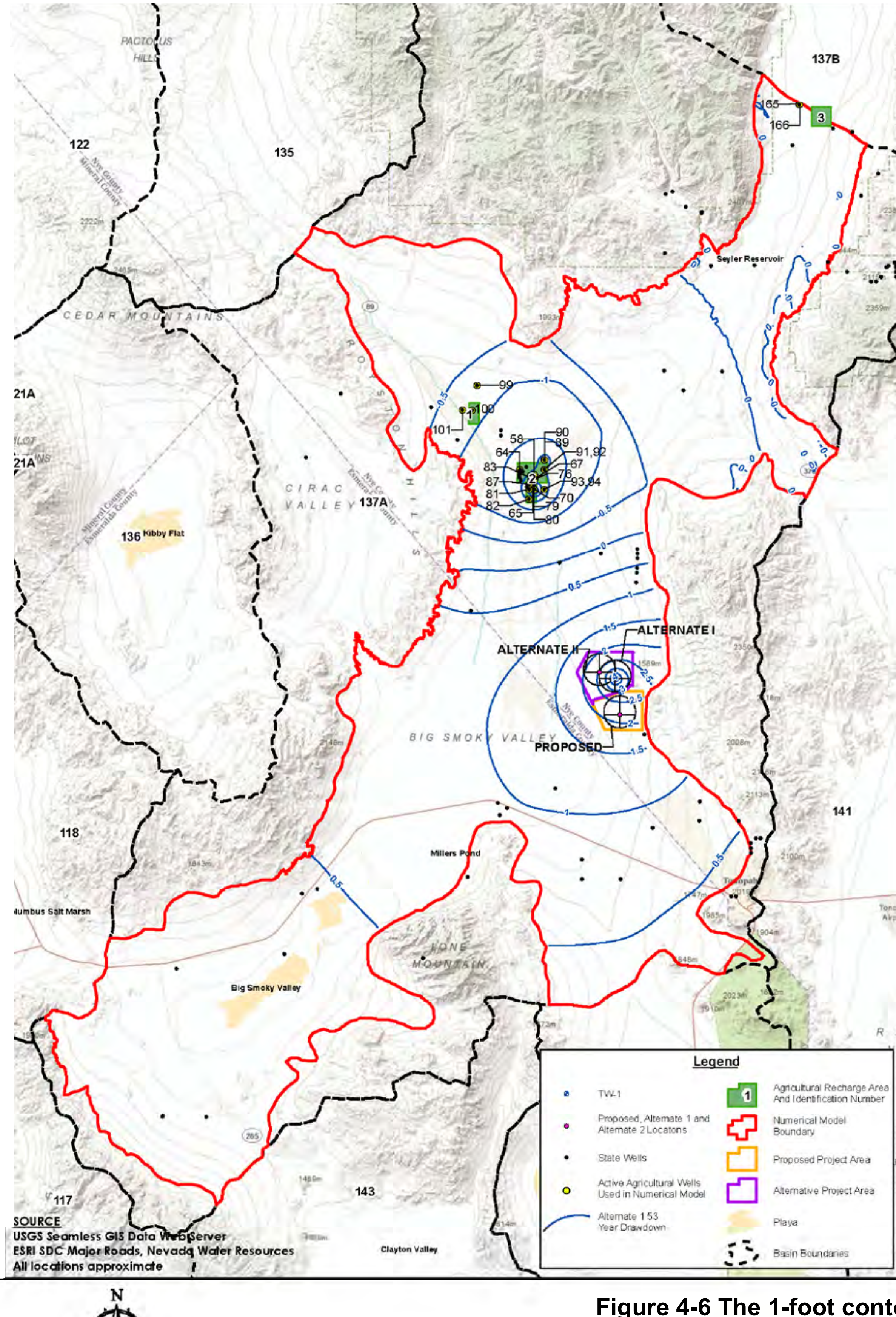

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Figure 4-6 The 1-foot contour for the 53-year scenario for the Alternative 1. In-direct Effects.

Crescent Dunes Solar Energy Project

Source: Worley Parsons, 2010

4.5.4 Alternative 2

4.5.4.1 <u>Construction</u>

Direct Effects

Groundwater

Direct effects of the construction of Alternative 2 on groundwater would be similar to those described for the Proposed Action because construction water would be delivered from the same point.

Surface Water

Direct effects of the construction of Alternative 2 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

Indirect Effects

Groundwater

Indirect effects of the construction of Alternative 2 on groundwater would be similar to those described for the Proposed Action because construction water would be delivered from the same point.

Surface Water

Indirect effects of the construction of Alternative 2 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

4.5.4.2 <u>Operation</u>

During operation of Alternative 2, the well would be located within the power block area, approximately 2.4 miles northwest of the test well. The geological features of this area are similar to that of the test well location, and the same drawdown contour can be expected from pumping water at this location (WorleyParsons 2010b). Figure 4-7 shows the 1-foot drawdown contour for the 53-year scenario at this location.

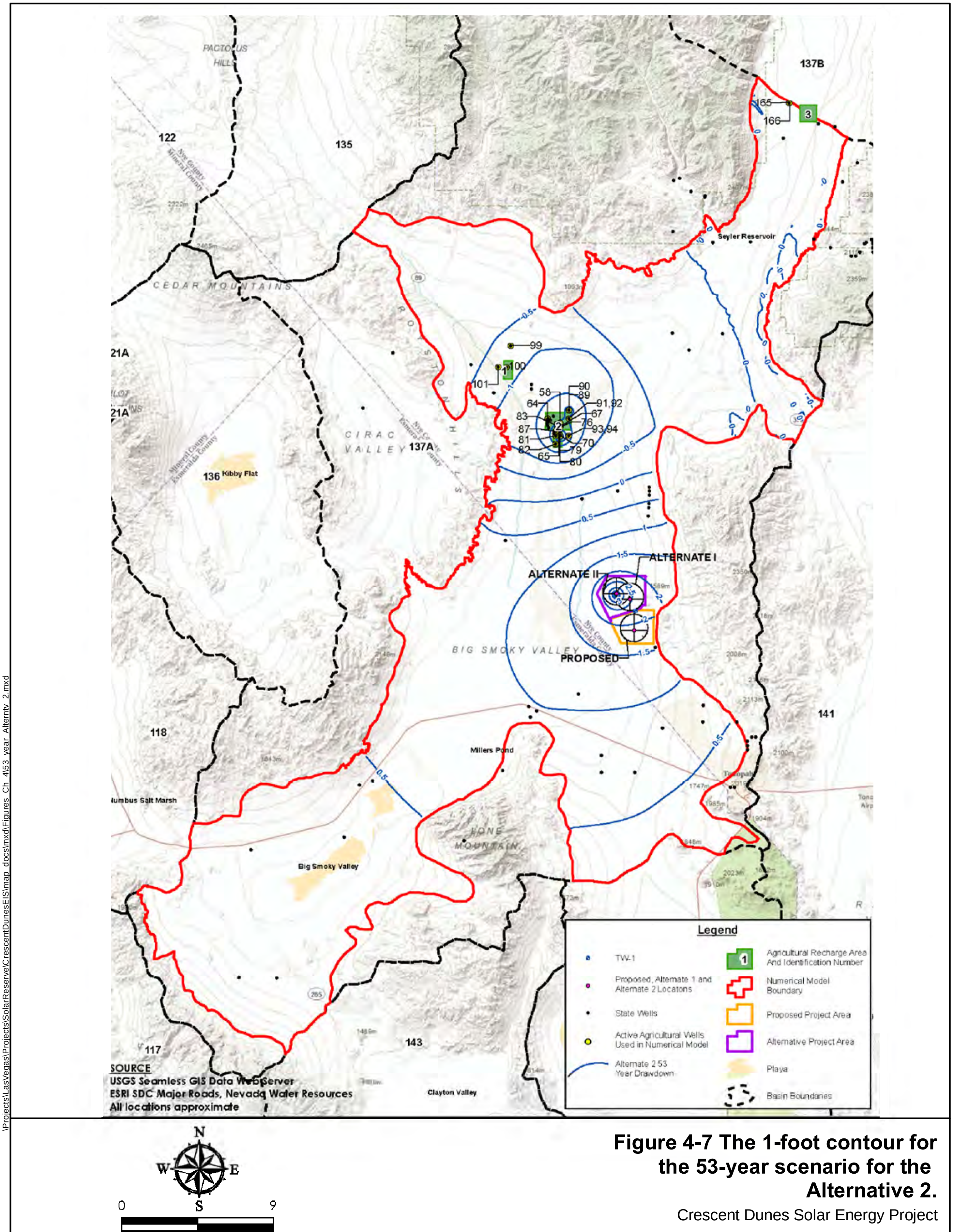

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Figure 4-7 The 1-foot contour for the 53-year scenario for the Alternative 2.

Crescent Dunes Solar Energy Project

Source: Worley Parsons, 2010

Direct Effects

Groundwater

Direct effects would be similar to those described for the Proposed Action.

Surface Water

Direct effects of the operation of Alternative 2 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites.

Indirect Effects

Groundwater

Indirect effects to groundwater would be similar to those described for the Proposed Action. The model showed that the recovery time for a well at this location would be 32 years.

Surface Water

Indirect effects of the operation of Alternative 2 on surface water would be similar to those described for the Proposed Action because the terrain is similar for both sites

4.5.5 TL and Anaconda-Moly Substation Corridor

4.5.5.1 <u>Construction</u>

Direct Effects

Groundwater

Construction of the TL corridor is not expected to affect groundwater.

Surface Water

The potential of a large storm occurring during construction on disturbed surfaces within the TL corridor could increase sediment transport in stormwater runoff.

Accidental spills from vehicles, motorized machinery, and heavy equipment could result in potential discharge of contaminants. The potential for accidental spills and the additional impervious areas (paved access roads, unpaved perimeter roads surfaced with rock, and several buildings and enclosures—with some buildings only temporary for construction) could result in increased pollutant loading of stormwater surface runoff during a storm.

The location of temporary construction laydown areas may affect the existing drainage pattern and runoff along the TL corridor. The location of transmission towers should avoid the ephemeral streams passing through the TL corridor to the extent feasible. TL construction activities and the placement of transmission towers could alter the normal flow of the defined ephemeral washes.

Indirect Effects

Groundwater

Construction of the TL corridor is not expected to affect groundwater.

Surface Water

A potential increase of stormwater runoff flows generated by the increase of soil compaction during construction could result in the extension of downstream limits of the existing ephemeral streams crossing the TL corridor. Currently, these ephemeral streams lose definition before reaching Peavine Creek. The increased runoff could result in flow reaching closer to Peavine Creek.

The potential of a large storm occurring during construction on disturbed surfaces within the proposed project site could increase sediment transport in stormwater runoff. If disturbed surfaces remain exposed (possibly denuded of vegetation) during long storms, the increased sediment in runoff could potentially discharge to Peavine Creek, creating turbidity and degrading water quality downstream.

4.5.5.2 Operation

Direct Effects

Groundwater

Operation of the TL and Anaconda-Moly Substation is not expected to affect groundwater.

Surface Water

Operation of the TL and Anaconda-Moly Substation is not expected to affect surface water.

Indirect Effects

Groundwater

Operation of the TL and Anaconda-Moly Substation is not expected to affect groundwater.

Surface Water

Operation of the TL and Anaconda-Moly Substation is not expected to affect surface water.

4.5.6 Borrow Pit

The following subsections summarize the impacts of the construction and operation of the borrow pit together because the borrow pit would be open only until the completion of construction of the generation facility.

Direct Effects

Groundwater

Water to support excavation of aggregate would be provided from the proposed well within the Proposed Action; therefore, no impact to groundwater associated with activities at the borrow pit during construction are likely.

Surface Water

The potential of a large storm occurring during construction (excavation) on disturbed surfaces within the borrow pit site could increase sediment transport in stormwater runoff. If disturbed surfaces remain exposed during long storms, the increased sediment in runoff could potentially discharge to the ephemeral Peavine Creek, creating turbidity and degrading water quality downstream.

Accidental spills from vehicles, motorized machinery, and heavy equipment could result in potential discharge of contaminants. The potential for accidental spills could result in increased pollutant loading of surface runoff during a storm that could discharge to the ephemeral Peavine Creek.

Indirect Effects

Groundwater

There should be no impacts to groundwater associated with activities at the borrow pit during construction.

Surface Water

Surface water runoff can have both direct and indirect effects. Contamination from spills can lead to effects such as small mammal fatalities, and subsequent predator/scavengers consumption.

4.5.7 Point of Diversion

Water rights for supplying the proposed project would be obtained by purchasing existing certificated water rights for agricultural use located in agricultural area 2 in the same basin as the proposed project site. Currently, this water is used for irrigation to grow and harvest alfalfa. If the water were diverted to the plant, the 853 AFY could no longer be used for the production of alfalfa.

It is likely that the land currently irrigated would be fallowed and, during the project lifetime, would revert back to native vegetation. Once alfalfa is no longer grown, the jobs associated with the alfalfa crop would no longer be needed. However, this discrepancy would be made up by the number of jobs the construction and operation of the project would generate.

4.5.8 PWR 107

Construction and operation of the proposed project should have no known direct or indirect effects on PWR 107 waters. The modeling showed no connection between the groundwater and springs/seeps, and further all identified PWR 107 locations outside the 1-foot drawdown contour.

There should be no known cumulative effects attributable to proposed project construction and operation activities. The 1-foot drawdown of the proposed well pumping is expected to be approximately 172 feet bgs and should not have an effect on the PWR 107 waters within the groundwater CESA (WorleyParsons 2010a).

4.5.9 No Action Alternative

Under the No Action Alternative, potential impacts to hydrological resources associated with this project would not occur.

4.5.10 Summary of Impacts

As discussed previously, there is a potential for direct, indirect, and cumulative impacts to hydrological resources associated with various tasks of construction and operation of the proposed project.

Groundwater

Potential direct impacts to groundwater associated with this proposed project include:

- contamination entering the wellhead protection area
- proposed well pumping causing drawdown, affecting nearby existing wells
- restrictions to existing well access or use

Potential indirect impacts to groundwater associated with this proposed project include:

- contamination entering groundwater within the CESA
- proposed well pumping causing drawdown, affecting existing springs or wells within the CESA

Table 4-8 shows the results provided in the Groundwater Evaluation Report regarding the drawdown on each of the existing wells within the CESA.

Table 4-8. Estimated drawdown on existing wells within the CESA

Well Number	Pumping Location			
	TW-1	Alt-2	Alt-1	Proposed
11	1.03	0.98	0.97	1.11
12	1.01	0.98	0.96	1.07
13	1.01	0.97	0.95	1.07
16	0.88	0.76	0.79	1.00
20	0.97	0.77	0.84	1.15
21	0.97	0.77	0.84	1.15
22	0.97	0.77	0.84	1.15
23	0.99	0.81	0.87	1.16
24	0.84	0.67	0.73	0.99
43	2.11	1.57	1.78	2.61
44	2.11	1.57	1.78	2.61
45	1.21	1.09	1.11	1.34

Surface Water

Potential direct impacts to surface water associated with this proposed project include:

- increased runoff flows
- increased sediment transport
- increased discharge and transport of contaminants
- possible effects to drainage paths or altered flow

Potential indirect impacts to surface water associated with this proposed project include:

- altered flow or drainage paths
- increased sediment or contaminants in downstream water, creating turbidity or degrading water quality downstream

4.5.11 Mitigation

Mitigation measures to avoid or eliminate the potential impacts to hydrological resources associated with various tasks of construction and operation of the proposed project are discussed below.

General water quality is protected under the Clean Water Act. All surface water runoff that would occur during and after construction as a result of the project would be controlled in accordance with the requirements of the construction and operational (post-construction) NPDES Stormwater Permit and other applicable laws, ordinances, regulations, and standards.

SPCC plans would be prepared for project construction and operation, to include spill prevention and countermeasure procedures to be implemented. To the extent practicable, SPCC would minimize the use of and need for disposal of hazardous and toxic wastes. The implementation of BMPs would prevent transport of contamination to the environment.

The preparation and implementation of a construction SWPPP (a requirement of NPDES) that includes site-specific BMPs would mitigate and reduce erosion and water pollution.

BMPs may include:

- silt barriers installed during construction to filter or contain sediment transport
- frequent inspection and cleaning of construction equipment to reduce or prevent contamination
- equipment fueling and service at designated locations away from drainage paths and wells to minimize contamination transport

As discussed in Section 2.5.2, grading of the site would allow storm flows to follow preexisting paths. The power island would be graded to direct rainfall within the power island to detention/retention basins adjacent to the on-site salt tanks to infiltrate into the ground instead of flowing off-site. Small ditches would be constructed along roadways and culverts as needed where washes cross roads. Transmission towers to be located along the proposed TL corridor would be positioned to avoid existing drainage paths of ephemeral washes to mitigate the potential for altered flow paths.

Facility water needs are estimated to be less than the anticipated maximum water right quantity to be acquired and would not negatively affect or alter the appropriation of groundwater.

The Proponent has filed for an approved jurisdictional determination requesting that the ephemeral Peavine Creek and its tributaries not be subject to jurisdiction under the Clean Water Act because they have been determined to be isolated intrastate waters (JBR 2010a).

Evaporation Ponds Avian and Wildlife Monitoring and Protection

A detailed monitoring and mitigation plan would be developed in coordination with NDOW as part of the Artificial Industrial Pond Permit application process. Initial mitigation and monitoring measures are described below.

Avian monitoring at the evaporation ponds would be conducted twice monthly for the first 2 years of project operation and would continue at least monthly over the life of the project. The monitor (an appointed biologist or Environment Compliance Manager) would identify bird species and/or functional groups (e.g., waterfowl, waders, shorebirds, upland shorebirds) and wildlife observed utilizing the ponds, record the behavior of the birds and wildlife (e.g., feeding, swimming, wading, nesting), and note any mortalities or physical infirmities (e.g., birth defects or reduced growth) associated with any animals observed on or adjacent to the evaporation ponds. This information would be compiled and submitted to NDOW on a quarterly basis in accordance with the AIPP guidelines and permit requirements. Any dead bird or wildlife that could be safely retrieved from the evaporation ponds would be collected by a biologist or Environment Compliance Manager and sent to a qualified laboratory to determine whether the mortality was directly related to salt toxicity or encrustation. In accordance with the AIPP guidelines and permit requirements, all mortalities or injuries would be reported to NDOW within 24 hours of the observation. Documented mortality resulting from salt toxicity or encrustation would result in corrective measures or additional mitigation actions implemented in coordination with NDOW, BLM, and any other appropriate agencies.

Each active evaporation pond would be outfitted with a level gauge for daily water level measurements, a hydrometer for daily salinity measurements, and a direct reading thermometer with the temperature data recorded at least diurnally. If the average overnight water temperature in the active evaporation ponds is at or below 4 degrees Celsius, a visual survey of the ponds would be conducted immediately on the following morning. If upon inspection of the active ponds, the designated representative observes evidence of recent substantive increases in salt crystallization anywhere within the pond (e.g., at or near the waterline) all wastewater would be pumped into one or two ponds to increase the pond volume and lower the average salinity within the pond(s). At the same time, the remaining pond or ponds would be pumped dry. The pond to which the combined flow is discharged during this time would be rotated each year periodically as needed so that water levels do not rise too high and minimum freeboard requirements are met.

4.6 Air Quality

This section describes the analysis conducted to assess the air quality impacts and to assess whether the proposed project conforms to Clean Air Act requirements and complies with state and local air quality requirements. Emission estimates are presented for project construction, commissioning, and operation. While the proposed solar power project would represent a significant reduction in greenhouse gas emissions relative to fossil fuel-based power generation projects, the relatively small amount of greenhouse gas emissions associated with the proposed project is provided for informational purpose. No conclusions regarding the significance of the greenhouse gas emissions are made in the analysis.

4.6.1 Methodology

For this project, the air quality impact analysis includes the entire proposed project site, the alternative sites, the borrow pit, the TL, and the Anaconda-Moly Substation corridor. The impacts do not substantively change for the alternative sites to necessitate separate evaluations.

In this section, the proposed project evaluation for air quality conformity is discussed. The annual direct and indirect criteria pollutant emission rates were calculated for the three phases of the project—construction, commissioning, and operation. The first two phases are nonrecurring, discrete, and of limited duration and extent. The first phase is the 30-month construction period for the permanent facilities, including the heliostat field, the liquid salt tower receiver, piping and storage systems, power generating block systems, and buildings. The construction phase also encompasses the salt melting and conditioning (“salt commissioning”) activities. The second phase includes the power block commissioning activities. The third and final phase is the steady state operation of the facility. The criteria pollutants evaluated include oxides of nitrogen (NO_x), oxides of sulfur (SO_x), volatile organic compounds (VOCs), CO, PM_{10}, and $PM_{2.5}$.

Greenhouse gas emissions, which include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), were calculated for all three phases of the project. As previously noted, emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) will be present, but they are expected to be insignificant for the proposed project. A quantification of HFCs, PFCs, and SF_6 was, therefore, not included in the analysis.

Hazardous air pollutants (HAPs) for the proposed project, which are mainly associated with mobile and construction sources powered by diesel fuel, were determined and found to be minor and well within the applicability thresholds of the National Emissions Standards for Hazardous Air Pollutants.

4.6.2 Proposed Project Emission Estimates

4.6.2.1 Construction

Short-term emissions would be generated from the installation of a 638-foot-tall solar receiving tower, the steam turbine power block, up to 17,500 heliostats, and various auxiliary equipment and ancillary structures. Approximately 1,600 acres (Table 4-1 shows the acreage associated with each alternative) of the total land holding would experience temporary disturbance during construction activities, which are expected to occur for approximately 30 months, resulting in between 1,652 and 1,673 acres (depending on alternative) of permanently disturbed land area.

Emissions were estimated for construction equipment exhaust, on-site and off-site motor vehicle exhaust, re-entrained road dust, fugitive dust emissions from soil disturbance, fugitive emissions from wind erosion of stockpiles, and fugitive emissions from a temporary concrete batch plant.

The salt commissioning activities would take place during the construction phase of the project and would involve the melting, heating, and conditioning of approximately 70 million pounds of sodium nitrate and potassium nitrate salts. The salt commissioning process is expected to take approximately 90 days and is planned to begin in the 18th month of construction. A detailed description of the salt system commissioning process is provided in Chapter 2. This section presents the analysis of the combined emissions from the concurrently scheduled construction and salt commissioning activities.

Construction Schedule

Project construction and initial commissioning would occur over approximately 30 months, from December 2010 to the third quarter of 2013. An overall project schedule is provided in the project description section. Construction would progress from site preparation to construction of the central receiver tower and molten salt system, then to construction of the power block and heliostat field. Other project requirements such as access roads, facility buildings, and new TLs would be constructed at the appropriate time during the overall construction schedule.

Estimated Construction Emissions

On-site and off-site project emissions were divided into three categories: vehicle and construction equipment exhaust, fugitive dust generated by vehicles and construction equipment, and wind-driven fugitive dust. Construction equipment exhaust emissions were estimated using the URBEMIS2007 (version 9.2.4) emission factors. Fugitive dust emissions from the concrete batch plant were estimated using EPA-approved emission factors published in AP-42 (EPA 2006). Fugitive dust emissions from paved and unpaved roads were estimated using EPA-approved emission factors and methodology published in

AP-42 (EPA 2006). These emission factors were reduced by 68 percent based on the proposed watering of traveled roads twice a day.

Fugitive dust emissions from soil disturbance (e.g., grading activities) were estimated based on the controlled emission factor published in URBEMIS. These emissions were assumed to have 50 percent control of fugitive dust emissions by the application of water to the disturbed surface. Fugitive dust emissions from wind erosion of material stockpiles were estimated using the methodology published in AP-42 (EPA 2006). On-road exhaust emissions were estimated using EMFAC2007 (version 2.3) emission factors. On-road and off-road exhaust emissions were estimated assuming the use of ultra low sulfur diesel fuel.

Construction emissions also would be generated during installation of a 9.5-mile-long TL. Off-site emission sources include the exhaust emissions from construction equipment and motorized vehicles used to install the TL poles and pull conductors, as well as the exhaust emissions from motor vehicles traveling to and from the planned work sites (e.g., delivery trucks and worker vehicles). Minor amounts of fugitive dust also would be generated by construction activities and vehicle travel on roadways. The emission calculation methodology for the off-site construction activities was similar to the methodology for estimating on-site construction emissions.

Maximum annual emissions were estimated based on the number and type of construction equipment, the number of heavy-duty trucks, fugitive dust, and the roundtrip workforce commutes projected for each month of construction. The maximum annual construction emissions were estimated as the sum of the maximum monthly emissions over a 12-month period.

The maximum annual construction emissions are presented in Table 4-9. The detailed emission calculations for construction are provided in the *Air Emissions Sources and Inventory Report* (Solar Reserve 2010).

Table 4-9. Maximum annual criteria pollutant emission estimates from construction activities

Construction Emission Source	Emissions (tons per year)					
	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
On-site construction emissions	26.1	14.0	3.0	0.03	28.4	4.4
Off-site vehicle emissions	5.8	15.5	1.9	0.02	7.6	0.9
Off-site construction emissions	2.9	1.7	0.3	0.004	2.3	0.3

Greenhouse gas emissions from construction activities are presented in Table 4-10. Construction equipment emissions and fuel use were estimated using emission factors from the California Climate Action Registry (CCAR) General Reporting Protocol (version 3.1) (CCAR 2009) and fuel consumption rates from the OFFROAD2007 model. Vehicle emissions and fuel use (trucks and worker commutes) were estimated using emission factors from the CCAR General Reporting Protocol (version 3.1) and EPA fuel economy values. This approach meets the reporting requirements of the Nevada Bureau of Air Quality Planning (BAQP).

Estimated total fuel use during construction would be 1,485,848 gallons of diesel and 1,168,622 gallons of gasoline. Detailed greenhouse gas emission and fuel use calculations are included in Air Emissions Sources and Inventory Report (Solar Reserve 2010).

Table 4-10. Nonrecurring greenhouse gas emissions estimates for construction activities

Duration	Greenhouse Gas Emissions (metric tons)			
	CO_2	CH_4	N_2O	CO_2 Equivalent
Maximum annual (tonnes/year)	7,037	0.30	0.146	7,089
Maximum project (tonnes/project)	9,415	0.48	0.228	9,496

Note: Tonnes are in metric tons.

4.7.2.1.3 Emissions Associated with Salt Commissioning Activities

The salt melting and heating processes would produce limited emissions of criteria pollutants resulting from the combustion of gaseous fuels in two temporary gas-fired convection heaters with rating capacities of 55 million British thermal units per hour (MMBtu/hr) and 20 MMBtu/hr. Propane was chosen for the analysis, but other fuels might include natural gas or liquefied natural gas as potential alternatives (there is no pipeline connection proposed for the project location and there is one potential liquefied natural gas truck terminal within a reasonable distance). Criteria and greenhouse gas emissions have been estimated using the highest emission rates among the fuel types considered. The NO_x emissions for the two heaters were estimated assuming the heaters would be equipped with both ultralow NO_x burners and flue gas recirculation. Minimal to no fugitive particulate emissions would be generated during the handling of the solid salts because the solid salts would be handled in an indoor environment. Furthermore, the salts are greatly hydrophilic (high tendency in absorbing moisture) and tend to solidify and remain in solid form.

The salt conditioning (i.e., the process of bringing salt up to its operating temperature range) would result in the release of NO_2 from the oxidation of magnesium nitrate impurity in the salt solution; this emission source would be separate from the combustion emissions from the heating process described above. The NO_2 estimates for the salt conditioning process assumed all the magnesium nitrate impurity as guaranteed by the supplier for each salt oxidizes completely and releases entirely from the liquid solution. This is conservative because the actual magnesium nitrate impurity is substantially less than the supplier guarantee level. To further reduce the potential emission from this process, the project is in the process of identifying sources and methods to further reduce the magnesium impurity in the salt. If achievable, salt conditioning would become unnecessary.

In the event that ultralow magnesium impurity salts are not available, the release of NO_2 from the salt conditioning process would be controlled by a multistage chemical wet scrubber. The project Proponent may also consider other control options such as the use of selective catalytic reduction. The emission estimates and analysis were conducted on the basis of the multistage chemical wet scrubber for controlling NO_2 emissions.

After the salt commissioning activity is completed, the two gas-fired heaters and the NO_2 scrubber system would be dismantled and removed from the project site.

The criteria pollutant emissions estimated for the salt commissioning process are presented in Table 4-11. The detailed emission calculations for commissioning are provided in the *Air Emissions Sources and Inventory Report* (Solar Reserve 2010).

Table 4-11. Nonrecurring criteria pollutant emission estimates for salt system commissioning activities

Salt System Commissioning	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Melting (lb/period)	1,282	12,327	1,644	2,465	1,151	1,151
Heating (lb/period)	186	1,790	239	358	167	167
Conditioning (lb/period)*	17,901	—	—	—	—	—
Total salt system commissioning period, tons (all phases)	9.7	7.1	0.9	1.4	0.7	0.7

*Conditioning emissions represent post-control emissions; this process would be unnecessary with ultralow magnesium impurity salts.

lb/period = pound(s) per duration of the commissioning activities

The greenhouse gas emissions resulting from the salt commissioning process are presented in Table 4-12. Salt commissioning activities would result in direct greenhouse gas emissions associated with combustion of propane in the salt heaters and indirect greenhouse gas emissions associated with electricity necessary to maintain the hot salt tank temperature during the conditioning period. Greenhouse gas emissions from propane combustion in the salt heaters were estimated using emission factors from Nevada's draft Greenhouse Gas Emissions Mandatory Reporter Monitoring Guidelines (2008b). Indirect greenhouse gas emissions from electricity used to maintain salt temperature were estimated using emission factors from the CCAR (2009) General Reporting Protocol. Since the draft guidance for greenhouse gas emissions by the CEQ is currently under review, the greenhouse gas emissions are presented here for informational purposes only at this time, and no conclusions regarding significance are presented.

Table 4-12. Nonrecurring greenhouse gas emission estimates for salt commissioning activities

	Greenhouse Gas Emissions (metric tons)			
	CO_2	CH_4	N_2O	CO_2 Equivalent
Total	12,442	0.24	0.03	12,458

4.6.2.2 Commissioning (Plant-Wide) Phase

The power block commissioning phase of the project would involve the steam blows and steam turbine startup activities. This phase of commissioning is expected to take place during the final months of construction and would follow the salt commissioning activities. The power block commissioning activities would not involve in any combustion of fossil fuels. As a result, no emissions of air pollutants would occur during the power block commissioning phase.

4.6.2.3 Operational Phase

Criteria Emission Estimates

The proposed project is based on concentrating solar-thermal power technology, which uses reflecting mirrors, called heliostats, to redirect sunlight onto a receiver on top of a tower near the center of the solar field. Liquid salt would be heated as it passes through the receiver and would be stored and circulated through a series of heat exchangers to generate high-pressure superheated steam. The steam would then be used to power an STG at conventional temperatures and pressures to produce electricity. The steam from the STG would be condensed using a steam condensing system and returned via feedwater pumps to the heat exchangers where the high-pressure superheated steam would be regenerated.

The plant is designed to capture available solar energy whenever the sun is not obscured by dense cloud cover. The thermal storage system would be sized so that the receiver and collector systems would be able to capture solar energy during the day and store the energy for use during hours with intermittent cloud cover or during evening hours when electric demand is still high. During off-generation hours, electricity would be back-fed from the power grid to maintain the hot salt tank temperature and balance-of-plant systems in a standby state. No fossil fuel-based combustion is proposed for the power generation process of this project. As a result, no criteria pollutant or HAP emissions would be generated from normal electrical generating operations or system start-up and shut-down events.

Although the solar-thermal power generation would not consume fossil fuels, the project prescribes two diesel-powered emergency generators and two diesel-powered emergency fire pumps. These units would be strictly for emergency response and would not normally be in operation. Additionally, these shop-assembled, skid-mounted modular units would be certified to EPA standards for engines of their respective application.

The primary function of the emergency generators would be to provide relatively instantaneous backup power needed to redirect the heliostat field flux off the solar receiver during loss of liquid salt flow emergencies. The emergency generators are approximately 4,000 brake-horsepower each and would be activated in test mode once every 2 weeks to meet supplier guarantee and the NFPA and insurance carrier requirements on maintenance and testing.

Emissions of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x from the new diesel-powered emergency generators and emergency fire pumps were estimated assuming they would meet the EPA Tier II and Tier III emission standards, respectively.

To conserve water use and optimize plant performance, the project Proponent has proposed the use of hybrid cooling for the steam cycle. In addition to an air-cooled condenser, the project would implement a small water-cooled condenser. The condenser would reject its heat through a cooling tower. This cooling tower would also provide cooling to various ancillary heat sources from the power block. The cooling tower would have an approximate water recirculation rate of 24,093 gallons per minute and would be equipped with a mist elimination system rated at 0.001 percent by weight efficiency. The PM_{10} and $PM_{2.5}$ emissions from the cooling tower were calculated based on the measured TDS concentration in the groundwater. Although the cooling tower may not be required during low-temperature hours, the emission estimates were conservatively based on a 50 percent annual capacity factor (i.e., 4,400 hours).

Annual criteria pollutant emissions for the operational phase of the plant are presented in Table 4-13. The emergency diesel engine emissions are based on 60 minutes of maintenance testing once every 2 weeks. The diesel-driven fire pumps emissions were based on 30 minutes of weekly testing. The annual cooling tower emissions were conservatively based on 4,400 hours of operation per year at a conservative 10 cycles of concentration.

Table 4-13. Annual criteria pollutant emissions from on-site stationary sources during the operation phase

Emission Source	NO_x	SO_2	VOC	CO	PM_{10}/ $PM_{2.5}$
Maximum Annual Emissions, lbs/year[a]					
Emergency generator (Unit 1)	1,174	1.17	23.1	145	6.9
Emergency generator (Unit 2)	1,174	1.17	23.1	145	6.9
Emergency fire pump (Unit 1)	99	0.17	1.6	19	3.6
Emergency fire pump (Unit 2)	99	0.17	1.6	19	3.6
Cooling tower	—	—	—	—	3,925
Total Project (lb/yr)	**2,546**	**2.7**	**49.4**	**328**	**3,946**
Total Project (tpy)	**1.27**	**0.001**	**0.02**	**0.16**	**1.97**

[a] Annual emissions are based on 26 hours of testing per unit. See Appendix 4.7-B.
Notes:
lb/year = pound(s) per year
tpy = ton(s) per year

Indirect criteria pollutant emissions from worker commutes, trucks used to wash the heliostats, and material deliveries were also calculated. These emissions are presented in Table 4-14. Exhaust emissions were estimated using emission factors from EMFAC2007 (version 2.3) database. Fugitive dust emissions from paved and unpaved roads were estimated using EPA-approved emission factors and methodology published in AP-42 (EPA 2006). Detailed calculations are included in the *Air Emissions Sources and Inventory Report* (Solar Reserve 2010).

Table 4-14. Annual criteria pollutant emissions from worker commute, heliostat washing, and deliveries during operation

Emission Source	Emissions (lb/yr)					
	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Worker commute	137	5,407	587	9	803	240
Trucks used for heliostat washing	155	257	575	1	10,160	1,040
Material deliveries	111	507	2,195	4	155	98
Total (lb/yr)	**403**	**6,171**	**3,357**	**13**	**11,118**	**1,378**
Total (tpy)	**0.2**	**3.1**	**1.7**	**0.01**	**5.6**	**0.7**

Greenhouse Gas Emission Estimates

Combustion of diesel fuel in the emergency fire pump engines and the emergency generators during weekly and biweekly testing would result in emissions of CO_2, CH_4, and N_2O. Greenhouse gas emissions for normal facility operations were calculated based on the maximum fuel use predicted for the project and emission factors contained in the Nevada Greenhouse Gas Emissions Mandatory Reporter Monitoring Guidelines (2008). The emission factors used to estimate the greenhouse gas emissions are summarized in the *Air Emissions Sources and Inventory Report* (Solar Reserve 2010). Emissions of CO_2, CH_4, and N_2O resulting from operation of the proposed project are presented in Table 4-15.

Table 4-15. Annual greenhouse gas emissions from on-site stationary sources

Emission Source	Estimated Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	CO_2 Equivalent
Emergency generator (Unit 1)	45.7	0.039	0.008	49
Emergency generator (Unit 2)	45.7	0.039	0.008	49
Emergency fire pump (Unit 1)	8.3	0.0003	0.0001	8
Emergency fire pump (Unit 2)	8.3	0.0003	0.0001	8
Total emissions	**108**	**0.079**	**0.016**	**114**

Notes: CO_2 = carbon dioxide, CH_4 = methane, N_2O = nitrous oxide

Indirect greenhouse gas emissions from worker commutes, the trucks used to wash the heliostats, and material deliveries were calculated as part of the analysis. The greenhouse gas emissions are presented in Table 4-16. Emissions were estimated using emission factors from the CCAR General Reporting Protocol (version 3.1). Detailed calculations are included in the Air Emissions Sources and Inventory Report (Solar Reserve 2010).

Table 4-16. Annual greenhouse gas emissions from worker commute, heliostat washing, and deliveries during operation

Emission Source	Greenhouse Gas Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	CO_2 Equivalent
Worker commute	635	0.019	0.01	640
Trucks used to wash heliostats	16	0.0005	0.0005	16
Material deliveries	172	0.005	0.005	172
Total emissions	**823**	**0.025**	**0.016**	**828**

Notes: CO_2 = carbon dioxide, CH_4 = methane, N_2O = nitrous oxide

4.6.3 Air Quality Conformity Assessment

The Clean Air Act General Conformity Requirements for the NEPA process provide the following conformity review steps.

1. Determine whether criteria pollutants or their precursors would be emitted from the proposed project.
2. Determine whether emissions of criteria pollutants or precursors would occur in a nonattainment or maintenance area.
3. Determine whether the proposed project is exempt from conformity determination.
4. Estimate emissions and compare to the threshold emissions and the nonattainment or maintenance area's emissions inventory.

As discussed in the previous sections, there are criteria pollutants and precursors emissions associated with the construction and operation of the proposed project. However, as stated in the environmental setting section and the EPA's Green Book (2010) on Nye County, the proposed project is located in a region currently classified as being in attainment for all pollutants. In accordance with the second step of the conformity determination process, the project would, therefore, be deemed in conformance with the national air quality goals and objectives.

In the highly unlikely event that the attainment status for the region changes any of the pollutants in the near future to a level immediately higher (i.e., "from attainment to maintenance status"), the following tables provide a comparison of the project emissions to the conformity threshold for each pollutant. Table 4-17 summarizes emission from the construction phase, which includes the salt commissioning activities. Table 4-18 shows the emission estimates for the project when the plant is in steady state operation. As stated in the previous section, emission associated with indirect vehicular sources include daily site employee commute, third-party trips to the plant, and wash trucks that travel in the heliostat field.

As shown in these tables, the estimated project emissions for each phase and activity are well below the conformity thresholds. A review of the emission inventory for Nye County through the EPA AirData database suggests that the estimated project emissions would be well below the 10 percent mark of the regional total emission inventory.

Table 4-17. Air quality conformity determination for project construction phase

	Construction Phase Emissions (tons/year)					
Pollutant	**On-site Construction**	**Off-site Construction**	**Off-site Vehicle**	**Salt Commissioning**	**Conformance Thresholds[a]**	**Clean Air Act Conformance**
VOC	3.0	2.9	0.3	0.9	100	Yes
CO	14.0	15.5	1.7	7.1	100	Yes
NO_X	26.1	5.8	2.9	9.7	100	Yes
SO_X	0.03	0.02	0.004	1.4	100	Yes
PM_{10}	28.4	7.6	2.3	0.7	100	Yes

[a] Conformance thresholds are for areas classified with "maintenance" requirement status. This is conservative because the project area has met attainment status for all pollutants.

Notes: CO = carbon monoxide, NO_x = oxide of nitrogen, SO_x = oxide of sulfur, PM_{10} = particulate matter, VOC = volatile organic compound

Table 4-18. Air quality conformity determination for project operation phase

Pollutant	Operation Phase (tons/year)			
	On-site Stationary Sources	On-site/Off-site Vehicle Sources	Conformance Thresholds[a]	Clean Air Act Conformance
VOC	0.02	0.2	100	Yes
CO	0.16	3.1	100	Yes
NO_X	1.27	1.7	100	Yes
SO_X	0.00	0.01	100	Yes
PM_{10}	1.97	5.6	100	Yes

[a] Conformance thresholds are for areas classified with "maintenance" requirement status. This is conservative because the project area has met attainment status for all pollutants.

Notes: CO = carbon monoxide, NO_x = oxide of nitrogen, SO_x = oxide of sulfur, PM_{10} = particulate matter, VOC = volatile organic compound

4.6.3.1 Regional Conformity

In addition to federal air quality conformity, the proposed project will also meet state and regional air quality goals and objectives. Nevada implements these goals and objectives through it state implementation plan, which consists of air pollution strategies, state statutes, rules, and local ordinances. In its implementation plan, Nevada provides for three areas jurisdictions: the NDEP through the BAQP and Air Pollution Control; Clark County, which encompasses Las Vegas; and Washoe County, which covers the Reno-Sparks metropolitan area. The proposed project is neither in Clark nor Washoe counties; in addition, as an electric generating facility, the project would be under the jurisdiction of NDEP.

Prior to the start of construction, the project Proponent will have submitted the necessary permit applications to BAQP of NDEP and obtained the necessary permits to construct. In this process, the project Proponent will have to demonstrate compliance with all applicable codes and regulations. The BAQP will also perform the necessary compliance determination, which will include best available control technology and the necessary modeling to demonstrate compliance with ambient air quality standards. The issuance of the permit would constitute conformance to state and regional air quality requirements.

Based on the sources and emission estimates provided in the previous subsections, it appears that the facility would qualify for BAQP's Class 2 operating permits status. These permits are typically provided for facilities that emit less than 100 tons per year for any one regulated pollutants. This category appears to be consistent with the federal air quality conformity thresholds. Based on the information provided above, key conditions anticipated for these permits would include but not be limited to:

- The temporary salt melter and heater shall be equipped with low NO_x burner and flue gas recirculation.
- Emissions resulting from the oxidation of magnesium impurity in the salt during the salt conditioning process shall be controlled, unless the project is able to locate an ultralow magnesium salt that renders the salt conditioning process unnecessary.

- The project shall equip the cooling tower with a mist elimination system that has an efficiency rating of 0.001 percent by weight.
- Emergency diesel-fired equipment shall be certified to meet applicable EPA emission standards for the respective class of equipment.

In addition, the project will apply for and obtain a Surface Area Disturbance permit from the bureau because the expected area of disturbance will exceed 5 acres. Consistent with the project intent and as required for the Surface Area Disturbance permit, a dust control plan will be filed with and approved by the NDEP-BACP. Key conditions of the permit would include but not limited to:

- Provide grid construction power to the site as soon as possible to minimize the use of portable diesel-powered generators during construction.
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Water all active construction areas twice daily.
- Use ultralow sulfur diesel for the construction fleet of vehicle and equipment.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
- Apply a nontoxic soil stabilizer on all unpaved access roads, parking areas, and staging areas at the construction site.
- Sweep daily, with water sweepers, all paved access roads, parking areas, and staging areas at the construction site.
- Enclose, cover, water daily, or apply a nontoxic soil binder to exposed stockpiles of soil, sand, or similar materials.

4.6.4 Alternatives and Cumulative Effects Analysis

The air quality impact evaluation discussed in this section includes the construction and operational phases of the plant from both on-site and off-site sources, the construction of the TL, and the operation of the borrow pit. Since there are no other known projects in the project vicinity, this evaluation also represents the cumulative effect analysis. Also, because the operational and construction emissions would be the same for the Proposed Action and the two other alternatives (Alternatives 1 and 2), the air quality evaluation under the Proposed Action applies to the two alternatives.

4.6.5 Summary of Impact Analysis

A thorough review of the construction activities and the operational phase of the proposed plant suggest that the associated emissions would be within established federal, state, and regional thresholds. Furthermore, the proposed project is located in a region that EPA has categorized as an attainment area for all regulated pollutants. As such, the proposed project with all its proposed emission control strategies is not expected to cause a violation of established air quality standards and would conform to federal air quality goals and objectives. Through the permit application process with NDEP-BAPC, the proposed project would also conform to regional air quality requirements and objectives. The proposed project would have less-than-significant mitigated air quality impacts.

4.7 Cultural Resources

This section evaluates the effects of project construction and operation that the Proposed Action, Alternative 1, Alternative 2, the TL and substation, and the borrow pit may have on existing cultural resources. Also considered are the effects of the No Action Alternative. Subsection 4.7.6 presents the summary of impacts. Finally, Subsection 4.7.7 discusses proposed measures to avoid, reduce, or mitigate adverse effects to cultural resources. The evaluation focuses solely on the historic properties identified in Chapter 3.

4.7.1 Methods

Methods employed to identify historic properties for this analysis included preparing a Class I literature review, undertaking a Class III cultural resources survey, and conducting a TCP study. The literature review consulted site and survey records obtained from the BLM TFO in Tonopah, Nevada; the online NVCRIS; GLO plat maps and historic topographic and other maps accessed at the University of Nevada, Reno, Mary B. Ansari Map Library; and the Nevada Bureau of Mining and Geology Web site. The Class III survey was performed by archaeologists walking parallel, pedestrian, systematically spaced transects and documenting their findings through notation, photography, and collection of GIS data for all cultural resources encountered during fieldwork.

4.7.2 Proposed Action

4.7.2.1 Construction

Direct Effects

Construction would have direct effects on four existing properties recommended eligible for listing on the NRHP: CrNV-62-14707, 14718, 14731, and 14734. Possible direct effects would be surface or subsurface disturbances caused by construction activities. Unanticipated discoveries encountered during construction could also result in direct effects to unknown historic properties within the Proposed Action.

Indirect Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no indirect impacts are associated with construction of the project.

4.7.2.2 Operation

Direct Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no direct impacts are associated with operation of the project. Undiscovered historic properties could be directly affected by operation of the facility.

Indirect Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no indirect impacts are associated with operation of the project.

4.7.3 Alternative 1

4.7.3.1 __Construction__

Direct Effects

Construction would have direct effects on one existing historic property: CrNV-61-14853. Unanticipated discoveries encountered during construction could also result in direct effects to unknown historic properties within Alternative 1.

Indirect Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no indirect impacts are associated with construction of the project.

4.7.3.2 __Operation__

Direct Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no direct impacts are associated with operation of the project. Undiscovered historic properties could also be directly affected by operation of the facility.

Indirect Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no indirect impacts are associated with operation of the project.

4.7.4 Alternative 2

4.7.4.1 __Construction__

Direct Effects

Construction of Alternative 2 would result in direct effects to eight known historic properties: CrNV-61-14824, 14830, 14864, 14867, 14877, 14881, 14888, and 14893. Construction could also result in direct effects to unanticipated discoveries.

Indirect Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no indirect impacts are associated with construction of the project.

4.7.4.2 __Operation__

Direct Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no direct impacts are associated with operation of the project. Undiscovered historic properties could also be directly affected by operation.

Indirect Effects

Any existing property eligible for listing on the NRHP would be salvaged prior to construction; therefore, no indirect impacts are associated operation of the project.

4.7.5 TL and Anaconda-Moly Substation Corridor

4.7.5.1 Construction

Direct Effects

No historic properties are known to be present within the boundaries of the TL and substation. Direct effects are not likely to occur; however, discovery of unanticipated finds during construction could result in direct effects to unknown historic properties.

Indirect Effects

No historic properties are known to be present within the boundaries of the TL and substation; therefore, indirect effects are not likely to occur.

4.7.5.2 Operation

Direct Effects

No direct effects to historic properties are likely to occur as a result of the operation of the TL and substation.

Indirect Effects

No indirect effects to historic properties are likely to occur as a result of the operation of the TL and substation.

4.7.6 Borrow Pit

The following subsections summarize the impacts of construction and operation of the borrow pit together because the borrow pit would be open only until the completion of construction of the generation facility.

4.7.6.1 Direct Effects

No historic properties are known to be present within the boundaries of the borrow pit. Direct effects to historic properties are not likely to occur; however, discovery of unanticipated finds during construction could result in direct effects to as yet unknown historic properties.

4.7.6.2 Indirect Effects

No historic properties are present within the boundaries of the borrow pit; therefore, no indirect effects are likely to occur.

4.7.7 No Action Alternative

The No Action Alternative would have no project-related impacts—direct or indirect—to cultural resources.

4.7.8 Summary of Impacts

Development of the Proposed Action would affect four historic properties. Eight historic properties would be affected by Alternative 2. Only one known historic property would be affected by Alternative 1. No impacts are likely to occur for the TL and substation or the borrow pit. Unanticipated discoveries during project construction could result in impacts to currently unidentified historic properties for any of the alternatives as well as for the TL and substation or borrow pit.

4.7.9 Mitigation

Further archaeological data collection would be needed to mitigate the adverse impacts to historic properties. A Historic Property Treatment Plan (HPTP) will be developed. The HPTP lists all historic properties to be adversely affected by the project and specify and describe in detail the mitigation measures—site avoidance, testing, data recovery, or monitoring—to be implemented prior to and/or during construction, including the management and protocol of any unanticipated discoveries.

4.8 Native American Religious Concerns

This section evaluates direct and indirect effects of project construction and operation that the Proposed Action, Alternative 1, Alternative 2, the TL and substation, and the borrow pit may have on Native American religious concerns (traditional and cultural sites, activities, resources).

To date, no specific prehistoric, ethnohistoric, or contemporary traditional and cultural resources, sites, or associated activities have been identified by tribal participants. However, considering that Native American consultation is ongoing, opportunities still exist to participate and identify concerns. Thus, specific direct and indirect impacts are not definitive at this time.

Possible impacts to tribal resources will be analyzed in a general sense, given current tribal input and the possibility of new and inadvertent discoveries, and will apply to the construction and operation of the Proposed Action, Alternative 1, Alternative 2, the TL and substation, and the borrow pit.

For cultural resources, treatment plan development and subsequent data recovery (excavation) of identified prehistoric or ethnohistoric archaeological sites are considered an acceptable mitigation measure. However, with regard to Native American religious concerns and to the tribes, proposed "mitigation" is often considered an adverse impact to tribal beliefs, customs, and traditional and cultural lifeways.

As stated earlier under Chapter 3, in Section 3.9.4.2, tribal participants have provided input on the following concerns: potential impacts to water sources and avoidance of identified cultural resources, further tribal participation (monitor or observer opportunities) during implementation of a cultural resources treatment plan (data recovery) or during new surface disturbance associated with construction activities, general concerns about possible impacts to older sites along the "old lakeshore" or within the dunes (Crescent Dunes), maintenance of existing access routes, and archaeological site inspections (BLM Cultural Resources Specialist accompanied by a tribal representative) to ensure construction activities do not degrade sites identified for avoidance.

4.8.1 Methods

Methods used to identify tribal concerns—which include traditional and cultural sites, activities, and resources—were: reviewing existing ethnographic literature and census records, providing to tribal entities the services of an ethnographer, conducting a Class I literature review and undertaking a Class III cultural resources survey, participating in (and continuing to provide opportunities for) site visits with participating tribal entities, conducting follow-up communications (by phone and e-mail), and conducting briefings and follow-up meetings.

4.8.2 No Action Alternative

The No Action Alternative would have no project-related impacts—direct or indirect—to Native American religious concerns.

4.8.3 Summary of Impacts

At this time, given the known and provided information, there exists some potential (not definitive) to affect project area specific archaeological sites and associated artifacts of concern. Potential impacts could occur because of cultural resources treatment plan implementation and the lack of avoidance of prehistoric and/or ethnohistoric archaeological sites. Based on previous consultations, historic sites appear to be of little concern, unless they are associated with specific family histories and ancestral habitations (i.e., homesteads located on turn-of-the-century allotment lands).

Considering that some impacts may not be known until after (or during) project development (i.e., inadvertent discovery of previously unidentifiable subsurface deposits) and the fact that consultation is ongoing, specific resource identification and subsequent determinations of impacts are not conclusive.

4.9 Land Use and Access

This section describes the potential impacts of construction and operation of the proposed project on land use and access in the area of analysis and CESA as described in Section 3.8.

4.9.1 Methods

The impact analysis for the land use and access areas was based on review of the existing conditions (as described in Section 3.8) and focuses on the following issues:

- conformity of the proposed project with federal and local land use plans, ordinances, and policies
- the potential for the proposed project to have direct and/or indirect land use and access conflicts with existing and planned uses

Project construction and operation would be considered to have an impact on land use and access if they would:

- permanently preclude a permitted or current land use over a substantial area

- permanently displace existing, developing, or approved urban/industrial buildings or activities over a substantial area (i.e., residential, commercial, industrial, governmental, or institutional)
- conflict with an existing ROW
- substantially conflict with applicable general and regional plans and/or approved or adopted policies, goals, or operations of communities or governmental agencies

4.9.2 Proposed Action

4.9.2.1 <u>Construction</u>

Direct Effects

The Proposed Action would have long-term direct impacts on potential uses of BLM-administered land within the analysis area by removing approximately 1,500 acres of lands from potential public use or disposal for the duration of the lease. Table 4-1 summarizes the amount of permanent land disturbance that would be associated with the project's construction.

The Proposed Action would have no direct effects to the authorized and pending BLM rights-of-way identified in Table 3-21 and presented in Figure 3-11. The meteorological tower is associated with this project and would remain if this project is developed.

The project would directly affect the grazing allotment by reducing the grazing potential, but only slightly. This impact is further summarized in Section 4.14 and Table 4-26.

The Proposed Action would have no direct effects on the restrictions on off-highway vehicles and would have minor effects on recreation uses established in the area, which are summarized in Section 4.15.

The Proposed Action would not affect the mineral leasing restrictions (no surface occupancy) adjacent to the project area.

The Proposed Action would not affect the intended use of the BLM-designated adjacent utility corridor.

The Proposed Action is within the U.S. Department of Defense Airspace Consultation Area, and could directly affect airspace use in the area. The U.S. Navy has expressed concerns about the potential impacts of this site on infrequent flights through this region; however, the FAA reviewed the proposed location and concluded the Proposed Action posed no hazard to aviation in the area. The FAA determined (FAA 2010b):

> "… that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities.
>
> Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is (are) met:
>
>> As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, 24-hr hi-strobes - Chapters 4,7(HIWOL),&12."

The U.S. Air Force has indicated that this location would affect instrumentation in the region that is used in training activities on the Nevada Test and Training Range located southeast of the project area.

The use of Crescent Dunes Road would not be affected by the proposed project. The proposed project would result in the loss of access to the lands within the proposed project area, but would not otherwise minimize or prevent access to the adjacent areas or the region.

The Proposed Action is within the boundary of the Nye County Planning Area mapped as federal lands; however, land requested under the Proponent's ROW application is entirely under the jurisdiction of the BLM TFO. No residential, commercial, industrial, or institutional uses are located within the analysis area, so no effects on such uses would result from the project.

The Proposed Action is consistent with the policies, goals, objectives, and land use descriptions set forth in the Nye County Comprehensive Plan and the BLM Tonopah Resource Management Plan.

Indirect Effects

The proposed project is not likely to have indirect effects on the potential land use on or access to public lands in the region.

4.9.2.2 **Operation**

Direct Effects

Any direct effects to land use or access would occur during construction activities as identified above, and would continue during the operation of the facility.

Indirect Effects

No indirect effects to land use or access are likely to occur with operation of the proposed project.

4.9.3 Alternative 1

4.9.3.1 **Construction**

Direct Effects

Many of the impacts to land use and access described for the Proposed Action would be the same for Alternative 1. However, Alternative 1 is not consistent with several of the policies, goals, objectives, and land use descriptions set forth in BLM's Tonopah Resource Management Plan.

As with the Proposed Action, Alternative 1 would have long-term direct impacts on potential uses of BLM-administered land within the analysis area by removing approximately 1,504 acres of lands from potential public use or disposal for the duration of the lease. Table 4-1 summarizes the amount of permanent land disturbance that would be associated with the project's construction.

As with the Proposed Action, Alternative 1 would have no direct effects to the authorized and pending BLM rights-of-way identified in Table 3-21 and presented in Figure 3-11. The meteorological tower is associated with this project and would remain if this project is developed.

As with the Proposed Action, Alternative 1 would directly affect the grazing allotment by reducing the grazing potential, but only slightly. This impact is further summarized in Section 4.14 and Table 4-26.

Unlike the Proposed Action, Alternative 1 would directly affect approximately 130 acres of the ROW avoidance area that is established for protection of the Crescent Dunes, and is in direct conflict with the intent of that set-aside. This impact is further summarized in Section 4.15.

The proposed project would have no direct effects on the restrictions on off-highway vehicles and recreation uses established in the area, which are summarized in Section 4.15. However, Alternative 1 overlaps a portion of the SRMA that encompasses the Crescent Dunes area. Construction and fencing of the facility would exclude use of a portion of that area, reducing potential recreational use.

Alternative 1 would encroach on an area designated with mineral leasing restrictions (no surface occupancy) on the eastern side of the project area. Structures would be established within the restricted area, in direct conflict with the intended protections.

Alternative 1 would not affect the intended use of the BLM-designated adjacent utility corridor.

As with the Proposed Action, Alternative 1 is within the U.S. Department of Defense Airspace Consultation Area, and could directly affect airspace use in the area. The U.S. Navy has expressed concerns about the potential impacts of this site on infrequent flights through this region; however, the FAA reviewed the proposed location and concluded the proposed project posed no hazard to aviation in the area (FAA 2010c). The U.S. Air Force has indicated that this location would not affect instrumentation in the region that is used in training activities on the Nevada Test and Training Range located southeast of the project area.

The use of Crescent Dunes Road would not be affected by Alternative 1. The proposed project would result in the loss of access to the lands within the proposed project area, but would not otherwise minimize or prevent access to the adjacent areas or the region.

Alternative 1 is within the boundary of the Nye County Planning Area mapped as federal lands; however, land requested under the Proponent's ROW application is entirely under the jurisdiction of the BLM TFO. No residential, commercial, industrial, or institutional uses are located within the analysis area, so no effects on such uses would result from the project.

Indirect Effects

No indirect effects to land use or access are likely to occur with operation of the proposed project.

4.9.3.2 Operation

Direct Effects

Any direct effects to land use would occur during construction activities as identified previously, so no additional direct effects to land use are likely to occur during operation or maintenance of the facility.

Indirect Effects

No indirect effects to land use or access are likely to occur with operation of the proposed project.

4.9.4 Alternative 2

4.9.4.1 <u>Construction</u>

Direct Effects

Many of the impacts to land use and access described for the Proposed Action would be the same for Alternative 2. Alternative 2 is consistent with several of the policies, goals, objectives, and land use descriptions set forth in the BLM Tonopah Resource Management Plan.

As with the Proposed Action, Alternative 2 would have long-term direct impacts on potential uses of BLM-administered land within the analysis area by removing approximately 1,504 acres of lands from potential public use or disposal for the duration of the lease. Table 4-1 summarizes the amount of permanent land disturbance that would be associated with the project's construction.

As with the Proposed Action, Alternative 2 would have no direct effects to the authorized and pending BLM rights-of-way identified in Table 3-21 and presented in Figure 3-11. The meteorological tower is associated with this project and would remain if this project were developed.

As with the Proposed Action, Alternative 2 would directly affect the grazing allotment by reducing the grazing potential, but only slightly. This impact is further summarized in Section 4.14 and Table 4-26.

As with the Proposed Action, Alternative 2 would not affect the ROW avoidance area that is established for protection of the Crescent Dunes located east of the project area.

The proposed project would have no direct effects on the restrictions on off-highway vehicles and recreation uses established in the area, which are summarized in Section 4.15. Alternative 2 would not affect the SRMA that encompasses the Crescent Dunes area.

Alternative 2 would not affect the area designated with mineral leasing restrictions (no surface occupancy) east of the project area.

Alternative 2 would not affect the intended use of the BLM-designated adjacent utility corridor.

As with the Proposed Action, Alternative 2 is within the U.S. Department of Defense Airspace Consultation Area, and could directly affect airspace use in the area. However, the FAA reviewed the proposed location and concluded the proposed location posed no hazard to aviation in the area (FAA 2010d). No objections were noted in the declaration from FAA.

The use of Crescent Dunes Road would not be affected by Alternative 2. The proposed project would result in the loss of access to the lands within the proposed project area, but would not otherwise minimize or prevent access to the adjacent areas or the region.

Alternative 2 is within the boundary of the Nye County Planning Area mapped as federal lands; however, land requested under the Proponent's ROW application is entirely under the jurisdiction of the BLM TFO. No residential, commercial, industrial, or institutional uses are located within the analysis area, so no effects on such uses would result from the project.

Alternative 2 is consistent with the policies, goals, objectives, and land use descriptions set forth in the Nye County Comprehensive Plan and the BLM Tonopah Resource Management Plan.

Indirect Effects

No indirect effects to land use or access are likely to occur with operation of the proposed project.

4.9.4.2 Operation

Direct Effects

Any direct effects to land use would occur during construction activities as identified above, so no additional direct effects to land use are likely to occur during operation or maintenance of the facility.

Indirect Effects

No indirect effects to land use or access are likely to occur with operation of the proposed project.

4.9.5 TL and Anaconda-Moly Substation Corridor

4.9.5.1 Construction

Direct Effects

Impacts to land use and access from the construction of the TL and substation are summarized in this subsection. The TL and substation are consistent with the policies, goals, objectives, and land use descriptions set forth in the BLM's Tonopah Resource Management Plan.

Unlike other components of the project, the proposed TL and substation are within an existing utility corridor and, therefore, would have no long-term direct impacts on potential uses of BLM-administered land. The new TL would be designed and constructed in accordance with current design standards to ensure no interference with the function and safety of the existing line. Table 4-1 summarizes the amount of permanent land disturbance that would be associated with construction of the TL.

The TL and substation would have no direct effects to the authorized and pending BLM rights-of-way identified in Table 3-21 and presented in Figure 3-11.

The TL would have negligible direct effects on the grazing allotment by reducing the grazing potential through the loss of a very small amount of forage production potential. This impact is further summarized in Section 4.14 and Table 4-26.

The proposed TL would have no direct effects on the restrictions on off-highway vehicles and recreation uses established in the area, which are summarized in Section 4.15.

As with the other portions of the project, the TL and substation are within the U.S. Department of Defense Airspace Consultation Area, but fall below the height limitation (200 feet) within which consultation is required. Therefore, no impacts to airspace are likely to occur from the TL.

The proposed TL is within the boundary of the Nye County Planning Area mapped as federal lands; however, land requested under the Proponent's ROW application is entirely under the jurisdiction of the BLM TFO. No residential, commercial, industrial, or institutional uses are located within the analysis area, so no effects on such uses would result from the project.

The TL and substation are consistent with the policies, goals, objectives, and land use descriptions set forth in the Nye County Comprehensive Plan and the BLM's Tonopah Resource Management Plan.

Indirect Effects

No indirect impacts of the construction of the TL and substation are likely to occur regarding land use and access.

4.9.5.2 Operation

Direct Effects

No direct effects on land use or access as a result of operation of the TL are likely to occur.

Indirect Effects

No indirect effects on land use or access as a result of operation of the TL are likely to occur.

4.9.6 Borrow Pit

Direct Effects

Impacts to land use and access from the construction of the borrow pit are summarized in this subsection. The borrow pit is consistent with the policies, goals, objectives, and land use descriptions set forth in the BLM Tonopah Resource Management Plan.

Unlike the other components of the project, the borrow pit would have short-term, but not long-term, direct impacts on potential uses of BLM-administered land within the analysis area. The borrow pit would be in use only during construction of the proposed project, and then would be recontoured and revegetated, making it available for other future uses. Approximately 40 acres of land would be removed from short-term potential public use, and then be released sometime in the future (see Table 4-1).

The borrow pit would have no direct effects on the authorized and pending BLM rights-of-way adjacent to the project that are identified in Table 3-21 and presented in Figure 3-11.

The borrow pit would have negligible direct effects on the grazing allotment by reducing the grazing potential through the loss of only 40 acres of forage production potential. This impact is further summarized in Section 4.14 and Table 4-26.

Construction and operation of the borrow pit would have no direct effects on transportation along the existing SH 68, which passes through the area proposed for the borrow pit. Some impacts on traffic may result because of the construction and hauling vehicles that would use this road to move materials to the construction site. These impacts would cease upon completion of the construction of the generation facility and the TL.

The proposed borrow pit is within the boundary of the Nye County Planning Area mapped as federal lands; however, land requested under the Proponent's ROW application is entirely under the jurisdiction of the BLM TFO. No residential, commercial, industrial, or institutional uses are located within the analysis area, so no effects on such uses would result from the project.

The borrow pit is consistent with the policies, goals, objectives, and land use descriptions set forth in the Nye County Comprehensive Plan and the BLM's Tonopah Resource Management Plan.

Indirect Effects

No indirect impacts on land use or access are likely to occur from the proposed borrow pit.

4.9.7 No Action Alternative

With the No Action Alternative, no project-related impacts to land use or access would occur. The No Action Alternative is consistent with the policies, goals, objectives, and land use descriptions set forth in the Nye County Comprehensive Plan and the BLM's Tonopah Resource Management Plan.

4.9.8 Summary of Impacts

Potential impacts on land use and access from the proposed project and its various components are relatively limited. The proposed project and the associated alternatives would not create hazards to air traffic according to determinations reached by the FAA. Alternative 1 would encroach on a ROW avoidance area for recreation (SRMA) and a no surface occupancy area for mining, both associated with the Crescent Dunes. Existing rights-of-way, mining claims, and other leases have been identified near or within the proposed project, but none of these have been identified as potentially conflicting with the project.

4.9.9 Mitigation

No mitigation has been identified as being needed to address impacts on land use or access.

4.10 Soils

4.10.1 Methods

The detailed study areas for soils at the Crescent Dunes Solar Energy Project (the proposed project) are the individual project areas associated with the Proposed Area (encompassing the Proposed Action), Alternative Area (a single area that encompasses Alternatives 1 and 2), TL and substation corridor, and the borrow pit (Figure 3-1). Soils were identified and mapped for the detailed study areas as stipulated by the data adequacy standards. The CESA for soils at the project consists of the area within a 5-mile radius of the project areas and proposed facilities (Figure 3-4). Identification and mapping of soils for the CESA was not stipulated by the data adequacy standards and was not performed.

The primary source of information for soils was the U.S. Department of Agriculture (USDA) NRCS online Web Soil Survey, which was accessed to obtain the soils data presented in this document (NRCS 2009). The specific soil survey represented by the data obtained through the Web Soil Survey is the survey of the Big Smoky Valley Area, Nevada, Part of Nye County. Information related to the principal soil orders and dominant suborders as provided by the BLM in the Data Adequacy Standards is also used.

As used in this section of the EIS, the term "soil" refers to the naturally weathered geologic sediments existing in layers or horizons of minerals and/or organic constituents of variable thickness, which differ from the geologic parent material (rock) in their morphological, physical, chemical, and mineralogical properties as well as their biological characteristics.

NRCS identifies and delineates soils into units with the objective of separating the landscape into segments with similar use and management requirements. Soils within the detailed study areas were described based on ten factors stipulated by the Data Adequacy Standards, including soil series name, texture, permeability, pH, available water capacity, hydrologic group, wind and water erosion hazard, landscape position, depth to bedrock, and suitability as topsoil for reclamation. This information is presented separately for each detailed study area in Section 3.9.

For the purpose of this EIS, project construction, operation, and maintenance activities could have direct and indirect impacts (effects) to soils if:

- on-site erosion increases
- on-site erosion results in downstream sedimentation
- increased soil compaction occurs
- there is a decrease in the potential or increase in the time period for revegetation or reclamation

Construction, operation, and maintenance activities could result in these direct and indirect impacts through the following ground-disturbing activities:

- excavation, blading, and/or grading for construction of project structures, buildings, and infrastructure
- construction of new roads and improvement of existing access roads
- temporary stockpiling of soil or construction materials and side-casting of soil and vegetation
- use of designated equipment staging areas
- soil compaction and dust
- equipment access through non-sensitive stream channels (defined as streams that do not support sensitive species, critical habitat, or woody riparian vegetation)

4.10.2 Proposed Action

4.10.2.1 Construction

Direct Effects

Erosion

Construction of the project would result in surface disturbances and removal of vegetation leading to increased on-site soil erosion potential. On-site soil loss could increase if disturbed soils were left exposed during periods of high precipitation, runoff, and winds.

Compaction

Soils with high clay content and saturated by storm events or by overwatering during dust control are susceptible to compaction by vehicles and construction equipment. Compacted soils can resist or delay reestablishment of vegetation and success in reclamation objectives.

Indirect Effects

Erosion

Construction of the project could result in surface disturbances and removal of vegetation, leading to increased on-site soil erosion. Sedimentation into ephemeral washes located downstream within the CESA, or beyond, could increase if disturbed soils were left exposed during periods of high precipitation and runoff. Off-site deposition of on-site soil eroded by wind could increase within the CESA, or beyond, if disturbed soils were left exposed.

Diminished Reclamation/Revegetation

Loss of topsoil through construction activity or construction-induced erosion, or over-compaction of topsoil from construction activity, can delay or reduce reclamation success following decommissioning. These conditions, alone or in concert, could make it difficult for native plant species to reestablish. The loss of topsoil can make plant establishment more difficult because of unfavorable nutrient level, water capacity, or permeability characteristics of surface soil remaining after topsoil loss. Over-compaction of soil can resist seed movement into the soil profile, seed germination, and subsequent seedling growth through the soil, and movement of water and nutrients into the root zone. These indirect effects are not expected to occur off-site within the CESA or beyond.

4.10.2.2 Operation

Direct Effects

Erosion

Operation of the project is not expected to result in increased on-site soil erosion.

Compaction

Operation of the project is not expected to increase soil compaction or resist or delay reestablishment of vegetation or success in reclamation objectives.

Indirect Effects

Erosion

Operation of the project is not expected to result in sedimentation into streams and water bodies located hydraulically downstream or off-site deposition of on-site soil eroded by wind.

Diminished Reclamation/Revegetation

Operation of the project is not expected to resist or delay reestablishment of vegetation or success in reclamation objectives.

4.10.3 Alternative 1

4.10.3.1 Construction

Direct Effects

Direct effects of construction of Alternative 1 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects

Indirect effects of construction of Alternative 1 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.3.2 Operation

Direct Effects

Direct effects of operation of Alternative 1 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects

Indirect effects of operation of Alternative 1 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.4 Alternative 2

4.10.4.1 Construction

Direct Effects

Direct effects of construction of Alternative 2 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects

Indirect effects of construction of Alternative2 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.4.2 Operation

Direct Effects

Direct effects of operation of Alternative 2 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects
Indirect effects of operation of Alternative 2 are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.5 TL and Anaconda-Moly Substation Corridor

4.10.5.1 Construction

Direct Effects
Direct effects of construction of the TL and Anaconda-Moly substation corridor are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects
Indirect effects of construction of the TL and Anaconda-Moly substation corridor are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.5.2 Operation

Direct Effects
Direct effects of operation of the TL and Anaconda-Moly substation corridor are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects
Indirect effects of operation of the TL and Anaconda-Moly substation corridor are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.6 Borrow Pit

Direct Effects
Direct effects of construction of the borrow pit are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

Indirect Effects
Indirect effects of construction of the borrow pit are anticipated to be similar to those described for the Proposed Action because the soils in the areas and the proposed activities are similar.

4.10.7 No Action Alternative

Under the No Action Alternative, impacts to existing soils resources associated with this project would not occur. Soils impacts could occur in other areas if planning efforts pursue other transmission and/or generation projects to meet the projected energy shortfalls.

4.10.8 Summary of Impacts

The potential for direct, indirect, and cumulative impacts associated with construction of the project exist. Impacts may include increased erosion, increased soil compaction, and diminished potential for revegetation. Direct, indirect, and cumulative impacts associated with operation of the project are not expected.

4.10.9 Mitigation

Mitigation of potential direct, indirect, and cumulative impacts are discussed separately below for each potential impact identified.

Erosion

The objectives of erosion mitigation are to reduce short-term erosion and sedimentation, as well as quickly restore topography and vegetation to preconstruction conditions in all areas required and approved by BLM. Measures to be implemented by the project Proponent during project construction and reclamation are listed below.

Implementation of the following measures and practices would minimize the effects of grading, excavation, and other surface disturbances in all project areas. Schedules and specifications on the use of these features would be included in the Construction, Operation, and Maintenance Plan (COM Plan).

- Confine all vehicular and equipment traffic associated with construction to the construction footprint, material yards, and access roads designated in the COM plan.
- Limit soils and vegetation disturbance and removal to the minimum areas necessary for access and construction.
- Where vegetation removal is necessary, use cutting/mowing methods instead of blading, wherever possible.
- Adhere to a construction methodology that mitigates impacts in sensitive areas during severe weather events.
- Prior to work on the project, inform all construction personnel of environmental concerns, pertinent laws and regulations, and elements of the erosion control plan.
- Minimize grading to the greatest extent possible. Where required, grading should be conducted away from drainages and watercourses to reduce the risk of material entering these features.
- Graded material should be sloped and bermed to reduce surface water flows across the graded area.
- Replace excavated materials and minimize the time between excavation and backfilling.
- Direct dewatering operations to stable surfaces to avoid soil erosion.

- Use detention basins, certified weed-free straw bales or wattles, or silt fences where appropriate to reduce soil loss from erosion.
- Use drainage control structures including culverts, ditches, water bars (berms and cross ditches), and sediment traps, as necessary, to direct surface drainage away from disturbed areas and minimize runoff and sedimentation down-slope from all disturbed areas.
- Implement other appropriate BMPs to minimize erosion-related impacts during site preparation and construction, and subsequent reclamation.
- Reestablish native vegetation and, if necessary, non-persistent, non-invasive, non-native vegetation in highly erodible areas as soon as possible following construction.

In areas of highly erodible soils, construction equipment and techniques that minimize surface disturbance, soil compaction, and loss of topsoil would be used, such as vehicles with low ground pressure tires. Erosion control measures, in accordance with the Soil Conservation and Erosion Control Plan, would be installed prior to construction in potential soil erosion areas. Erodible slopes that do not require grading should be cleared using equipment that results in little to no soil disturbance.

Compaction

Construction, operation, and maintenance activities would be restricted when the soil is too wet to support construction or maintenance equipment (i.e., when heavy equipment creates ruts in excess of 4 inches deep over a distance of 100 feet or more in wet or saturated soils). If soil is too wet, one or more of the following measures would apply:

- Where feasible, route all construction or maintenance activities to avoid wet areas as long as the route does not enter sensitive resource areas.
- If wet areas cannot be avoided, implement BMPs for use in these areas during construction and improvement of access roads, and during subsequent reclamation. Appropriate BMPs include use of wide-track or balloon-tire vehicles and equipment, or other approved weight dispersing systems, geotextile cushions, pre-fabricated equipment pads, and other materials to minimize damage to soil. If BMPs cannot be successfully applied, construction or routine maintenance activities would not be allowed in these areas until the project conditions improve and construction activity can proceed without damage to soils.
- Limit construction equipment access to the minimum amount feasible, remove and separate topsoil in wet or saturated areas, and stabilize subsurface soils with a combination of one or more of the following: grading to dewater problem areas, use of weight dispersion mats, and erosion control measures such as surface rilling and back-dragging. Following construction, regrade and recontour the area, replace topsoil, and reseed to achieve preconstruction native plant densities.

Diminished Reclamation/Revegetation

Vegetation removal and soil disturbances (including temporary road improvements) would be minimized. Where vegetation removal is required, mowing or cutting methods would be used to the greatest extent possible. Topsoil removed during clear and grub activity and grading and excavation required for construction would be collected and stockpiled on-site. Stockpiles would be protected from wind and water erosion through establishment of native vegetation and temporary or permanent erosion control BMPs including weed-free straw bales or wattles for the duration of facility construction, operation, and decommission. Following decommission, the stockpiled topsoil would be replaced across the site where topsoil was previously removed to provide a proper soil substrate for seeding or planting and enhance reestablishment of native vegetation to preconstruction conditions.

4.11 Social and Economics

4.11.1 Methods

Implementation of any of the action alternatives would have direct and indirect effects on local and regional social and economic conditions. These would be the result of temporary (during construction) and permanent (during operations) activities. No differences are anticipated in the effects on these resources from the different action alternatives. As such, the following sections will not differentiate between the action alternatives but, rather, will present all potential effects of any action alternative, as well as the effects of the No Action Alternative, cumulative impacts, and proposed mitigation.

The work force will remain the same for any of the alternatives, the TL, substation, and borrow pit, and it is concluded that the socioeconomic factors would not change with each of these actions. Therefore, the results of the Proposed Action remain the same for each of the other action alternatives.

4.11.2 Proposed Action

4.11.2.1 Construction

Direct Effects

Social Conditions

The following subsections contain an analysis of impacts on the local and regional social conditions, specifically population and housing, during construction.

Population

During the anticipated 30-month construction phase, an average of 250 construction personnel would be on site, with a peak of 400–500 personnel. Where possible, construction workers would be hired from the local and regional workforce. Table 4-19 illustrates the forecast construction industry work force in the county and the state.

Table 4-19. County and state construction industry work force

Area	2008 Workforce	2010 Workforce Forecast
Nye County, Nevada	1,571	Not available
Esmeralda County, Nevada	24	Not available
Nevada	116,500	85,895

Source: Nevada Department of Employment, Training, and Rehabilitation: Nevada Workforce Informer 2010

If communities of 25,000 or more residents are located within 60–70 miles of the construction site, a substantial number of construction workers can be hired within the region (EPRI 1982). The closest communities to the project area are shown in Table 4-20, along with the community population and approximate travel distance to the project area.

Table 4-20. Communities, population, and travel distance from project site

Community	Population	Travel Distance
Tonopah, Nevada	2,580	13
Goldfield, Nevada	441	40
Silver Peak, Nevada	141	68
Round Mountain, Nevada	837	70
Pahrump, Nevada	38,247	180
Ely, Nevada	4,291	181
Las Vegas, Nevada	591,422	224
Reno, Nevada	218,143	251
Carson City, Nevada	56,506	250

Source: Nevada State Demographer's Office, 2009 Estimates by County

With limited opportunities to hire a construction work force in the immediate project area, a substantial temporary work force is anticipated. At the peak of construction, the local population could increase by 20 percent or more.

Housing

Of the housing units in the project area, approximately one-third are rental properties (City-data.com 2010). With a projected vacancy rate of 29 percent to 49 percent, it is anticipated that there would be approximately 150 rental properties available for temporary workers. Eight hotels/motels are present in Tonopah and one in Goldfield. Based on the available information, guest rooms are available at these facilities. Accommodations are also available at recreational vehicle facilities, mobile home parks, and campgrounds.

Public Services

Law Enforcement

During construction, security would be provided by on-site personnel and, as needed, the Nye County Sheriff's Department. The on-site guards would be tasked with controlling entering and exiting of vehicles and personnel. During off hours, the guards would perform fire and security watch.

Fire and Emergency Medical Services

As a backup to the on-site services, the Tonopah Fire and Emergency Medical Services has 14 emergency medical technicians and 3 ambulances, which are backed up by a volunteer hazardous materials team from Tonopah and Round Mountain. The Nye Regional Medical Center (Tonopah) is equipped to provide immediate medical care and has emergency medical flight services to emergency care units in Las Vegas and Reno.

Utilities

Water required for construction and operation of the facility would be acquired from a new groundwater well on the project site. No additional water would be required.

Temporary sanitary facilities would be provided at the site, including portable toilets in the construction area. A temporary septic system would be installed during the construction phase and would be abandoned upon completion of construction.

Schools

Families relocating during construction would reside in existing housing within the communities surrounding the project site. The Nye County School District has an established schooling program that would accommodate the relocating families.

Economic Conditions and Fiscal Resources

Total expenditures for construction, including materials, supplies, and equipment, of any of the action alternatives is anticipated to be between $700 million and $800 million over the 30-month construction period. Typically, 250 personnel would be employed, with up to 500 personnel during peak construction periods. Similar to personal income, the gross state product for Nevada would experience an increase of up to $160 million per year directly or indirectly as a result of construction (Nevada State Demographer's Office 2008).

Indirect Effects

For each construction-related job created by a 100-megawatt solar energy facility, there can be up to two additional indirect or induced jobs created during the construction phase. With up to 500 jobs on-site during peak construction, up to 1,000 indirect or induced jobs would be created. This would result in an influx of approximately $140 million of personal income in Nevada per year of construction.

4.11.2.2 Operation

Direct Effects

Social Conditions

The following subsections contain an analysis of impacts on the local and regional social conditions, specifically population and housing, during operations.

Population

As part of the operations, the project Proponent anticipates employing 30 to 40 full-time employees. This staff would include engineering and administrative staff, skilled workers, and operators. The facility would be operated up to 7 days a week and 24 hours per day. While some of this staff may be hired locally, it is anticipated that many of them would relocate to the area from the region or nationally. This would result in a potential 2 percent increase in the local population.

Housing

The project area is experiencing a residential vacancy rate of 29 to 49 percent. It is assumed any need for permanent housing for operations staff would be accommodated within the existing market. No additional housing would be required.

Public Services

Law Enforcement

During operations, security would be provided by on-site personnel and, as needed, by Nye County Sheriff's Department. The on-site guards would be tasked with controlling entering and exiting of vehicles and personnel. During off hours, the guards would perform fire and security watch.

Utilities

All water needs at the project site would be accommodated through the use of a new groundwater well installed for construction. No additional water sources would be required.

Schools

Families relocating during construction would reside in existing housing within the communities surrounding the project site. The Nye County School District has an established schooling program, which would accommodate the relocating families.

Economic Conditions and Fiscal Resources

Throughout the life of the proposed action facility, it is anticipated that up to 50 employees would be required to operate and maintain the site. Similar to personal income, the gross state product for Nevada would experience an increase of up to $22.7 million per year directly or indirectly as a result of operations (Nevada State Demographer's Office 2008).

Indirect Effects

For each job directly created by the operation and maintenance of the facility, there would be up to 3 additional indirect or induced jobs created. This would result in an influx of approximately $30 million of personal income in Nevada per year of operation.

4.11.3 No Action Alternative

Under the No Action Alternative, the previously described action alternative impacts would not occur. However, the land would remain available for use consistent with the existing BLM land use plan, including potential other renewable energy projects. Both state and federal law support the increased use of renewable power generation because such renewable projects would likely be developed on other sites in the region.

The temporary and permanent impacts associated with identification of an action alternative would not occur, including the need for temporary housing, the increase in personal income, and the increase in the Nevada gross state product.

4.11.4 Summary of Impacts

The following subsections summarize the anticipated construction and operation of the project as related to socioeconomic impacts.

4.11.4.1 Construction

- While some construction work force is available locally, the majority would relocate to the surrounding communities temporarily. This could increase the local population by 20 percent or more during the peak of construction, resulting in the need for temporary work force housing.
- Through direct, indirect, and induced impacts during the peak of construction, approximately 1,500 jobs would be created, $140 million of personal income would be added to the State of Nevada annually, and $160 million would be added to the gross state product annually.

4.11.4.2 Operation and Maintenance

- While some operations and maintenance work force is available locally, the majority would relocate to the surrounding communities. This could increase the local population by 2 percent or more. However, enough existing residential properties exist to accommodate the relocating workforce.
- Through direct, indirect, and induced impacts during operations and maintenance of the facility, approximately 200 jobs would be created, $30 million of personal income would be added to the State of Nevada annually, and $22.7 million would be added to the gross state product annually.

4.11.5 Mitigation

Following are the proposed mitigation measures for the socioeconomic impacts associated with the construction and operations/maintenance phases of the proposed project:

- In coordination with the Tonopah Town Board, develop a housing and rental plan to coordinate available rental property in and around Tonopah.
- If available rental properties do not meet needs, work with the Town Board to develop a temporary trailer park for relocating work force members in town or at the site.

4.12 Visual Resources

4.12.1 Methods

The visual resource analysis discussed in this section followed the BLM VRM system as an objective methodology to assess the aesthetic conditions of the landscape, characterize the current viewing environment, and evaluate the potential effects of the proposed project on the environment. The analysis included an evaluation of existing visual conditions and an impact analysis that considered viewer sensitivity and visual contrast. Where BLM VRM guidelines do not apply (e.g., non-BLM-administered lands), an inventory of aesthetic conditions was conducted using BLM visual resource inventory guidelines to determine public sensitivity toward the introduction of the proposed facilities.

Viewer Sensitivity

The viewer sensitivity analysis determined the classes of viewers or viewer groups that would experience the visual landscape. That is, viewer sensitivity establishes what the visual response is to the introduction of the proposed project in the viewshed.

Viewer sensitivity is influenced by existing topography, vegetation, and urban development or structures. Views of the proposed project typically would diminish with distance, topographic or landform interference, overgrown vegetation, and other structural impediments.

Viewer sensitivity was established by evaluating the types of viewers and their proximity to the proposed project. Viewer sensitivity is ranked from high to low, with “high” being the most sensitive viewing condition (Table 4-21). The viewer sensitivity analysis also considered the frequency, duration, and type of viewing conditions. Additionally, viewer sensitivity is affected by viewer activity, awareness, perception, and visual expectations.

Table 4-21. Sensitivity ratings for viewer types

Viewer Sensitivity Rating	Viewer Type
High	Residents within viewing proximity to project
Medium	Recreationists within viewing proximity to project
Low	Motorists and non-recreational travelers along roadway

Visual Contrast

Visual contrast is the measure of the degree of perceived change that would occur in the landscape attributable to potential effects from the proposed project (e.g., construction, use, and maintenance). BLM’s visual contrast rating system was used to determine visual effects and identify measures to mitigate these effects. The contrast rating form was completed at all KOPs that represent important views (HDR 2010).

Visual Simulations

To indicate the probable visual effects of the proposed action alternatives, computer-aided simulations were prepared. These simulations not only represent effects at KOPs, but also broadly represent typical views in the project area. These simulations removed elements of the existing conditions and added the features of the proposed build alternatives. The purpose of the simulations was to provide a comparison of visual changes. Not all potential views were reproduced or simulated. Visual simulations were performed based on the determination of sensitivity from these KOPs. The visual simulations provided a general depiction of the scale and significance of the solar facility as it would likely appear from the selected KOPs.

Visual Impact Evaluation

The visual impact evaluation determined the degree of change and the viewer response to change after the proposed facility is introduced into the environment. All of the previously listed criteria helped to determine the level of impact including exposure, viewer sensitivity, simulations, and visual contrast ratings. Additionally, other factors helped determine the level of impact for each proposed action alternative including the cultural significance and the local values. A visual resource specialist used all these factors to assign each proposed action alternative a visual impact level. Visual impact levels, definitions, and examples are presented in Table 4-22.

Effects from the proposed project were considered for both phases of the project, construction and operation. Building on the baseline of environmental conditions, the visual contrast rating system and viewer sensitivity analysis were applied to each proposed action alternative.

Table 4-22. Visual impact levels defined

Impact Level	General Definition	Definition Specific to Visual Resources	Examples
Major	Effects that potentially would cause significant change or stress to an environmental resource or use, or severe adverse or exceptional beneficial effects	Visual contrasts resulting from construction disturbances and the presence of new facilities that would substantially alter the scenic value of the landscape and would dominate views from sensitive viewpoints	• Structures that significantly impede and obstruct scenic views, such as impeding a view from a scenic turnout or observation point • Construction that would irrevocably damage scenic quality • Facilities that would be seen in the foreground to middleground distance zones in previously undisturbed, highly scenic landscapes
Moderate	Effects that potentially would cause some change or stress to an environmental resource or use, or readily apparent effects to scenic quality	Visual contrasts that would diminish the scenic quality of the landscape and would easily be noticeable from sensitive viewpoints	• Vertical structures that may detract from existing scenic quality • Facilities would be visible in the foreground to middleground distance zones from sensitive viewpoints • Facilities parallel to highly scenic landscape that have not been previously disturbed
Minor	Effects that are potentially detectable but slight	Visual contrasts that diminish the scenic quality of the landscape to a minimal degree and are potentially noticeable when viewed from moderately sensitive viewpoints	• Facilities would be visible in middleground or background distance zones from moderate sensitivity viewpoints, or parallel to existing facilities in a previously disturbed landscape, or landscapes of common scenic quality
Negligible	Effects that potentially cause an insignificant or indiscernible change or stress to an environmental resource or use, effects range from immeasurable and undetectable to low levels of detection	Visual contrasts that would not diminish the scenic quality of the landscape	• Temporarily displacing vegetation while maintenance and/or construction occurs • Facilities would be visible in the background distance zone, where new facilities parallel existing facilities or traverse previously disturbed landscape in landscapes of common to minimal scenic quality
None	No discernable or measureable effects would result	No discernable or measureable visual contrast	• No project activity would take place

Distance Zones

To establish the impacts of the proposed project on the visual environment, the following distance zones (Table 4-23) were used to describe perception thresholds, the scale and nature of the objects being viewed, and the viewing environment. The perception of the landscape character, including form, line, texture, and color, is among other complex phenomena, largely a function of changing distance from a viewing point. Landscape elements tend to become less obvious and less detailed at greater distances. Perception of texture and color become less noticeable with increased distance.

Table 4-23. Distance zones (from BLM 1986a)

Distance Zone	Distance (in miles)	Summary of Definition
Foreground/Middleground	0 to 5	These areas can be seen from each travel route for a distance of 3 to 5 miles where management activities may be viewed in detail.
Background	6 to 15	These areas can be seen from each travel route to approximately 15 miles. To be included within this distance zone, vegetation should be visible at least as patterns of light and dark.
Seldom Seen	Beyond 15	These areas are beyond the background zones.

Source: BLM Manual H-8410-1. Visual Resource Inventory. 1986.

4.12.2 Proposed Action

The landscape in the Proposed Area is generally characterized by flat desert with low-lying desert scrub vegetation bounded by high-relief fault-block mountains in the seldom seen distance zone (over 15 miles away). Landscape in the region appears desolate, that is, devoid of any major cultural modification aside from a paved two-lane rural highway and a power line corridor (oriented northeast and southwest) that bisects the landscape approximately 3 miles north of the Proposed Area. The colors within the landscape are limited to bands of earth tone browns and tans with few other distinguishing colors, creating a relatively homogenous appearance.

The most distinctive natural feature in the area is the Crescent Dunes SRMA. The Crescent Dunes are relatively unique because they are smooth, undulating sand dunes that are visible from over 5 miles away.

The closest residences to the Proposed Area are approximately 10 miles away to the south. The residential area is on the outskirts of Tonopah, located off of Radar Road. Most of the residences in this area are single-family detached homes. Approximately 10 houses (located at a slightly higher elevation) currently have views of the Crescent Dunes in the distance and, as such, would have views of the Proposed Area. Views from this area may be slightly obstructed by vegetation, topography, and distance.

The Proposed Area is located immediately adjacent to Pole Line Road, which is a paved two-lane highway. This road provides access to residences and farmland and the existing Anaconda-Moly substation from US 95. Pole Line Road has a very low level of daily traffic.

Given the special recreation designation of the Crescent Dunes, the area supports some recreational activity, although no signs indicating recreational areas are apparent. The Crescent Dunes and the surrounding landscape are used by off-highway vehicle recreationists, as evidenced by an extensive network of four-wheel-drive trails and staging areas located sporadically throughout the area.

4.12.2.1 Construction

Direct Effects

Visual effects resulting from the construction of the proposed facility are considered short-term and would include the implementation of mitigation measures (e.g., dust abatement, phased construction) intended to minimize effects to the aesthetic environment. During construction, large equipment, vehicles, and materials would be present and visible on the project site. Given that there are no other construction activities within the viewshed, the visual effects of construction are likely to be moderate for recreationists (with a medium sensitivity rating) and moderate for travelers (with a low sensitivity rating) traveling along Pole Line Road.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.2.2 Operation

Visual simulations were prepared for the Proposed Action at each of the six KOPs. Given the height of the central receiver tower and the distance from the project site, the project may be highly visible from KOP 1 and KOP 4; moderately visible from KOP 3; and barely visible from KOP 2, KOP 5, and KOP 6. Therefore, the visual contrast rating, viewer sensitivity analysis, and visual impact analysis are included for only KOP 1, KOP 3, and KOP 4.

KOP 1

Visual Simulation from Crescent Dunes (KOP 1) to the Proposed Action.

KOP 1 is located on the Crescent Dunes just northeast of the Proposed Action. This KOP was chosen to represent views that recreationists would see while using the dunes. From this location, the view is to the southwest and looks out over the wide-open valley floor in the foreground and middleground. Low shrubs and grasses sparsely cover the valley floor. The Monte Cristo Mountain Range forms a rugged horizon line in the background.

In relation to the surrounding landforms, the Proposed Action would result in a moderate contrast in form, line, color, and texture. The tower would be a new structure in the surrounding flat landscape, introducing a strong vertical line. The central receiver tower would be approximately 1.5 miles from this KOP. At this distance, the tower and surrounding heliostat field would be clearly visible from the dunes. Additionally, the Proposed Action would result in a moderate contrast of texture because the solar panels would create a repetitive texture on the landscape that would be moderately different from the texture of the surrounding landforms. Additionally, at this distance, the tower may appear white, and the reflective properties of the heliostats may appear to have a water-like effect on the surrounding landscape.

The primary type of viewer in this area is the off-highway vehicle recreationist. Typically, off-highway vehicle users are considered to have moderate viewer sensitivity because their primary objective is not to view scenic vistas. They often travel at speeds that are not conducive to viewing the landscape. However, because this area is undeveloped, recreationists who frequent this area may enjoy the sense of isolation from the modern world. For this reason, recreationists in the Crescent Dunes SRMA may be more sensitive to changes in the landscape.

Based on visual contrast, viewer sensitivity, and the KOP distance from the proposed project, the overall visual impact rating for the Crescent Dunes SRMA is considered major. This level of change is consistent with development of a VRM Class IV landscape, which allows "for major modifications to the existing characteristic of the landscapes" (BLM 1986).

KOP 3

Visual Simulation from the Anaconda-Moly Substation Access Road (KOP 3) to the Proposed Action.

KOP 3 is located at the junction of Pole Line Road and the Anaconda-Moly substation access road, approximately 5.6 miles from the Proposed Action. This KOP was chosen to represent the view that travelers would have while driving along the Anaconda-Moly mine access road. From this location, the project is visible to the southeast and looks over the wide-open valley floor in the foreground and middleground. The San Antonio Mountains are visible in the background. The Proposed Action would introduce a weak visual contrast for form, line, color, and texture into the viewshed because the central receiver tower and surrounding heliostats would barely be discernable from this distance. Viewers in this area would likely be commuters. Typically, commuters have a low sensitivity rating because they are traveling at high speeds and tend to be focused on the road rather than the surrounding landscape. The overall visual impact rating associated with the proposed action is moderate because of the lack of sensitive viewers in the area and the distance from the proposed facility.

KOP 4

Visual Simulation from Pole Line Road (KOP 4) to the Proposed Action.

KOP 4 is located at the junction of Pole Line Road and the Crescent Dunes access road, approximately 1.8 miles from the central tower of the Proposed Action. This KOP was chosen to represent the view that travelers would have while driving along Pole Line Road. From this location, the view is to the east and looks over the valley. The Crescent Dunes are visible in the foreground and the San Antonio Mountains are visible in the middleground. The Proposed Action would introduce a moderate visual contrast for form, line, color, and texture because the facilities would be dominant in the foreground. Viewers in this area would likely be commuters traveling to work or home. Typically, these viewers would be considered low sensitivity viewers because they pass through the area frequently, traveling at high speeds, and tend to be focused on the road and not on the surrounding landscape. Based on the scenic quality of the area, viewer sensitivity, and the visual contrast evaluation, the visual impact rating is considered moderate.

4.12.2.2.1 Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.3 Alternative 1

4.12.3.1 <u>Construction</u>

Direct Effects

Visual effects resulting from the construction of Alternative 1 would be the same as those presented for the Proposed Action.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.3.2 <u>Operation</u>

Visual effects for Alternative 1 would be similar as those for the Proposed Action. Visual simulations for KOP 1, KOP 3, and KOP 4 are provided on subsequent pages.

KOP 1

Visual Simulation from the Crescent Dunes (KOP 1) to Alternative 1.

KOP 1 is located on the Crescent Dunes just southeast of Alternative 1. The visual contrast rating, viewer sensitivity analysis, distance from the KOP, and the visual impact analysis are the similar to those associated with the Proposed Action.

<u>KOP 3</u>

Visual Simulation from the Anaconda-Moly Substation Access Road (KOP 3) to Alternative 1.

KOP 3 is located approximately 3.8 miles from Alternative 1. Although the Alternative 1 is slightly closer to this KOP (approximately 1.8 miles closer), the visual contrast rating, viewer sensitivity analysis, distance from the KOP, and the visual impact analysis are similar to those associated with the Proposed Action.

KOP 4

Visual Simulation from Pole Line Road (KOP 4) to Alternative 1.

KOP 4 is located approximately 1.7 miles southwest of the Proposed Action. The visual contrast rating, viewer sensitivity, and visual contrast evaluation are the same as those associated with the Proposed Action.

Indirect Effects

No indirect effects to visual resources are likely to occur.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.4 Alternative 2

4.12.4.1 Construction

Direct Effects

Visual effects resulting from construction of Alternative 2 would be similar to those presented for the Proposed Action.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.4.2 Operation

Visual effects for Alternative 2 would be similar to those associated with the Proposed Action. Visual simulations for KOP 1, KOP 3, and KOP 4 are provided below.

KOP 1

Visual Simulation from the Crescent Dunes (KOP1) to Alternative 2.

KOP 1 is located on the Crescent Dunes approximately 1.8 southeast of Alternative 2. The visual contrast rating, viewer sensitivity analysis, distance from the KOP, and visual impact analysis would be the same as those associated with the Proposed Action.

KOP 3

Visual Simulation from the Anaconda-Moly Substation Access Road (KOP 3) to Alternative 2.

KOP 3 is located approximately 2.9 miles from Alternative 2. Although Alternative 2 would be slightly closer to this KOP (approximately 2 miles closer), the viewer contrast rating, viewer sensitivity analysis, and overall visual impact analysis would be similar to those associated with the Proposed Action.

<u>KOP 4</u>

Visual Simulation from Pole Line Road (KOP 4) to Alternative 2.

KOP 4 is located approximately 1.6 miles from Alternative 2. The visual contrast rating, viewer sensitivity, and the visual impact analysis would be the same as those associated with the Proposed Action.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.5 TL and Anaconda-Moly Substation Corridor

The proposed TL and substation would connect the existing Anaconda-Moly substation to the proposed power block location at the project site. The majority of the proposed TL would follow the existing Miller's to Anaconda-Moly TL corridor, oriented northeast to southwest. The TL corridor would run perpendicular to Pole Line Road in the vicinity of the proposed project site, then would parallel the road before connecting with the proposed power block.

The landscape in the area of the TL corridor is flat desert valley, bounded by high-relief, fault-block mountains in the seldom seen distance zone (beyond 15 miles).

Views of the proposed TL would be evident from Pole Line Road but would likely be indiscernible from other areas.

Recreationists (with a medium viewer sensitivity rating) using the Crescent Dunes SRMA would likely be able to see the proposed TL from the Crescent Dunes, resulting in a moderate effect.

4.12.5.1 Construction

Direct Effects

The construction of the TL facilities is considered a short-term visual effect. During construction, large equipment, vehicles, and materials would be present and visible on the project site and within the TL corridor.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.5.2 Operation

Direct Effects

TL facilities would be used to connect the proposed substation to the existing Anaconda-Moly substation. This TL corridor would primarily be constructed within the existing Miller's to Anaconda-Moly TL corridor, with connections to the proposed substation and solar field diverging from the existing corridor. The proposed 230 kV TL poles would be constructed on "H"-frame wooden structures, which span approximately 500 feet apart.

KOP 2 is located at the Anaconda-Moly substation, approximately 8.1 miles north of the project area. This KOP was chosen to represent views from travelers on the Anaconda-Moly substation access road. From this location, the view is to the southeast and looks out over the wide-open valley floor in the foreground and middleground. The San Antonio Mountains are visible in the background. The proposed solar facility would be barely discernible because of the distance; however, this view represents the visual impacts of the transmission line. The new transmission line would result in a moderate contrast in form, line, and texture by introducing new vertical and horizontal lines into the surrounding landscape. Viewers in this area would likely be traveling to the existing substation. Typically, commuters have a low sensitivity rating because of constant motion and high traveling speeds. As a result, commuters tend to focus on the road and not the surrounding scenery. The visual contrast in this area is considered minor because while the TLs would be evident, they would not be a dominant feature in the viewshed because they would be among many TLs in the existing corridor. Based on the scenic quality, visual contrast rating, and viewer sensitivity in the area, the overall visual impact rating associated with the TL is minor because of the lack of sensitive viewers in the area and the existing TLs already present within the corridor.

Indirect Effects

No indirect effects to visual resources are likely to occur.

4.12.6 Borrow Pit

The borrow pit area is an existing industrial use area located outside of the viewshed. None to very few sensitive viewers are likely to see this area.

4.12.6.1 <u>Construction</u>

Direct Effects

No effects on visual resources are likely to occur.

Indirect Effects

No effects on visual resources are likely to occur.

4.12.6.2 <u>Operation</u>

Direct Effects

No effects on visual resources are likely to occur.

Indirect Effects

No effects on visual resources are likely to occur.

4.12.7 No Action Alternative

The No Action Alternative would result in no change to the visual landscape.

4.12.8 Summary of Effects

The proposed solar energy generating facility would have an estimated footprint of 1,628–1,673 acres, which would house the solar field, administration buildings, evaporation pond, generation transmission tie line, substation, and ancillary facilities. The solar field would have approximately 17,500 heliostats, or solar reflector panels, that would stand approximately 25 feet in height. The heliostats would be arranged asymmetrically in an array oriented within a 4,300-foot-diameter circle. The power block, located in the center of the solar field, would have a diameter of approximately 800 feet and would house storage tanks, a steam turbine, an air-cooled condenser, transformers, heat exchanges, buildings, and the central receiver tower, which would stand at approximately 633 feet in height and would be the tallest (most visible) element of the project.

Additionally, linear facilities would include the overhead TLs and access roads. The proposed TLs would run about 6 miles due north of the solar field and would be placed in the existing TL corridor when possible. The outgoing TL would follow Pole Line Road and head north to the Miller's to Anaconda-Moly TL and parallel the existing corridor to the Anaconda-Moly substation to interconnect with the electrical grid. For most of the distance between the project site and Anaconda-Moly substation, the TL would be placed within existing ROW. The proposed power line poles are approximately 80 feet tall and would be cor-ten steel 230 kV single-circuit monopoles.

Roads would be built to provide access to the project site from Pole Line Road. Major access roads to the project will be surfaced with asphalt and will have a width of 24-feet wide within 80-foot ROW. Traffic on these roads will occur predominantly during construction. There will also be unpaved perimeter roads constructed and located to provide access from the power block to the east and south edges of the solar field and around the perimeter of the solar field.

Table 4-24 summarizes visual effects of introducing the aforementioned project components into the existing environment from selected KOPs within the visual resources study area.

Table 4-24. Visual effects summary for KOPs for each proposed action alternative

KOPs/Action Alternative	Viewer Sensitivity	Construction Effects	Operation Effects
Proposed Action			
KOP 1	Recreationists – medium/high	Moderate	Major
KOP 3	Travelers – low	Moderate	Moderate
KOP 4	Travelers – low	Moderate	Moderate
Alternative 1			
KOP 1	Recreationists – medium/high	Moderate	Major
KOP 3	Travelers – low	Moderate	Moderate
KOP 4	Travelers – low	Moderate	Moderate
Alternative 2			
KOP 1	Recreationists – medium/high	Moderate	Major
KOP 3	Travelers – low	Moderate	Moderate
KOP 4	Travelers – low	Moderate	Moderate

4.12.9 Mitigation

The project location would be integrated with the surrounding landscape to avoid conflict with significant aesthetic conditions. Mitigation measures would include color treating the buildings, the backs of the solar panels, and the central receiving tower to a BLM-approved color that blends into the surrounding landscape. Subsequent to construction, restoration efforts would be made in areas that were temporarily disturbed.

Given the importance of maintaining dark sky conditions, conscious efforts would be made to protect the current dark skies from light pollution. The FAA requires lighting on any temporary or permanent structure that exceeds an overall height of 200 feet above ground level. In order to maintain dark sky conditions and minimize visual disturbance, it is recommended that the central receiver tower be illuminated with white lighting during daytime hours and red strobe lights during the night. Additionally, perimeter lighting, including lighting used to illuminate walkways, roadways, equipment yards, and parking lots, would be shielded so that light would be cast in a downward direction. Low-pressure sodium lighting would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

The TL poles would be constructed of wooden "H"-frame poles, which tend to blend into the landscape with distance. Given the flat, expansive nature of the landscape, the poles would provide less structural contrast as they blend into the horizon and skyline. The appearance of the poles would be similar to the existing wood power line poles present in the corridor.

4.13 Hazardous Materials

4.13.1 Methods

A variety of chemicals and hazardous substances would be stored and used during construction and operation of the project. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, and regulations. The analysis in this section included a review of the Proponent's Plan of Development (Tonopah Solar Energy 2009), which lists the expected hazardous materials that would be stored and used during construction and operation of the proposed facility.

As discussed in Chapter 2, the proposed project alternatives would be designed to meet all applicable standards to reduce the risk of an accidental release, operated in a manner that complies with safety standards and practices, and maintained to provide a safe workplace for personnel and to prevent significant adverse off-site impacts.

Construction and operation would involve the use of the latest industrial technology and design standards and would adhere to regulatory health and safety codes and guidelines. Training, operating, inspection, and maintenance procedures that would minimize the risk and severity of potential upset conditions would be implemented.

4.13.2 Proposed Action

4.13.2.1 <u>Construction</u>

During construction, several hazardous materials would be used, including diesel fuel, gasoline, oil, lubricants, welding gases, solvents, and paints. During the startup, the solar facility would require the use of large amounts of nitrate salt ($NaNO_{3,}$ CAS 7631-99-4; and $KNO_{3,}$ CAS 7757-79-1) at the site. The salt would be melted once during construction of the project and would be used throughout the project life at temperatures between 550°F and 1050°F.

Flammable materials, such as paint and solvents, would be stored in approved flammable material cabinets. Any welding gases would be stored in approved metal cylinders. A temporary 10,000-gallon aboveground storage tank would be used to supply diesel fuel during construction of the facility. The tank would be located in the temporary lay down area and would be double walled or located within a containment area in accordance with applicable regulations.

The salt would be delivered in 1-ton "super sacks," which can be stored on-site until melted for use in the plant process. The salt must be heated until fluid for use in the system, and would be stored within the lay down area of the site until it is heated, liquefied, and sent to the storage tanks. The solid salt would be heated to liquid form using propane gas. It is not anticipated that the salt would have to be refilled during operation of the plant because it would be stored in a fully closed system.

A hazardous materials and waste management plan would be implemented prior to construction of the proposed project that would instruct workers on the applicable procedures on hazardous materials storage and waste disposal. A SWPPP would be in place before construction detailing the BMPs for managing any stormwater runoff.

Direct Effects

The potential for hazardous material spills would increase during the construction phase of the project; however, by implementing the plans listed in Section 4.13.9, the direct effects of construction of the proposed project would be minimal.

Indirect Effects

If proper cleanup of any hazardous material spills in the construction phase were not implemented, the potential for soil contamination to remain and the potential to migrate with stormwater runoff from the construction area would exist. By implementing the plans and control measures listed in Section 4.13.9, the indirect effects of the project would be minimal.

4.13.2.2 Operation

Hazardous materials would be used and stored at the facility during operation and maintenance; a list of the materials expected to be used during operation is presented in Table 4-25.

Table 4-25. Hazardous materials that would be used during project operation

Material	Chemical Abstract Service Number (CAS No.)	Use	Hazardous Characteristics	Estimated Quantity On Site
Carbon dioxide (gas)	124-38-9	Generator purging	Asphyxiant, compressed gas	25,000 scf
Carbon dioxide (liquid)	124-38-9	Fire suppression	Asphyxiant, compressed liquid, cryogen	25,000 lb
Diesel fuel (no. 2)	68476-34-6	Fuel for emergency generator, fire water pump, and diesel storage for vehicle use	Toxic, combustible	11,500 gal
Ferric chloride solution	7705-08-0	Possible use for water pretreatment	Toxic	3,000 gal
Hydrogen	1333-74-0	Generator cooling	Toxic, flammable, explosive	24,000 scf
Hydrated lime	1305-62-0	Possible use for water pretreatment	Toxic, corrosive	2,000 cf
Lubricating oil	Various	Mechanical equipment lubrication	Toxic, combustible	25,000 gal
Mineral oil	Various	Transformer oil	Toxic, combustible	100,000 gal
Nitrogen	7727-37-9	Blanketing	Asphyxiant, compressed gas	400 lb
Sodium carbonate	497-19-8	Water pretreatment	Toxic	2,000 cf
Sulfur hexafluoride	TBD	Contained in switchgear devices	Toxic	200 lb
Sodium hydroxide (50% by weight)	1310-73-2	Possible water demineralizer media regeneration	Toxic, corrosive	3,000 gal
Sulfuric acid (29% by weight)	7664-93-9	Batteries	Toxic, corrosive	2,000 gal
Sulfuric acid (93% by weight)	7664-93-9	RO feed pH control, possibly water demineralizer media regeneration	Toxic, corrosive	5,000 gal

The project would produce maintenance and plant wastes typical of a power generation plant. These wastes would be managed in accordance with a waste management plan. Wastes may include oily rags, broken and rusted metal and machine parts, defective or broken solar mirrors and electrical materials, empty containers, and other miscellaneous solid wastes including the typical refuse generated by workers. These materials would be collected by a local waste disposal company and disposed at a landfill permitted to receive these wastes. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects, prevent leaks and spills, and prevent potential contact with stormwater.

Several methods would be used to properly manage and dispose of hazardous wastes generated by the project. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters would be disposed of in a Class I landfill. Workers would be trained to handle hazardous wastes generated at the site.

Chemical cleaning wastes would consist of alkaline and acid cleaning solutions used during pre-operational chemical cleaning of heat exchangers after the units are put into service. These wastes, which can contain elevated metal concentrations, would be temporarily stored on-site in portable tanks, and would be disposed of off-site by a chemical cleaning contractor in accordance with applicable regulatory requirements.

Industrial wastewater would consist of a relatively small amount of blowdown from the steam system and reverse osmosis treatment return flow. This wastewater would be disposed in evaporation ponds at the site. The ponds would be designed to hold the accumulated sludge/precipitated solids for the 33-year operational life of the facility. Pond cleanout is, therefore, not proposed as a regular part of maintenance activities; however, cleanout could be required to support unscheduled maintenance, repairs, or contingency responses. The general requirements for undertaking cleanout works for evaporation ponds are outlined below.

Before water could be pumped out of the pond for maintenance, the capacity of the other evaporation ponds would be assessed to verify that sufficient capacity exists to contain wastewater from continued operation for a sufficient amount of time to allow planned maintenance activities. Design estimates indicate that if one pond is undergoing cleanout activities, the additional two ponds could operate effectively for up to 1 year.

A manually placed pumping system would be used to transfer the water into an adjacent evaporation pond. Because the bases of the ponds would not be covered with a hard liner/protective layer, care must be taken with pump placement to avoid damaging the pond liners or transfer piping. During pond drainage, the flow rates from the pumps would be monitored to ensure that the outflow would not negatively affect the receiving evaporation pond.

Dust generated during the activities would be controlled through moisture conditioning, if needed. Wastewater would not be used as a dust suppression agent. Work would be conducted pursuant to the TSE site health and safety program and under a job-specific safety analysis.

Sludge removal activities would be conducted on an as-needed basis. The sludge would be removed by a pumping or vacuum system if fluid, or should be dried and removed using light excavation and loading equipment light enough to not damage the liner system. Ramps constructed of granular material at least 1 foot thick may be placed to serve as a working platform for equipment access, if necessary. The sludge would be sampled and analyzed to meet the characterization requirements of the receiving disposal facility because this would determine the transportation and disposal methodology.

A technical document would be submitted to NDEP to permit evaporation ponds for industrial wastewater disposal at the site. The document would include waste characterization, impoundment design, leak collection and detection, construction and operating parameters for the ponds, and closure requirements.

Direct Effects

Once the project were constructed, all hazardous materials would be stored in accordance with applicable regulations as listed in Section 3.13, and managed in accordance with the plans listed in Section 4.13.9. Operation of the facility would increase the risk of accidental spills; however, through implementation of the mitigation measures and proper housekeeping at the facility, no direct effects are likely to occur.

Indirect Effects

By implementing the required mitigation measures and plans, any potential for long-term effects are not likely to occur; therefore, no indirect effects are likely to occur from the operation and maintenance of the facility.

4.13.3 Alternative 1

The construction and operation of Alternative 1 would be the same as for the Proposed Action; therefore, Alternative 1 would have the same direct and indirect effects as the Proposed Action.

4.13.4 Alternative 2

The construction and operation of Alternative 2 would be the same as for the Proposed Action; therefore, Alternative 1 would have the same direct and indirect effects as the Proposed Action.

4.13.5 TL and Anaconda-Moly Substation Corridor

Construction of the TL would require that hazardous materials be transported and used along the 7- to 9-mile-long TL route. The main hazardous material during construction of the TL would be diesel and gasoline fuel for the construction trucks. The fuel would be stored in the trucks, and refueling would take place from the 10,000-gallon tank located at the temporary lay down area as described in Section 4.13.2.1.

Applicable plans would be implemented to minimize and clean any spills during the construction phase, as described in Section 4.13.9.

4.13.5.1 <u>Construction</u>

Direct Effects

The potential for minor spills, mainly vehicle and equipment fuel, would be present throughout the construction of the TL and substation; however, by implementation of the mitigation measures and proper housekeeping during the construction phase no direct effects are likely to occur.

Indirect Effects

By implementing the required mitigation measures and plans, any potential for long-term effects are not likely to occur; therefore, no indirect effects are likely to occur from construction of the TL and substation.

4.13.5.2 <u>Operation</u>

Once constructed, the TL would require only periodic inspections, which would be accomplished by a service vehicle using the adjacent maintenance road. No hazardous materials would be used for the periodic inspections, except vehicle fuel stored in the gas tank.

Direct Effects

Because of to the minimal amount of hazardous materials required during operation of the TL, no direct effects are likely to occur from construction of the TL.

Indirect Effects

No indirect effects are likely to occur during construction of the TL.

4.13.6 Borrow Pit

The borrow pit would be used only during parts of the construction phase, and would mainly require that diesel fuel and gasoline be available at the site for the construction vehicles and aggregate equipment. The fuel would be stored in accordance with applicable regulations, and the plans described in Section 4.13.9 would be implemented during operation of the pit.

The following subsections summarize the impacts of construction and operation of the borrow pit together because the borrow pit would be open only until the completion of construction of the generation facility.

Direct Effects

The potential for minor spills, mainly vehicle and equipment fuel, would be present throughout the operation of the borrow pit. However, through implementation of the mitigation measures and proper housekeeping during the construction phase, no direct effects are likely to occur.

Indirect Effects

By implementing the required mitigation measures and plans, any potential for long-term effects are not likely to occur; therefore, no Indirect effects are likely to occur from use of the borrow pit.

4.13.7 No Action Alternative

Under the No Action Alternative, no project-related impacts from hazardous materials would occur.

4.13.8 Summary of Impacts

- An increase of accidental hazardous material spills may occur.
- Larger spills may leek into the proposed facility’s groundwater well, affecting groundwater.

4.13.9 Mitigation

During facility construction, various hazardous materials and one regulated substance would be stored on-site. Construction service personnel would follow general industry health, safety, and environmental BMPs for filling and servicing construction equipment and vehicles. The BMPs are designed to reduce the potential for incidents involving hazardous materials. They include the following:

- Refueling and maintenance of vehicles and equipment would occur only in designated areas that are either bermed or covered with concrete, asphalt, or other impervious surfaces to control potential spills. Employees would be present during refueling activities.

- Vehicle and equipment service and maintenance would be conducted only by authorized personnel.
- Refueling would be conducted only with approved pumps, hoses, and nozzles.
- Catch-pans would be placed under equipment to catch potential spills during servicing.
- All disconnected hoses would be placed in containers to collect residual fuel from the hoses.
- Vehicle engines would be shut down during refueling.
- No smoking, open flames, or welding would be allowed in refueling or service areas.
- Refueling would be performed away from bodies of water to prevent contamination of water in the event of a leak or spill.
- When refueling is completed, the service truck would leave the project site.
- Service trucks would be provided with fire extinguishers and spill containment equipment, such as absorbents.
- Should a spill contaminate soil, the soil would be put in containers and disposed of as appropriate. All containers used to store hazardous materials would be inspected at least once per week for signs of leaking or failure. All maintenance and refueling areas would be inspected monthly. Results of inspections would be recorded in a logbook that would be kept on-site.

In the unlikely event of a spill, the spill may need to be reported to the appropriate regulatory agencies and cleanup of contaminated soil could be required. Small spills would be contained and cleaned up immediately by trained, on-site personnel. Larger spills would be reported by emergency phone numbers to obtain help from off-site containment and cleanup crews. All personnel working on the project during the construction phase would be trained in handling hazardous materials and the dangers associated with hazardous materials. An on-site health and safety person would be designated to implement health and safety measures. If there is a large spill from a service or refueling truck, contaminated soil would be placed into barrels or trucks by service personnel for off-site disposal at an appropriate facility in accordance with the law. If a spill involves hazardous materials quantities equal to or greater than the specific Reportable Quantity (42 gallons for petroleum products), all federal, state, and local reporting requirements would be followed. In the event of a fire or injury, the local fire department would be called.

In addition to these BMPs to address accidental hazardous materials releases, a construction site security plan would be prepared to address hazardous materials security and would include the following elements:

- descriptions of the site perimeter fencing and access security
- evacuation procedures
- a protocol for contacting law enforcement in the event of conduct endangering the facility, its employees, its contractors, or the public
- a site access protocol for contractors and vendors, including applicable personnel background checks consistent with state and federal law regarding security and privacy
- a protocol for hazardous materials vendors to prepare and implement security plans in accordance with 49 CFR 172.800 and to ensure that all hazardous materials drivers are in

compliance with personnel background security checks in accordance with 49 CFR Part 172, Subpart I

- a protocol for ensuring the security of nitrate salts in accordance with DHS measures to protect listed Chemicals of Interest (risk: theft) in accordance with 6 CFR Part 27

During facility operation, various hazardous materials and one regulated substance would be stored on-site as shown in Table 4-25. MSDS for the chemicals likely to occur on-site during operation of the proposed project can be found in the Plan of Development (Tonopah Solar Energy 2009).

During operation of the facility, all hazardous materials would be handled and stored in accordance with applicable codes and regulations specified in Section 3.13. Some general measures that would be implemented include:

- provision of an automatic sprinkler system for indoor hazardous material storage areas
- provision of an exhaust system for indoor hazardous material storage areas
- separation of incompatible materials by isolating them from each other with a noncombustible partition
- spill control in all storage, handling, and dispensing areas
- separate secondary containment for each chemical storage system; secondary containment is required to hold the entire contents of the tank plus the volume of water for the fire suppression system that could be used for fire protection for a period of 20 minutes in the event of a catastrophic spill

The above mitigation measures will be outlined in the following plans:

Health and Safety Requirements – To comply with regulations set forth by OSHA and the Nevada Division of Industrial Relations, health and safety programs would be established for construction and operations at the site that would document potential hazards and requirements for establishing and maintaining a safe working environment during construction and operation. The programs would include identification of all hazardous substances and chemicals used at the site, including MSDS, a communication and training program, labeling, and identification of hazards and safe work practices. In addition, safety showers and eyewashes would be provided adjacent to, or in the vicinity of, chemical storage and use areas. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored on-site for spill cleanup.

Construction and Operating SWPPPs – The project would comply with the requirements of the NPDES through preparation and implementation of a SWPPP and filing of an NOI to comply with the General Construction and General Industrial Stormwater NPDES permit. The plans would include procedures to be followed during construction to prevent erosion and sedimentation, non-stormwater discharges, and contact between stormwater and potentially polluting substances.

Hazardous Materials Management Plans (HMMPs) – HMMPs would be filed with Nye County for the construction and operation of the facility. The plans would inventory the hazardous materials and waste properties, quantities, storage containers and locations, and contingency planning and emergency response procedures.

SPCC Plans – SPCC Plans would be prepared for construction and operation of the site. The plans would include spill prevention and countermeasures procedures to be implemented, including (but not limited to) a spill record (if applicable), analysis of potential spills, description of containment facilities, fill and overfill prevention facilities, spill response procedures, personnel training, and spill prevention. In addition, all spills would be reported to the BLM Hazardous Materials Coordinator.

4.14 Range Resources

4.14.1 Methods

The environmental consequences of the proposed project on range resources were evaluated by reviewing the proposed activities associated with the project components and evaluating each of the range resources individually. The primary evaluation focused on the extent to which livestock grazing would be affected either because of the loss of forage production relative to the grazing allotment or by altering the grazing management within the allotment.

Project construction and operation activities would affect range resources (livestock grazing) if they:

- result in loss of forage such that it would adversely affect livestock operations and dramatically reduce the number of AUMs available
- substantially disrupt livestock movement and migration routes for wild horses
- substantially increase human disturbance/harassment to wild horses, burros, or livestock
- substantially conflict with the use of existing livestock grazing areas and HMAs for wild horses

Actual impacts to acreages of the allotment and forage production, and the resulting AUMs, would depend on the alternative selected and the final designs of the project. However, to address the potential for the loss of AUMs, BLM notified the permittee that the authorized grazing could be reduced to approximately 434,875 acres and 13,270 AUMs (a reduction of about 1.7 percent) because the permittee had requested a much larger area in the original ROW application. This number will be adjusted when the final alternative is selected and the ROW granted. The impacts of each of the alternatives are evaluated based on the acreage of impacts presented in Table 4-1 at the beginning of this chapter.

4.14.2 Proposed Action

4.14.2.1 <u>Construction</u>

The following section describes impacts to range resources that would occur as a result of constructing the Proposed Action.

Direct Effects

Construction of the generation facility under the Proposed Action would result in the long-term loss of approximately 1,500 acres of forage production and livestock grazing area, which amounts to 46 AUMs. This area would be within the security fence, inaccessible to cattle, and nearly all of the area would be disturbed for the construction of the heliostats and other facilities. The reduction in potential cattle production because of the loss of the AUMs from the generation facility is approximately 0.4 percent of the current authorized grazing level (reduction from 13,505 AUM to 13,453 AUM).

The proposed project would result in increased vehicle traffic on the existing SH 69 from US 95 to the proposed project site, with the greatest increase occurring during the construction period. Increased traffic on these roads may result in a minimal increase in the potential death or injury of cattle caused by vehicle collisions. The occurrence of these impacts is expected to be infrequent because of the low density of cattle in this large allotment and the speed limits currently established on these roads.

In cases where projects are proposed near water sources, or crossing traditional movement paths between grazing areas and water sources, substantial impacts to grazing and grazing management can occur. However, for this project, no natural or constructed water sources are known to occur in the vicinity of the Proposed Area. For these reasons, no impacts to water sources or associated movement patterns are expected.

Indirect Effects

Indirect effects on range resources from construction of the Proposed Action are likely to be limited to the areas adjacent to the construction area and would result from increased presence of humans and noise during construction, which may cause livestock to leave the vicinity of the construction areas. No impacts are likely to occur to water sources in the region; therefore, no reductions in water availability would occur. No additional potential indirect effects have been identified.

4.14.2.2 <u>Operation</u>

Direct Effects

Operation of the power generation facility is expected to have few direct effects on range resources other than the continued loss of forage production and grazing opportunities that are associated with construction of the facility.

Indirect Effects

Indirect effects of operations of the facility on range resources would continue to be the increased human presence in the area and the potential that livestock would avoid the area adjacent to the project area.

4.14.3 Alternative 1

4.14.3.1 **Construction**

Direct Effects

The direct effects of construction of Alternative 1 would be similar to the effects described for the Proposed Action. The total acreage removed as a result of construction of the facility would be 1,504 acres, and the grazing potential would be reduced by 46 AUMs. The reduction in potential cattle production attributable to the loss of the AUMs from the generation facility is approximately 0.4 percent of the current authorized grazing level (reduction from 13,505 AUM to 13,453 AUM).

Indirect Effects

The indirect effects of construction of Alternative 1 would be similar to the effects described for the Proposed Action.

4.14.3.2 **Operation**

Direct Effects

The direct effects of operation of Alternative 1 would be similar to the effects described for the Proposed Action.

Indirect Effects

The indirect effects of operation of Alternative 1 would be similar to the effects described for the Proposed Action.

4.14.4 Alternative 2

4.14.4.1 **Construction**

Direct Effects

The direct effects of construction of Alternative 2 facility be similar to the effects described for the Proposed Action. The total acreage removed as a result of construction of the facility would be 1,501 acres, and the grazing potential would be reduced by 46 AUMs. The reduction in potential cattle production attributable to the loss of the AUMs from the generation facility is approximately 0.4 percent of the current authorized grazing level (reduction from 13,505 AUM to 13,455 AUM).

Indirect Effects

The indirect effects of construction of Alternative 2 would be similar to the effects described for the Proposed Action.

4.14.4.2 **Operation**

Direct Effects

The direct effects of operation of Alternative 2 would be similar to the effects described for the Proposed Action.

Indirect Effects

The indirect effects of operation of Alternative 2 would be similar to the effects described for the Proposed Action.

4.14.5 TL and Anaconda-Moly Substation Corridor

This section describes the potential effects associated with the TL and substation that would be constructed if any of the three action alternatives are selected.

4.14.5.1 <u>Construction</u>

Direct Effects

Construction of the TL towers and the associated access pullouts from the existing power line road would result in between 127 and 173 acres of new disturbance and loss of forage production, which amounts to between 4 and 5 AUMs. The range of impacts associated with construction of the TL is attributable to the varying distances between the generation facilities and the substation, and thus the number of towers required. In addition to the long-term disturbance of grazing areas with the construction of the access spurs, some construction activities may result in only temporary disturbance of the vegetation. The type of disturbance would vary in nature, with some temporary disturbance requiring removal of vegetation and leveling of the ground surface, and others requiring only crushing or cutting of the vegetation. Temporary disturbance associated with the facility is expected to result in between 127 and 173 acres of disturbance, such as crushed or cut vegetation that would be able to recover after construction is complete. This disturbance would result in a temporary reduction in forage production for between 4 and 5 AUMs.

In cases where projects are proposed near water sources, or crossing traditional movement paths between grazing areas and water sources, substantial impacts to grazing and grazing management can occur. However, for this project, the TL does not appear to cross known movement paths nor is it near any water resources. The TL would not be fenced during construction; therefore, cattle movement would not be restricted.

No range improvements such as fences, gates, or cattle guards are present within the project area. Therefore, no impacts to range improvements are likely to result from the construction of the TL or substation.

The construction of the new TL and expanded substation would result in increased vehicle traffic along Pole Line Road, resulting in a potential increase in death or injury of cattle caused by vehicle collisions. The occurrence of these impacts is expected to be infrequent because of the low density of cattle in this large allotment and the low vehicle speeds associated with construction.

Indirect Effects

No indirect effects of the construction of the new TL are likely to occur on range resources.

4.14.5.2 Operation

Direct Effects

Operation of the TL may include occasional monitoring and maintenance of the transmission towers, which would include vehicle traffic on the existing access road. Vehicle traffic could result in death or injury of cattle resulting from collisions, but such accidents are unlikely because of the speed limits on the roads.

Indirect Effects

Operation of the TL and the substation is not anticipated to have indirect effects on range resources.

4.14.6 Borrow Pit

4.14.6.1 Construction

Direct Effects

Expansion of the borrow pit is anticipated to require approximately 40 acres of previously undisturbed area may be removed from forage production. The loss of this amount of area would equate to 1 AUM within the allotment. However, the subsequent reclamation of the area makes this impact temporary in nature. Expansion of the borrow pit would be conducted in accordance with BLM guidelines currently in place for the existing facility to prevent cattle from entering the facility and potentially being killed or injured. No other direct effects on range resources are anticipated.

Indirect Effects

No indirect effects on range resources are anticipated from construction of the borrow pit.

4.14.6.2 Operation

Direct Effects

No direct effects on range resources as a result of operation of the borrow pit are anticipated.

Indirect Effects

No indirect effects on range resources as a result of operation of the borrow pit are anticipated.

4.14.7 No Action Alternative

Under the No Action Alternative, impacts to range resources associated with this project would not occur.

4.14.8 Summary of Impacts

As stated in the previous sections, the primary effect on range resources resulting from implementation the Proposed Action or the other action alternatives would be the loss of forage production and the associated reduction in grazing. Table 4-26 presents the estimates of acreage to be lost to the construction of the Proposed Action and each alternative, as well as the estimated AUMs that would be lost. In each case, the number of AUMs is small relative to the current preference of 13,505 AUMs.

Table 4-26. Grazing acreage and AUM reductions attributable to project components and alternatives

Project Component/Alternative	Long-term Impact		Temporary Impact	
	Acreage	AUMs	Acreage	AUMs
Proposed Project Area				
Generation facility	1,500	46	52	2
Transmission line and substation	173	5	173	5
Borrow pit		0	40	1
Total	**1,673**	**52**	**265**	**3**
New Authorized Totals	**440,882**	**13,453**	**—**	**—**
Alternative 1				
Generation facility	1,504	46	52	2
Transmission line and substation	136	4	136	4
Borrow pit		0	40	1
Total	**1,640**	**50**	**228**	**7**
New Authorized Totals	**440,918**	**13,455**	**—**	**—**
Alternative 2				
Generation facility	1,501	46	52	2
Transmission line and substation	127	4	127	4
Borrow pit		0	40	1
Total	**1,628**	**50**	**219**	**7**
New Authorized Totals	**440,927**	**13,484**	**—**	**—**

Note: AUM = animal unit month

4.14.9 Mitigation

The project would be designed to minimize impacts where possible, and construction measures would be taken to reduce long-term impacts during construction of the facility and the TLs, such as blading only areas that are needed for long-term access. Mitigation of these impacts would include recontouring and revegetating the area after removal and decommissioning of the facility at the end of the lease period. Goals of the revegetation plan are to return the site to a condition of production of comparable type and volume of forage and to a sustainable ecological condition.

Mitigation for temporary impacts would vary by the type and severity of the impact. Impacts requiring removal of vegetation would be mitigated through revegetation efforts as described in the Revegetation Plan. These efforts may include salvage and subsequent redistribution of topsoil, distribution of seeds to promote reestablishment of native plants, and control of noxious and invasive weed species. Where possible, vegetation would be crushed to allow the necessary construction access, minimizing impacts to the vegetation and the soils. In other cases, plants may be cut to allow construction access, retaining a root stock to provide a base for resprouting and more rapid plant reestablishment.

4.15 Recreation and Wilderness

4.15.1 Methods

A recreation specialist analyzed the effects of the Proposed Action, Alternative 1, Alternative 2, the TL and Anaconda-Moly substation corridor, and the borrow pit on recreation and wilderness resources. To assess the direct effects on recreation and wilderness, GIS was used to overlay the footprints of the project components on the mapped recreation and wilderness resources within the proposed project area to identify those resources that would be directly affected by the project construction and operation (Figure 4-8).

4.15.2 Proposed Action

4.15.2.1 Construction

Direct Effects

The recreational opportunities identified in the project area are the Crescent Dunes ROW avoidance area (i.e., the SRMA), the TRAC-ON trail ride route, and Hunting Unit 173 (see Section 3.15). The Proposed Area does not encroach upon the Crescent Dunes ROW avoidance area; therefore, no effects to the ROW avoidance area are anticipated. The proposed project would affect the existing TRAC-ON trail ride route by building the facility over the existing trail. Construction of the solar facility would result in decreased scenic quality and increased traffic throughout the area, affecting recreational opportunities within the Crescent Dunes SRMA. Project construction would be visible from the Crescent Dunes SRMA, Crescent Dunes Road, and Pole Line Road (see Section 4.12). Construction of the solar facility may reduce a recreationist's sense of a remote experience.

The Proposed Action could directly affect hunting activities by removing approximately 1,500 acres of potential hunting grounds for pronghorn, mule deer, and bighorn sheep within Hunting Unit 173. However, during hunting season, pronghorn have an affinity for areas with water sources, most likely alfalfa fields (NDOW 2010c). Mule deer and bighorn sheep prefer more mountainous habitat (above 8,500 feet) (NDOW 2010a, 2010b). Because the Proposed Area is at a relatively low elevation (below 5,000 feet) and does not contain any water sources or alfalfa fields, it is unlikely that game species would utilize the project area during hunting season; therefore, no direct effects to hunting during construction activities are anticipated.

Indirect Effects

Construction of the Proposed Action would not impede access to the Crescent Dunes or optimal hunting areas (i.e., nearby mountains and water sources); therefore, no indirect effects to recreational opportunities are anticipated.

4.15.2.2 Operation

Direct Effects

As previously stated, the Proposed Action would not encroach upon the Crescent Dunes ROW avoidance area or optimal hunting areas; therefore, no direct impacts to recreational opportunities are associated with the operation of the Proposed Action. However, operation of the solar facility would result in decreased scenic quality and increased traffic throughout the area, affecting recreational opportunities within the Crescent Dunes SRMA. The project would be visible from the Crescent Dunes SRMA, Crescent Dunes Road, and Pole Line Road (see Section 4.12). The presence of the solar facility may detract from a recreationist's remote experience.

Indirect Effects

Operation of the proposed project would not impede access to the Crescent Dunes or optimal hunting areas (i.e., nearby mountains and water sources); therefore, no indirect impacts to recreational opportunities are anticipated.

4.15.3 Alternative 1

4.15.3.1 <u>Construction</u>

Direct Effects

Direct effects of construction of Alternative 1 would be similar to that of the Proposed Action except that construction of Alternative 1 would result in direct effects to approximately 130 acres of the Crescent Dunes ROW avoidance area (Figure 4-8). During construction, this area would fenced in, graded, and permanently converted into project facilities for the life of the project, thus restricting recreational access to that portion of the ROW avoidance area.

Similar to the Proposed Action, construction of Alternative 1 would remove approximately 1,504 acres of potential hunting grounds. However, as previously stated, this would have minimal impact on hunting activities because game animals would not likely be found in the Alternative 1 area during hunting season.

Indirect Effects

Construction of the proposed project would not impede access to the Crescent Dunes or optimal hunting areas (i.e., nearby mountains and water sources); therefore, no indirect effects to recreational opportunities are anticipated.

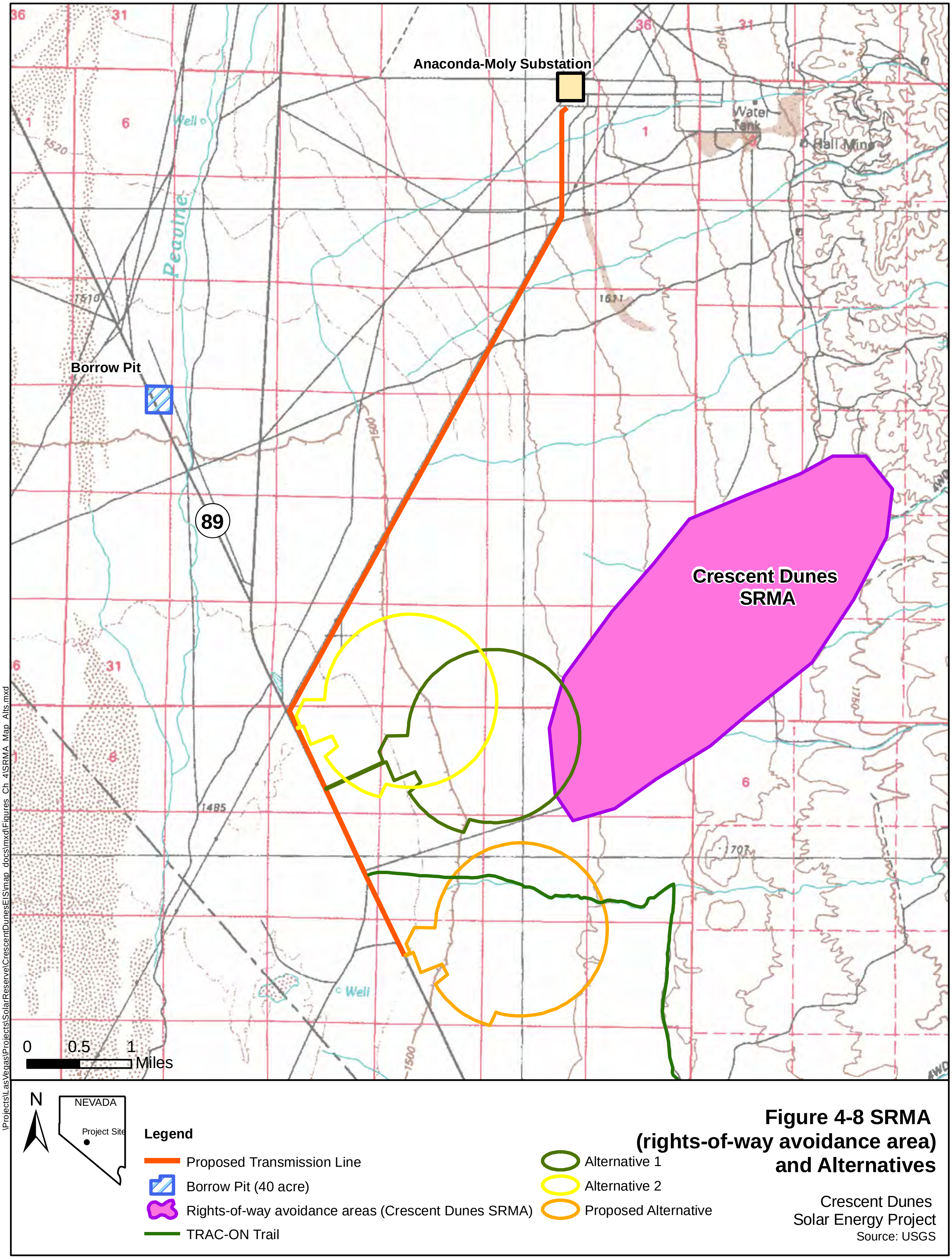

Figure 4-8 SRMA (rights-of-way avoidance area) and Alternatives

Crescent Dunes Solar Energy Project

Source: USGS

4.15.3.2 Operation

Direct Effects

Direct effects of operation of Alternative 1 would be similar to that of the Proposed Action except that approximately 130 acres of the Crescent Dunes ROW avoidance area and 1,504 acres of potential hunting grounds would be permanently converted into project facilities during construction; therefore, no direct impacts to recreation resources are associated with operation of the facility.

Indirect Effects

Operation of Alternative 1 would not impede access to the majority of the Crescent Dunes ROW avoidance areas (approximately 2,770 acres) or optimal hunting grounds; therefore, no indirect impacts to recreational resources are associated with operation of the facility.

4.15.4 Alternative 2

4.15.4.1 Construction

Direct Effects

Direct effects from construction of Alternative 2 would be similar to the Proposed Action in that this location would not affect the Crescent Dunes ROW avoidance areas, and construction of Alternative 2 would remove approximately 1,501 acres of potential hunting grounds in Hunting Unit 173. As previously stated, this would have minimal impact on hunting activities because game animals would not utilize the habitat in the Alternative 2 area during hunting season. Therefore, no direct effects on recreation are associated with the construction of Alternative 2.

Indirect Effects

Construction of Alternative 2 would not impede access to the Crescent Dunes or optimal hunting areas (i.e., nearby mountains and water sources); therefore, no indirect effects to recreational opportunities are anticipated.

4.15.4.2 Operation

Direct Effects

As previously stated, the project area would not encroach upon the Crescent Dune ROW avoidance area or optimal hunting areas; therefore, no direct impacts to recreational opportunities are associated with the operation of Alternative 2.

Indirect Effects

Operation of Alternative 1 would not impede access to the Crescent Dunes or optimal hunting areas (i.e., mountains and water sources); therefore, no indirect impacts to recreational opportunities are anticipated.

4.15.5 TL and Anaconda-Moly Substation Corridor

4.15.5.1 Construction

Direct Effects

Direct effects from construction of the TL and Anaconda-Moly substation would be similar to the Proposed Action in that this location would not affect the Crescent Dunes ROW avoidance areas or optimal hunting habitat; therefore, no effects to recreational resources are associated with the construction of the TL and Anaconda-Moly substation.

Indirect Effects

Construction of the TL and Anaconda-Moly substation corridor would not impede access to nearby recreational opportunities; therefore, no indirect effects to recreation are associated with construction of the TL and Anaconda-Moly substation.

4.15.5.2 Operation

Direct Effects

Direct effects from operation of the TL and Anaconda-Moly substation would be similar to the Proposed Action in that this location would not affect the Crescent Dunes ROW avoidance areas or optimal hunting habitat; therefore, no effects to recreational resources are associated with operation of the TL and Anaconda-Moly substation.

Indirect Effects

Operation of the TL and Anaconda-Moly substation corridor would not impede access to nearby recreational opportunities (i.e., Crescent Dunes or optimal hunting grounds); therefore, no indirect effects to recreation are associated with operation of the TL and Anaconda-Moly substation.

4.15.6 Borrow Pit

4.15.6.1 Construction

Direct Effects

Direct effects from construction of the borrow pit would be similar to the Proposed Action in that this location would not affect the Crescent Dunes ROW avoidance areas. Construction of the borrow pit would remove approximately 40 acres of potential hunting grounds within Hunting Units 171 and 173. As previously stated, this would have minimal impact on hunting activities because game animals would not utilize the habitat in the borrow pit area during hunting season. Therefore, no direct effects on recreation are associated with the construction of the borrow pit.

Indirect Effects

Construction of the borrow pit would not impede access to nearby recreational or wilderness opportunities; therefore, no indirect effects are associated with construction of the borrow pit.

4.15.6.2 Operation

Direct Effects

Direct effects from operation of the borrow pit would be similar to the Proposed Action in that this location would not affect the Crescent Dunes ROW avoidance areas or optimal hunting habitat; therefore, no effects to recreational resources are associated with operation of the borrow pit.

Indirect Effects

Operation of the borrow pit would not impede access to nearby recreational opportunities (i.e., Crescent Dunes or optimal hunting grounds); therefore, no indirect effects are associated with construction of the borrow pit.

4.15.7 No Action Alternative

Under the No Action Alternative, no project-related impacts to existing recreation or wilderness would occur.

4.15.8 Summary of Impacts

As stated in the previous sections, the primary effect on recreation and wilderness resources of the proposed project or the other action alternatives would be the loss approximately 1,652–1,673 acres of BLM land that is currently used for recreational activities such as hunting. Additionally, Alternative 1 would affect approximately 130 acres of the SRMA, which is currently used primarily as an off-road vehicle use area.

4.15.9 Mitigation

The TRAC-ON Trail ride route would be affected only by the Proposed Action. If the Proposed Action is selected as the BLM-preferred alternative; then the TRAC-ON Trail ride route would need to be rerouted around the project area. Two possible new routes include: rerouting the trail to the north of the project where it would intersect with the Crescent Dunes access road, or rerouting the trial to the south of the project where it would intersect with Pole Line Road.

4.16 Unavoidable Adverse Environmental Impacts

Unavoidable adverse impacts are those impacts that would occur after implementation of all committed and recommended mitigation. Unavoidable impacts do not include temporary or permanent impacts that would be mitigated by the actions of the project. They also do not include impacts from speculative events such as hazardous waste spills that are not contained and removed promptly in accordance with accepted industry standards or regulatory requirements.

The Proponent has committed to implementing mitigation measures in the project design to avoid or minimize potential impacts from construction and operation of the proposed project. However, unavoidable adverse impacts would result from the project. The proposed project would result in the unavoidable removal of vegetation, wildlife habitat, and grazing potential within the portions of the project area proposed for construction of the generation facility, borrow pit, and the TL towers.

However, these impacts would be reversed with revegetation and reclamation of the site upon decommissioning of the facility. Individuals of various wildlife species within the proposed project area that may not be able to move from the area would be killed during construction of the proposed project.

The aesthetic nature of the area would be unavoidably altered as a result of the proposed project, although efforts would be made to minimize the impact. The structures associated with the generation facility would alter the viewshed until the facility is decommissioned and removed.

If additional mitigation requirements are identified through other permitting processes, the Proponent would develop appropriate measures in consultation with the requesting agency and include these in the project design.

4.17 Irreversible and Irretrievable Commitment of Resources

This section describes the irreversible and irretrievable commitments of resources associated with construction and operation of the proposed project. A commitment of resources is irreversible when primary or secondary impacts limit the future options for a resource. The term applies primarily to the effects or use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over very long periods of time.

Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. For example, livestock forage production from an area is lost while an area is serving as a mining area. The production lost is irretrievable, but the action is not irreversible. If the use changes and the mine is reclaimed, it is possible to resume forage production. Irreversible and irretrievable impacts of the Proposed Action are summarized in Table 4-27.

Implementation of the proposed project would result in the consumption of energy as it relates to the fuel needed for construction-related activities. Large amounts of gasoline and diesel petroleum products would be required for project construction. Additionally, construction would require the manufacture of new materials, some of which would not be recyclable at the end of the lifetime of the proposed project. The raw materials and energy required for the production of these materials would also result in an irretrievable commitment of natural resources. Operation of the proposed project would not cause a substantial increase in the consumption or use of nonrenewable resources.

Construction and operation of the proposed project would require the use of a limited amount of hazardous materials such as fuel, lubricants, and cleaning solvents. All hazardous materials would be stored, handled, and used in accordance with BMPs and applicable federal, state, and local regulations, including a construction-phase SWPPP and an operational phase SWPPP. Assuming appropriate implementation of these plans and practices as recommended in the conditions of certification, potential degradation of the environment attributable to accidental spills associated with the proposed project's use of hazardous materials would not occur.

Table 4-27. Irreversible and irretrievable commitment of resources by the Proposed Action

Resource	Irreversible?	Irretrievable?	Commitments Explanation
Vegetation resources	No	Yes	Approximately 1,628–1,673 acres of land would be committed for the life of the project, but could be reclaimed upon decommissioning.
Wildlife resources	No	Yes	A total of 1,628–1,673 acres of wildlife habitat would be lost to development of the facility, but could be reclaimed upon decommissioning.
Special status species	No	Yes	Habitat and an undetermined sum of individuals
Water quality and quantity	No	Yes	Water that is removed from the aquifer and used in the operations would not be available for other uses.
Wetlands, riparian zones, and waters of the United States	No	No	No wetlands, riparian zones, or waters of the United States are present in the project area.
Hazardous materials	No	No	No irreversible or irretrievable commitment of resources or impact is anticipated. However, if a spill were to affect a sensitive resource, an irretrievable impact could occur pending the recovery of the resource.
Air quality	No	No	Emissions from the project would not deteriorate the existing air quality of the air quality management area.
Cultural resources	Yes	No	Cultural resources would be documented and mitigated
Land use and access	No	Yes	Approximately 1,628–1,673 acres would be committed to the proposed project, which would not be available for other land uses or access within that area. The area would be available for other land uses and access upon decommissioning and reclamation of the area.
Geology, minerals, paleontology	Yes	Yes	Mineral resources that are mined from the borrow pit (aggregate, sands, other construction materials) would no longer be available for future production. Impacts to paleontological resources (if present) would be irreversible.
Soils	No	No	Soils excavated from the borrow pit or the generation site would be salvaged and stockpiled for future use in reclamation.
Social, economic	No	No	No socioeconomic resources would be irreversibly or irretrievably committed to this project.
Environmental justice	No	No	No environmental justice populations would be affected by the project; therefore, no associated resources would be committed.
Noise	No	No	Noise is not considered irreversible because it would cease when construction and operation of the facility cease.
Visual resources	No	Yes	Impacts to visual resources would result from construction/operation of the facilities. Successful reclamation procedures at the end would return the visual continuity. However, because of the extended time required for the desert to recover to the point of such disturbances being unnoticeable, the commitment could be deemed irreversible.
Range resources	No	Yes	Temporary loss of 50–52 animal unit months throughout the life of the project, but reclamation of the facility after decommissioning would return the site to previous production levels.
Recreation/ wilderness	No	Yes	Approximately 1,628–1,673 acres of lands potentially used for recreation would be committed to the project, but the lands would be available upon decommissioning of the area.
Transportation/ traffic	No	No	No commitment of resources associated with transportation would occur.

4.18 Relationship between Short-Term Uses and Long-Term Productivity of the Environment

NEPA requires consideration of the relationship between short-term uses and long-term productivity of the environment (40 CFR 1502.16). This section discusses the short-term use of the local environment and the maintenance and enhancement of long-term productivity as a result of construction and operation of the proposed project.

For the purposes of this discussion, "short-term" is defined as the period from the onset of construction activities through the initiation of project operation. "Long-term" is defined as the entire operational life of the solar energy plant, which is anticipated to be 3 years of construction and 30 years or more of operation.

4.18.1 Short-Term Uses

The proposed short-term uses of the natural environment associated with the Proposed Action are the development of about 1,628–1,673 acres of land for the proposed solar power plant and ancillary facilities, the borrow pit, and TL; the consumptive use of approximately 800 AFY of groundwater over a 30-month construction period; and the direct loss of localized vegetation and wildlife resources. Short-term effects on the natural environment would result from land-clearing and construction activities. These would be related primarily to soil disturbance and air quality effects from site clearing and grading, and an increase in noise and traffic in the local area.

Short-term effects on social and economic resources would be beneficial and would include an increase in revenue for some local businesses such as construction suppliers, hotels, restaurants, gas stations, and grocery stores.

4.18.2 Long-Term Productivity of the Environment

The long-term productivity of the areas affected by the proposed project would depend on the effectiveness of the decommissioning and revegetation efforts that would be implemented in the project area. A reclamation plan would include recontouring the site after the facility is removed and redistributing topsoil prior to revegetating the site. Because of the low precipitation and relatively brief growing season in this high desert, reestablishing a fully functioning and productive ecosystem would take time. Long-term effects to resources important to Native Americans would include visual effects.

4.19 Cumulative Impacts

4.19.1 Actions Considered for Cumulative Analysis

The CEQ regulations for implementing NEPA define cumulative effects as:

> "… the impact on the environment which results from the incremental impact of the action [project] when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

> Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7)

Past, present, and reasonably foreseeable future actions will be identified for the geographic and temporal scope for the resources considered in the cumulative effects analysis.

4.19.2 Regulations and Guidance

Cumulative effects may result from actions that include current and projected area development, management activities and authorizations on public land, land use trends, and applicable industrial/infrastructure components. Although the individual impacts of each separate project may not be significant, the additive effects of multiple projects could be. These past, present, and reasonably foreseeable future actions are analyzed to the extent that "they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal for action and its alternatives may have an additive and significant relationship to those effects."

4.19.3 Methodology for Assessing Cumulative Impacts

The principles for cumulative effects analysis identified by CEQ—*Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997)—have gained acceptance for use. These principles are based on the premise that resources, ecosystems, and the human community each can experience effects. For each of these, there are thresholds, or levels, of stress beyond which their desired conditions degrade.

Each affected resource, ecosystem, or human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own geographic and temporal parameters. Appropriate cumulative effects analyses focus on what is needed to ensure long-term productivity or sustainability of the resource.

Information about past, present, and reasonably foreseeable future activities in the CESA were gathered from BLM, Nye County, and other agencies; land use plans; and personal communications with public agency representatives.

The approach to cumulative impacts of the proposed project considers "past" projects to be those that have completed construction and are in operation. These projects are included in the environmental baseline, described in the affected environment portion of each resource area. Since the impact analysis in each resource area assesses impacts in terms of changes to existing environmental conditions, past projects are not separately addressed in the cumulative analysis. "Present" projects include those that are currently under construction or have been fully permitted such that they are likely to be part of the existing environment when the proposed project has begun construction.

"Reasonably foreseeable" future projects are those for which a formal application has been filed and substantive progress has been made to move the projects forward. The working definition of "reasonably foreseeable" projects on BLM land is based on whether or not a draft or final Plan of Development has been filed with BLM by an applicant. The projects specifically considered in the cumulative scenario for this project include other solar power projects and mining projects proposed on public land managed by BLM.

4.19.4 Past and Present Actions

CEQ NEPA regulations and guidance on cumulative effects do not require development of a catalog of specific past actions or quantification of these actions in a cumulative effects analysis, and CEQ recognizes that this may not be practical and the information may not be available (40 CFR 1500–1508; and CEQ 2005). Therefore, description or quantification of individual past actions is typically not performed. However, past actions are considered collectively in describing the current health of each resource.

Present actions are actions that are ongoing at the time of the analysis and are described individually.

4.19.5 Reasonable Foreseeable Future Actions

Reasonably foreseeable future actions are those for which there are existing decisions, funding, formal proposals, or which are highly probable based on known opportunities or trends (BLM 2008a). When identifying reasonably foreseeable future actions for the cumulative effects analysis, reasonably foreseeable actions will include those actions within the geographic and temporal scope that meet one of more of the following criteria:

- The action is included in an adopted long-range or comprehensive plan.
- The action is included in an existing proposal, such as a submitted permit application.
- The action has a commitment of resources, such as funding.
- If the action is federal, the NEPA process has been initiated.

In addition to these criteria, BLM considered the cumulative effects area for each resource area. BLM identified the resource with the largest CESA, which is socioeconomics (50-mile radius). Even though the cumulative area for other resources is substantially smaller, BLM determined that projects within 50 miles could potentially affect socioeconomics and/or environmental justice (Table 4-28).

Sierra Geothermal Power is proposing development of a geothermal energy facility in the southernmost portion of the Big Smoky Valley, approximately 15 miles north of Silver Peak, in Esmeralda County. This project is proposed on approximately 9,660 acres of lands managed by BLM. The project is approximately 25 miles from the proposed project, but is within the southern extent of the Big Smoky groundwater subbasin.

Indeck Energy Services, LLC, has proposed development of a 20 MW solar energy project on 150 acres of lands that would be leased from Nye County at the Tonopah Airport, which is located approximately 8 miles east of the town of Tonopah. The proposed project would be located approximately 13 miles from the project site.

Iberdrola Solar has proposed development of a 30 MW photovoltaic solar energy project on approximately 200 acres of lands to be leased from Nye County at the Tonopah Airport. The airport is approximately 8 miles east of the town of Tonopah, which is approximately 13 miles from the project site.

Nye County has proposed development of a new TL from the Tonopah Airport, east of the town of Tonopah, in Nye County. The 3-mile-long TL would connect renewable energy projects proposed at the airport and an existing line along SH 6. The project is approximately 13 miles from the proposed project site.

Midway Gold Corporation has proposed expanded exploration and future development of a mine approximately 20 miles east the project area. The project is east of the San Antone Mountains.

Tonopah Solar Energy, LLC, may consider purchasing the lands on which the project is being constructed subsequent to the ROW lease.

Tonopah Solar Energy, LLC, may consider continuing operation of the plant for an additional 20-year period, thereby extending the total project lifetime to 50 years. If the project will operate for an additional 20 years, the identified direct, indirect, and cumulative effects would also continue for 20 years.

Table 4-28. Reasonable and foreseeable future projects

Project Name	Project Proponent/ BLM Applicant	Location (County)	Description	Size (Acres)
Alum Site – Geothermal Exploration	Sierra Geothermal Power, Corp.	15 miles north of Silver Peak, 25 miles from project, southern extent of Big Smoky Valley (Esmeralda County)	Geothermal exploration for a potential geothermal energy facility. In 2010 plan. Exploration continuing.	9,660
Tonopah Airport Transmission Line	Nye County	Transmission line from Tonopah Airport to the existing transmission line along State Highway 6 (3 miles) (Nye County)	Development of 3 miles of power transmission line from airport to existing transmission line along State Highway 6. Planning stages.	TBD
Tonopah Airport Solar Project – Indeck	Indeck	Tonopah Airport, 8 miles east of Tonopah on State Highway 6 (Nye County)	Develop up to 20 MW of solar energy on airport property. Lease agreement signed with Nye County.	150
Tonopah Airport Solar Project – Iberdrola	Iberdrola Solar	Tonopah Airport, 8 miles east of Tonopah (Nye County)	Develop 10–30 MW of photovoltaic power on airport property. Planning stage for a potential lease agreement with Nye County for a 10–30 MW photovoltaic facility.	200
Midway Exploration Project (Mining)	Midway Gold Corporation	15 miles north of Tonopah; 20 miles from project over San Antone Mountains; at State Highway 376 and Belmont Road, Ralston Valley (Nye County)	Proposed expanded exploration and development of an underground mine. BLM's 2009 planning schedule indicated this project is on hold pending evaluation of water treatment options. No mention in the 2010 planning schedule.	TBD
Crescent Dunes Solar Energy Project (Disposal)	Tonopah Solar Energy	Current project	Tonopah Solar Energy may propose to purchase the land after construction of the facility is completed.	1,700

Notes: BLM = Bureau of Land Management; MW = megawatt; TBD = to be determined

4.19.6 Cumulative Impacts, by Resource

Vegetation

At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Wildlife

At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Special Status Species (Plants)
At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Special Status Species (Wildlife)
At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Water and Water Quality
Of the potential impacts identified, increased runoff and sediment transport are expected to have a potential cumulative effect. If ground surface disturbances in the surrounding watershed or adjacent areas have occurred in the past, are currently occurring, or will occur in the future attributable to activities unrelated to the proposed project (i.e., recreational vehicle use), cumulative impacts related to the project could occur within the CESA.

Air Quality
At this time, there are insufficient data on the reasonably foreseeable future projects in the CESA to adequately perform an impact analysis (data are not available specifically on air quality emissions from these projects). If any of the listed projects were constructed during the same period as the Crescent Dunes Solar Energy Project, there may be an increase in dust emissions within the CESA.

Cultural Resources
At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Land Use and Access
At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. However, if at the end of the 30-year lease term the land is made available by BLM for purchase, TSE may purchase the land, and it would be converted to permanent private ownership. BLM would not have control over any reclamation of the land, and it would be removed from public use.

Social and Economics
It is likely that development of this project—combined with development of reasonably foreseeable future projects—may have impacts on socioeconomics in the CESA. To date, insufficient information is available on the reasonably foreseeable future projects to make such an impact analysis and determine the potential cumulative effects.

Visual Resources

The cumulative area, or viewshed, is defined as the area wherein the project facilities, including the solar field and TLs, are visible. The viewshed has an approximate radius of 10 miles in any direction from the project site. The proposed project would not be a dominant visual feature beyond 5 miles, and views beyond 10 miles of the project would be very difficult to discern. No other projects exist within the 10-mile radius of this project; therefore, this project would not contribute to any visual cumulative impacts.

Hazardous Materials

At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Range Resources

At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

Recreation and Wilderness

At this time, there are no known or reasonably foreseeable future projects within the CESA that would create a cumulative effect. Therefore, the proposed Crescent Dunes Solar Energy Project is unlikely to have impacts that would combine cumulatively with other related past, present, and reasonably foreseeable future projects.

5.0 Consultation and Coordination

This chapter summarizes the consultation and coordination activities conducted with interested agencies, organizations, tribes, and individuals for the proposed Crescent Dunes Solar Energy Project. The primary goal of the NEPA public involvement process is to ensure that all interested and affected parties are aware of the proposed project. For the purposes of public involvement, the NEPA process is divided into two phases: the scoping period and the Draft EIS review period. The scoping period includes the initial presentation of the proposed project to the public and opportunities for the public and agency representatives to provide comments on the proposed project. The Draft EIS review period presents the public with opportunities to comment on the document. More information on these phases is presented in the sections below

5.1 Public Involvement Process

5.1.1 Scoping

The *Federal Register* NOI was published on November 24, 2009, marking the beginning of the scoping period for the project. The scoping period ended on December 24, 2009. This period fulfilled the BLM minimum requirement of a 30-day scoping period.

Announcements for the public scoping meetings were published in a variety of local newspapers (see Table 5-1). Additionally, scoping meeting dates, times, and locations were posted on the BLM TFP Web site (BLM 2010b). A public service announcement was also made on News 88.9 KNPR Nevada Public Radio on November 24, 2009.

Public meetings are required when there is a substantial "environmental controversy concerning the proposed action or substantial interest in holding the [meeting]" or when there is a "request for a hearing by another agency with jurisdiction over the action" (40 CFR 1506.6). Public scoping meetings locations, dates, and number of attendees are provided in Table 5-1. In accordance with BLM requirements, sign-in sheets were provided and attendees were encouraged to sign in.

Table 5-1. Public meeting information

Meeting Location	Date	Number of Attendees
Tonopah Convention Center 301 Brougher Ave Tonopah, Nevada	Thursday, December 17, 2009	42
BLM Southern Nevada District Office 4701 N. Torrey Pines Drive Las Vegas, Nevada	Friday, December 18, 2009	6

Note: All meetings were held from 6–8 p.m.

5.1.2 Final Environmental Impact Statement

Members of the public, agencies, organizations, tribes, and jurisdictions will be provided an opportunity to comment on the Draft EIS.

Upon receipt and consideration of the public comments on the DEIS, the BLM TFO will publish the FEIS. Concurrently, the BLM TFO may publish a ROD and authorize the ROW applications. The ROD would identify the selected alternative for the proposed project.

5.2 Formal Consultation with Interested Agencies and Tribal Government

Formal consultation was initiated by the BLM TFO in November 2009, when the project information was relayed to five tribes and various other family members known to have interests in the Tonopah and/or Big Smoky Valley areas. Consultation letters were subsequently distributed to the tribes, requesting their respective input on the project.

The BLM TFO conducted a site visit with the Timbisha on April 7, 2010. Present at the meeting were representatives of the Timbisha: Barbara Durham (Tribal Historic Preservation Office), Grace Goad, Pauline Esteves, Ed Esteves, Madeline Esteves, and Ted James. BLM was represented by TFO Manager Thomas Seley, TFO Archaeologist Scott Stadler, and Susan Rigby. The BLM Battle Mountain District Office was represented by Renewable Energy Coordination Office Manager Timothy Coward, Wendy Seley of Lands and Realty, and William Coyle of GIS. The Timbisha representatives were given a brief overview of the project and its alternative areas, followed by a site visit to the project area.

BLM conducted a second field trip and meeting with the Yomba Shoshone Tribe on July 12, 2010. The Yomba Shoshone Tribe was represented by Teola Brady, and Ester Birchim. Attendees from BLM included TFO Manager Thomas Seley, and TFO Archaeologist Susan Rigby. The Battle Mountain District Office was represented by Renewable Energy Coordination Office Manager Timothy Coward, and Battle Mountain District Office Native American Coordinator Gerald Dixon.

5.3 List of Agencies, Organizations, and Persons to Whom Copies of the Environmental Impact Statement Were Sent

5.3.1 Federal Government

- BLM
- Mojave South – Great Basin Resource Advisory Council
- NRCS
- U.S. Air Force, 98th Range Wing, Nellis Air Force Base (98th RANW/XPL)
- U.S. Air Force (HQ-USAF/LEEV) Environmental Division
- U.S. Army Corps of Engineers
- U.S. Army Corps of Engineers, Regulatory Section
- U.S. Department of Energy, Office of Environmental Compliance (EH-23)
- EPA
- EPA, Region IX

- USFWS
- U.S. Air Force, Office of the Deputy A/S Environment, Safety, Occupational Health
- U.S. Department of Agriculture, Humboldt Toiyabe National Forest
- U.S. Department of the Interior, Bureau of Reclamation, Denver Federal Center (D-150)
- U.S. Department of the Interior, Geological Survey, Environmental Affairs Program
- U.S. Department of the Interior, National Park Service (2310), Division of Environmental Quality
- U.S. Department of the Interior, Natural Resources Library
- U.S. Department of the Interior, Office of Environmental Policy and Compliance

5.3.2 State Government

- Nevada Outdoor Recreation Association
- NDOW
- NDOT
- NDEP, Bureau of Air Pollution Control
- NDEP, Bureau of Mining Regulation and Reclamation
- NDEP, Bureau of Waste Management
- Nevada Division of Minerals
- Nevada Legislature
- Nevada SHPO
- State of Nevada/Department/Administration State Clearinghouse
- Wild Horse Commission

5.3.3 Local Government

- Nye County Environmental Department
- Tonopah Chamber of Commerce
- Tonopah Public Utilities
- Tonopah Town Board
- Town of Manhattan
- Town of Round Mountain

5.3.4 Tribal Government

- Ely Shoshone Tribe
- Duckwater Shoshone Tribe
- Timbisha Shoshone Tribe
- Yomba Shoshone Tribe

5.3.5 Other Organizations

- Earthworks
- Friends of Nevada Wilderness
- Great Basin Resource Watch

- High Country Hay
- Lahontan Audubon Society
- Nevada Cattlemen's Association
- Nevada Miner's & Prospector's Association
- Nevada Mining Association
- Nevada Wilderness Project
- Sierra Club
- Nevada Wildlife
- Truckee River Ranches
- Western Mining Action Project
- Western Watersheds Project

5.3.6 Elected Government Officials

- Joni Eastley, Nye County Commissioner
- Lorinda Wichman, Nye County Commissioner
- Nancy Boland, Esmeralda County Commissioner
- John Ensign, U.S. Senator
- Ed Goedhart, Assemblyman
- Jim Gibbons, Governor
- Dean Heller, U.S. Congressman
- Harry Reid, U.S. Senator

5.3.7 Availability

Copies of the Crescent Dunes Solar Energy Project EIS are available for public review at the following public libraries and BLM offices:

Tonopah Library
167 South Central Street
Tonopah, NV 89049

The Beatty Library District
400 North Fourth Street
PO Box 129
Beatty, NV 89003-0129

BLM Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

BLM Tonopah Field Office
1553 South Main Street
Tonopah, NV 89049

6.0 List of Preparers and Reviewers

Table 6-1. List of BLM Reviewers.

Resource/Responsibility	BLM Team Member	Degree and Experience	BLM Office Location
BLM Project Lead, National Environmental Policy Act Compliance Lead	Dave Davis	BS Forest Resources & Conservation, Wildlife, Range 30+ years experience	Battle Mountain District Office
Native American Traditional Values	Gerald Dixon	BS Cultural Anthropology 14 years experience	Battle Mountain District Office
Hydrology - Water Quality (Surface and Ground) and Water Use	Jon Sherve	MS Hydrology/Hydrogeology BA Biological Sciences 16 years experience	Battle Mountain District Office
	Tom Olsen	PhD Geology, Engineering, MS, BS Geology 28 years experience	Nevada State Office
Recreation/VRM/Wilderness	Barb Kelleher	BS Recreation 20 + years experience	Nevada State Office
Floodplains/Wetlands/Riparian	Robert Hassmiller	BS Resource Conservation (emphasis in Terrestrial Systems and Hydrology) 5 years experience	Battle Mountain District Office
Hazmat	Daniel Tecca	BS Chemistry 19 years experience	Battle Mountain District Office
Migratory Birds, Wildlife, Threatened and Endangered Species (Plants and Animals), Special Status Species	Susan Cooper	MS Zoology 10 years experience	Mount Lewis Field Office
Access and Land Use	Wendy Seley	BA Business Management (emphasis Outdoor Recreation) 25 years experience	Battle Mountain District Office (RECO)
GIS	William Coyle	MS GIS/Cartography BS Park and Resource Management 1 year experience	Battle Mountain District Office (RECO)
Project Manager	Timothy Coward	31 years project management experience	Battle Mountain District Office (RECO)

Resource/Responsibility	BLM Team Member	Degree and Experience	BLM Office Location
Cultural Resources, Paleontological Resources, Native American Traditional Values	Scott Stadler	MS Anthropology 18 years experience	Tonopah Field Office
	Susan Rigby	MA Anthropology BS Biology BS Geology 16 years experience	Tonopah Field Office
Migratory Birds, Wildlife, Threatened and Endangered Species (Plants and Animals), Special Status Species	Devin Englestead		Tonopah Field Office
Minerals	Alan Buehler	BS Geology 30 years experience	Tonopah Field Office
	Duane Bays	MS Environmental Science BS Environmental Science BS Geology 9 years experience	Tonopah Field Office
Range	Sheryl Post	BS Range Science 15 years experience	Tonopah Field Office
Noxious Weeds, Invasive, Non-native species	Sheryl Post	BS Range Science 15 years experience	Tonopah Field Office
Vegetation	Sheryl Post	BS Range Science 15 years experience	Tonopah Field Office
	Marc Pointel	BS Range Science/ Wildlife Science 35 years experience	Tonopah Field Office
Threatened and Endangered Species (Plants), Special Status Species	Marc Pointel	BS Range Science/ Wildlife Science 35 years experience	Tonopah Field Office
Soils	Marc Pointel	BS Range Science/ Wildlife Science 35 years experience	Tonopah Field Office
Wild Horse and Burros	Dustin Hollowell	BS Forestry, Wildlife Mgmt MS Range/Wildlife Science	Tonopah Field Office
Renewable Energy Coordinator	Erin Eastvedt	J.D. (Law) 1 year experience	Nevada State Office
Planning and Environmental Coordinator	Brian Amme	BA Cultural Anthropology 22 years experience	Nevada State Office
Hydrologist	Sarah Peterson	MS Hydrology 11 years experience	Nevada State Office
State Lead Travel Management	Leo Drumm	BS Recreation 31 years experience	Nevada State Office

Table 6-2. Environmental Impact Statement Contractor and Subcontractors

Role/Responsibility	Name/Firm	Degree(S)	Years of Exp.
Project Manager, NEPA Compliance, Hazardous Materials/Waste	Henrik Christensen HDR	B.S. Environmental Mgmt	20
Assistant Project Manager, Vegetation, Wildlife, Special Status Species, Visual, Recreation and Wilderness	Stephanie Locke HDR	M.S. Biology B.S. Biology	6
Range Resources, Biological Resources	Danny Rakestraw HDR	M.S. Wildlife Ecology B.S. Wildlife Ecology	21
Land Use, Recreation	Sherri McMahon HDR	M.A. Business Admin/Mgmt	19
GIS Support	Preston Kessinger HDR	B.S. Geography	11
Environmental Justice	Audrey Unger HDR	MEP. Environmental Policy and Management B.S. Environmental Sciences/Studies	8
Geology, Soils, Paleontology	Gregg Mitchell HDR	B.S. Environmental Technology A.A. Liberal Arts/Sciences	22
Air Quality, Noise	Dustin Watson HDR	MEP Environmental Sciences/Studies BS Planning	19
Socio/Economic Resources	Amy Edwards HDR	M.S. Civil Engineering B.S. Civil Engineering	19
Water Resources, Wetlands/Riparian Habitats	Scott Mars HDR	M.S. Environmental Engineering B.S. Environmental Engineering	22
Transportation/Traffic	Laycee Kolkman, PE HDR	M.S. Civil Engineering B.S. Civil Engineering	7
Visual Resources	Pam Cecere HDR	M.S. Community/Reg. Planning B.A. Political Science/Government	6
Cultural Resources	Marc Brodbeck HDR	M.A. Anthropology B.A. Anthropology	24
Native American Consultation	Ginny Bengston Bengston Consulting	M.A Anthropology B.S. Anthropology	21

Table 6-3. Technical Studies and Design Contractor(s)

Role/Responsibility	Name/Firm	Degree(S)	Years of Exp.
Engineering Manager, Project Description, Figures	Bob Anders, WorleyParsons	B.S. Civil Engineering	26
Environmental Manager	Deborah Builder, WorleyParsons	J.D. Law M.S. Environmental Studies B.S. Biology	12
Groundwater Resources - impact evaluation preparation and technical peer review	Mike Tietze, WorleyParsons	B.S. Geology	26
Air Quality Review	Joel Reisman, WorleyParsons	M.S. Mechanical Engineering B.S. Mechanical Engineering	42 total; 30 in air quality
Wastewater Plan which included design of the evaporation ponds	Janine Forrest, WorleyParsons	B.S. Environmental Engineering	7
Groundwater modeling, GER report review, GER work planning assistance	Dennis Jamison, WorleyParsons	M.S. Engineering Science B.S. Geology	31
Groundwater modeling, GER report review, GER work planning assistance	Andie Gehlhausen, WorleyParsons	B.A. Geology, M.S. Hydrogeology,	7
Groundwater Basin Profile	Miles Kenney, WorleyParsons	B.S. Geological Science & Chemistry Ph.D Geological Sciences	20
Civil Engineer re: Site Design (survey coordination, drainage design, grading design, roadways and utilities, etc.)	Dave Alcoa, WorleyParsons	B.S. Engineering M.S. Civil Engineering Professional licenses in NV & CA	45
Project Manager - Test Well Program	Ed Baquerizo	B.S. Environmental Biology M.S. Water Resource Engineering	25
Senior Technical Specialist	Richard Antoline	B.S. Chemical Engineering	10

Table 6-4. Project Proponent(s)

Role/Responsibility	Name/Firm	Degree(S)	Years of Exp.
Project Director	Rob Howe SolarReserve	B.S. Mechanical Engineering; B.S Foreign Service M. A. International Economics	22
Consultant (former Project Director)	Julie Way SolarReserve (consultant)	B.S. Mechanical Engineering; M.B.A.	25

Role/Responsibility	Name/Firm	Degree(S)	Years of Exp.
Senior Engineer (Technical/System Review Air Quality Review)	Charles Diep SolarReserve	B.S. Chemical Engineering P.E. Mechanical Engineering	21
Project Engineer	David De Andrade SolarReserve	M.S. Electrical Engineering; P.E. license in Control Systems (registered in CA)	7.5
Project Engineer	Scott Kaminski SolarReserve	B.S. Human Resources Management	25
Development Manager	Vaughan Johnson SolarReserve	B.S. Civil Engineering; P.E. license in Civil Engineering (registered in NJ, CA)	13
VP Development	Tom Georgis SolarReserve	B.A. International Studies; M.B.A.	20

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8.0 Glossary

Acre-foot: A unit commonly used for measuring the volume of water; equal to the quantity of water required to cover one acre (43,560 square feet or 4,047 square meters) to a depth of 1 foot (0.30 meter) and equal to 43,560 cubic feet (1,234 cubic meters), or 325,851 gallons.

Action: In the context of the National Environmental Policy Act (NEPA), describes activities proposed to meet a specific purpose and need and that may have effects on the environment, which are potentially subject to Federal control and responsibility. Federal actions generally fall into the categories of adoption of official policy, formal plans, and programs; or approval of specific projects. For this document, the term action applies to this specific project.

Affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air quality: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Allotment:A unit of land suitable and available for livestock grazing that is managed as one grazing unit.

Alluvium: A general term for clay, silt, sand, gravel, or similar consolidated material deposited during comparatively recent geologic time by a stream or other body of running water in the bed of the stream, river, or floodplain, or as a cone or fan at the base of a mountain slope.

Alternative: Any one of a number of options for a project.

Ambient: The surrounding natural conditions (or environment) in a given place and time, most commonly applied to air quality and noise.

American Indian tribe (or tribe): Any American Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Animal Unit Month: Grazing of a 1,000 pound cow with suckling calf for 1 month (or equivalent metabolic weight of other kinds of livestock).

Angle of Incidence: The angle that a ray of sun makes with a line perpendicular to the surface.

Aquifer: A water-bearing rock unit (unconsolidated or bedrock) that will yield water in a usable quantity to a well or spring.

Archaeological site: A discrete location that provides physical evidence of past human use.

Archaeology: The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

Area of Critical Environmental Concern (ACEC): A Bureau of Land Management (BLM) designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards.

A-Weighted Sound Levels: Decibels (referenced to 20 micro-Pascals) as measured with an Aweighting network of a standard sound level meter, abbreviated dB(A).

Background (visual): That portion of the visual landscape lying from the outer limit of the middleground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis here is primarily concerned with the two-dimensional shape of landforms against the sky.

Base Load: The average amount of electric power that a utility must supply in any period.

Baseline: The existing conditions against which impacts of the proposed action and its alternatives can be compared.

Basin: A depressed area having no surface outlet (topographic basin); a physiographic feature or subsurface structure that is capable of collecting, storing, or discharging water by reason of its shape and the characteristics of its confining material (water); a depression in the earth's surface, the lowest part often filled by a lake or pond (lake basin); a part of a river or canal widened (drainage, river, stream basin).

Best Management Practices (BMPs): A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes and help to protect the environmental resources by avoiding or minimizing impacts of an action.

Borrow: Earth material, such as sand or gravel, which has been taken from one location to be used as at another location.

Borrow Pit: An excavated area from which borrow has been obtained.

Clean Air Act of 1990: Federal legislation governing air pollution. The Clean Air Act established National Ambient Air Quality Standards for carbon monoxide, nitrogen oxide, ozone, particulate matter, sulfur dioxide, and lead. Prevention of Significant Deterioration classifications define the allowable increased levels of air quality deterioration above legally established levels and include the following:

Class I – minimal additional deterioration in air quality (certain national parks and wilderness areas).

Class II – moderate additional deterioration in air quality (most lands)

Class III – greater deterioration for planned maximum growth (industrial areas)

Clean Water Act of 1987: National environmental law enforced by the U.S. Environmental Protection Agency that regulates water pollution.

Code of Federal Regulations: The compilation of federal regulations adopted by federal agencies through a rule-making process.

Cone of Depression: The depression of groundwater levels around a pumping well caused by the withdrawal of water.

Cooperating Agency: Assists the lead Federal agency in developing an environmental assessment or environmental impact statement. The Council on Environmental Quality regulations implementing NEPA define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any Federal, state, or local government jurisdiction with such qualification may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ): An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effort on environmental studies, and advises the President on environmental matters.

Cultural resources: Remains of human activity, occupation, or endeavor as reflected in districts, sites, buildings, objects, artifacts, ruins, works of art, architecture, and natural features important in human events.

Cumulative effect (or impact): The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. Cumulative impacts are evaluated as part of the environmental impact statement (EIS), and may include consideration of additive or interactive effects regardless of what agency or person undertakes the other actions.

Decibel: A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the A-weighted decibel, a frequency-weighted noise unit, is widely used. The A-weighted decibel scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

Discharge: Outflow of surface water from a stream or canal (water). Discharge from an industrial facility that may contain pollutants harmful to fish or animals if it is released into nearby water bodies usually requires a permit issued by the U.S. Environmental Protection Agency and is monitored.

Distance zone: A visibility threshold distance where visual perception changes. They usually are defined as foreground, middleground, and background.

Drainage: The natural channel through which water flows some time of the year; natural and artificial means for affecting discharge of water as by a system of surface and subsurface passages.

Drawdown: The lowering of the water level in a well as a result of withdrawal; the reduction in groundwater level at a point caused by the withdrawal of water from an aquifer.

Easement: A right afforded a person, agency, or organization to make limited use of another's real property for access or other purposes.

Ecology: The relationship between living organisms and their environment.

Effect (or impact): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An effect may be direct, indirect, or cumulative. The terms effect and impact are synonymous under the NEPA. A direct effect is caused by an action and occurs at the same time and same place (40 CFR 1508.8(a)). An indirect effect is caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Electrical grid: An integrated system of electricity distribution, usually covering a large area.

Emission: Effluent discharged into the atmosphere, usually specified by mass per unit time, and considered when analyzing air quality.

Endangered Species: Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act; Any species in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act of 1973: The Endangered Species Act requires Federal agencies to seek to conserve threatened and endangered species, use applicable authorities in furtherance of the purposes of the Endangered Species Act, and avoid jeopardizing the continued existence of any species that is listed or proposed for listing as threatened and endangered or destroying or adversely modifying its designated or proposed critical habitat. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service are responsible for administration of this act.

Environment: The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Impact Statement (EIS): A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies (see Executive Order 12898).

Ephemeral wash or stream: A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and that has a channel bottom that is always above the local water table.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as "gravitation creep."

Eutectic: A single chemical composition that solidifies at a lower temperature than any other composition.

Federal Register: Published by the Office of the Federal Register, National Archives and Records Administration, the Federal Register is the official daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as executive orders and other presidential documents.

Floodplain: That portion of a river or stream valley, adjacent to a river channel, that is built of sediments and is inundated with water when the stream overflows its banks.

Fluid Minerals: A BLM regulatory and legal term used to denote petroleum and natural gas resources.

Foreground: The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Fossil: Any remains, trace, or imprint of a plant or animal that has been preserved by natural processes in the earth's crust since some past geologic time.

Geographic information system: A system of computer hardware, software, data, people and applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information.

Geology: The science that relates to the earth, the rocks of which it is composed, and the changes that the earth has undergone or is undergoing.

Global warming: An increase in the average temperature of the earth's atmosphere and oceans. The term also is used to describe the theory that increasing temperatures are the result of a strengthening greenhouse effect caused primarily by manmade increases in carbon dioxide and other greenhouse gases.

Groundwater: Subsurface water that fills available openings in rock or soil materials to the extent that they are considered saturated.

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, group of species, or large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Heliostat: A mirror that reflects solar rays onto a central receiver. A heliostat automatically adjusts its position to track daily or seasonal changes in the sun's position. The arrangement of heliostats around a central receiver is also called a solar collector field or array.

Hydrology: The study of the movement, distribution, and quality of water throughout the earth, addresses both the hydrologic cycle and water resources.

Impact (or effect): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An impact may be direct, indirect, or cumulative. The terms effect and impact are synonymous under NEPA.

Indirect effect (or impact): Secondary effects that occur in locations other than the initial action or later in time, but that are caused by the proposed action.

Infrastructure: The facilities, services, and equipment needed for a community or facility to function, such as and including roads, sewers, water lines, and electric lines.

Insolation: The solar power density incident on a surface of stated area and orientation, usually expressed as Watts per square meter or Btu per square foot per hour.

Invasive species: Describes a large number of nonnative plant species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Irretrievable: Applies primarily to the lost production of renewable natural resources during the life of the project.

Irreversible: Applies primarily to the use of nonrenewable resources, such as minerals, cultural resources, wetlands, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Key Observation Point: An observer position on a travel route used to determine visible area.

Kilowatt (kW): A standard unit of electrical power equal to 1000 watts, or to the energy consumption at a rate of 1000 joules per second.

Kilowatt-Hour (kWh): 1,000 thousand watts acting over a period of 1 hour. The kWh is a unit of energy. 1 kWh=3600 kJ.

Labor force: All persons 16 years of age or over who are either employed or unemployed and actively looking for a job.

Land use plan: A plan or document developed by a government entity that outlines specific functions, uses, or management-related activities of an area, and may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use.

Landform: A term used to describe the many land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Landscape: An area composed of interacting ecosystems that are repeated because of geology, landform, soils, climate, biota, and human influences throughout the area. Landscapes are generally of a size, shape, and pattern, which are determined by interacting ecosystems.

Lease: An authorization or contract by which one party (lessor) conveys the use of property toanother (lessee) in return for rental payments. In cases of resource production, lessees pay royalties to the lessor in addition to rental payments.

LEQ: The equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels, over a specified monitoring period.

Megawatt (MW): A unit for measuring power equal to 1,000 kilowatts, or 1 million watts. The productive capacity of electrical generators is measured in megawatts.

Mineral resources: Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Minimal (impact): Unless otherwise specified, "minimal" shall mean non-deleterious impacts that are measurable on the short term.

Mitigation: The abatement or reduction of an impact on the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, (5) replacing or providing substitute resources to the environment, or (6) gathering data (e.g., archaeological or paleontological) prior to disturbance.

Molten salt: A heat transfer medium found inside the central receiver. Can be heated up to 1,200°F. Molten salt is primarily used due to the fact that it can remain heated for a long period of time, even after the sun has set.

Multi-Use: Land use where a combination of use types can be found in close proximity together: commercial, residential, public, industrial, etc.

National Ambient Air Quality Standards: The allowable concentrations of air pollutants in the air specified by the Federal government. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare) from any unknown or expected adverse effects of air pollutants.

National Environmental Policy Act of 1969 (NEPA): An Act that establishes policy, sets goals, and provides means for carrying out the environmental protection policy of the Nation. In accordance with NEPA, all Federal agencies must prepare a written statement on the environmental impacts of a proposed action. The provisions to ensure that Federal agencies act according to the letter and spirit of NEPA are in the CEQ regulations for implementing NEPA (43 CFR 1500-1508).

National Pollutant Discharge Elimination System: As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal and other facilities must obtain permits if their discharges go directly to surface waters of the United States. These permits are referred to as NPDES permits and are administered by the USEPA.

National Register of Historic Places: A listing, maintained by the Secretary of the Interior, of districts, sites, buildings, structures, and objects worthy of preservation. To be eligible a property must normally be at least 50 years old, unless it has exceptional significance, and have national, State, or local significance in American history, architecture, archaeology, engineering, or culture; and possess integrity of location, design, setting, material, workmanship, feeling, and association; and (a) be associated with events that have made a significant contribution to the broad patterns of history, (b) be associated with the lives of persons significant in our past, or (c) embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction; or (d) have yielded, or may be likely to yield, information important to prehistory or history.

Native American Graves Protection and Repatriation Act: A Federal law passed in 1990 that provides a process for museums and Federal agencies to return certain Native American cultural items -- human remains, funerary objects, sacred objects, or objects of cultural patrimony -- to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations.

Negligible (impact): Unless otherwise specified, “negligible” shall mean impacts of such a small scale such as to be non-measurable.

Nevada Administrative Code:The text of the regulations implementing the laws passed by the Nevada legislature.

Nevada Revised Statutes:The text of laws passed by the Nevada legislature.

Noise Emission: The industry standard format of sound power level, which is the total acoustic power radiated from a given sound source as relates to a reference power level of 10 picowatts. Sound power level differs from sound pressure level, which quantifies the fluctuations in air pressure caused by acoustic energy.

Noise Level Measurements: Unless otherwise indicated, the use of A-weighted and "slow" response of a noise monitoring instrument complying with at least Type 2 requirements as defined by the latest revision of American National Standard Institute (ANSI) S1.4 Specification for Sound Level Meters.

Nonattainment area: An air quality control region (or portion thereof) in which the U.S. Environmental Protection Agency has determined that ambient air concentrations exceed national ambient air quality standards for one or more criteria pollutants.

Noxious weed: Nonnative plant species that negatively impact crops, native plant communities, and/or management of natural or agricultural systems. Noxious weeds are officially designated by a number of states (including Nevada) and Federal agencies.

Particulates: Minute, separate particles, such as dust or other air pollutants.

Perennial stream: A stream or that part of a stream that flows continuously during all of the calendar year as a result of groundwater discharge or surface runoff.

Perennial yield: The amount of usable water from a groundwater aquifer that can be withdrawn economically and consumed each year for an indefinite period of time. It cannot exceed the natural recharge to that aquifer and ultimately is limited to maximum amount of discharge that can be used for beneficial use.

Playa: The shallow central lake basin of a desert plain, in which water gathers after a rain and is evaporated.

Public land: Land or interest in land owned by the United States and administered through the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf, and land held in trust for the benefit of American Indians, Aleuts, and Eskimos.

Range: A large, open area of land over which livestock can wander and graze.

Rare: A plant or animal of limited distribution and/or abundance. May be locally abundant in a limited area or few in number over a wide area.

Recharge: Replenishment of a groundwater reservoir (aquifer) by the addition of water, through either natural or artificial means.

Reclamation: Restoration of land disturbed by natural or human activity (e.g., mining, pipeline construction) to original contour, use, or condition. Also describes the return of land to alternative uses that may, under certain circumstances, be different from those prior to disturbance.

Recontouring: Return a surface to or near to its original form through some type of action such as grading.

Record of Decision: A document separate from, but associated with, an EIS that publicly and officially discloses the responsible official’s decision on a proposed action.

Region of Influence: Area which is impacted by activities related to the project. Varies by species and activity.

Revegetation: The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.

Reverse osmosis: A separation process that uses pressure to force a solvent through a membrane that retains the solute on one side and allows the pure solvent to pass to the other side. More formally, it is the process of forcing a solvent from a region of high solute concentration through a membrane to a region of low solute concentration by applying a pressure in excess of the osmotic pressure.

Right-of-way: Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, such as a road or utility.

Riparian: Situated on or pertaining to the bank of a river, stream, or other body of water. Riparian is normally used to refer to plants of all types that grow along streams, rivers, or at spring and seep sites.

Rural: Sparsely settled places away from the influence of large cities and towns. Such areas are distinct from more intensively settled urban and suburban areas, and also from unsettled lands such as outback or wilderness. People tend to live in villages, on farms, and in other isolated houses on large plots of land.

Scoping: The process open to the public early in the preparation of an EIS for determining the scope of issues related to a proposed action and identifying significant issues to be addressed in an EIS.

Sediment: Particulate matter that can be transported by fluid flow, and which eventually is deposited; Material suspended in or settling to the bottom of a liquid. Sediment input comes from natural sources, such as soil erosion and rock weathering, construction activities, or anthropogenic sources, such as forestry or agricultural practices.

Sediment Load: The amount of sediment (sand, silt, and fine particles) carried by a stream or river.

Sedimentation: The result when soil or mineral is transported by moving water, wind, gravity, or glaciers and deposited in streams or other bodies of water, or on land. Also, letting solids settle out of wastewater by gravity during treatment.

Sensitive receptor: In terms of noise, people or animals that may hear a noise or be sensitive to increased noise levels within their range of hearing.

Sensitive Receptor Location: A location of regulatory compliance where particular sensitivities to noise exist, such as residential areas, institutions, hospitals, parks, or other environmentally sensitive areas.

Sensitivity: The state of being readily affected by the actions of external influence.

Special Development Area: sets aside public or private areas of special interest that would be subject to a specific plan of development or a Development Agreement in accordance with Nye County Code Title 16.32. SDA is a mixed-use designation and a variety of land uses might be proposed for approval, such as the Yucca Mountain Project Gateway Area Concept Plan, and projects under review by the Bureau of Land Management, such as the Solar Energy Facilities. A property owner/developer must provide a specific plan of development for the subject property and obtain recommendations from the Planning Committee and the Town Advisory Board prior to Nye County Commission approval.

Solar Energy: Electromagnetic energy transmitted from the sun (solar radiation). The amount that reaches the earth is equal to one billionth of total solar energy generated, or the equivalent of about 420 trillion kilowatt-hours.

Solar power tower: A solar energy conversion system that uses a large field of independently adjustable mirrors(heliostats) to focus solar rays on a near single point atop a fixed tower (receiver). The concentrated energy may be used to directly heat the working fluid of a Rankine cycle engine or to heat an intermediary thermal storage medium (such as a molten salt).

Sound Pressure Level (SPL): The observable effect of acoustic energy radiation, quantifying the sound level as perceivable by the receiver. When Sound Pressure is used to describe a noise source, the distance between source and receiver must be known in order to yield useful information about the power rating of the source.

Solar Thermal Electric Systems: Solar energy conversion technologies that convert solar energy to electricity by heating a working fluid to power a turbine that drives a generator. Examples of these systems include central receiver systems, parabolic dish, and solar trough.

Special status species: Wildlife and plant species either federally listed or proposed for listing as endangered or threatened; state-listed; or priority species of concern to Federal agencies or tribes.

Species:A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed producing fertile offspring.

Sound power Level (PWL): A specialized analytical metric used to fully quantify the acoustic energy emitted by a source which is considered a complete value without the accompanying information on the position of measurement relative to the source. It may be used to calculate the sound pressure level at any desired distance away from the source.

Surface water: All bodies of water on the surface of the earth and open to the atmosphere such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Surfactant: Any substance that when dissolved in water or an aqueous solution reduces its surface tension or the interfacial tension between it and another liquid.

Terrain: Used to describe the geophysiographic characteristics of land in terms of elevation, slope, and orientation.

Thermal storage: Storage of heated material for later heating or generation of steam for power production, potentially at night.

Threatened Species: Any species of plant or animal that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Animal or plant species that are listed under the Federal Endangered Species Act of 1973, as amended (federally listed), or under similar state laws (statelisted).

Total dissolved solids: A term that describes the quantity of dissolved material in a sample of water.

Traditional cultural places: These named places (landscape features) comprise the cultural landscape that provides the context for evaluating specific traditional cultural properties.

Transmissivity: The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Tribe: Any Indian tribe, band, group, or community having a governing body recognized by the Secretary of Interior.

Vegetation community or association: Species of plants that commonly live together in the same region or ecotone.

Visibility: The distance to which an observer can distinguish objects from their background. The determinants of visibility include the characteristics of the target object (shape, size, color, pattern), the angle and intensity of sunlight, the observer's eyesight, and any screening present between the viewer and the object (i.e., vegetation, landform, even pollution such as regional haze).

Visual resource management classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes, each of which has an objective that prescribes the amount of change allowed in the characteristic landscape.

Waters of the United States: All water bodies that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including adjacent wetlands and tributaries; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Watershed: All land and water within the confines of a drainage.

Well field: Area containing one or more wells that produce usable amounts of water or oil.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples of wetlands include marshes, shallow swamps, lakeshores, wet meadows, estuaries, and riparian areas.

Wilderness: An area formally designated by Congress as part of the National Wilderness Preservation System.